Munich Cancer Registry

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- *Deutsch*

ICD-10 C18: Colon cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	40,203
Diseases	41,105
Creation date	12/20/2021
Database export	12/20/2021
Population	4.95 m

Munich Cancer Registry
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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

Index of figures and tables

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, December 2021

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.65 million to 4.10 in 2002, and to 4.69 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

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

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

INCIDENCE

Table 1

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

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	1278	89	7.0	12.3	11.5	80.6	97.9
1999	1208	98	8.1	13.0	11.3	80.9	97.4
2000	1095	83	7.6	13.5	11.2	79.1	97.2
2001	1222	110	9.0	13.6	11.1	77.6	98.0
2002	2048	295	14.4	13.1	10.9	79.5	97.5 #
2003	2080	243	11.7	13.4	10.6	76.7	97.7
2004	2054	197	9.6	13.4	10.3	76.2	97.9
2005	1939	176	9.1	14.1	10.1	76.5	97.1
2006	1984	131	6.6	14.4	9.7	72.1	95.5
2007	2179	166	7.6	14.5	9.3	70.3	94.0 #
2008	2220	151	6.8	14.8	8.8	68.6	98.5
2009	2201	127	5.8	15.2	8.3	66.7	98.5
2010	2003	140	7.0	15.5	7.7	64.9	97.9
2011	1943	126	6.5	15.9	7.2	63.6	98.2
2012	1944	126	6.5	16.1	6.7	60.0	98.0
2013	1994	118	5.9	16.5	6.4	57.3	98.2
2014	1934	118	6.1	16.7	6.0	57.1	97.5
2015	1905	106	5.6	17.0	5.6	54.4	97.5
2016	1927	98	5.1	17.2	5.0	49.2	99.2
2017	1985	130	6.5	17.3	4.4	42.6	99.3
2018	1601	65	4.1	17.7	3.7	33.5	99.5
2019	1355	8	0.6	17.8	2.9	26.3	99.8
2020	1006			17.9	2.3	17.5	99.6 ##
1998-2020	41105	2901	7.1	17.9	11.5	63.0	97.8

41,105 cases diagnosed 1998-2020 are related to a total of 40,203 patients. Currently, in 11,603 (28.9 %) of these 40,203 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 9,028 / 1,981 / 594 (22.5 % / 4.9 % / 1.5 %) 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 1,601 cases has been diagnosed, of which 17.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.7 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

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

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	611	47.8	32	5.2	12.8	13.4	80.5	99.2
1999	584	48.3	37	6.3	12.8	13.2	81.7	98.1
2000	529	48.3	23	4.3	13.1	13.0	77.5	97.7
2001	606	49.6	36	5.9	13.0	12.9	77.1	98.0
2002	1029	50.2	130	12.6	12.6	12.6	79.4	98.3 #
2003	1066	51.3	91	8.5	13.0	12.3	77.6	98.6
2004	1058	51.5	70	6.6	13.4	11.9	78.4	98.3
2005	985	50.8	74	7.5	14.2	11.6	76.9	97.3
2006	1026	51.7	47	4.6	14.8	11.3	73.3	96.1
2007	1143	52.5	68	5.9	15.1	10.7	71.5	94.2 #
2008	1180	53.2	62	5.3	15.6	10.2	70.1	98.7
2009	1177	53.5	60	5.1	16.1	9.6	66.7	98.6
2010	1064	53.1	51	4.8	16.5	8.9	64.9	97.7
2011	1005	51.7	45	4.5	17.0	8.3	62.8	98.1
2012	1021	52.5	51	5.0	17.3	7.9	60.5	98.3
2013	1088	54.6	41	3.8	17.7	7.4	58.0	97.8
2014	1049	54.2	55	5.2	18.0	7.0	58.5	98.3
2015	1006	52.8	46	4.6	18.3	6.4	54.6	97.7
2016	1050	54.5	34	3.2	18.4	5.8	49.7	99.1
2017	1063	53.6	58	5.5	18.7	4.9	42.6	99.4
2018	820	51.2	24	2.9	19.0	4.2	34.3	99.4
2019	737	54.4	4	0.5	19.1	3.4	27.7	99.9
2020	553	55.0			19.2	2.7	19.3	99.5 ##
1998-2020	21450	52.2	1139	5.3	19.2	13.4	63.2	98.1

21,450 cases diagnosed 1998-2020 are related to a total of 20,900 patients. Currently, in 6,675 (31.9 %) of these 20,900 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 5,105 / 1,177 / 393 (24.4 % / 5.6 % / 1.9 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 820 cases has been diagnosed, of which 19.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.2 % 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	667	52.2	57	8.5	11.8	9.5	80.7	96.7	
1999	624	51.7	61	9.8	13.2	9.4	80.1	96.6	
2000	566	51.7	60	10.6	13.9	9.3	80.6	96.6	
2001	616	50.4	74	12.0	14.1	9.1	78.1	98.1	
2002	1019	49.8	165	16.2	13.6	9.0	79.6	96.7	#
2003	1014	48.8	152	15.0	13.7	8.8	75.7	96.8	
2004	996	48.5	127	12.8	13.5	8.6	73.8	97.5	
2005	954	49.2	102	10.7	13.9	8.4	76.2	96.9	
2006	958	48.3	84	8.8	13.9	8.0	70.9	94.8	
2007	1036	47.5	98	9.5	13.8	7.7	68.9	93.7	#
2008	1040	46.8	89	8.6	14.0	7.3	66.8	98.3	
2009	1024	46.5	67	6.5	14.3	6.8	66.6	98.5	
2010	939	46.9	89	9.5	14.5	6.4	64.7	98.1	
2011	938	48.3	81	8.6	14.7	6.0	64.5	98.3	
2012	923	47.5	75	8.1	14.8	5.4	59.5	97.7	
2013	906	45.4	77	8.5	15.1	5.1	56.4	98.7	
2014	885	45.8	63	7.1	15.3	5.0	55.4	96.5	
2015	899	47.2	60	6.7	15.6	4.6	54.3	97.3	
2016	877	45.5	64	7.3	15.8	4.1	48.7	99.2	
2017	922	46.4	72	7.8	15.9	3.8	42.6	99.2	
2018	781	48.8	41	5.2	16.2	3.2	32.7	99.6	
2019	618	45.6	4	0.6	16.3	2.4	24.6	99.7	
2020	453	45.0			16.4	1.9	15.2	99.8	##
1998-2020	19655	47.8	1762	9.0	16.4	9.5	62.7	97.5	

19,655 cases diagnosed 1998-2020 are related to a total of 19,303 patients. Currently, in 4,928 (25.5 %) of these 19,303 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 3,923 / 804 / 201 (20.3 % / 4.2 % / 1.0 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 781 cases has been diagnosed, of which 16.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.2 % 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 4.94 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	611	667	55.1	56.7	32.8	23.6	50.1	35.9	66.7	47.6
1999	584	624	52.2	52.6	30.6	21.6	47.0	32.9	63.6	43.4
2000	529	566	46.4	47.1	26.9	19.1	41.3	29.3	54.9	38.6
2001	606	616	52.3	50.6	30.3	20.4	46.1	31.3	59.6	41.9
2002	1029	1019	55.2	52.0	30.1	20.4	46.4	31.1	62.6	41.2
2003	1066	1014	56.9	51.5	30.5	20.1	46.7	30.8	62.4	40.7
2004	1058	996	56.2	50.4	29.2	20.0	45.0	30.2	60.8	39.5
2005	985	954	52.0	47.9	26.8	18.0	40.9	27.6	54.7	36.8
2006	1026	958	53.6	47.7	27.5	18.8	41.9	28.4	55.7	37.6
2007	1143	1036	51.6	44.9	26.4	17.5	39.7	26.3	53.0	34.6
2008	1180	1040	53.0	44.8	25.8	17.2	39.8	26.1	53.1	34.1
2009	1177	1024	52.7	44.0	25.4	16.3	38.6	24.8	51.7	33.3
2010	1064	939	47.2	40.1	22.4	14.6	34.1	22.3	45.7	29.8
2011	1005	938	44.9	40.1	20.9	15.0	32.0	22.8	42.9	29.9
2012	1021	923	45.0	39.1	21.1	15.3	31.9	22.4	41.9	29.4
2013	1088	906	47.3	38.0	21.3	14.6	32.5	21.6	43.7	28.2
2014	1049	885	45.0	36.8	20.2	14.1	30.8	21.0	40.9	27.2
2015	1006	899	42.3	36.9	19.3	13.9	29.1	20.7	38.2	27.0
2016	1050	877	43.7	35.7	20.2	13.4	30.1	20.0	39.6	26.1
2017	1063	922	44.1	37.4	19.3	14.6	29.3	21.3	39.1	27.6
2018	820	781	33.7	31.5	14.9	12.1	22.5	17.9	29.5	23.0
2019	737	618	30.3	24.9	14.0	9.9	20.7	14.3	26.7	18.5
2020	553	453	22.7	18.2	10.6	7.1	15.6	10.3	20.1	13.6
1998–2020	21450	19655	46.1	40.7	22.4	15.7	33.8	23.5	44.7	30.9

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	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	1278	70.8	12.3	13.2	98.1	54.7	62.1	72.2	79.6	86.2
1999	1208	71.3	12.5	20.2	101	55.3	63.2	72.7	79.8	86.6
2000	1095	71.3	12.0	24.7	103	56.2	62.6	72.7	79.5	86.8
2001	1222	71.2	12.4	30.8	103	55.8	62.7	71.8	80.5	87.2
2002	2048	72.1	12.2	17.7	101	56.4	63.7	73.5	81.1	87.5
2003	2080	72.1	11.7	8.4	99.4	57.2	64.3	72.8	80.8	87.0
2004	2054	71.9	12.2	13.8	101	56.4	64.3	73.0	81.0	86.8
2005	1939	72.6	12.3	15.1	99.9	57.2	65.2	73.7	81.8	87.0
2006	1984	71.6	12.0	17.9	102	55.6	64.2	72.4	80.7	85.7
2007	2179	71.5	12.8	13.4	103	54.7	64.5	72.6	81.0	86.3
2008	2220	72.3	12.4	18.9	105	56.3	65.3	73.1	81.6	87.2
2009	2201	72.4	12.3	12.4	99.1	56.4	65.3	73.3	81.3	86.9
2010	2003	72.6	12.4	14.9	101	56.0	65.4	73.9	81.8	86.9
2011	1943	72.6	12.6	15.5	101	55.9	64.9	74.0	82.0	87.4
2012	1944	72.2	13.1	9.7	101	55.9	65.0	73.9	81.7	87.0
2013	1994	72.4	13.0	15.7	105	54.5	65.4	74.1	81.7	87.2
2014	1934	72.3	13.2	15.8	103	53.8	65.2	74.5	81.6	87.5
2015	1905	72.2	13.2	11.4	101	53.7	65.8	74.4	81.2	87.4
2016	1927	72.0	13.3	9.4	100	54.0	64.1	74.4	81.2	86.8
2017	1985	72.4	13.2	9.4	99.0	55.2	64.8	74.8	81.2	87.1
2018	1601	72.2	12.6	14.3	102	55.4	64.2	74.3	81.2	86.4
2019	1355	71.1	13.6	17.7	98.2	52.9	63.0	73.6	81.0	86.1
2020	1006	71.1	13.1	17.6	99.3	53.9	63.4	73.3	80.5	85.4
1998–2020	41105	72.0	12.6	8.4	105	55.4	64.4	73.5	81.1	86.9

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	611	68.9	11.5	31.4	98.1	55.0	60.7	69.5	77.0	84.2
1999	584	69.5	11.6	20.2	95.5	55.9	62.4	70.2	77.9	83.8
2000	529	69.2	10.6	36.0	93.0	55.5	61.8	69.7	77.0	82.6
2001	606	69.2	11.7	31.3	102	54.7	61.7	69.0	77.0	85.6
2002	1029	70.4	11.0	20.9	98.5	56.6	63.1	71.5	78.1	83.2
2003	1066	70.3	11.1	8.4	99.4	56.7	63.3	70.9	78.1	83.4
2004	1058	70.8	11.1	27.8	101	56.8	63.9	71.4	78.6	84.5
2005	985	70.6	11.4	28.3	98.5	56.7	64.2	70.9	78.5	84.4
2006	1026	70.4	11.1	17.9	102	55.9	63.5	71.0	78.3	83.9
2007	1143	69.8	12.1	15.8	99.4	54.4	63.5	71.0	78.7	83.8
2008	1180	71.0	11.5	19.3	105	56.2	64.9	71.6	79.2	84.8
2009	1177	70.6	11.4	12.4	99.0	55.6	64.1	71.6	79.0	83.7
2010	1064	71.0	11.4	27.9	98.9	55.5	64.1	71.5	79.3	84.5
2011	1005	71.4	11.7	15.5	97.3	56.2	64.8	72.7	79.9	85.1
2012	1021	71.4	11.4	9.7	101	57.1	64.7	72.8	79.3	85.1
2013	1088	71.6	11.9	19.4	99.6	55.3	64.7	73.3	79.9	85.4
2014	1049	71.9	12.3	20.3	102	54.9	65.4	74.1	80.7	85.7
2015	1006	71.1	12.5	21.3	97.6	53.7	64.5	73.3	79.6	85.4
2016	1050	70.7	13.0	9.4	100	53.8	63.3	73.2	80.1	85.2
2017	1063	72.2	12.0	12.9	96.3	56.0	65.4	74.3	80.2	85.4
2018	820	71.6	12.0	14.3	95.8	55.4	64.0	73.9	80.4	85.3
2019	737	70.5	13.0	17.9	98.2	53.0	62.6	72.3	79.8	84.9
2020	553	70.1	12.4	18.5	96.3	54.0	62.3	71.7	79.4	84.0
1998-2020	21450	70.7	11.8	8.4	105	55.4	63.7	72.0	79.1	84.6

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	667	72.6	12.8	13.2	96.7	54.5	63.9	74.9	82.0	87.2
1999	624	73.0	13.0	26.9	101	54.9	64.3	75.1	82.6	88.3
2000	566	73.2	12.9	24.7	103	56.3	64.4	75.3	82.0	88.5
2001	616	73.2	12.7	30.8	103	56.1	64.1	75.5	81.8	89.0
2002	1019	73.9	13.0	17.7	101	55.8	64.7	76.4	83.0	89.4
2003	1014	74.1	12.0	23.5	98.9	57.8	65.3	75.9	82.9	88.8
2004	996	73.1	13.3	13.8	100	55.6	64.7	75.3	83.3	88.6
2005	954	74.7	12.7	15.1	99.9	57.9	67.0	76.6	83.9	90.2
2006	958	73.0	12.7	24.6	97.1	55.1	65.1	75.1	82.7	86.9
2007	1036	73.5	13.2	13.4	103	55.4	66.4	75.4	83.4	87.7
2008	1040	73.9	13.3	18.9	101	56.7	65.7	75.3	84.1	88.7
2009	1024	74.4	12.9	15.9	99.1	58.0	67.4	76.1	83.9	88.8
2010	939	74.3	13.3	14.9	101	56.1	67.4	76.4	83.8	89.1
2011	938	73.9	13.3	16.5	101	55.9	65.2	75.7	84.6	88.8
2012	923	73.0	14.8	13.7	100	54.3	65.4	75.6	83.8	89.2
2013	906	73.2	14.2	15.7	105	53.6	66.2	75.3	83.8	89.1
2014	885	72.8	14.2	15.8	103	52.3	65.1	75.3	82.7	89.1
2015	899	73.4	14.0	11.4	101	53.6	66.9	75.6	83.2	89.3
2016	877	73.4	13.4	13.8	100	54.4	65.2	75.9	82.7	88.6
2017	922	72.6	14.4	9.4	99.0	54.7	63.6	75.6	82.6	88.6
2018	781	72.8	13.2	19.3	102	54.9	64.6	75.0	82.3	87.6
2019	618	71.9	14.2	17.7	97.5	52.3	64.2	75.1	81.9	87.0
2020	453	72.3	13.8	17.6	99.3	53.6	64.6	75.4	81.8	87.1
1998-2020	19655	73.4	13.4	9.4	105	55.3	65.4	75.6	83.2	88.6

Table 4

Age distribution by 5-year age group and sex for period 2007-2020
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9	3	0.0	0.0	2	0.0	0.0	1	0.0	0.0
10-14	9	0.0	0.0	3	0.0	0.0	6	0.0	0.1
15-19	47	0.2	0.2	10	0.1	0.1	37	0.3	0.4
20-24	64	0.2	0.5	28	0.2	0.3	36	0.3	0.7
25-29	83	0.3	0.8	39	0.3	0.6	44	0.4	1.0
30-34	107	0.4	1.2	55	0.4	1.0	52	0.4	1.4
35-39	185	0.7	1.9	95	0.7	1.7	90	0.7	2.2
40-44	350	1.3	3.2	183	1.3	3.0	167	1.4	3.5
45-49	642	2.5	5.7	338	2.4	5.4	304	2.5	6.0
50-54	1150	4.4	10.1	640	4.6	10.0	510	4.2	10.2
55-59	1636	6.2	16.3	920	6.6	16.6	716	5.8	16.0
60-64	2364	9.0	25.3	1418	10.2	26.7	946	7.7	23.8
65-69	3224	12.3	37.7	1958	14.0	40.8	1266	10.3	34.1
70-74	4201	16.0	53.7	2464	17.7	58.4	1737	14.2	48.3
75-79	4423	16.9	70.6	2453	17.6	76.0	1970	16.1	64.4
80-84	3919	15.0	85.5	1972	14.1	90.1	1947	15.9	80.3
85+	3790	14.5	100.0	1378	9.9	100.0	2412	19.7	100.0
All ages	26197	100.0		13956	100.0		12241	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007–2020

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=598 %	Females DCO rate n=879 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4								
5- 9	2	1	0.1	0.1			1.7	1.0
10-14	3	6	0.2	0.4			2.2	4.7
15-19	10	37	0.6	2.3			3.1	14.0
20-24	28	36	1.4	1.9	3.6		4.5	6.9
25-29	37	44	1.6	2.0			3.9	3.7
30-34	54	51	2.3	2.2		2.0	4.2	2.4
35-39	92	90	4.0	4.0	2.2	3.3	5.0	2.6
40-44	180	167	7.2	6.9			6.4	2.7
45-49	335	301	12.5	11.6	0.6	0.3	6.6	3.2
50-54	629	505	24.7	20.1	1.4	1.4	7.4	4.0
55-59	908	707	42.8	32.5	1.2	0.8	7.2	5.3
60-64	1398	933	79.1	49.1	1.9	1.4	7.9	6.0
65-69	1924	1252	117.9	69.0	1.6	1.8	7.9	6.6
70-74	2415	1713	161.1	99.6	3.1	2.3	8.8	8.6
75-79	2408	1938	199.0	129.1	3.2	4.1	10.0	9.9
80-84	1921	1920	265.3	180.4	6.7	7.2	12.5	12.5
85+	1354	2386	289.9	228.9	17.4	23.8	12.9	14.6
All ages	13698	12087			4.4	7.3	8.9	7.8
Incidence								
Raw			42.1	36.0				
WS			19.5	13.7				
ES			29.4	20.4				
BRD-S			38.8	26.7				

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

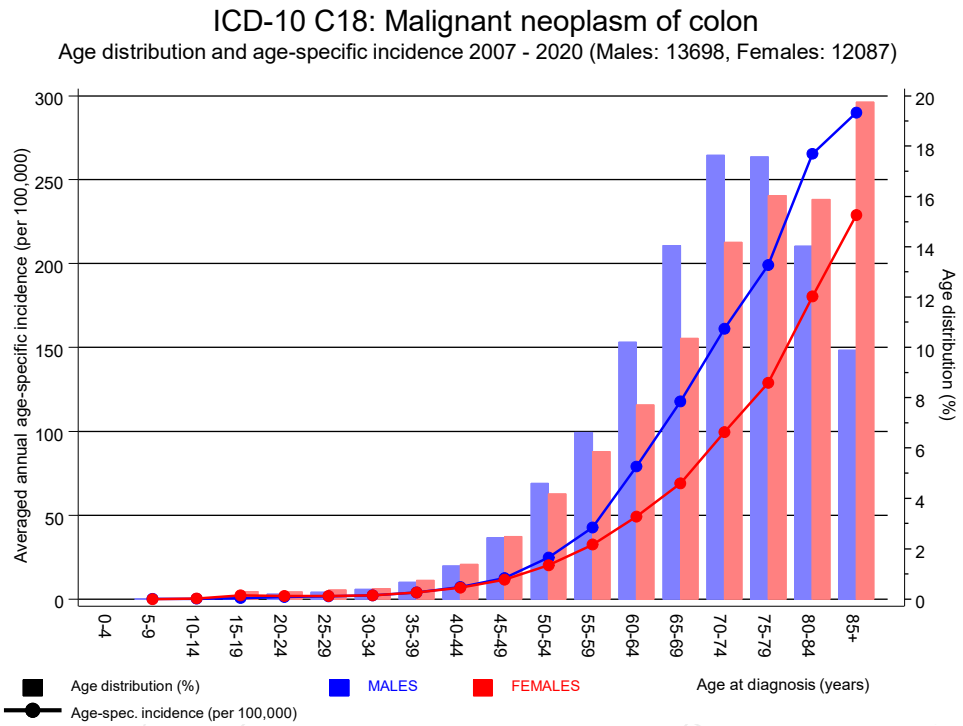


Figure 6. Age distribution (males: mean=71.1 yrs, median=72.6 yrs; females: mean=73.3 yrs, median=75.6 yrs) and age-specific incidence.

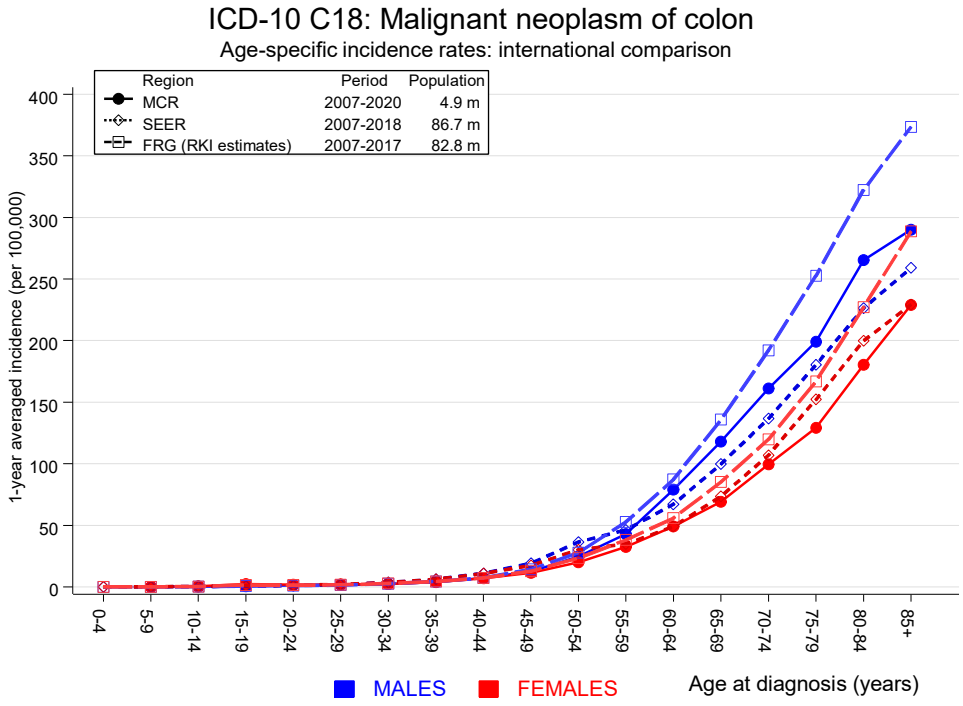


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Estimated age-specific patient population of Germany, latest update: 16 March 2021. German Centre for Cancer Registry Data, Robert Koch Institute (RKI), based on data of the population based cancer registries. http://www.krebsdaten.de. Last access: 08/17/2021
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 21 Regs Research Data, released April 2021, based on the November 2020 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 1998–2020

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C00	Lip	4	1.7	2.4	0.7	6.2		0.3	
C03–C06	Oral cavity	16	9.5	1.7	1.0	2.7		0.9	6.3
C07–C08	Salivary gland	4	3.6	1.1	0.3	2.9		0.1	
C09–C10	Oropharynx	18	11.2	1.6	0.9	2.5		0.9	5.6
C12–C13	Hypopharynx	14	6.1	2.3	1.3	3.8	#	1.1	7.1
C15	Oesophagus	85	25.0	3.4	2.7	4.2	#	8.3	10.6
C16	Stomach	177	59.4	3.0	2.6	3.5	#	16.2	7.3
C17	Small intestine	90	8.1	11.1	9.0	13.7	#	11.3	1.1
C18	Colon	547	143.9	3.8	3.5	4.1	#	55.4	0.7
C19–C20	Rectum	402	71.7	5.6	5.1	6.2	#	45.4	0.2
C21	Anus/canal	10	3.1	3.2	1.5	5.9	#	0.9	
C22	Liver	105	39.3	2.7	2.2	3.2	#	9.0	21.0
C23–C24	Bile	37	15.3	2.4	1.7	3.3	#	3.0	13.5
C25	Pancreas	135	56.2	2.4	2.0	2.8	#	10.8	25.9
C32	Larynx	24	12.4	1.9	1.2	2.9	#	1.6	8.3
C33–C34	Lung	347	160.4	2.2	1.9	2.4	#	25.7	15.0
C38,C45	Mesothelioma	14	9.9	1.4	0.8	2.4		0.6	7.1
C43	Malign. melanoma	123	60.2	2.0	1.7	2.4	#	8.6	3.3
C46,C49	Soft tissue	17	8.2	2.1	1.2	3.3	#	1.2	
C50	Breast	10	3.8	2.6	1.2	4.8	#	0.8	10.0
C60	Penis	8	3.6	2.2	1.0	4.4		0.6	12.5
C61	Prostate	695	394.0	1.8	1.6	1.9	#	41.4	5.2
C62	Testis	5	2.4	2.1	0.7	4.9		0.4	20.0
C64	Kidney	135	45.9	2.9	2.5	3.5	#	12.2	8.1
C65	Renal pelvis	20	6.5	3.1	1.9	4.7	#	1.9	
C66	Ureter	15	3.9	3.8	2.1	6.3	#	1.5	
C67	Bladder	152	72.5	2.1	1.8	2.5	#	10.9	7.9
C68	Urethra	4	1.3	3.0	0.8	7.7		0.4	
C68	Urinary org.	4	1.1	3.5	1.0	9.0		0.4	50.0
C70–C72	CNS cancer	27	16.7	1.6	1.1	2.4	#	1.4	25.9
C73	Thyroid	16	7.3	2.2	1.3	3.6	#	1.2	6.3
C76–C79	CUP	40	24.6	1.6	1.2	2.2	#	2.1	2.5
C82–C85	NHL	133	60.9	2.2	1.8	2.6	#	9.9	3.0
C90	Mult. myeloma	29	19.0	1.5	1.0	2.2	#	1.4	27.6
C91–C96	Leukaemia	47	22.7	2.1	1.5	2.7	#	3.3	19.1
Others, specified		19	16.1	1.2	0.7	1.8		0.4	10.5
Not observed		0	2.6	0.0	0.0	1.4		-0.4	
All further malignancies		3528	1410.4	2.5	2.4	2.6	#	291.2	7.0

Patients	19959
Median age at next malignancy (years)	74.8
Person-years	72729
Mean observation time (years)	3.6
Median observation time (years)	2.0

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 3 are pooled in category “Others, specified”.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2020
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	8	4.6	1.7	0.7	3.4		0.5	
C09–C10	Oropharynx	7	2.8	2.5	1.0	5.2	#	0.6	
C15	Oesophagus	14	5.4	2.6	1.4	4.3	#	1.3	14.3
C16	Stomach	85	34.9	2.4	1.9	3.0	#	7.7	17.6
C17	Small intestine	50	4.2	11.8	8.7	15.5	#	7.0	2.0
C18	Colon	348	97.2	3.6	3.2	4.0	#	38.4	0.6
C19–C20	Rectum	179	37.0	4.8	4.2	5.6	#	21.8	0.6
C21	Anus/canal	10	4.6	2.2	1.0	4.0	#	0.8	
C22	Liver	32	11.5	2.8	1.9	3.9	#	3.1	37.5
C23–C24	Bile	22	14.2	1.5	1.0	2.3		1.2	13.6
C25	Pancreas	106	45.5	2.3	1.9	2.8	#	9.3	27.4
C26	GI cancer	4	2.1	1.9	0.5	4.9		0.3	50.0
C32	Larynx	5	1.4	3.7	1.2	8.6	#	0.6	
C33–C34	Lung	173	60.3	2.9	2.5	3.3	#	17.3	10.4
C38,C45	Mesothelioma	3	1.7	1.8	0.4	5.2		0.2	
C43	Malign. melanoma	67	30.2	2.2	1.7	2.8	#	5.6	3.0
C46,C49	Soft tissue	9	5.0	1.8	0.8	3.4		0.6	
C48	Peritoneal	13	3.1	4.1	2.2	7.1	#	1.5	30.8
C50	Breast	480	238.1	2.0	1.8	2.2	#	37.0	5.8
C51	Vulva	21	10.2	2.0	1.3	3.1	#	1.6	
C52	Vagina	3	1.8	1.7	0.3	4.9		0.2	
C53	Cervix uteri	21	9.4	2.2	1.4	3.4	#	1.8	14.3
C54	Corpus uteri	108	44.4	2.4	2.0	2.9	#	9.7	1.9
C56	Ovary	102	33.7	3.0	2.5	3.7	#	10.5	28.4
C64	Kidney	74	20.7	3.6	2.8	4.5	#	8.2	10.8
C65	Renal pelvis	9	2.9	3.1	1.4	5.8	#	0.9	
C66	Ureter	5	1.6	3.2	1.0	7.5	#	0.5	20.0
C67	Bladder	40	20.3	2.0	1.4	2.7	#	3.0	22.5
C70–C72	CNS cancer	19	10.8	1.8	1.1	2.7	#	1.3	42.1
C73	Thyroid	17	10.3	1.7	1.0	2.7		1.0	5.9
C74–C80	Cancer others	4	4.3	0.9	0.3	2.4		−0.0	50.0
C76–C79	CUP	12	18.9	0.6	0.3	1.1		−1.1	
C81	Hodgkin lymphoma	5	1.4	3.5	1.1	8.3	#	0.5	
C82–C85	NHL	68	35.7	1.9	1.5	2.4	#	4.9	14.7
C90	Mult. myeloma	19	11.3	1.7	1.0	2.6	#	1.2	15.8
C91–C96	Leukaemia	34	13.8	2.5	1.7	3.4	#	3.1	47.1
Others, specified		14	8.5	1.7	0.9	2.8		0.8	14.3
Not observed		0	2.8	0.0	0.0	1.3		−0.4	
All further malignancies		2190	866.8	2.5	2.4	2.6	#	202.7	9.7

Patients	17862
Median age at next malignancy (years)	76.6
Person-years	65287
Mean observation time (years)	3.7
Median observation time (years)	1.9

The occurrence of further specified malignancy is statistically significant.

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

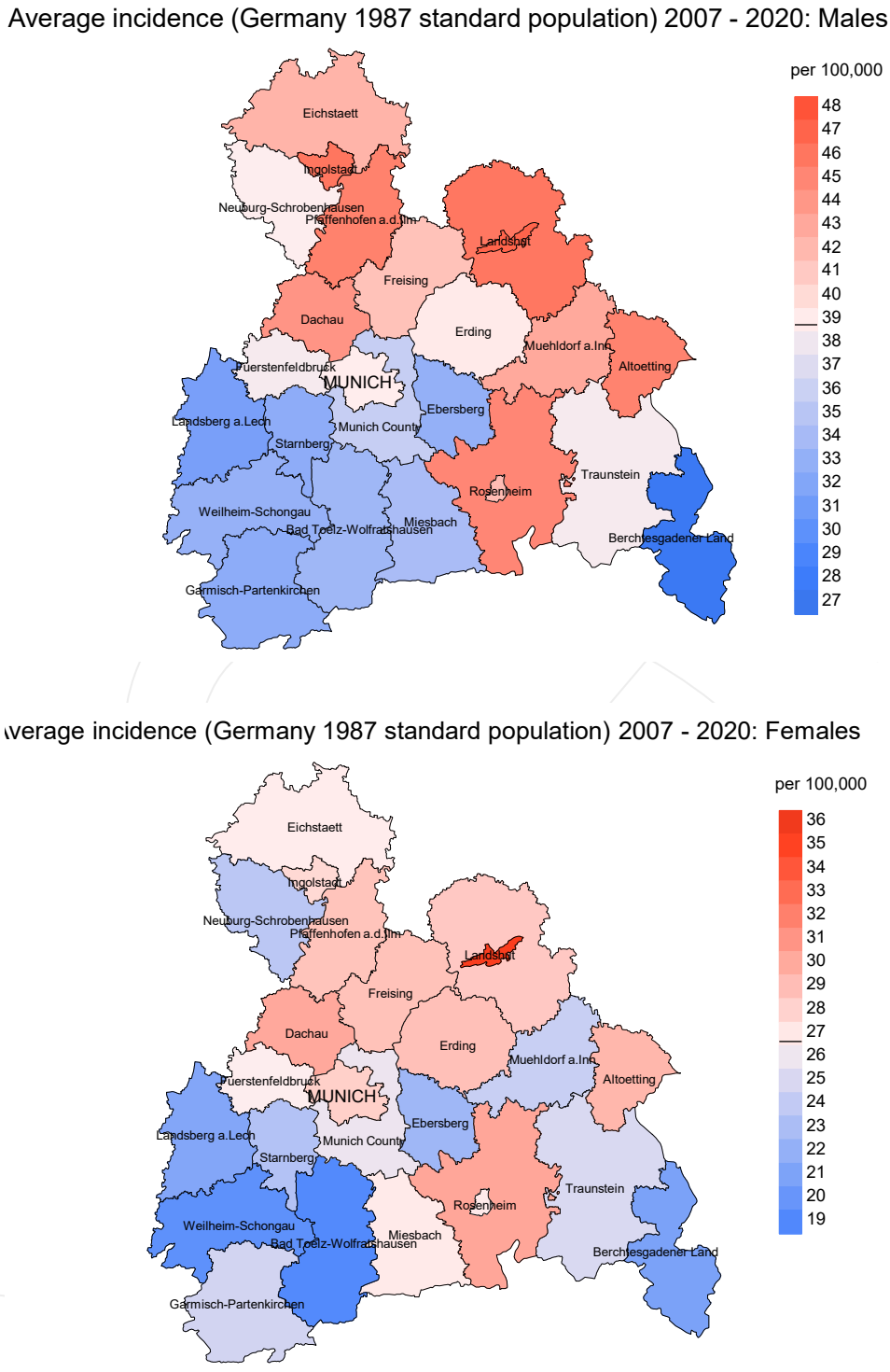
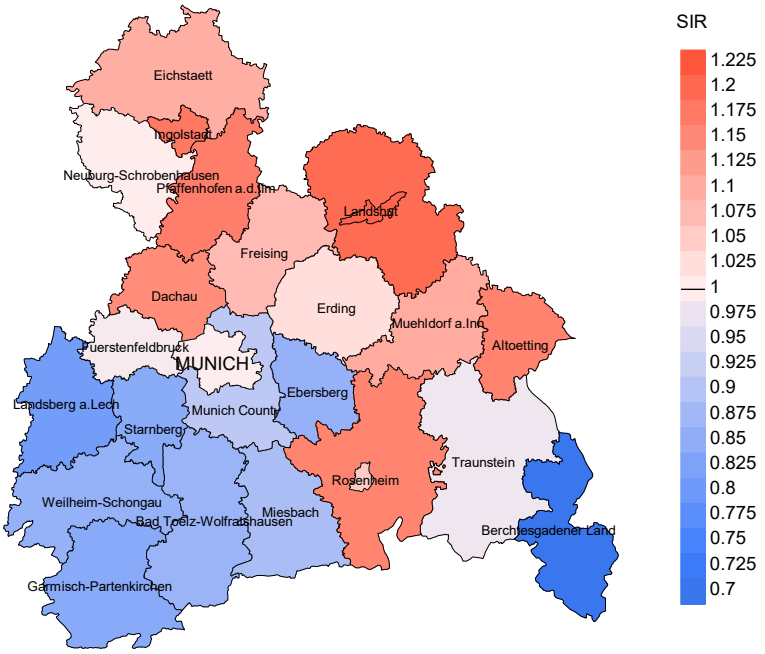


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 38.8/100,000 WS N=13,698, females 26.7/100,000 WS N=12,087).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 269 women were identified with newly diagnosed colon cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 22.5/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 19.0 and 26.4/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

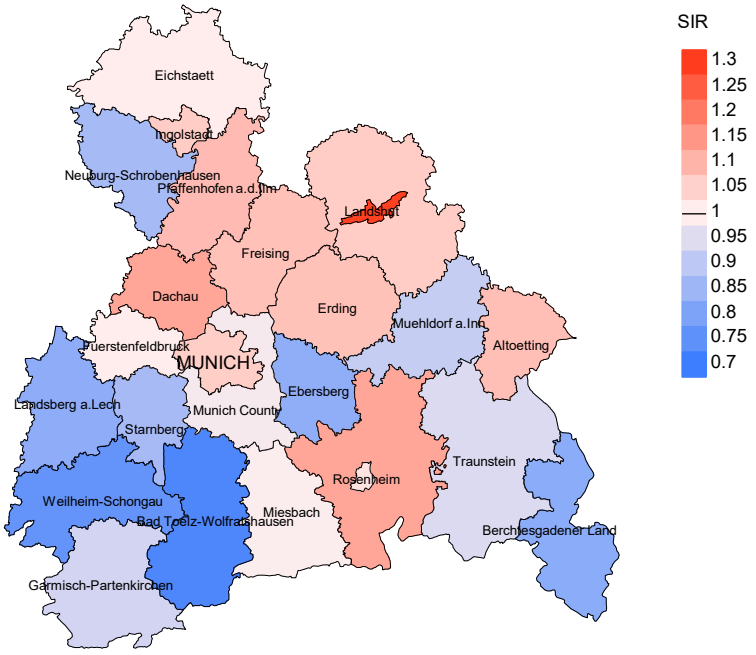


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=13,698, females N=12,087).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 269 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 0.83. Though, the value of this parameter may vary with an underlying probability of 99% between 0.70 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 4.94 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	1278	97.9	7.0	1030	80.6	93.2
1999	1208	97.4	8.1	977	80.9	93.8
2000	1095	97.2	7.6	866	79.1	95.6
2001	1222	98.0	9.0	948	77.6	94.9
2002	2048	97.5	14.4	1628	79.5	96.4
2003	2080	97.7	11.7	1595	76.7	96.1
2004	2054	97.9	9.6	1565	76.2	95.5
2005	1939	97.1	9.1	1484	76.5	96.6
2006	1984	95.5	6.6	1431	72.1	97.3
2007	2179	94.0	7.6	1531	70.3	96.0
2008	2220	98.5	6.8	1522	68.6	94.8
2009	2201	98.5	5.8	1467	66.7	95.7
2010	2003	97.9	7.0	1299	64.9	93.9
2011	1943	98.2	6.5	1236	63.6	93.5
2012	1944	98.0	6.5	1167	60.0	94.1
2013	1994	98.2	5.9	1142	57.3	92.4
2014	1934	97.5	6.1	1104	57.1	91.8
2015	1905	97.5	5.6	1037	54.4	91.0
2016	1927	99.2	5.1	949	49.2	87.9
2017	1985	99.3	6.5	846	42.6	82.3
2018	1601	99.5	4.1	536	33.5	70.0
2019	1355	99.8	0.6	356	26.3	79.5
2020	1006	99.6		176	17.5	93.2
1998-2020	41105	97.8	7.1	25892	63.0	93.4

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 4.94 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	1278	715	91.0	242	18.9
1999	1208	723	92.1	233	19.3
2000	1095	706	94.1	214	19.5
2001	1222	746	95.4	221	18.1
2002	2048	1049	98.2	501	24.5
2003	2080	1137	97.8	449	21.6
2004	2054	1139	98.5	430	20.9
2005	1939	1234	96.8	400	20.6
2006	1984	1207	97.5	345	17.4
2007	2179	1307	97.4	403	18.5
2008	2220	1345	98.4	448	20.2
2009	2201	1372	98.0	379	17.2
2010	2003	1413	98.2	349	17.4
2011	1943	1407	98.7	362	18.6
2012	1944	1433	98.2	362	18.6
2013	1994	1449	98.3	340	17.1
2014	1934	1462	98.0	371	19.2
2015	1905	1500	97.7	348	18.3
2016	1927	1503	98.5	333	17.3
2017	1985	1611	97.4	357	18.0
2018	1601	1301	66.7	201	12.6
2019	1355	1179	43.9	145	10.7
2020	1006	1375	90.2	111	11.0
1998–2020	41105	28313	93.4	7544	18.4

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	715	72.2	27.8	86.8
1999	723	71.5	28.5	84.8
2000	706	72.9	27.1	85.4
2001	746	68.9	31.1	84.1
2002	1049	74.0	26.0	86.8
2003	1137	72.2	27.8	85.4
2004	1139	76.6	23.4	85.9
2005	1234	70.5	29.5	80.0
2006	1207	68.5	31.5	81.5
2007	1307	70.6	29.4	82.6
2008	1345	70.4	29.6	81.3
2009	1372	67.7	32.3	77.0
2010	1413	65.1	34.9	77.4
2011	1407	64.7	35.3	75.8
2012	1433	64.5	35.5	77.3
2013	1449	62.2	37.8	72.3
2014	1462	62.5	37.5	74.7
2015	1500	59.3	40.7	71.4
2016	1503	57.4	42.6	70.6
2017	1611	59.8	40.2	70.6
2018	1301	47.1	52.9	59.2
2019	1179	43.3	56.7	62.4
2020	1375	43.8	56.2	59.8
1998-2020	28313	63.7	36.3	76.6

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	336	74.5	72.3	80.1	73.7
1999	317	75.5	72.8	80.7	74.4
2000	356	76.9	73.9	82.4	75.4
2001	341	74.7	71.9	81.5	73.0
2002	513	75.4	73.1	81.0	74.3
2003	572	76.7	75.2	80.6	75.8
2004	559	76.4	75.3	81.6	75.8
2005	615	76.6	74.2	82.1	74.6
2006	629	77.5	76.0	81.0	76.2
2007	684	77.6	75.2	81.3	75.8
2008	733	77.5	75.7	82.6	76.4
2009	691	77.8	76.1	81.6	76.7
2010	738	78.2	75.4	82.2	76.8
2011	735	77.8	74.2	82.8	75.7
2012	748	78.5	76.3	83.2	77.1
2013	769	80.1	77.4	84.4	78.4
2014	772	79.9	77.3	83.8	78.9
2015	791	80.2	77.2	84.0	78.4
2016	832	79.9	76.2	84.1	77.7
2017	857	80.9	78.2	84.5	79.1
2018	702	81.3	77.8	83.8	79.0
2019	675	81.1	76.7	84.3	79.0
2020	816	81.0	77.1	84.2	78.3
1998–2020	14781	78.6	75.8	83.1	76.8

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

Table 10b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	379	78.2	76.5	84.0	78.1
1999	406	80.9	78.7	86.1	80.0
2000	350	81.1	78.8	86.8	80.3
2001	405	81.5	79.3	86.7	80.6
2002	536	81.7	79.7	87.0	80.9
2003	565	81.6	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	578	82.8	80.3	86.5	81.4
2007	623	82.3	79.7	86.9	80.9
2008	612	83.1	80.4	86.6	81.8
2009	681	83.6	80.4	87.6	81.2
2010	675	83.7	80.8	87.8	82.6
2011	672	84.5	80.3	88.5	81.9
2012	685	84.1	79.7	88.4	81.5
2013	680	84.5	79.5	88.8	82.0
2014	690	84.3	79.1	88.1	80.9
2015	709	84.5	79.2	89.3	81.0
2016	671	84.2	78.7	88.9	81.3
2017	754	83.5	79.7	89.6	81.1
2018	599	84.5	79.0	88.0	80.0
2019	504	83.0	77.9	87.2	79.5
2020	559	85.5	80.4	87.8	81.9
1998–2020	13532	83.1	79.5	87.7	81.0

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

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

Table 11a

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	246	22.2	0.40	12.9	0.40	20.5	0.41	28.2	0.42
1999	222	19.8	0.38	11.4	0.37	18.1	0.39	25.6	0.40
2000	266	23.4	0.50	12.9	0.48	20.8	0.50	29.5	0.54
2001	247	21.3	0.41	11.9	0.39	18.9	0.41	25.6	0.43
2002	392	21.0	0.38	11.2	0.37	17.8	0.39	24.5	0.39
2003	423	22.6	0.40	11.4	0.38	18.6	0.40	26.7	0.43
2004	436	23.2	0.41	11.4	0.39	18.5	0.41	26.6	0.44
2005	443	23.4	0.46	11.3	0.43	18.1	0.45	25.7	0.48
2006	428	22.3	0.42	10.5	0.39	17.1	0.42	24.6	0.45
2007	494	22.3	0.44	10.2	0.39	16.5	0.42	23.7	0.46
2008	541	24.3	0.47	10.8	0.43	17.6	0.45	25.4	0.49
2009	467	20.9	0.40	9.2	0.37	15.0	0.39	21.4	0.42
2010	487	21.6	0.47	9.3	0.42	14.9	0.45	21.4	0.48
2011	495	22.1	0.50	9.8	0.47	15.5	0.49	21.3	0.50
2012	497	21.9	0.50	9.4	0.45	15.1	0.48	21.0	0.51
2013	501	21.8	0.47	8.7	0.42	14.4	0.45	20.4	0.48
2014	486	20.8	0.47	8.3	0.42	13.4	0.45	19.1	0.48
2015	471	19.8	0.48	7.7	0.41	12.6	0.44	17.8	0.48
2016	501	20.8	0.49	8.6	0.43	13.6	0.46	18.5	0.48
2017	515	21.3	0.49	8.1	0.43	13.3	0.46	18.4	0.48
2018	338	13.9	0.42	5.3	0.36	8.5	0.38	11.9	0.41
2019	288	11.8	0.40	4.8	0.34	7.5	0.37	10.2	0.39
2020	364	15.0	0.67	5.9	0.57	9.3	0.61	13.0	0.66
1998-2020	9548	20.5	0.45	9.0	0.41	14.5	0.43	20.2	0.46

Table 11b

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	270	23.0	0.41	8.6	0.36	13.6	0.38	19.0	0.40
1999	295	24.9	0.48	8.6	0.40	13.9	0.42	19.4	0.45
2000	249	20.7	0.44	7.3	0.38	11.7	0.40	16.0	0.41
2001	267	21.9	0.43	7.5	0.37	12.2	0.39	17.1	0.41
2002	384	19.6	0.38	6.6	0.33	10.6	0.34	14.7	0.36
2003	398	20.2	0.39	6.9	0.34	11.1	0.36	15.4	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	399	19.9	0.42	6.2	0.33	10.2	0.36	14.4	0.38
2007	431	18.7	0.42	6.2	0.36	9.9	0.38	13.7	0.40
2008	408	17.6	0.40	5.4	0.32	8.8	0.34	12.5	0.37
2009	462	19.9	0.46	6.2	0.39	10.0	0.41	13.8	0.42
2010	434	18.5	0.47	5.8	0.40	9.2	0.42	12.6	0.43
2011	416	17.8	0.45	5.4	0.36	8.7	0.38	12.0	0.41
2012	427	18.1	0.47	5.6	0.37	9.1	0.41	12.6	0.43
2013	401	16.8	0.45	5.3	0.37	8.5	0.40	11.5	0.41
2014	428	17.8	0.49	5.5	0.39	8.8	0.42	11.9	0.44
2015	418	17.2	0.47	5.3	0.39	8.4	0.41	11.5	0.43
2016	363	14.8	0.42	4.7	0.35	7.3	0.37	10.0	0.39
2017	448	18.2	0.49	5.3	0.37	8.6	0.41	12.0	0.44
2018	278	11.2	0.37	3.5	0.30	5.5	0.32	7.5	0.34
2019	225	9.1	0.37	3.2	0.32	4.8	0.34	6.4	0.35
2020	238	9.6	0.53	2.9	0.42	4.6	0.45	6.2	0.46
1998-2020	8503	17.6	0.44	5.6	0.36	9.0	0.39	12.4	0.40

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females 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	0.1	0.1
25-29	11	0.1	0.1	5	0.1	0.1	6	0.1	0.2
30-34	16	0.1	0.3	11	0.2	0.3	5	0.1	0.3
35-39	33	0.3	0.5	14	0.2	0.5	19	0.4	0.6
40-44	94	0.8	1.3	46	0.7	1.2	48	0.9	1.5
45-49	169	1.4	2.8	87	1.3	2.6	82	1.5	3.0
50-54	307	2.6	5.4	178	2.8	5.3	129	2.4	5.4
55-59	487	4.1	9.5	287	4.5	9.8	200	3.7	9.2
60-64	751	6.4	15.8	457	7.1	16.9	294	5.5	14.6
65-69	1196	10.1	26.0	741	11.5	28.4	455	8.5	23.1
70-74	1692	14.3	40.3	1026	15.9	44.3	666	12.4	35.5
75-79	2075	17.6	57.8	1225	19.0	63.3	850	15.8	51.3
80-84	2173	18.4	76.2	1211	18.8	82.1	962	17.9	69.2
85+	2813	23.8	100.0	1155	17.9	100.0	1658	30.8	100.0
All ages	11822	100.0		6445	100.0		5377	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**incl. multiple malignancies**)

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	0.10			2.1	
20-24	1	3	0.0	0.04	0.2	0.08	1.4	7.0
25-29	5	6	0.2	0.14	0.3	0.14	5.4	6.1
30-34	11	5	0.5	0.20	0.2	0.10	7.7	2.8
35-39	14	19	0.6	0.15	0.8	0.21	5.2	4.7
40-44	46	48	1.8	0.26	2.0	0.29	7.6	5.6
45-49	87	82	3.2	0.26	3.1	0.27	6.1	4.9
50-54	178	129	7.0	0.28	5.1	0.26	6.7	4.9
55-59	287	200	13.5	0.32	9.2	0.28	6.5	5.2
60-64	457	294	25.8	0.33	15.5	0.32	7.1	5.9
65-69	741	455	45.4	0.39	25.1	0.36	8.1	6.5
70-74	1026	666	68.4	0.42	38.7	0.39	8.6	7.6
75-79	1225	850	101.2	0.51	56.6	0.44	9.8	8.7
80-84	1211	962	167.2	0.63	90.4	0.50	11.6	10.2
85+	1155	1658	247.3	0.85	159.0	0.69	12.7	13.9
All ages	6445	5377					9.3	8.7
Mortality								
Raw			19.8	0.47	16.0	0.44		
WS			8.1	0.42	5.0	0.36		
ES			13.1	0.44	7.9	0.39		
BRD-S			18.3	0.47	10.9	0.41		
PYLL-70								
per 100,000			57.2		44.1			
ES			48.6		36.6			
AYLL-70			9.0		10.0			

Table 14a

Further malignancies in deaths in period 1998–2020
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	28	0.7	18	64.3	3	10.7	7	25.0
C09–C10	Oropharynx	36	0.8	22	61.1	2	5.6	12	33.3
C12–C13	Hypopharynx	20	0.5	7	35.0	1	5.0	12	60.0
C15	Oesophagus	78	1.8	11	14.1	12	15.4	55	70.5
C16	Stomach	227	5.3	63	27.8	56	24.7	108	47.6
C17	Small intestine	58	1.4	9	15.5	23	39.7	26	44.8
C18	Colon	325	7.6			149	45.8	176	54.2
C19–C20	Rectum	380	8.9	107	28.2	193	50.8	80	21.1
C21	Anus/canal	13	0.3	6	46.2			7	53.8
C22	Liver	123	2.9	8	6.5	30	24.4	85	69.1
C23–C24	Bile	39	0.9	4	10.3	8	20.5	27	69.2
C25	Pancreas	159	3.7	12	7.5	19	11.9	128	80.5
C30–C31	Sinuses	8	0.2	6	75.0			2	25.0
C32	Larynx	63	1.5	43	68.3			20	31.7
C33–C34	Lung	434	10.2	77	17.7	60	13.8	297	68.4
C38,C45	Mesothelioma	21	0.5	1	4.8	4	19.0	16	76.2
C43	Malign. melanoma	127	3.0	78	61.4	2	1.6	47	37.0
C44	Skin others	284	6.7	149	52.5	17	6.0	118	41.5
C46,C49	Soft tissue	20	0.5	7	35.0			13	65.0
C50	Breast	11	0.3	5	45.5			6	54.5
C60	Penis	11	0.3	3	27.3			8	72.7
C61	Prostate	954	22.4	562	58.9	67	7.0	325	34.1
C62	Testis	20	0.5	16	80.0			4	20.0
C64	Kidney	177	4.2	81	45.8	34	19.2	62	35.0
C65	Renal pelvis	20	0.5	5	25.0			15	75.0
C66	Ureter	15	0.4	4	26.7	2	13.3	9	60.0
C67	Bladder	202	4.7	72	35.6	21	10.4	109	54.0
C69	Eye melanoma	8	0.2	8	100.0				
C70–C72	CNS cancer	36	0.8	4	11.1	3	8.3	29	80.6
C73	Thyroid	17	0.4	8	47.1	2	11.8	7	41.2
C76–C79	CUP	50	1.2	9	18.0	8	16.0	33	66.0
C81	Hodgkin lymphoma	12	0.3	11	91.7			1	8.3
C82–C85	NHL	162	3.8	73	45.1	26	16.0	63	38.9
C90	Mult. myeloma	33	0.8	11	33.3	4	12.1	18	54.5
C91–C96	Leukaemia	57	1.3	11	19.3	4	7.0	42	73.7
Others, specified		34	0.8	11	32.4	3	8.8	20	58.8
All further malignancies		4262	100.0	1522	35.7	753	17.7	1987	46.6

Further malignancies with number of cases 1 to 5 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 1998–2020
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	17	0.5	9	52.9	1	5.9	7	41.2
C09–C10	Oropharynx	11	0.4	5	45.5	1	9.1	5	45.5
C15	Oesophagus	15	0.5	3	20.0	2	13.3	10	66.7
C16	Stomach	157	5.1	46	29.3	35	22.3	76	48.4
C17	Small intestine	22	0.7	3	13.6	12	54.5	7	31.8
C18	Colon	227	7.3			82	36.1	145	63.9
C19–C20	Rectum	231	7.5	70	30.3	103	44.6	58	25.1
C21	Anus/canal	22	0.7	8	36.4	7	31.8	7	31.8
C22	Liver	40	1.3	2	5.0	13	32.5	25	62.5
C23–C24	Bile	42	1.4	11	26.2	7	16.7	24	57.1
C25	Pancreas	136	4.4	8	5.9	20	14.7	108	79.4
C32	Larynx	13	0.4	7	53.8	2	15.4	4	30.8
C33–C34	Lung	211	6.8	40	19.0	19	9.0	152	72.0
C43	Malign. melanoma	82	2.6	54	65.9	5	6.1	23	28.0
C44	Skin others	113	3.6	68	60.2	7	6.2	38	33.6
C46,C49	Soft tissue	14	0.5	9	64.3			5	35.7
C48	Peritoneal	14	0.5	3	21.4	7	50.0	4	28.6
C50	Breast	782	25.2	529	67.6	52	6.6	201	25.7
C51	Vulva	26	0.8	16	61.5	1	3.8	9	34.6
C52	Vagina	9	0.3	3	33.3	1	11.1	5	55.6
C53	Cervix uteri	75	2.4	53	70.7	6	8.0	16	21.3
C54	Corpus uteri	176	5.7	115	65.3	14	8.0	47	26.7
C55,C57	Fem. genitals un	16	0.5	13	81.3	1	6.3	2	12.5
C56	Ovary	198	6.4	69	34.8	37	18.7	92	46.5
C64	Kidney	61	2.0	31	50.8	9	14.8	21	34.4
C66	Ureter	10	0.3	2	20.0	1	10.0	7	70.0
C67	Bladder	69	2.2	27	39.1	2	2.9	40	58.0
C70–C72	CNS cancer	27	0.9	6	22.2	1	3.7	20	74.1
C73	Thyroid	35	1.1	21	60.0	2	5.7	12	34.3
C76–C79	CUP	31	1.0	12	38.7	5	16.1	14	45.2
C81	Hodgkin lymphoma	11	0.4	9	81.8	1	9.1	1	9.1
C82–C85	NHL	99	3.2	48	48.5	10	10.1	41	41.4
C90	Mult. myeloma	28	0.9	9	32.1	3	10.7	16	57.1
C91–C96	Leukaemia	37	1.2	6	16.2	6	16.2	25	67.6
Others, specified		43	1.4	10	23.3	3	7.0	30	69.8
All further malignancies		3100	100.0	1325	42.7	478	15.4	1297	41.8

Further malignancies with number of cases 1 to 8 are pooled in category “Others, specified”.

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

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**First primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.10			2.2	
20-24	1	3	0.0	0.04	0.2	0.08	1.5	7.3
25-29	5	6	0.2	0.15	0.3	0.14	5.9	6.6
30-34	11	3	0.5	0.21	0.1	0.06	8.0	1.9
35-39	12	16	0.5	0.15	0.7	0.20	4.8	4.3
40-44	41	41	1.6	0.25	1.7	0.28	7.3	5.4
45-49	81	69	3.0	0.27	2.7	0.26	6.3	4.8
50-54	150	115	5.9	0.28	4.6	0.26	6.4	5.1
55-59	245	173	11.5	0.31	7.9	0.29	6.4	5.4
60-64	378	238	21.4	0.32	12.5	0.31	7.1	5.8
65-69	572	369	35.0	0.38	20.4	0.36	7.8	6.7
70-74	782	503	52.2	0.44	29.3	0.38	8.6	7.4
75-79	896	649	74.0	0.52	43.2	0.44	9.8	8.6
80-84	822	725	113.5	0.67	68.1	0.48	11.0	10.0
85+	799	1294	171.1	0.89	124.1	0.69	12.3	13.7
All ages	4796	4204					9.0	8.6
Mortality								
Raw			14.7	0.47	12.5	0.44		
WS			6.2	0.41	4.0	0.35		
ES			9.9	0.44	6.3	0.38		
BRD-S			13.6	0.47	8.5	0.40		
PYLL-70								
per 100,000			48.9		37.5			
ES			41.7		31.2			
AYLL-70			9.4		10.3			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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	0.10			2.2	
20-24	1	3	0.0	0.04	0.2	0.09	1.5	7.5
25-29	5	6	0.2	0.16	0.3	0.14	5.9	6.8
30-34	11	3	0.5	0.21	0.1	0.06	8.0	1.9
35-39	12	15	0.5	0.15	0.7	0.19	4.8	4.1
40-44	41	41	1.6	0.26	1.7	0.29	7.4	5.5
45-49	76	68	2.8	0.27	2.6	0.27	5.9	4.8
50-54	139	111	5.5	0.27	4.4	0.27	6.0	5.0
55-59	224	159	10.6	0.31	7.3	0.29	5.9	5.1
60-64	342	220	19.3	0.33	11.6	0.31	6.5	5.5
65-69	484	323	29.7	0.37	17.8	0.36	6.8	6.0
70-74	624	423	41.6	0.40	24.6	0.36	7.1	6.4
75-79	697	551	57.6	0.47	36.7	0.41	8.0	7.6
80-84	602	609	83.1	0.54	57.2	0.43	8.6	8.8
85+	580	1072	124.2	0.68	102.8	0.60	9.7	11.9
All ages	3839	3604					7.5	7.6
Mortality								
Raw			11.8	0.42	10.7	0.40		
WS			5.2	0.37	3.5	0.34		
ES			8.0	0.40	5.5	0.36		
BRD-S			10.9	0.42	7.4	0.37		
PYLL-70								
per 100,000			45.2		35.5			
ES			38.6		29.6			
AYLL-70			9.7		10.6			

* See corresponding tables with multiple malignancies.

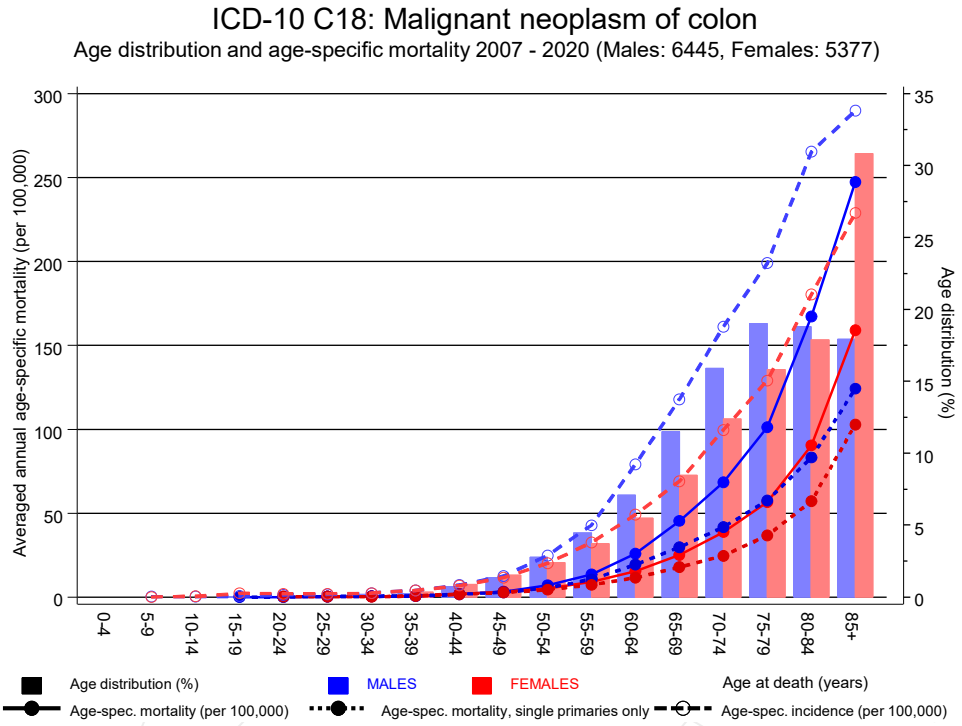
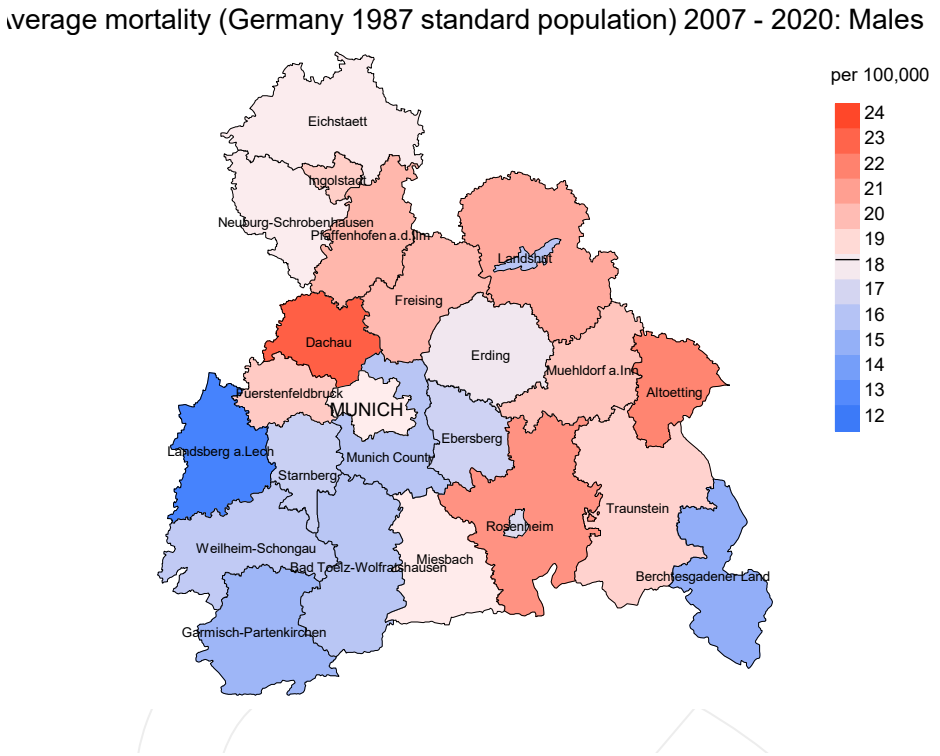


Figure 17. Distribution of age at death (bars; males: mean=71.3 yrs, median=72.5 yrs; females: mean=74.2 yrs, median=76.0 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed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

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



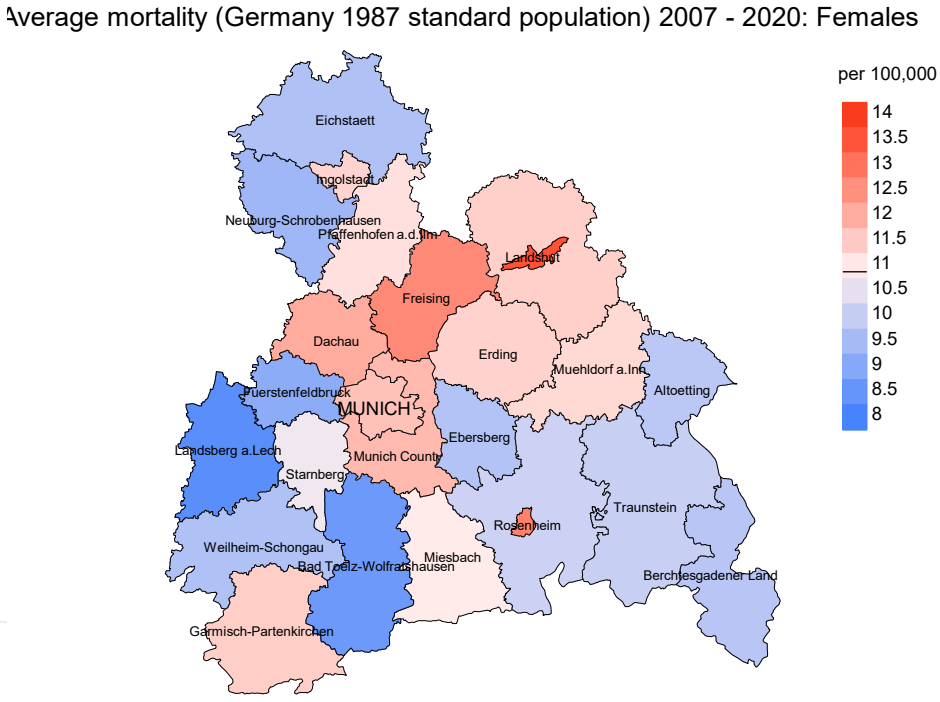
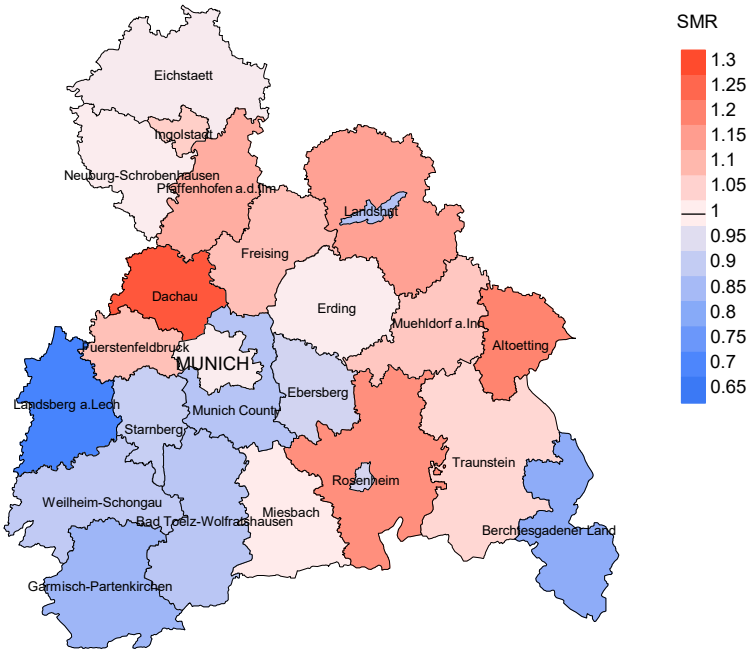


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 18.3/100,000 WS N=6,445, females 10.9/100,000 WS N=5,377).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 126 women died from colon cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 9.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.6 and 12.3/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

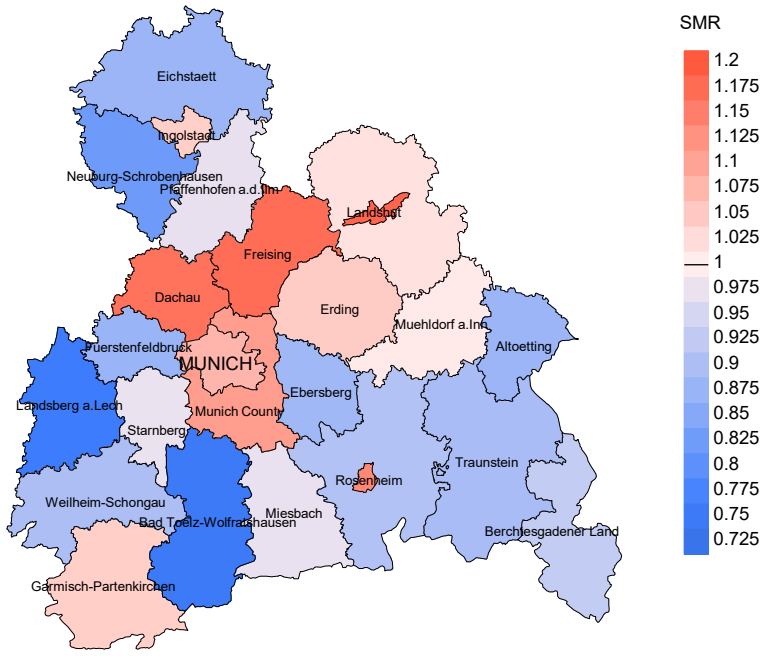


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=6,445, females N=5,377).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 126 women died from colon cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.88. Though, the value of this parameter may vary with an underlying probability of 99% between 0.69 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 ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MIR. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

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

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

Shortcuts

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

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