Munich Cancer Registry

- Survival
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- *Deutsch*

ICD-10 C15-C26: GI cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	116,994
Diseases	121,337
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/bC1526E-ICD-10-C15-C26-GI-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
C15	Oesophagus
C16	Stomach
C17	Small intestine
C18	Colon
C19	Rectosigmoid junction
C20	Rectum
C21	Anus and anal canal
C22	Liver and intrahepatic bile ducts
C23	Gallbladder
C24	Other and unspecified parts of biliary tract
C25	Pancreas
C26	Other and ill-defined digestive organs

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	3258	425	13.0	10.9	8.3	86.2	98.3
1999	3298	463	14.0	11.5	8.1	85.7	97.8
2000	3099	480	15.5	12.1	8.1	85.5	98.1
2001	3381	527	15.6	12.3	8.0	82.3	97.5
2002	5747	1145	19.9	12.5	7.9	85.6	98.3 #
2003	5523	911	16.5	12.7	7.7	82.4	98.0
2004	5575	815	14.6	12.9	7.5	81.6	97.9
2005	5507	773	14.0	13.4	7.3	82.2	97.8
2006	5656	630	11.1	13.8	7.0	79.4	96.7
2007	6391	749	11.7	14.0	6.8	78.5	96.1 #
2008	6396	727	11.4	14.4	6.5	77.0	98.7
2009	6380	692	10.8	14.7	6.2	75.6	98.8
2010	6117	665	10.9	15.0	5.8	74.5	98.7
2011	6108	632	10.3	15.4	5.6	74.0	98.7
2012	6195	645	10.4	15.6	5.2	71.0	98.4
2013	6040	610	10.1	15.9	4.9	68.5	98.3
2014	6101	651	10.7	16.2	4.6	67.9	98.2
2015	6087	625	10.3	16.5	4.2	65.8	97.4
2016	6031	668	11.1	16.7	3.8	63.1	99.5
2017	6019	625	10.4	16.9	3.3	56.9	99.5
2018	4862	303	6.2	17.2	2.9	47.4	99.6
2019	4235	46	1.1	17.3	2.3	42.1	99.7
2020	3331	5	0.2	17.4	1.8	31.3	99.7 ##
1998–2020	121337	13812	11.4	17.4	8.3	71.7	98.3

121,337 cases diagnosed 1998-2020 are related to a total of 116,994 patients. Currently, in 27,817 (23.8 %) of these 116,994 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 22,128 / 4,454 / 1,235 (18.9 % / 3.8 % / 1.1 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 4,862 cases has been diagnosed, of which 17.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.9 % 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	1688	51.8	204	12.1	10.7	9.2	86.6	98.6
1999	1738	52.7	214	12.3	11.0	9.1	86.0	98.0
2000	1661	53.6	204	12.3	11.8	9.0	85.2	98.2
2001	1804	53.4	231	12.8	12.0	8.9	83.2	97.7
2002	3081	53.6	531	17.2	12.2	8.7	86.4	98.6 #
2003	2987	54.1	422	14.1	12.7	8.5	83.6	98.7
2004	3016	54.1	344	11.4	13.0	8.3	83.1	98.1
2005	2985	54.2	354	11.9	13.7	8.0	83.0	98.1
2006	3129	55.3	274	8.8	14.2	7.8	80.0	96.9
2007	3621	56.7	350	9.7	14.5	7.5	79.0	96.2 #
2008	3593	56.2	328	9.1	14.9	7.2	77.5	98.9
2009	3653	57.3	321	8.8	15.2	6.9	76.7	98.9
2010	3477	56.8	299	8.6	15.6	6.5	74.8	98.7
2011	3474	56.9	297	8.5	16.0	6.2	74.4	98.6
2012	3490	56.3	292	8.4	16.4	5.8	72.3	98.7
2013	3471	57.5	276	8.0	16.7	5.4	68.5	98.3
2014	3505	57.4	319	9.1	16.9	5.1	68.2	98.3
2015	3524	57.9	291	8.3	17.2	4.7	66.4	97.9
2016	3500	58.0	330	9.4	17.4	4.3	64.5	99.6
2017	3426	56.9	313	9.1	17.7	3.6	57.7	99.6
2018	2769	57.0	140	5.1	18.0	3.1	48.4	99.6
2019	2489	58.8	23	0.9	18.2	2.4	42.8	99.8
2020	1962	58.9	2	0.1	18.3	2.0	32.4	99.6 ##
1998-2020	68043	56.1	6359	9.3	18.3	9.2	72.1	98.5

68,043 cases diagnosed 1998-2020 are related to a total of 65,222 patients. Currently, in 16,401 (25.1 %) of these 65,222 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 12,922 / 2,662 / 817 (19.8 % / 4.1 % / 1.3 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 2,769 cases has been diagnosed, of which 18.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.1 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	1570	48.2	221	14.1	11.1	7.0	85.9	97.9	
1999	1560	47.3	249	16.0	12.1	7.0	85.3	97.6	
2000	1438	46.4	276	19.2	12.5	6.9	85.9	98.1	
2001	1577	46.6	296	18.8	12.7	6.8	81.2	97.3	
2002	2666	46.4	614	23.0	12.7	6.7	84.6	98.0	#
2003	2536	45.9	489	19.3	12.7	6.6	80.9	97.2	
2004	2559	45.9	471	18.4	12.7	6.4	79.9	97.6	
2005	2522	45.8	419	16.6	13.1	6.2	81.2	97.5	
2006	2527	44.7	356	14.1	13.3	6.0	78.7	96.6	
2007	2770	43.3	399	14.4	13.5	5.8	77.7	96.0	#
2008	2803	43.8	399	14.2	13.8	5.6	76.3	98.5	
2009	2727	42.7	371	13.6	14.0	5.3	74.1	98.6	
2010	2640	43.2	366	13.9	14.3	4.9	74.1	98.8	
2011	2634	43.1	335	12.7	14.6	4.7	73.5	98.7	
2012	2705	43.7	353	13.0	14.8	4.3	69.2	98.1	
2013	2569	42.5	334	13.0	15.0	4.2	68.4	98.3	
2014	2596	42.6	332	12.8	15.3	4.0	67.4	98.0	
2015	2563	42.1	334	13.0	15.5	3.7	65.0	96.8	
2016	2531	42.0	338	13.4	15.7	3.2	61.3	99.5	
2017	2593	43.1	312	12.0	15.9	3.0	55.8	99.4	
2018	2093	43.0	163	7.8	16.1	2.5	46.0	99.7	
2019	1746	41.2	23	1.3	16.3	2.0	41.1	99.5	
2020	1369	41.1	3	0.2	16.4	1.4	29.7	99.8	##
1998-2020	53294	43.9	7453	14.0	16.4	7.0	71.1	98.1	

53,294 cases diagnosed 1998-2020 are related to a total of 51,772 patients. Currently, in 11,416 (22.1 %) of these 51,772 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 9,206 / 1,792 / 418 (17.8 % / 3.5 % / 0.8 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 2,093 cases has been diagnosed, of which 16.1 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.5 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 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	1688	1570	152.3	133.5	91.6	55.6	138.3	84.4	181.1	111.8
1999	1738	1560	155.3	131.5	91.8	53.8	139.2	81.9	183.0	108.9
2000	1661	1438	145.8	119.7	85.6	48.0	129.6	73.9	167.9	98.4
2001	1804	1577	155.7	129.6	91.0	54.6	136.8	82.5	176.3	107.6
2002	3081	2666	165.4	136.2	92.7	54.1	139.8	82.5	181.6	109.1
2003	2987	2536	159.3	128.7	87.6	51.7	132.2	78.5	172.1	102.7
2004	3016	2559	160.3	129.5	86.4	53.1	130.3	79.6	169.7	103.3
2005	2985	2522	157.6	126.7	83.3	49.8	125.2	75.2	163.0	99.0
2006	3129	2527	163.4	125.8	85.8	50.1	128.5	75.4	166.4	98.8
2007	3621	2770	163.5	120.0	85.6	47.3	127.7	71.2	165.2	92.9
2008	3593	2803	161.4	120.8	82.2	47.3	123.0	71.1	159.5	92.7
2009	3653	2727	163.7	117.3	81.4	45.5	122.1	68.5	158.7	89.7
2010	3477	2640	154.3	112.8	76.5	42.7	114.5	64.6	147.9	85.3
2011	3474	2634	155.3	112.7	74.8	43.8	112.2	65.5	145.8	84.5
2012	3490	2705	153.8	114.6	74.6	45.4	111.3	67.1	142.8	86.9
2013	3471	2569	150.8	107.8	71.8	42.2	107.2	62.7	138.4	81.0
2014	3505	2596	150.3	107.8	71.0	41.9	105.9	62.2	136.8	79.9
2015	3524	2563	148.1	105.3	69.8	40.0	104.1	59.8	134.4	77.5
2016	3500	2531	145.6	103.1	68.8	39.6	101.8	59.0	131.5	76.2
2017	3426	2593	142.0	105.2	64.5	41.4	96.8	61.1	125.9	78.3
2018	2769	2093	113.7	84.3	53.0	34.0	78.4	49.9	100.5	63.3
2019	2489	1746	102.2	70.3	48.5	29.2	71.3	42.4	90.6	53.8
2020	1962	1369	80.6	55.1	38.7	22.9	56.5	33.1	71.6	42.1
1998-2020	68043	53294	146.3	110.4	73.3	43.5	109.2	65.0	140.6	84.4

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	3258	70.3	12.7	13.2	102	53.5	61.1	71.6	79.4	86.3
1999	3298	70.7	12.6	10.8	102	54.6	62.1	71.7	79.7	86.6
2000	3099	70.7	12.5	21.7	103	54.3	61.8	71.8	79.6	87.0
2001	3381	70.2	12.7	14.5	103	54.0	61.7	70.7	79.6	86.7
2002	5747	71.1	12.3	17.7	104	55.0	62.7	72.0	80.2	87.0
2003	5523	71.1	12.1	8.4	101	55.6	63.1	71.8	80.2	86.2
2004	5575	70.7	12.3	3.1	101	54.7	62.9	71.1	79.9	85.5
2005	5507	71.3	12.3	1.0	100	55.9	63.7	71.6	80.3	85.9
2006	5656	70.8	12.2	12.3	102	54.9	63.2	71.4	80.0	85.6
2007	6391	70.8	12.5	0.3	103	54.2	63.4	71.4	80.2	86.0
2008	6396	71.2	12.4	1.1	105	54.9	63.8	71.8	80.3	86.3
2009	6380	71.2	12.3	1.4	102	54.5	63.8	72.0	80.2	86.3
2010	6117	71.3	12.4	0.8	103	54.5	63.6	72.1	80.7	86.1
2011	6108	71.4	12.6	0.7	101	54.2	63.9	72.4	80.7	86.7
2012	6195	71.0	12.6	0.0	101	54.4	63.5	72.4	79.9	86.1
2013	6040	71.1	12.7	0.6	105	54.1	63.5	72.8	79.8	86.2
2014	6101	71.4	12.7	0.4	103	54.0	63.8	73.2	80.2	86.6
2015	6087	71.4	12.7	7.0	105	53.8	63.7	73.4	80.1	86.5
2016	6031	71.3	12.9	2.0	104	53.6	63.4	73.3	80.3	86.2
2017	6019	71.4	12.5	2.1	99.7	54.4	63.5	73.5	80.1	86.0
2018	4862	70.8	12.4	14.3	105	54.1	62.5	72.5	79.7	85.0
2019	4235	70.0	12.6	17.7	100	52.9	61.7	71.9	79.3	84.2
2020	3331	69.7	12.7	0.0	101	52.8	61.5	71.5	79.3	84.0
1998-2020	121337	71.0	12.5	0.0	105	54.3	63.0	72.2	80.1	86.1

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	1688	67.9	12.1	16.5	98.1	52.3	58.9	68.6	76.7	84.0
1999	1738	68.3	11.9	10.8	97.4	53.9	60.2	68.9	76.9	83.7
2000	1661	68.5	11.6	25.1	97.8	53.8	60.4	68.6	76.8	84.3
2001	1804	68.1	11.8	14.5	102	53.6	60.6	67.9	76.7	83.5
2002	3081	68.9	11.3	20.9	98.5	54.4	61.6	69.2	76.7	82.7
2003	2987	69.2	11.3	8.4	99.4	55.0	62.4	69.3	76.9	83.0
2004	3016	69.1	11.3	22.5	101	54.4	62.0	69.2	77.1	83.7
2005	2985	69.2	11.3	19.0	99.6	55.0	62.5	69.3	77.3	83.4
2006	3129	69.0	11.3	12.3	102	54.7	62.2	69.3	77.1	83.0
2007	3621	68.9	11.7	0.3	99.4	53.8	62.0	69.4	77.5	83.2
2008	3593	69.4	11.4	6.5	105	54.5	62.7	70.1	77.7	83.4
2009	3653	69.6	11.5	1.4	102	54.1	62.7	70.7	77.8	83.4
2010	3477	69.6	11.6	0.8	98.9	54.3	62.1	70.6	78.1	83.8
2011	3474	70.1	11.6	0.8	97.3	54.2	63.4	71.4	78.2	84.2
2012	3490	69.9	11.5	0.0	101	54.9	62.7	71.2	77.8	83.8
2013	3471	70.0	11.9	0.6	99.8	54.3	62.9	71.8	78.2	84.2
2014	3505	70.4	12.0	0.4	102	54.0	63.0	72.0	78.7	84.8
2015	3524	70.2	12.0	9.2	105	53.4	62.7	72.1	78.7	84.3
2016	3500	70.2	12.4	9.4	104	53.4	62.7	72.2	79.1	84.5
2017	3426	70.9	11.7	12.9	99.7	54.5	63.1	72.9	79.3	84.3
2018	2769	70.2	11.8	14.3	98.8	54.5	62.1	71.7	78.9	83.7
2019	2489	69.5	12.1	17.9	98.5	53.3	61.4	71.4	78.3	83.4
2020	1962	69.1	12.1	18.5	100	52.9	61.3	70.5	78.7	82.9
1998–2020	68043	69.5	11.7	0.0	105	54.1	62.1	70.5	78.0	83.7

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	1570	72.9	12.8	13.2	102	54.6	64.3	75.0	82.9	87.6
1999	1560	73.4	12.9	18.8	102	55.9	64.7	75.4	82.9	88.5
2000	1438	73.2	13.0	21.7	103	55.5	64.1	75.8	82.4	88.5
2001	1577	72.6	13.3	26.4	103	54.9	63.4	74.7	81.8	89.0
2002	2666	73.6	12.9	17.7	104	55.8	64.9	75.9	82.4	89.0
2003	2536	73.3	12.6	10.9	101	56.3	64.4	75.3	82.7	88.6
2004	2559	72.6	13.1	3.1	100	55.1	64.3	74.3	82.8	88.0
2005	2522	73.7	13.0	1.0	100	57.1	65.4	75.5	83.1	89.6
2006	2527	73.0	12.9	20.4	99.2	55.0	64.9	75.0	83.1	87.4
2007	2770	73.2	12.9	13.4	103	55.1	65.6	74.7	83.2	87.7
2008	2803	73.4	13.3	1.1	102	55.4	65.3	74.7	83.7	88.3
2009	2727	73.3	13.1	15.9	102	55.1	65.4	75.0	83.3	88.2
2010	2640	73.5	13.0	14.9	103	55.4	66.4	75.2	83.3	88.1
2011	2634	73.0	13.6	0.7	101	54.3	64.8	74.5	83.5	88.7
2012	2705	72.4	13.8	1.5	101	53.7	64.8	74.4	82.7	88.3
2013	2569	72.5	13.6	2.7	105	53.6	64.8	74.4	82.5	88.4
2014	2596	72.7	13.5	0.4	103	54.0	65.1	74.7	82.7	88.6
2015	2563	73.1	13.3	7.0	101	54.6	65.8	75.2	82.5	89.0
2016	2531	72.7	13.4	2.0	102	54.0	64.5	75.3	82.0	88.2
2017	2593	72.1	13.5	2.1	99.0	54.1	64.0	74.6	81.6	87.4
2018	2093	71.6	13.0	19.3	105	53.7	63.0	73.7	80.9	86.9
2019	1746	70.7	13.2	17.7	100	52.0	62.7	73.0	80.4	85.3
2020	1369	70.5	13.4	0.0	101	52.7	62.0	72.9	80.5	84.9
1998–2020	53294	72.8	13.2	0.0	105	54.7	64.7	74.8	82.6	88.2

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	24	0.0	0.0	11	0.0	0.0	13	0.0	0.0
5-9	9	0.0	0.0	7	0.0	0.0	2	0.0	0.0
10-14	10	0.0	0.1	3	0.0	0.0	7	0.0	0.1
15-19	62	0.1	0.1	19	0.0	0.1	43	0.1	0.2
20-24	103	0.1	0.3	52	0.1	0.2	51	0.1	0.3
25-29	161	0.2	0.5	77	0.2	0.4	84	0.2	0.6
30-34	327	0.4	0.9	172	0.4	0.7	155	0.5	1.0
35-39	542	0.7	1.5	284	0.6	1.4	258	0.8	1.8
40-44	1105	1.4	2.9	610	1.3	2.7	495	1.4	3.2
45-49	2377	3.0	5.9	1377	3.0	5.7	1000	2.9	6.1
50-54	4209	5.2	11.1	2562	5.6	11.3	1647	4.8	10.9
55-59	5996	7.5	18.6	3805	8.3	19.5	2191	6.4	17.3
60-64	8021	10.0	28.6	5210	11.3	30.9	2811	8.2	25.5
65-69	10684	13.3	41.9	6861	14.9	45.8	3823	11.1	36.6
70-74	13145	16.4	58.3	8081	17.6	63.4	5064	14.7	51.4
75-79	13213	16.5	74.7	7689	16.7	80.1	5524	16.1	67.5
80-84	10549	13.1	87.8	5468	11.9	92.0	5081	14.8	82.3
85+	9756	12.2	100.0	3666	8.0	100.0	6090	17.7	100.0
All ages	80293	100.0		45954	100.0		34339	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=3504 %	Females DCO rate n=4017 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4	11	13	0.7	0.8	9.1	23.1	5.0	7.6
5- 9	7	2	0.4	0.1			6.0	2.0
10-14	3	7	0.2	0.5			2.2	5.5
15-19	19	43	1.1	2.7			6.0	16.2
20-24	52	51	2.6	2.7	3.8		8.3	9.8
25-29	74	84	3.3	3.7			7.8	7.1
30-34	171	154	7.4	6.8	0.6	1.3	13.2	7.2
35-39	278	255	12.0	11.2	2.2	2.7	15.2	7.3
40-44	606	493	24.2	20.4	0.5	0.8	21.7	8.0
45-49	1358	987	50.6	37.9	1.7	0.7	26.9	10.5
50-54	2519	1637	98.8	65.2	3.7	2.1	29.8	13.1
55-59	3744	2163	176.4	99.3	3.1	2.2	29.5	16.2
60-64	5099	2774	288.4	146.1	3.9	3.6	29.0	17.8
65-69	6683	3756	409.4	207.1	5.0	4.2	27.5	19.8
70-74	7861	4969	524.3	289.0	5.8	5.8	28.7	25.0
75-79	7491	5406	619.1	360.0	8.2	8.7	31.2	27.7
80-84	5298	5002	731.6	469.9	13.2	16.1	34.5	32.5
85+	3580	5997	766.6	575.2	26.7	34.9	34.1	36.6
All ages	44854	33793			7.8	11.9	29.2	21.8
Incidence								
Raw			137.7	100.6				
WS			66.3	39.4				
ES			98.6	58.5				
BRD-S			126.7	75.5				

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

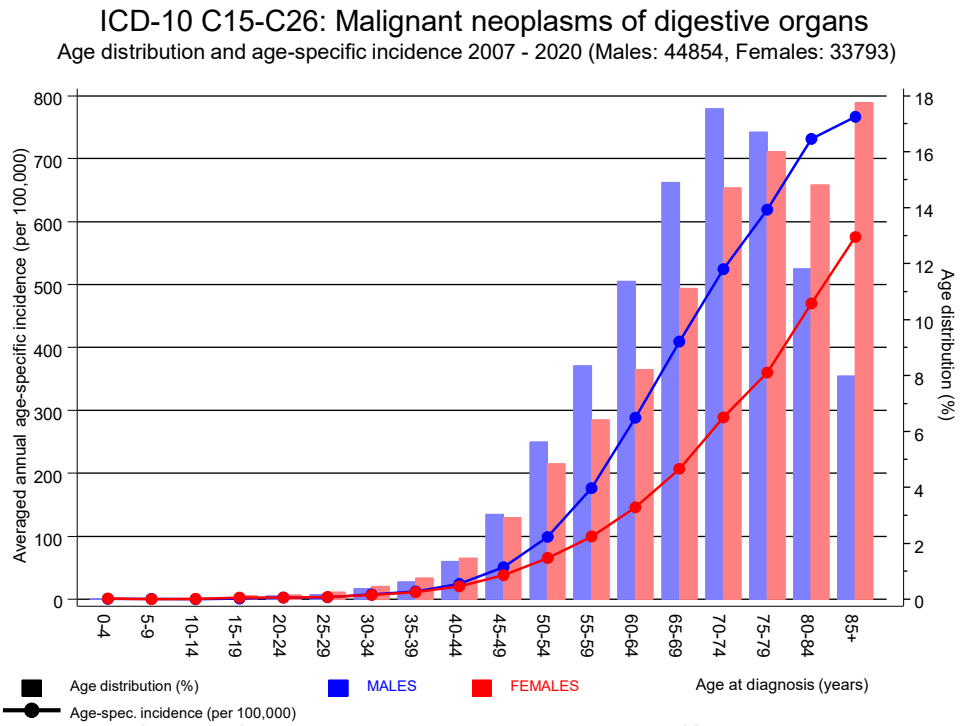


Figure 6. Age distribution (males: mean=69.8 yrs, median=71.2 yrs; females: mean=72.6 yrs, median=74.5 yrs) and age-specific incidence.

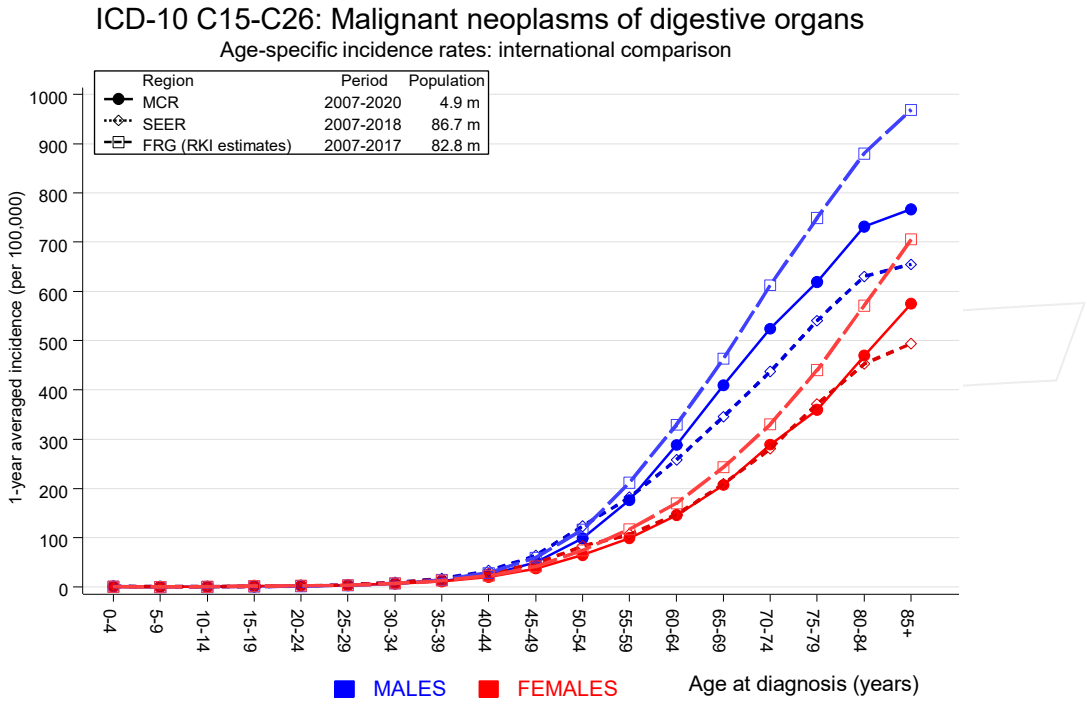


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

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	8	3.5	2.3	1.0	4.5		0.3	
C03–C06	Oral cavity	63	22.8	2.8	2.1	3.5	#	2.3	4.8
C07–C08	Salivary gland	11	7.5	1.5	0.7	2.6		0.2	
C09–C10	Oropharynx	82	27.6	3.0	2.4	3.7	#	3.2	3.7
C12–C13	Hypopharynx	58	14.9	3.9	2.9	5.0	#	2.5	3.4
C15	Oesophagus	174	57.7	3.0	2.6	3.5	#	6.7	7.5
C16	Stomach	343	125.7	2.7	2.4	3.0	#	12.6	7.9
C17	Small intestine	146	18.0	8.1	6.8	9.5	#	7.4	0.7
C18	Colon	1062	306.5	3.5	3.3	3.7	#	43.7	3.4
C19–C20	Rectum	408	159.6	2.6	2.3	2.8	#	14.4	2.9
C21	Anus/canal	22	7.0	3.1	2.0	4.7	#	0.9	4.5
C22	Liver	235	87.5	2.7	2.4	3.1	#	8.5	15.3
C23–C24	Bile	81	33.1	2.4	1.9	3.0	#	2.8	14.8
C25	Pancreas	291	121.7	2.4	2.1	2.7	#	9.8	22.3
C30–C31	Sinuses	7	5.4	1.3	0.5	2.7		0.1	
C32	Larynx	63	28.6	2.2	1.7	2.8	#	2.0	7.9
C33–C34	Lung	889	355.2	2.5	2.3	2.7	#	30.9	14.6
C38,C45	Mesothelioma	34	21.4	1.6	1.1	2.2	#	0.7	11.8
C43	Malign. melanoma	247	134.6	1.8	1.6	2.1	#	6.5	2.8
C46,C49	Soft tissue	40	17.7	2.3	1.6	3.1	#	1.3	2.5
C50	Breast	24	8.4	2.8	1.8	4.2	#	0.9	20.8
C60	Penis	15	7.8	1.9	1.1	3.2	#	0.4	13.3
C61	Prostate	1434	867.4	1.7	1.6	1.7	#	32.8	9.2
C62	Testis	15	6.1	2.4	1.4	4.0	#	0.5	13.3
C64	Kidney	312	102.7	3.0	2.7	3.4	#	12.1	9.3
C65	Renal pelvis	41	14.1	2.9	2.1	4.0	#	1.6	
C66	Ureter	25	8.4	3.0	1.9	4.4	#	1.0	
C67	Bladder	318	151.8	2.1	1.9	2.3	#	9.6	8.2
C68	Urethra	10	2.9	3.4	1.6	6.3	#	0.4	
C70–C72	CNS cancer	64	37.3	1.7	1.3	2.2	#	1.5	21.9
C73	Thyroid	41	17.5	2.3	1.7	3.2	#	1.4	7.3
C76–C79	CUP	92	52.7	1.7	1.4	2.1	#	2.3	1.1
C81	Hodgkin lymphoma	13	6.6	2.0	1.1	3.4	#	0.4	7.7
C82–C85	NHL	278	131.3	2.1	1.9	2.4	#	8.5	5.8
C90	Mult. myeloma	69	41.0	1.7	1.3	2.1	#	1.6	20.3
C91–C96	Leukaemia	98	48.2	2.0	1.7	2.5	#	2.9	23.5
Others, specified		47	30.7	1.5	1.1	2.0	#	0.9	29.8
Not observed		0	0.2	0.0	0.0	16.5		−0.0	
All further malignancies		7160	3091.2	2.3	2.3	2.4	#	235.6	8.9

Patients	60557
Median age at next malignancy (years)	73.8
Person-years	172712
Mean observation time (years)	2.9
Median observation time (years)	1.2

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 6 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	19	9.3	2.0	1.2	3.2	#	0.7	
C09–C10	Oropharynx	26	5.9	4.4	2.9	6.4	#	1.5	7.7
C12–C13	Hypopharynx	7	1.5	4.6	1.8	9.5	#	0.4	14.3
C15	Oesophagus	29	10.9	2.7	1.8	3.8	#	1.3	20.7
C16	Stomach	181	66.1	2.7	2.4	3.2	#	8.5	14.4
C17	Small intestine	77	8.6	8.9	7.0	11.2	#	5.1	1.3
C18	Colon	650	184.7	3.5	3.3	3.8	#	34.4	6.3
C19–C20	Rectum	194	71.7	2.7	2.3	3.1	#	9.0	4.6
C21	Anus/canal	20	9.2	2.2	1.3	3.4	#	0.8	
C22	Liver	62	22.3	2.8	2.1	3.6	#	2.9	32.3
C23–C24	Bile	56	27.1	2.1	1.6	2.7	#	2.1	14.3
C25	Pancreas	209	87.1	2.4	2.1	2.7	#	9.0	26.8
C26	GI cancer	7	3.8	1.9	0.7	3.8		0.2	57.1
C32	Larynx	11	2.8	3.9	2.0	7.0	#	0.6	
C33–C34	Lung	415	122.8	3.4	3.1	3.7	#	21.6	11.3
C43	Malign. melanoma	131	61.0	2.1	1.8	2.5	#	5.2	4.6
C46,C49	Soft tissue	21	9.9	2.1	1.3	3.3	#	0.8	
C48	Peritoneal	23	6.5	3.5	2.2	5.3	#	1.2	26.1
C50	Breast	982	485.0	2.0	1.9	2.2	#	36.7	7.7
C51	Vulva	47	19.6	2.4	1.8	3.2	#	2.0	2.1
C52	Vagina	14	3.5	4.0	2.2	6.8	#	0.8	7.1
C53	Cervix uteri	47	19.4	2.4	1.8	3.2	#	2.0	23.4
C54	Corpus uteri	186	90.0	2.1	1.8	2.4	#	7.1	3.8
C55,C57	Fem. genitals un	8	4.9	1.6	0.7	3.2		0.2	37.5
C56	Ovary	207	67.2	3.1	2.7	3.5	#	10.3	25.6
C64	Kidney	143	40.7	3.5	3.0	4.1	#	7.6	15.4
C65	Renal pelvis	17	5.7	3.0	1.7	4.8	#	0.8	
C66	Ureter	9	3.0	3.0	1.4	5.6	#	0.4	11.1
C67	Bladder	80	38.3	2.1	1.7	2.6	#	3.1	21.3
C70–C72	CNS cancer	28	21.5	1.3	0.9	1.9		0.5	39.3
C73	Thyroid	43	22.0	2.0	1.4	2.6	#	1.6	7.0
C76–C79	CUP	40	35.4	1.1	0.8	1.5		0.3	5.0
C81	Hodgkin lymphoma	8	2.8	2.8	1.2	5.6	#	0.4	12.5
C82–C85	NHL	143	69.5	2.1	1.7	2.4	#	5.4	11.9
C90	Mult. myeloma	42	22.0	1.9	1.4	2.6	#	1.5	21.4
C91–C96	Leukaemia	64	26.5	2.4	1.9	3.1	#	2.8	45.3
	Others, specified	43	25.3	1.7	1.2	2.3	#	1.3	16.3
	Not observed	0	1.1	0.0	0.0	3.4		−0.1	
	All further malignancies	4289	1714.7	2.5	2.4	2.6	#	190.4	11.8

Patients	46354
Median age at next malignancy (years)	75.8
Person-years	135236
Mean observation time (years)	2.9
Median observation time (years)	1.1

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 6 are pooled in category “Others, specified”.

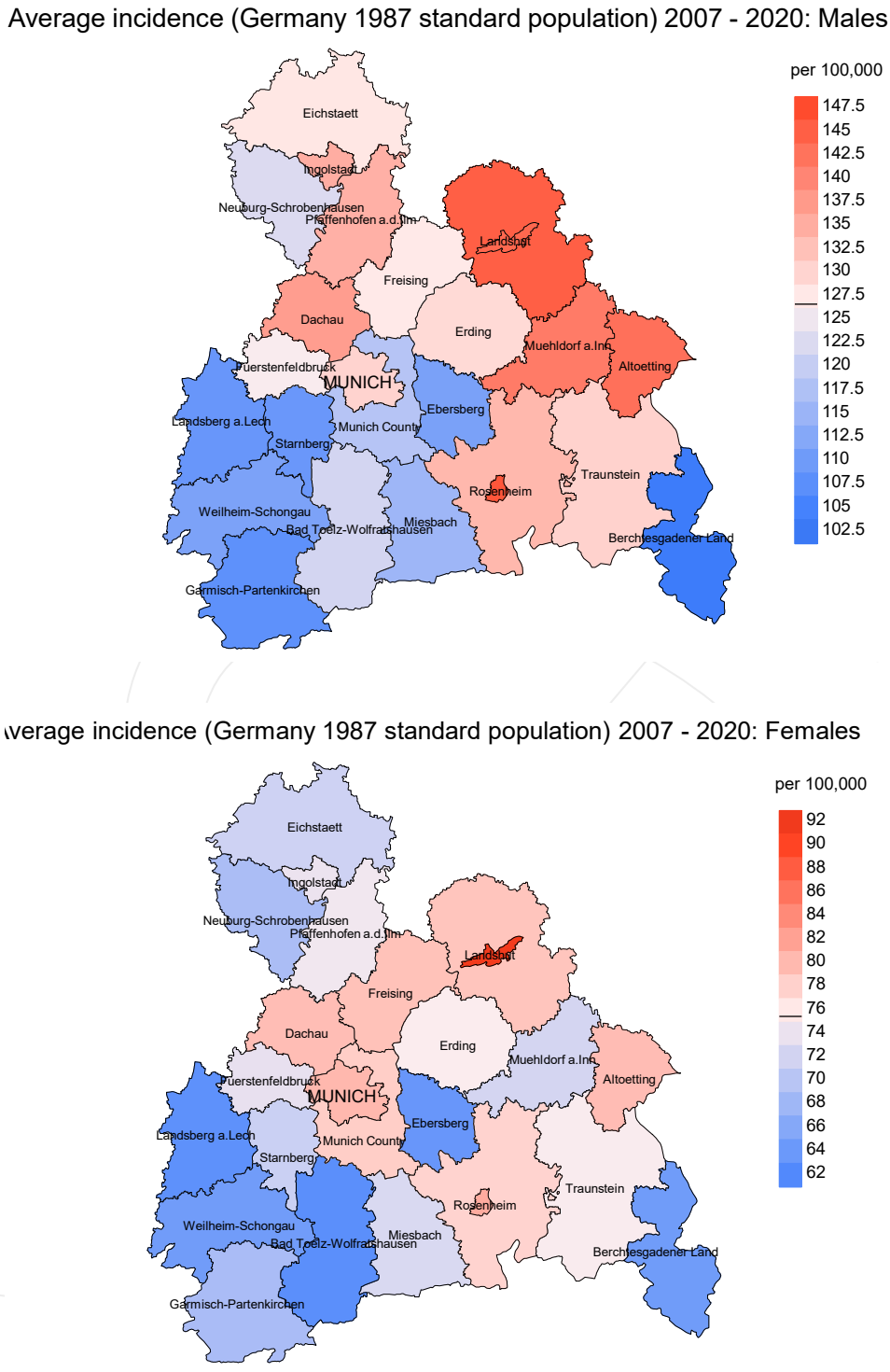
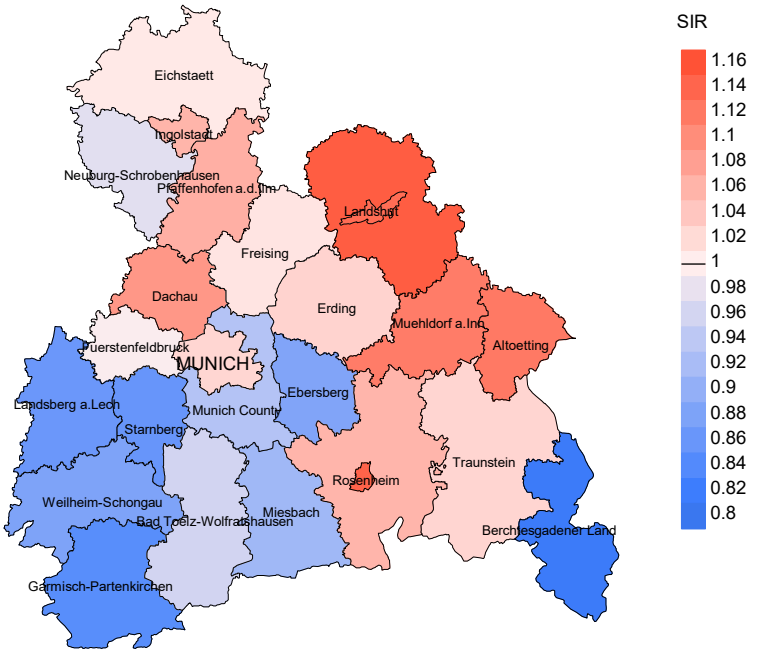


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 126.7/100,000 WS N=44,854, females 75.5/100,000 WS N=33,793).

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 765 women were identified with newly diagnosed GI cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 63.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 57.9 and 70.1/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

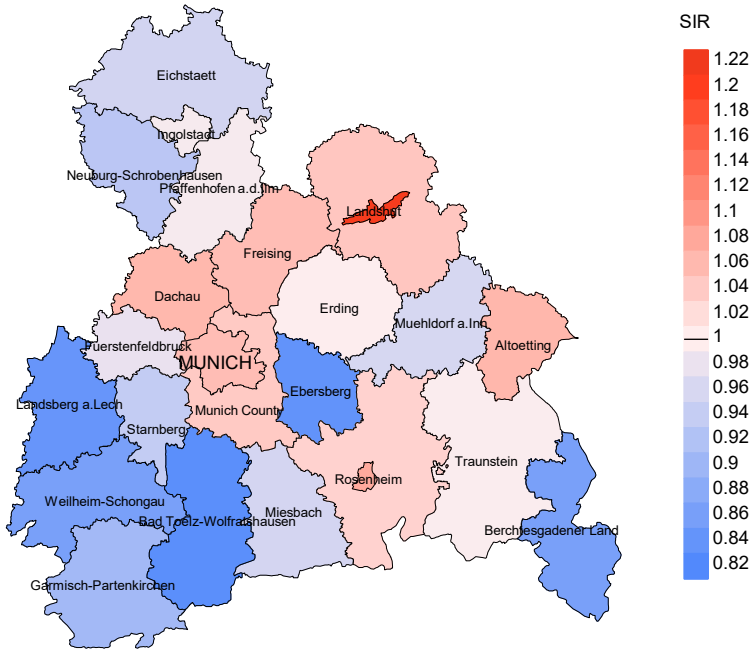


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=44,854, females N=33,793).

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 765 women were identified with newly diagnosed GI cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.84. Though, the value of this parameter may vary with an underlying probability of 99% between 0.76 and 0.92.

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	3258	98.3	13.0	2809	86.2	93.1
1999	3298	97.8	14.0	2825	85.7	94.2
2000	3099	98.1	15.5	2650	85.5	96.0
2001	3381	97.5	15.6	2781	82.3	95.3
2002	5747	98.3	19.9	4917	85.6	96.8
2003	5523	98.0	16.5	4549	82.4	96.9
2004	5575	97.9	14.6	4549	81.6	96.4
2005	5507	97.8	14.0	4528	82.2	97.3
2006	5656	96.7	11.1	4493	79.4	97.4
2007	6391	96.1	11.7	5014	78.5	97.1
2008	6396	98.7	11.4	4923	77.0	96.5
2009	6380	98.8	10.8	4821	75.6	96.9
2010	6117	98.7	10.9	4557	74.5	95.9
2011	6108	98.7	10.3	4518	74.0	96.0
2012	6195	98.4	10.4	4397	71.0	95.6
2013	6040	98.3	10.1	4135	68.5	94.8
2014	6101	98.2	10.7	4141	67.9	94.0
2015	6087	97.4	10.3	4007	65.8	92.9
2016	6031	99.5	11.1	3807	63.1	91.1
2017	6019	99.5	10.4	3425	56.9	84.2
2018	4862	99.6	6.2	2303	47.4	64.9
2019	4235	99.7	1.1	1783	42.1	79.9
2020	3331	99.7	0.2	1042	31.3	93.9
1998–2020	121337	98.3	11.4	86974	71.7	94.0

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	3258	2178	92.5	974	29.9
1999	3298	2262	92.1	1011	30.7
2000	3099	2205	95.1	922	29.8
2001	3381	2356	95.5	1004	29.7
2002	5747	3373	98.2	1968	34.2
2003	5523	3456	97.8	1680	30.4
2004	5575	3517	98.1	1613	28.9
2005	5507	3716	97.0	1606	29.2
2006	5656	3870	97.7	1606	28.4
2007	6391	4098	98.0	1759	27.5
2008	6396	4257	98.6	1829	28.6
2009	6380	4324	98.7	1713	26.8
2010	6117	4438	98.7	1674	27.4
2011	6108	4500	98.3	1707	27.9
2012	6195	4559	98.4	1734	28.0
2013	6040	4430	98.0	1577	26.1
2014	6101	4506	98.0	1693	27.7
2015	6087	4728	98.1	1671	27.5
2016	6031	4679	98.4	1745	28.9
2017	6019	4734	97.4	1630	27.1
2018	4862	3863	67.8	974	20.0
2019	4235	3465	45.0	763	18.0
2020	3331	3848	92.2	603	18.1
1998–2020	121337	87362	94.0	33456	27.6

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 4.94 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	2178	76.3	23.7	91.3
1999	2262	80.0	20.0	91.6
2000	2205	81.7	18.3	91.2
2001	2356	78.4	21.6	91.0
2002	3373	82.9	17.1	91.8
2003	3456	81.9	18.1	91.2
2004	3517	83.4	16.6	91.0
2005	3716	81.3	18.7	89.1
2006	3870	81.4	18.6	89.6
2007	4098	80.8	19.2	89.2
2008	4257	81.3	18.7	88.5
2009	4324	79.9	20.1	87.5
2010	4438	78.2	21.8	86.6
2011	4500	78.1	21.9	86.7
2012	4559	77.5	22.5	86.1
2013	4430	75.6	24.4	83.4
2014	4506	75.7	24.3	84.8
2015	4728	74.1	25.9	82.9
2016	4679	73.2	26.8	83.0
2017	4734	73.5	26.5	81.5
2018	3863	62.2	37.8	72.9
2019	3465	56.5	43.5	75.7
2020	3848	61.0	39.0	72.9
1998-2020	87362	76.1	23.9	86.0

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	1104	72.5	70.8	78.4	72.2
1999	1183	72.3	70.6	77.9	71.8
2000	1157	72.8	70.9	80.7	71.9
2001	1222	71.9	70.1	79.5	71.1
2002	1793	72.3	70.7	79.9	71.7
2003	1887	72.6	71.2	78.9	72.2
2004	1880	73.6	71.8	80.5	72.7
2005	2029	73.0	71.2	80.3	71.6
2006	2151	73.7	71.8	80.1	72.6
2007	2281	73.2	72.0	80.2	72.5
2008	2376	74.2	72.7	80.5	73.2
2009	2432	73.6	71.9	80.0	72.5
2010	2473	74.2	72.8	81.2	73.5
2011	2576	74.2	72.5	81.8	73.3
2012	2568	74.9	73.2	81.0	73.8
2013	2498	75.7	73.6	82.8	74.4
2014	2556	75.7	74.5	81.2	75.0
2015	2695	76.6	74.5	82.6	75.3
2016	2755	76.8	74.9	82.2	75.7
2017	2721	77.3	75.3	83.4	75.9
2018	2269	77.5	75.0	81.2	76.4
2019	2108	77.8	74.1	81.5	75.5
2020	2362	78.4	74.7	82.9	75.8
1998–2020	49076	75.0	72.9	81.3	73.7

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

Table 10b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	1074	78.2	76.3	84.3	78.3
1999	1079	79.5	78.0	84.9	79.2
2000	1048	79.2	78.0	85.3	78.8
2001	1134	79.4	77.2	86.6	78.7
2002	1580	79.8	78.6	85.8	79.3
2003	1569	79.6	77.8	85.6	78.7
2004	1637	79.8	78.2	84.8	78.8
2005	1687	79.8	78.1	84.9	78.8
2006	1719	80.2	78.4	85.8	79.2
2007	1817	80.0	77.8	86.4	78.9
2008	1881	80.3	78.1	86.4	79.1
2009	1892	80.7	78.2	86.9	79.0
2010	1965	80.9	78.3	86.7	79.4
2011	1924	80.8	77.8	87.6	78.8
2012	1991	80.5	77.3	87.7	78.2
2013	1932	80.6	77.2	87.8	78.6
2014	1950	80.4	77.5	87.3	78.7
2015	2033	80.1	77.4	88.3	78.2
2016	1924	80.3	77.7	88.0	78.6
2017	2013	80.7	78.1	88.3	78.9
2018	1594	80.3	77.1	86.6	77.8
2019	1357	79.8	76.2	84.2	77.8
2020	1486	81.1	77.2	87.2	78.0
1998–2020	38286	80.2	77.7	86.7	78.8

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	846	76.4	0.51	44.8	0.49	69.7	0.51	94.2	0.53
1999	955	85.3	0.56	49.5	0.54	77.0	0.56	104.5	0.58
2000	949	83.3	0.58	47.6	0.56	74.3	0.58	100.0	0.60
2001	982	84.7	0.55	48.5	0.54	75.1	0.56	99.0	0.57
2002	1486	79.8	0.49	43.9	0.48	67.5	0.49	89.5	0.50
2003	1567	83.6	0.53	44.7	0.52	69.2	0.53	93.0	0.55
2004	1585	84.2	0.53	43.4	0.51	67.9	0.53	92.8	0.55
2005	1683	88.9	0.58	45.3	0.55	69.6	0.57	94.3	0.59
2006	1754	91.6	0.57	45.6	0.54	71.1	0.57	96.3	0.59
2007	1864	84.1	0.53	41.2	0.49	63.9	0.51	86.7	0.54
2008	1975	88.7	0.56	42.7	0.53	66.5	0.55	90.6	0.58
2009	1970	88.3	0.55	42.5	0.53	65.2	0.54	86.4	0.55
2010	1958	86.9	0.58	40.3	0.54	62.3	0.56	84.2	0.58
2011	2038	91.1	0.60	42.3	0.58	65.2	0.59	86.5	0.61
2012	2015	88.8	0.59	40.2	0.55	62.1	0.57	83.5	0.60
2013	1936	84.1	0.57	37.5	0.54	58.1	0.56	78.0	0.58
2014	1947	83.5	0.57	36.4	0.53	56.4	0.55	76.0	0.57
2015	2000	84.1	0.58	36.5	0.54	56.5	0.56	76.1	0.58
2016	2052	85.4	0.60	36.3	0.54	56.4	0.57	76.3	0.59
2017	2015	83.5	0.60	35.3	0.56	54.8	0.58	73.3	0.60
2018	1432	58.8	0.53	24.8	0.48	38.2	0.50	51.3	0.52
2019	1187	48.8	0.49	20.9	0.44	32.0	0.46	42.8	0.48
2020	1450	59.6	0.76	25.3	0.67	38.8	0.70	52.1	0.74
1998-2020	37646	80.9	0.57	38.1	0.53	58.8	0.55	78.7	0.57

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	818	69.5	0.53	26.9	0.49	42.0	0.50	57.5	0.52
1999	857	72.2	0.56	26.4	0.50	41.8	0.52	57.9	0.54
2000	853	71.0	0.60	25.9	0.54	41.1	0.56	56.0	0.58
2001	865	71.1	0.56	26.8	0.50	42.2	0.52	57.3	0.54
2002	1311	67.0	0.50	23.8	0.44	37.5	0.46	51.4	0.48
2003	1264	64.2	0.50	23.5	0.46	36.9	0.47	50.1	0.49
2004	1351	68.3	0.54	23.9	0.46	37.9	0.48	52.0	0.51
2005	1339	67.3	0.54	23.9	0.49	37.5	0.51	50.8	0.52
2006	1399	69.6	0.56	23.8	0.48	37.6	0.50	52.1	0.53
2007	1454	63.0	0.53	22.6	0.48	35.1	0.50	47.4	0.52
2008	1489	64.2	0.54	22.2	0.48	34.9	0.50	47.3	0.52
2009	1485	63.9	0.55	21.8	0.49	34.2	0.51	46.6	0.53
2010	1515	64.7	0.58	21.7	0.51	34.1	0.53	46.3	0.55
2011	1480	63.3	0.57	21.3	0.49	33.2	0.51	45.1	0.54
2012	1522	64.5	0.57	22.0	0.49	34.2	0.52	46.2	0.54
2013	1416	59.4	0.56	20.2	0.48	31.4	0.51	42.3	0.53
2014	1463	60.8	0.57	20.0	0.49	31.3	0.51	42.4	0.54
2015	1505	61.8	0.60	20.5	0.52	32.1	0.55	43.3	0.57
2016	1377	56.1	0.55	18.5	0.48	29.0	0.50	39.3	0.53
2017	1465	59.4	0.58	18.9	0.47	29.8	0.50	41.0	0.53
2018	981	39.5	0.48	13.5	0.40	20.8	0.42	27.9	0.45
2019	785	31.6	0.46	11.4	0.40	17.3	0.41	23.0	0.43
2020	903	36.4	0.67	12.6	0.56	19.2	0.59	25.6	0.62
1998-2020	28897	59.9	0.55	20.6	0.48	32.2	0.50	43.6	0.52

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	4	0.0	0.0	2	0.0	0.0	2	0.0	0.0
5-9	1	0.0	0.0	1	0.0	0.0			0.0
10-14	3	0.0	0.0	3	0.0	0.0			0.0
15-19	6	0.0	0.0	4	0.0	0.0	2	0.0	0.0
20-24	13	0.0	0.1	6	0.0	0.1	7	0.0	0.1
25-29	32	0.1	0.1	16	0.1	0.1	16	0.1	0.1
30-34	76	0.2	0.3	38	0.1	0.3	38	0.2	0.3
35-39	147	0.3	0.6	85	0.3	0.6	62	0.3	0.7
40-44	351	0.8	1.4	206	0.8	1.4	145	0.8	1.4
45-49	825	1.8	3.3	492	1.9	3.3	333	1.8	3.2
50-54	1574	3.5	6.8	1012	3.9	7.2	562	3.0	6.2
55-59	2613	5.8	12.6	1713	6.6	13.8	900	4.8	11.0
60-64	3775	8.4	21.1	2516	9.7	23.6	1259	6.7	17.7
65-69	5438	12.2	33.3	3578	13.8	37.4	1860	9.9	27.5
70-74	7209	16.1	49.4	4514	17.5	54.9	2695	14.3	41.8
75-79	7878	17.6	67.0	4711	18.2	73.1	3167	16.8	58.6
80-84	7126	15.9	83.0	3859	14.9	88.1	3267	17.3	76.0
85+	7608	17.0	100.0	3083	11.9	100.0	4525	24.0	100.0
All ages	44679	100.0		25839	100.0		18840	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	2	2	0.1	0.18	0.1	0.15	10.5	12.5
5- 9	1		0.1	0.14			3.6	
10-14	3		0.2	1.00			10.7	
15-19	4	2	0.2	0.21	0.1	0.05	8.3	8.0
20-24	6	7	0.3	0.12	0.4	0.14	8.2	16.3
25-29	16	16	0.7	0.22	0.7	0.19	17.2	16.2
30-34	38	38	1.6	0.22	1.7	0.25	26.6	21.0
35-39	85	62	3.7	0.31	2.7	0.24	31.8	15.2
40-44	206	145	8.2	0.34	6.0	0.29	34.0	17.0
45-49	492	333	18.3	0.36	12.8	0.34	34.8	19.9
50-54	1012	562	39.7	0.40	22.4	0.34	38.1	21.2
55-59	1713	900	80.7	0.46	41.3	0.42	38.7	23.6
60-64	2516	1259	142.3	0.49	66.3	0.45	39.2	25.2
65-69	3578	1860	219.2	0.54	102.6	0.50	38.9	26.7
70-74	4514	2695	301.1	0.57	156.7	0.54	38.0	30.8
75-79	4711	3167	389.3	0.63	210.9	0.59	37.7	32.2
80-84	3859	3267	532.9	0.73	306.9	0.65	36.8	34.8
85+	3083	4525	660.2	0.86	434.0	0.75	33.9	37.8
All ages	25839	18840					37.3	30.5
Mortality								
Raw			79.3	0.58	56.1	0.56		
WS			35.4	0.53	19.0	0.48		
ES			54.6	0.55	29.5	0.50		
BRD-S			73.1	0.58	39.9	0.53		
PYLL-70								
per 100,000			311.9		181.7			
ES			266.1		150.8			
AYLL-70			9.2		9.9			

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 ←%
C00	Lip	22	0.2	15	68.2			7	31.8
C03–C06	Oral cavity	213	1.9	158	74.2	15	7.0	40	18.8
C09–C10	Oropharynx	223	2.0	145	65.0	30	13.5	48	21.5
C12–C13	Hypopharynx	138	1.2	84	60.9	19	13.8	35	25.4
C15	Oesophagus	117	1.0	52	44.4	46	39.3	19	16.2
C16	Stomach	276	2.5	179	64.9	77	27.9	20	7.2
C17	Small intestine	47	0.4	23	48.9	18	38.3	6	12.8
C18	Colon	1036	9.2	527	50.9	322	31.1	187	18.1
C19–C20	Rectum	486	4.3	335	68.9	126	25.9	25	5.1
C22	Liver	92	0.8	40	43.5	28	30.4	24	26.1
C23–C24	Bile	47	0.4	20	42.6	11	23.4	16	34.0
C25	Pancreas	113	1.0	38	33.6	38	33.6	37	32.7
C30–C31	Sinuses	27	0.2	23	85.2	1	3.7	3	11.1
C32	Larynx	240	2.1	184	76.7	18	7.5	38	15.8
C33–C34	Lung	1241	11.1	306	24.7	231	18.6	704	56.7
C38,C45	Mesothelioma	50	0.4	3	6.0	8	16.0	39	78.0
C43	Malign. melanoma	441	3.9	324	73.5	15	3.4	102	23.1
C44	Skin others	888	7.9	539	60.7	50	5.6	299	33.7
C46,C49	Soft tissue	61	0.5	28	45.9	4	6.6	29	47.5
C50	Breast	38	0.3	22	57.9			16	42.1
C60	Penis	28	0.2	17	60.7			11	39.3
C61	Prostate	2914	26.0	2056	70.6	196	6.7	662	22.7
C62	Testis	104	0.9	95	91.3	2	1.9	7	6.7
C64	Kidney	505	4.5	288	57.0	87	17.2	130	25.7
C65	Renal pelvis	54	0.5	21	38.9	2	3.7	31	57.4
C66	Ureter	32	0.3	15	46.9	3	9.4	14	43.8
C67	Bladder	582	5.2	302	51.9	54	9.3	226	38.8
C70–C72	CNS cancer	83	0.7	17	20.5	7	8.4	59	71.1
C73	Thyroid	74	0.7	52	70.3	5	6.8	17	23.0
C76–C79	CUP	151	1.3	58	38.4	29	19.2	64	42.4
C81	Hodgkin lymphoma	54	0.5	47	87.0	2	3.7	5	9.3
C82–C85	NHL	452	4.0	247	54.6	68	15.0	137	30.3
C90	Mult. myeloma	106	0.9	51	48.1	10	9.4	45	42.5
C91–C96	Leukaemia	141	1.3	44	31.2	12	8.5	85	60.3
Others, specified		139	1.2	79	56.8	17	12.2	43	30.9
All further malignancies		11215	100.0	6434	57.4	1551	13.8	3230	28.8

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 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	65	0.9	51	78.5	4	6.2	10	15.4
C09–C10	Oropharynx	60	0.8	36	60.0	8	13.3	16	26.7
C15	Oesophagus	20	0.3	10	50.0	6	30.0	4	20.0
C16	Stomach	179	2.4	106	59.2	48	26.8	25	14.0
C17	Small intestine	25	0.3	13	52.0	10	40.0	2	8.0
C18	Colon	689	9.2	327	47.5	200	29.0	162	23.5
C19–C20	Rectum	250	3.3	167	66.8	63	25.2	20	8.0
C21	Anus/canal	31	0.4	24	77.4	6	19.4	1	3.2
C22	Liver	24	0.3	6	25.0	9	37.5	9	37.5
C23–C24	Bile	40	0.5	26	65.0	7	17.5	7	17.5
C25	Pancreas	85	1.1	28	32.9	27	31.8	30	35.3
C32	Larynx	27	0.4	17	63.0	3	11.1	7	25.9
C33–C34	Lung	501	6.7	121	24.2	66	13.2	314	62.7
C43	Malign. melanoma	245	3.3	191	78.0	8	3.3	46	18.8
C44	Skin others	364	4.8	254	69.8	16	4.4	94	25.8
C46,C49	Soft tissue	29	0.4	17	58.6	3	10.3	9	31.0
C48	Peritoneal	26	0.3	6	23.1	12	46.2	8	30.8
C50	Breast	2334	31.1	1771	75.9	164	7.0	399	17.1
C51	Vulva	68	0.9	43	63.2	2	2.9	23	33.8
C52	Vagina	24	0.3	10	41.7	3	12.5	11	45.8
C53	Cervix uteri	238	3.2	192	80.7	10	4.2	36	15.1
C54	Corpus uteri	478	6.4	361	75.5	24	5.0	93	19.5
C55,C57	Fem. genitals un	36	0.5	25	69.4	5	13.9	6	16.7
C56	Ovary	415	5.5	179	43.1	76	18.3	160	38.6
C64	Kidney	205	2.7	124	60.5	35	17.1	46	22.4
C66	Ureter	19	0.3	6	31.6	1	5.3	12	63.2
C67	Bladder	179	2.4	94	52.5	9	5.0	76	42.5
C70–C72	CNS cancer	46	0.6	13	28.3	5	10.9	28	60.9
C73	Thyroid	114	1.5	87	76.3	4	3.5	23	20.2
C76–C79	CUP	99	1.3	37	37.4	28	28.3	34	34.3
C81	Hodgkin lymphoma	31	0.4	27	87.1	1	3.2	3	9.7
C82–C85	NHL	270	3.6	165	61.1	35	13.0	70	25.9
C90	Mult. myeloma	72	1.0	25	34.7	11	15.3	36	50.0
C91–C96	Leukaemia	81	1.1	20	24.7	10	12.3	51	63.0
Others, specified		139	1.9	75	54.0	16	11.5	48	34.5
All further malignancies		7508	100.0	4654	62.0	935	12.5	1919	25.6

Further malignancies with number of cases 1 to 18 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	2	2	0.1	0.18	0.1	0.15	10.5	13.3
5- 9	1		0.1	0.14			3.7	
10-14	3		0.2	1.00			10.7	
15-19	4	2	0.2	0.21	0.1	0.05	8.7	8.7
20-24	5	7	0.2	0.10	0.4	0.14	7.6	17.1
25-29	16	15	0.7	0.23	0.7	0.19	18.8	16.5
30-34	38	33	1.6	0.23	1.4	0.23	27.5	20.8
35-39	82	56	3.6	0.32	2.5	0.24	32.9	15.2
40-44	197	130	7.9	0.34	5.4	0.30	35.2	17.2
45-49	455	294	16.9	0.36	11.3	0.33	35.2	20.5
50-54	909	501	35.7	0.40	19.9	0.35	38.8	22.3
55-59	1521	770	71.7	0.46	35.4	0.41	39.4	24.1
60-64	2158	1052	122.1	0.49	55.4	0.46	40.3	25.8
65-69	2906	1494	178.0	0.54	82.4	0.50	39.6	27.0
70-74	3544	2122	236.4	0.59	123.4	0.54	39.1	31.4
75-79	3497	2450	289.0	0.65	163.2	0.59	38.4	32.6
80-84	2735	2561	377.7	0.75	240.6	0.64	36.7	35.4
85+	2195	3583	470.0	0.89	343.7	0.75	33.7	38.1
All ages	20268	15072					37.9	30.8
Mortality								
Raw			62.2	0.57	44.9	0.55		
WS			28.7	0.53	15.5	0.48		
ES			43.6	0.55	23.9	0.50		
BRD-S			57.3	0.58	32.0	0.52		
PYLL-70								
per 100,000			277.7		157.4			
ES			237.4		131.0			
AYLL-70			9.6		10.2			

* 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	2	2	0.1	0.18	0.1	0.15	10.5	13.3
5- 9	1		0.1	0.14			3.7	
10-14	3		0.2	1.00			10.7	
15-19	4	2	0.2	0.21	0.1	0.05	8.7	9.1
20-24	5	7	0.2	0.10	0.4	0.14	7.6	17.5
25-29	16	15	0.7	0.24	0.7	0.19	18.8	17.0
30-34	38	33	1.6	0.23	1.4	0.24	27.7	21.0
35-39	80	54	3.5	0.32	2.4	0.24	32.3	14.8
40-44	195	126	7.8	0.35	5.2	0.30	35.1	16.9
45-49	453	289	16.9	0.38	11.1	0.34	35.4	20.4
50-54	886	491	34.8	0.41	19.5	0.37	38.3	22.3
55-59	1469	734	69.2	0.47	33.7	0.42	38.6	23.4
60-64	2059	999	116.5	0.50	52.6	0.47	39.1	25.0
65-69	2728	1395	167.1	0.56	76.9	0.51	38.1	25.8
70-74	3232	1991	215.6	0.59	115.8	0.55	37.0	30.3
75-79	3143	2287	259.7	0.63	152.3	0.58	36.1	31.5
80-84	2360	2355	325.9	0.70	221.2	0.62	33.9	33.9
85+	1863	3302	398.9	0.79	316.7	0.71	31.3	36.7
All ages	18537	14082					36.1	29.7
Mortality								
Raw			56.9	0.57	41.9	0.55		
WS			26.6	0.53	14.6	0.48		
ES			40.2	0.55	22.5	0.50		
BRD-S			52.4	0.57	30.0	0.52		
PYLL-70								
per 100,000			269.3		151.9			
ES			230.3		126.6			
AYLL-70			9.7		10.3			

* See corresponding tables with multiple malignancies.

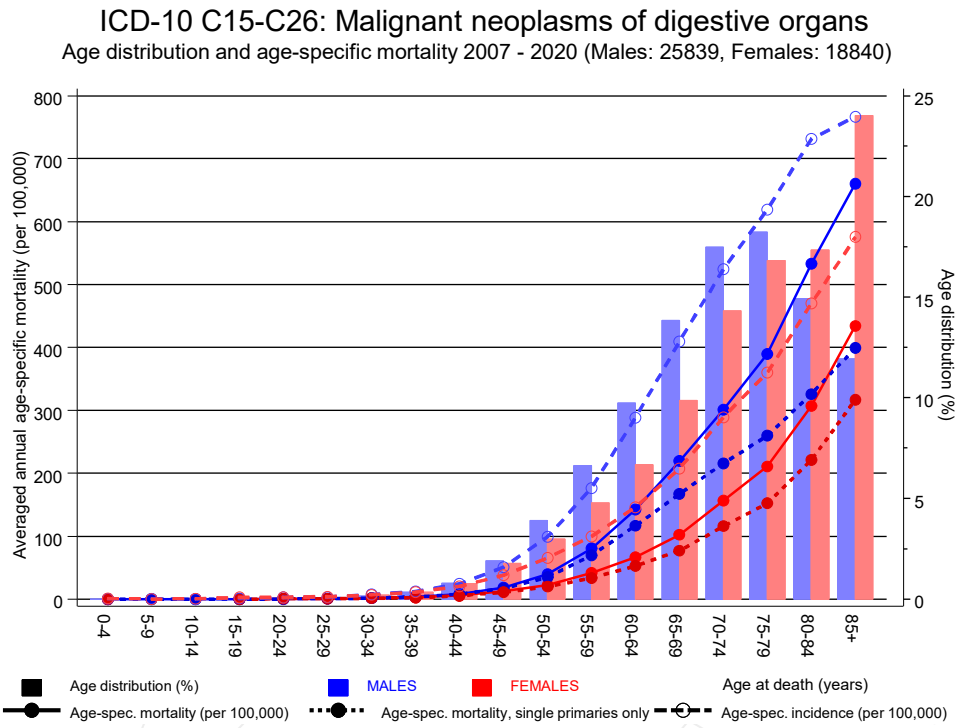
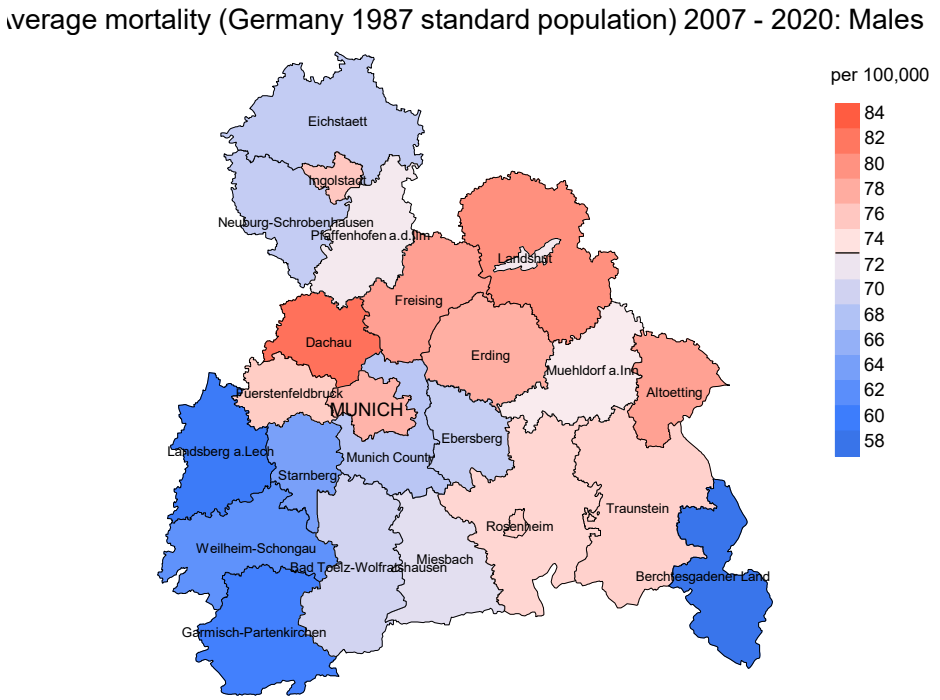


Figure 17. Distribution of age at death (bars; males: mean=70.0 yrs, median=71.1 yrs; females: mean=73.6 yrs, median=75.2 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



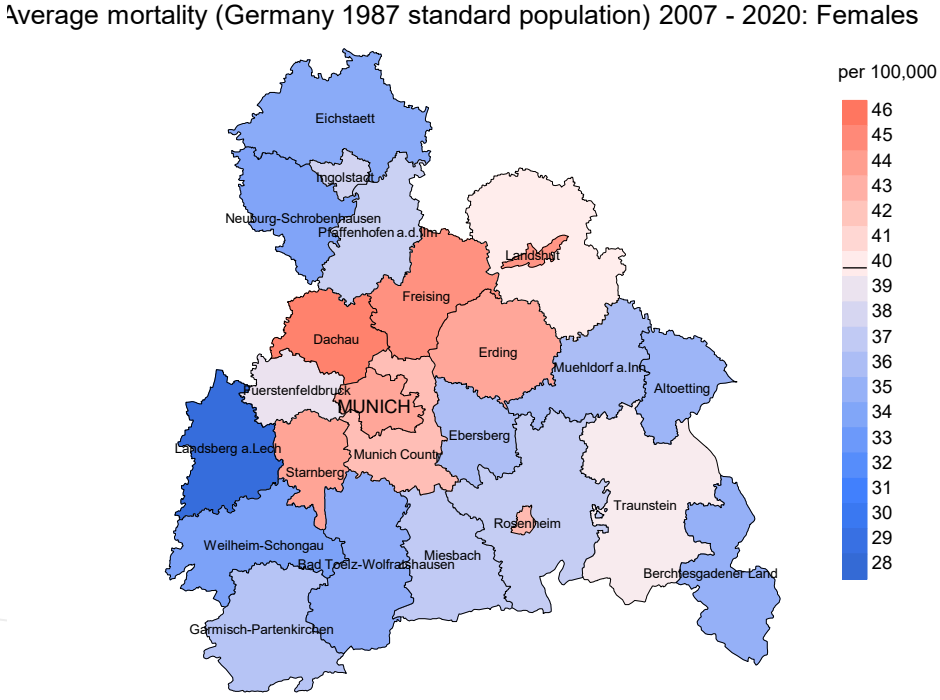
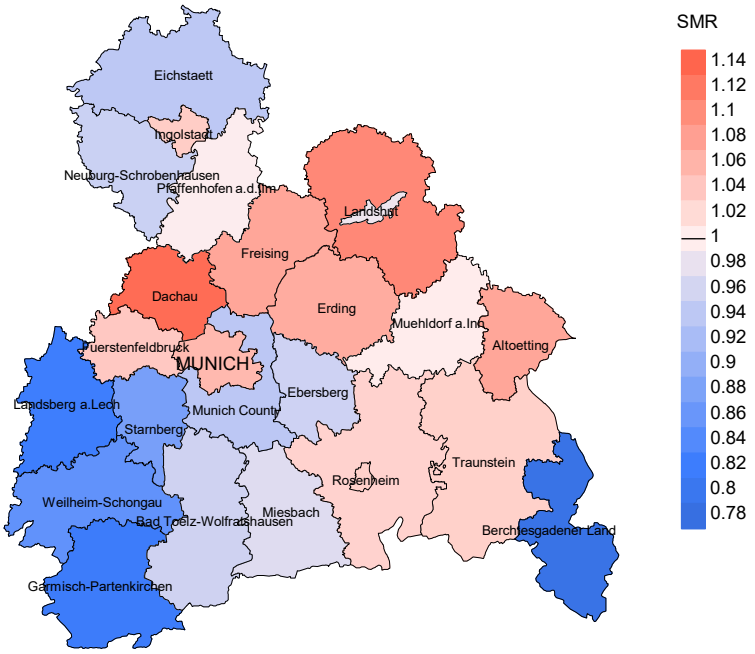


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 73.1/100,000 WS N=25,839, females 39.9/100,000 WS N=18,840).

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 461 women died from GI cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 36.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 31.8 and 40.8/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

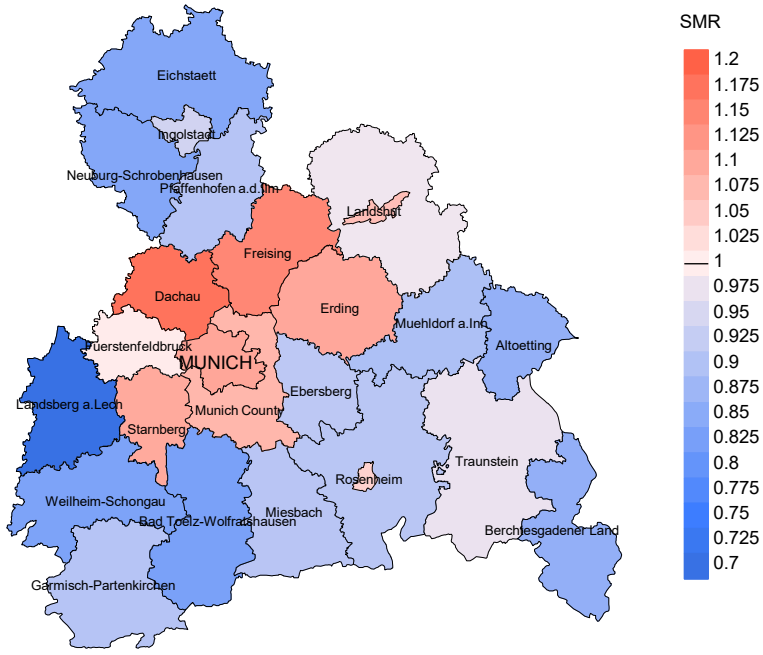


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=25,839, females N=18,840).

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 461 women died from GI cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.92. Though, the value of this parameter may vary with an underlying probability of 99% between 0.81 and 1.03, 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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