Munich Cancer Registry

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ICD-10 C91.0, C92.0-C94.4: Acute leukaemias

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	4,712
Diseases	4,718
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninistr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/base/bC914aE-ICD-10-C91.0-C92.0-C94.4-Acute-leukaemias-incidence-and-mortality.pdf

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

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

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

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

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

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

Munich Cancer Registry, 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.

Some remarks regarding this cancer type

The results for leukemias should be interpreted with caution. As with other primarily non-surgically or non-radiologically treated cancer diseases, the MCR hardly manages to obtain even the simplest information on this cancer. The proportion of DCO cases indicates a situation that is far away from a satisfying cooperation. In the group of institutions that potentially participate in reporting are a few hospitals that refuse any contribution to MCR.

ICD-10 codes (ICD-10 2016) used for specifying cancer site

Code	Description
C91.0	Acute lymphoblastic leukaemia [ALL]
C92.0	Acute myeloblastic leukaemia [AML]
C92.4	Acute promyelocytic leukaemia [PML]
C92.5	Acute myelomonocytic leukaemia
C92.6	Acute myeloid leukaemia with 11q23-abnormality
C92.8	Acute myeloid leukaemia with multilineage dysplasia
C93.0	Acute monoblastic/monocytic leukaemia
C94.0	Acute erythroid leukaemia
C94.2	Acute megakaryoblastic leukaemia
C94.4	Acute panmyelosis with myelofibrosis

INCIDENCE

Table 1

Cases 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	67	4	6.0	10.4	4.5	80.6	100.0
1999	70	3	4.3	9.5	4.5	70.0	94.3
2000	104	22	21.2	9.5	4.4	73.1	99.0
2001	128	53	41.4	10.3	4.4	80.5	96.1
2002	160	48	30.0	11.7	4.4	78.1	95.0 #
2003	201	66	32.8	12.9	4.3	78.6	97.5
2004	211	73	34.6	14.6	4.2	73.5	96.2
2005	222	63	28.4	15.1	4.2	72.1	96.4
2006	245	89	36.3	16.6	4.1	80.8	95.9
2007	235	60	25.5	17.0	4.1	74.9	95.7 #
2008	242	59	24.4	18.0	4.0	70.2	99.2
2009	236	43	18.2	18.9	4.0	75.4	99.2
2010	301	57	18.9	20.0	3.8	72.8	100.0
2011	257	39	15.2	20.8	3.7	69.3	99.2
2012	321	63	19.6	21.5	3.4	71.3	98.1
2013	292	63	21.6	22.1	3.0	74.0	99.0
2014	276	74	26.8	23.1	2.4	79.7	96.0
2015	259	59	22.8	23.5	2.0	84.6	98.8
2016	265	61	23.0	23.9	1.1	79.2	100.0
2017	237	48	20.3	24.4	0.8	77.2	99.6
2018	149	35	23.5	24.8	1.0	73.8	100.0
2019	111	6	5.4	25.0	0.8	61.3	100.0
2020	129	1	0.8	25.2	0.0	58.1	100.0 ##
1998-2020	4718	1089	23.1	25.2	4.5	74.8	98.1

4,718 cases diagnosed 1998-2020 are related to a total of 4,712 patients. Currently, in 1,391 (29.5 %) of these 4,712 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,099 / 240 / 52 (23.3 % / 5.1 % / 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 149 cases has been diagnosed, of which 24.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.0 % 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 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	35	52.2	4	11.4	8.6	5.0	80.0	100.0
1999	40	57.1	1	2.5	8.0	4.9	77.5	97.5
2000	51	49.0	12	23.5	7.9	4.8	72.5	98.0
2001	74	57.8	29	39.2	8.0	4.8	81.1	95.9
2002	89	55.6	24	27.0	9.3	4.9	74.2	95.5 #
2003	106	52.7	32	30.2	10.4	4.8	79.2	97.2
2004	107	50.7	31	29.0	11.8	4.8	74.8	96.3
2005	120	54.1	29	24.2	13.7	4.7	69.2	96.7
2006	148	60.4	52	35.1	15.8	4.7	80.4	96.6
2007	123	52.3	32	26.0	16.3	4.6	76.4	96.7 #
2008	129	53.3	28	21.7	17.5	4.3	59.7	99.2
2009	109	46.2	20	18.3	18.6	4.2	76.1	99.1
2010	155	51.5	33	21.3	19.5	4.1	74.8	100.0
2011	127	49.4	18	14.2	20.4	3.9	72.4	99.2
2012	157	48.9	28	17.8	20.9	3.8	68.2	97.5
2013	168	57.5	39	23.2	22.0	3.2	73.2	99.4
2014	144	52.2	36	25.0	23.2	2.2	77.8	95.1
2015	131	50.6	30	22.9	23.1	1.7	84.0	98.5
2016	139	52.5	25	18.0	23.6	0.9	75.5	100.0
2017	125	52.7	21	16.8	24.3	0.6	75.2	100.0
2018	80	53.7	20	25.0	24.8	1.0	77.5	100.0
2019	53	47.7	3	5.7	24.9	0.8	67.9	100.0
2020	71	55.0	1	1.4	25.2	0.0	64.8	100.0 ##
1998-2020	2481	52.6	548	22.1	25.2	5.0	74.4	98.1

2,481 cases diagnosed 1998-2020 are related to a total of 2,476 patients. Currently, in 731 (29.5 %) of these 2,476 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 575 / 124 / 32 (23.2 % / 5.0 % / 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 80 cases has been diagnosed, of which 24.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.0 % 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 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	32	47.8			12.5	4.0	81.3	100.0	
1999	30	42.9	2	6.7	11.3	4.0	60.0	90.0	
2000	53	51.0	10	18.9	11.3	4.0	73.6	100.0	
2001	54	42.2	24	44.4	13.0	3.9	79.6	96.3	
2002	71	44.4	24	33.8	14.6	3.8	83.1	94.4	#
2003	95	47.3	34	35.8	15.8	3.8	77.9	97.9	
2004	104	49.3	42	40.4	17.8	3.6	72.1	96.2	
2005	102	45.9	34	33.3	16.8	3.6	75.5	96.1	
2006	97	39.6	37	38.1	17.6	3.5	81.4	94.8	
2007	112	47.7	28	25.0	17.7	3.5	73.2	94.6	#
2008	113	46.7	31	27.4	18.5	3.6	82.3	99.1	
2009	127	53.8	23	18.1	19.2	3.8	74.8	99.2	
2010	146	48.5	24	16.4	20.5	3.5	70.5	100.0	
2011	130	50.6	21	16.2	21.2	3.5	66.2	99.2	
2012	164	51.1	35	21.3	22.2	2.9	74.4	98.8	
2013	124	42.5	24	19.4	22.2	2.6	75.0	98.4	
2014	132	47.8	38	28.8	23.0	2.7	81.8	97.0	
2015	128	49.4	29	22.7	23.9	2.4	85.2	99.2	
2016	126	47.5	36	28.6	24.3	1.4	83.3	100.0	
2017	112	47.3	27	24.1	24.6	1.0	79.5	99.1	
2018	69	46.3	15	21.7	24.8	1.1	69.6	100.0	
2019	58	52.3	3	5.2	25.1	0.9	55.2	100.0	
2020	58	45.0			25.3	0.0	50.0	100.0	##
1998-2020	2237	47.4	541	24.2	25.3	4.0	75.3	98.1	

2,237 cases diagnosed 1998-2020 are related to a total of 2,236 patients. Currently, in 660 (29.5 %) of these 2,236 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 524 / 116 / 20 (23.4 % / 5.2 % / 0.9 %) 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 69 cases has been diagnosed, of which 24.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.1 % 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 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	35	32	3.2	2.7	3.2	2.3	3.3	2.5	3.5	2.5
1999	40	30	3.6	2.5	3.0	3.1	3.4	2.7	3.6	2.5
2000	51	53	4.5	4.4	4.5	3.6	4.7	3.9	5.1	4.0
2001	74	54	6.4	4.4	4.9	3.3	6.0	3.7	6.9	4.1
2002	89	71	4.8	3.6	4.3	2.4	4.6	2.9	5.0	3.2
2003	106	95	5.7	4.8	4.3	3.6	5.2	4.0	6.2	4.2
2004	107	104	5.7	5.3	4.8	3.9	5.3	4.3	5.8	4.7
2005	120	102	6.3	5.1	5.5	4.0	5.9	4.2	6.6	4.6
2006	148	97	7.7	4.8	6.0	3.2	6.9	3.6	7.9	4.1
2007	123	112	5.6	4.9	4.3	3.9	4.9	4.1	5.6	4.4
2008	129	113	5.8	4.9	5.5	3.4	5.5	3.8	5.7	4.4
2009	109	127	4.9	5.5	3.4	3.8	4.0	4.3	4.7	4.7
2010	155	146	6.9	6.2	5.1	4.0	5.9	4.7	6.8	5.2
2011	127	130	5.7	5.6	4.5	4.3	5.0	4.5	5.4	4.8
2012	157	164	6.9	6.9	5.2	5.3	5.9	5.7	6.7	6.1
2013	168	124	7.3	5.2	4.9	3.4	5.8	3.8	7.0	4.4
2014	144	132	6.2	5.5	3.5	2.8	4.6	3.6	5.7	4.5
2015	131	128	5.5	5.3	3.0	2.5	4.1	3.4	5.0	4.2
2016	139	126	5.8	5.1	3.0	2.5	4.2	3.3	5.3	4.0
2017	125	112	5.2	4.5	2.7	2.1	3.7	2.9	4.7	3.6
2018	80	69	3.3	2.8	1.7	1.3	2.3	1.8	3.0	2.2
2019	53	58	2.2	2.3	1.1	1.3	1.5	1.7	2.0	2.0
2020	71	58	2.9	2.3	1.5	1.1	2.1	1.5	2.6	1.9
1998–2020	2481	2237	5.3	4.6	3.8	3.1	4.5	3.5	5.2	4.0

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	67	49.2	27.7	0.9	88.3	4.6	29.0	53.7	73.3	83.2
1999	70	48.2	28.2	0.3	88.2	3.3	15.5	56.3	72.3	77.4
2000	104	50.5	24.9	0.4	94.3	8.4	35.0	56.9	70.3	77.7
2001	128	56.7	22.7	1.4	92.7	13.6	46.2	62.6	73.4	80.8
2002	160	54.5	25.3	1.0	94.9	12.7	36.8	61.3	74.1	82.5
2003	201	57.7	24.9	0.3	93.6	11.5	43.8	64.0	77.6	82.6
2004	211	56.2	25.7	0.4	92.3	10.3	39.1	64.6	76.9	83.1
2005	222	54.0	26.6	0.6	91.3	6.6	38.4	64.2	75.6	81.7
2006	245	59.6	26.2	1.0	95.1	8.0	47.8	69.4	78.6	84.4
2007	235	55.9	25.4	0.3	94.5	10.6	42.1	65.0	74.9	81.3
2008	242	54.5	26.9	0.4	94.8	8.5	35.3	65.5	75.1	82.7
2009	236	59.2	23.9	1.3	99.2	19.4	44.8	67.8	76.3	84.1
2010	301	60.8	24.3	0.3	94.2	17.9	50.9	68.4	77.8	85.4
2011	257	56.3	26.2	0.3	98.4	9.9	43.4	66.1	75.4	83.1
2012	321	57.8	25.5	0.0	92.6	11.0	44.4	67.6	76.8	83.1
2013	292	61.7	23.9	0.1	92.7	18.6	53.4	70.7	78.3	84.3
2014	276	65.9	20.0	0.5	95.9	31.4	58.6	72.7	78.9	85.0
2015	259	66.6	18.1	1.8	92.7	39.6	57.6	71.9	78.6	85.7
2016	265	66.3	18.4	9.1	94.5	36.6	55.3	71.7	80.1	85.4
2017	237	67.1	16.2	16.8	94.8	41.3	58.9	71.6	78.4	84.2
2018	149	68.0	17.3	8.3	96.5	42.1	60.5	72.5	80.7	85.7
2019	111	64.1	17.8	20.2	88.6	32.4	55.0	68.8	79.1	82.6
2020	129	67.1	16.1	18.5	91.6	42.2	58.6	71.5	79.1	83.7
1998–2020	4718	59.9	23.9	0.0	99.2	18.2	47.9	67.7	77.3	83.7

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	35	45.9	29.1	0.9	88.3	4.3	8.7	52.9	72.9	78.4
1999	40	51.7	24.4	0.3	86.9	5.8	39.6	57.6	71.2	77.4
2000	51	47.7	26.2	0.4	86.5	8.4	20.3	52.9	70.7	77.7
2001	74	56.1	21.7	1.4	92.7	16.5	45.0	61.9	70.9	79.8
2002	89	50.2	27.4	1.0	94.9	5.2	31.0	58.6	72.8	81.2
2003	106	58.2	25.0	1.6	93.6	14.4	44.6	64.8	78.0	82.6
2004	107	54.1	26.5	0.4	89.2	7.5	34.9	63.5	74.6	82.9
2005	120	52.6	26.9	0.7	91.3	4.7	34.2	64.4	74.2	79.5
2006	148	57.4	25.8	1.0	93.6	7.3	42.1	67.5	75.4	81.2
2007	123	55.8	24.2	0.3	94.5	13.5	41.1	64.1	73.4	80.6
2008	129	49.7	28.5	0.4	93.8	4.2	25.9	62.3	73.6	80.6
2009	109	59.4	23.1	2.2	88.1	19.4	49.0	69.1	75.2	82.0
2010	155	59.3	24.2	0.3	92.8	15.9	50.9	68.1	75.8	82.7
2011	127	56.2	25.8	2.5	98.4	7.5	43.7	64.3	74.3	82.2
2012	157	58.5	25.6	2.4	92.6	9.9	47.9	68.0	77.6	84.4
2013	168	61.8	23.5	0.5	92.7	17.8	56.5	70.4	77.5	83.6
2014	144	66.1	21.2	0.5	95.9	29.7	57.4	73.1	80.2	85.6
2015	131	66.6	18.8	1.8	92.5	41.1	57.8	71.9	78.7	85.6
2016	139	65.6	17.8	17.5	92.2	35.8	54.9	71.1	77.7	84.0
2017	125	66.5	15.8	16.8	91.2	42.6	58.9	71.6	77.5	81.9
2018	80	68.3	18.5	8.3	96.5	41.8	63.4	74.2	80.7	85.4
2019	53	65.2	17.8	20.2	86.0	32.4	57.9	70.4	79.4	82.5
2020	71	67.2	16.4	18.5	91.6	42.2	58.3	72.4	79.6	83.5
1998–2020	2481	59.0	24.1	0.3	98.4	16.5	47.6	67.3	76.5	82.8

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	32	52.8	26.1	1.3	87.5	12.1	38.3	54.1	74.9	83.2
1999	30	43.5	32.5	1.5	88.2	3.2	4.4	54.6	73.4	78.1
2000	53	53.3	23.4	2.1	94.3	16.5	38.5	59.7	69.8	77.5
2001	54	57.6	24.2	2.8	89.5	13.6	49.8	64.0	75.1	81.4
2002	71	59.8	21.4	2.9	89.0	26.1	45.4	62.1	77.5	83.1
2003	95	57.2	25.0	0.3	89.1	6.4	43.2	63.8	77.6	82.6
2004	104	58.5	24.8	0.7	92.3	12.5	45.1	65.4	77.5	83.3
2005	102	55.6	26.2	0.6	90.8	11.1	40.3	64.2	78.1	83.4
2006	97	63.1	26.5	1.8	95.1	8.0	56.4	72.9	80.9	86.6
2007	112	56.0	26.7	1.0	94.3	6.5	42.1	65.3	76.0	81.9
2008	113	59.9	23.9	1.4	94.8	18.9	48.7	67.9	77.9	83.9
2009	127	58.9	24.7	1.3	99.2	19.0	43.0	66.4	77.6	86.7
2010	146	62.4	24.3	0.8	94.2	21.9	51.3	69.1	80.9	86.9
2011	130	56.5	26.7	0.3	90.0	10.6	42.0	69.5	76.0	84.8
2012	164	57.1	25.5	0.0	92.4	11.0	43.8	65.3	76.4	82.6
2013	124	61.7	24.6	0.1	91.4	20.8	50.7	71.0	79.6	86.1
2014	132	65.7	18.8	2.7	93.2	32.4	59.5	72.4	78.1	83.8
2015	128	66.7	17.4	5.0	92.7	36.4	56.6	71.6	78.6	86.0
2016	126	67.0	19.0	9.1	94.5	38.6	55.5	73.5	81.9	87.3
2017	112	67.7	16.6	18.8	94.8	40.8	59.1	71.9	79.6	85.5
2018	69	67.7	16.0	26.6	92.9	42.1	58.0	70.0	80.5	87.0
2019	58	63.2	17.9	21.2	88.6	31.4	51.7	68.0	78.4	84.2
2020	58	67.0	15.9	19.4	87.0	45.2	58.6	69.8	78.9	83.7
1998–2020	2237	60.8	23.6	0.0	99.2	21.9	48.9	68.1	78.3	84.6

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	112	3.4	3.4	64	3.7	3.7	48	3.0	3.0
5-9	69	2.1	5.5	36	2.1	5.8	33	2.1	5.1
10-14	51	1.5	7.0	28	1.6	7.5	23	1.4	6.5
15-19	59	1.8	8.8	37	2.2	9.6	22	1.4	7.9
20-24	51	1.5	10.3	29	1.7	11.3	22	1.4	9.3
25-29	57	1.7	12.1	26	1.5	12.9	31	1.9	11.2
30-34	73	2.2	14.3	33	1.9	14.8	40	2.5	13.7
35-39	82	2.5	16.7	32	1.9	16.7	50	3.1	16.8
40-44	111	3.4	20.1	55	3.2	19.9	56	3.5	20.3
45-49	123	3.7	23.8	62	3.6	23.5	61	3.8	24.1
50-54	160	4.8	28.6	85	5.0	28.5	75	4.7	28.8
55-59	193	5.8	34.5	88	5.1	33.6	105	6.6	35.4
60-64	222	6.7	41.2	118	6.9	40.5	104	6.5	41.9
65-69	359	10.8	52.0	203	11.9	52.4	156	9.8	51.7
70-74	459	13.9	65.9	252	14.7	67.1	207	12.9	64.6
75-79	497	15.0	80.9	262	15.3	82.4	235	14.7	79.3
80-84	353	10.7	91.6	181	10.6	93.0	172	10.8	90.1
85+	279	8.4	100.0	120	7.0	100.0	159	9.9	100.0
All ages	3310	100.0		1711	100.0		1599	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=334 %	Females DCO rate n=334 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4	64	48	3.9	3.1	1.6	2.1	29.1	28.1
5- 9	36	33	2.3	2.2	2.8		30.8	33.0
10-14	28	23	1.8	1.5		4.3	20.4	18.0
15-19	37	22	2.2	1.4		4.5	11.6	8.3
20-24	29	22	1.4	1.2	3.4	4.5	4.6	4.2
25-29	26	31	1.1	1.4			2.7	2.6
30-34	33	40	1.4	1.8		5.0	2.5	1.9
35-39	32	50	1.4	2.2	9.4	4.0	1.7	1.4
40-44	55	56	2.2	2.3	5.5	7.1	2.0	0.9
45-49	62	61	2.3	2.3	11.3	13.1	1.2	0.7
50-54	85	75	3.3	3.0	9.4	8.0	1.0	0.6
55-59	88	105	4.1	4.8	11.4	10.5	0.7	0.8
60-64	118	104	6.7	5.5	16.1	16.3	0.7	0.7
65-69	203	156	12.4	8.6	20.7	23.7	0.8	0.8
70-74	251	207	16.7	12.0	21.1	22.2	0.9	1.0
75-79	262	235	21.7	15.7	24.8	28.9	1.1	1.2
80-84	181	172	25.0	16.2	37.6	32.6	1.2	1.1
85+	120	159	25.7	15.3	44.2	45.9	1.1	1.0
All ages	1710	1599			19.5	20.9	1.1	1.0
Incidence								
Raw			5.3	4.8				
WS			3.5	2.9				
ES			4.2	3.5				
BRD-S			5.0	4.0				

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

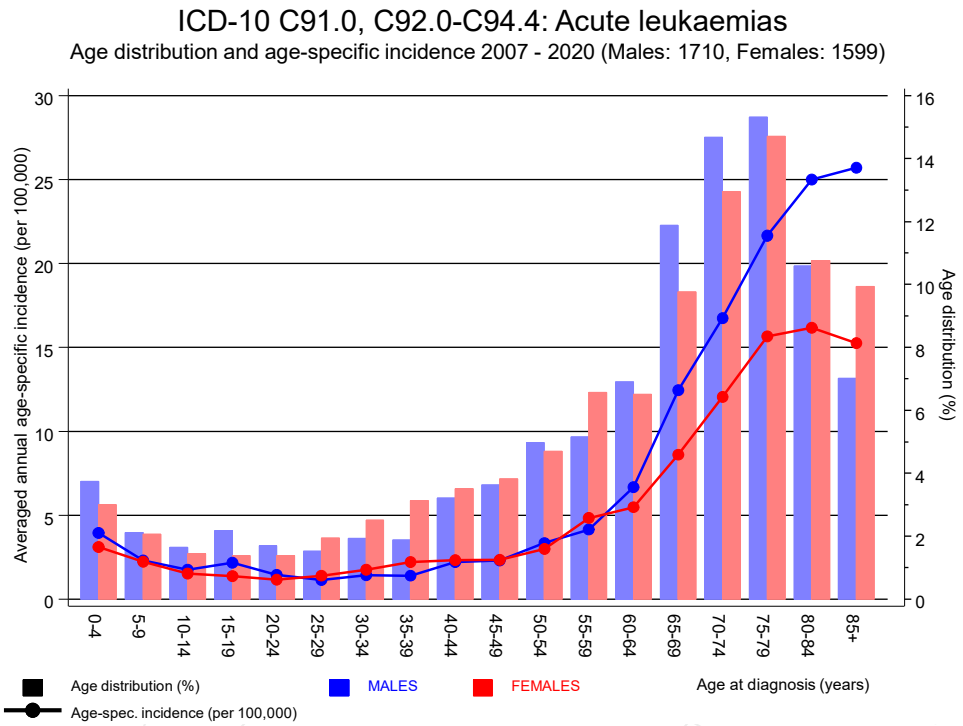

Figure 6. Age distribution (males: mean=61.4 yrs, median=69.1 yrs; females: mean=62.2 yrs, median=69.2 yrs) and age-specific incidence.

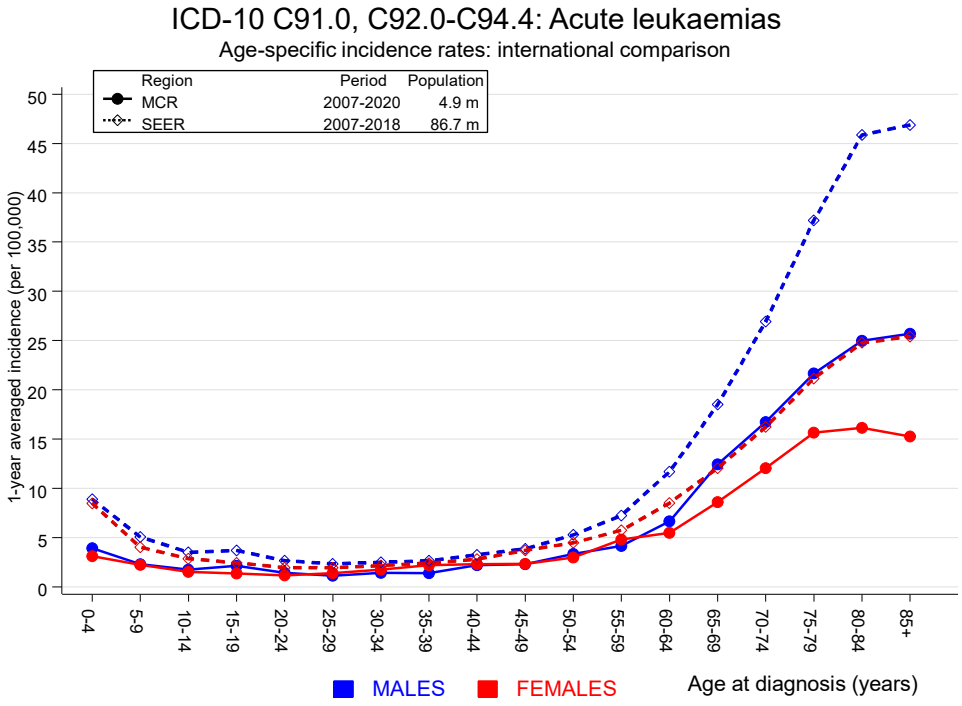

Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 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 %
C03-C06	Oral cavity	2	0.4	5.6	0.7	20.4		3.4	
C09-C10	Oropharynx	1	0.4	2.3	0.1	12.8		1.2	
C12-C13	Hypopharynx	1	0.2	4.3	0.1	23.8		1.6	
C15	Oesophagus	3	0.8	3.8	0.8	11.2		4.6	33.3
C16	Stomach	2	1.3	1.5	0.2	5.4		1.4	
C18	Colon	8	3.3	2.4	1.1	4.8	#	9.9	
C19-C20	Rectum	5	1.9	2.6	0.8	6.0		6.4	
C23-C24	Bile	1	0.4	2.7	0.1	15.1		1.3	
C25	Pancreas	3	1.4	2.2	0.4	6.3		3.4	
C32	Larynx	1	0.4	2.6	0.1	14.7		1.3	100.0
C33-C34	Lung	12	4.3	2.8	1.4	4.9	#	16.1	8.3
C38,C45	Mesothelioma	1	0.2	4.3	0.1	23.7		1.6	
C40-C41	Bone	1	0.0	20.7	0.5	115.1		2.0	
C43	Malign. melanoma	2	1.8	1.1	0.1	4.1		0.5	
C46,C49	Soft tissue	4	0.2	17.6	4.8	45.1	#	7.9	
C50	Breast	2	0.1	20.2	2.4	73.0	#	4.0	
C61	Prostate	18	10.0	1.8	1.1	2.8	#	16.7	11.1
C62	Testis	2	0.3	6.2	0.8	22.6		3.5	
C64	Kidney	1	1.3	0.8	0.0	4.3		-0.6	
C67	Bladder	1	1.5	0.7	0.0	3.6		-1.1	
C70-C72	CNS cancer	4	0.5	7.5	2.0	19.3	#	7.2	
C73	Thyroid	6	0.3	19.2	7.1	41.8	#	11.9	
C81	Hodgkin lymphoma	2	0.1	14.3	1.7	51.6	#	3.9	
C82-C85	NHL	15	1.5	9.7	5.5	16.1	#	28.1	
C90	Mult. myeloma	4	0.5	8.8	2.4	22.5	#	7.4	
C91-C96	Leukaemia	10	0.6	17.1	8.2	31.4	#	19.7	20.0
Not observed		0	2.9	0.0	0.0	1.3		-6.0	
All further malignancies		112	36.7	3.0	2.5	3.7	#	157.1	6.3

Patients	2128
Median age at next malignancy (years)	66.8
Person-years	4789
Mean observation time (years)	2.3
Median observation time (years)	0.7

The occurrence of further specified malignancy is statistically significant.

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	2	0.1	15.3	1.9	55.3	#	4.7	
C07-C08	Salivary gland	1	0.0	28.1	0.7	156.3		2.4	
C09-C10	Oropharynx	1	0.1	9.4	0.2	52.6		2.3	
C15	Oesophagus	3	0.1	21.3	4.4	62.4	#	7.2	
C18	Colon	3	1.7	1.7	0.4	5.1		3.2	
C19-C20	Rectum	2	0.8	2.6	0.3	9.4		3.1	
C22	Liver	2	0.2	8.4	1.0	30.4	#	4.4	
C25	Pancreas	1	0.8	1.2	0.0	6.6		0.4	
C33-C34	Lung	6	1.6	3.7	1.3	8.0	#	11.0	
C43	Malign. melanoma	3	1.0	3.1	0.6	9.1		5.1	
C46,C49	Soft tissue	1	0.1	7.9	0.2	43.9		2.2	
C50	Breast	18	7.2	2.5	1.5	3.9	#	27.2	5.6
C51	Vulva	1	0.2	5.0	0.1	27.8		2.0	
C53	Cervix uteri	4	0.4	10.2	2.8	26.2	#	9.1	50.0
C54	Corpus uteri	4	1.2	3.3	0.9	8.5		7.1	
C56	Ovary	1	0.9	1.2	0.0	6.5		0.4	
C64	Kidney	1	0.5	2.2	0.1	12.0		1.4	
C70-C72	CNS cancer	1	0.3	3.3	0.1	18.3		1.8	
C73	Thyroid	3	0.5	5.7	1.2	16.5	#	6.2	
C76-C79	CUP	1	0.3	3.2	0.1	18.0		1.7	
C82-C85	NHL	7	0.8	9.0	3.6	18.6	#	15.7	
C90	Mult. myeloma	2	0.2	8.7	1.1	31.3	#	4.5	
C91-C96	Leukaemia	2	0.3	6.2	0.8	22.4		4.2	50.0
C96	Systemic	1	0.0	287.5	7.3	1602	#	2.5	100.0
Not observed		0	2.1	0.0	0.0	1.8		-5.2	
All further malignancies		71	21.6	3.3	2.6	4.1	#	124.6	7.0

Patients	1881
Median age at next malignancy (years)	64.1
Person-years	3963
Mean observation time (years)	2.1
Median observation time (years)	0.6

The occurrence of further specified malignancy is statistically significant.

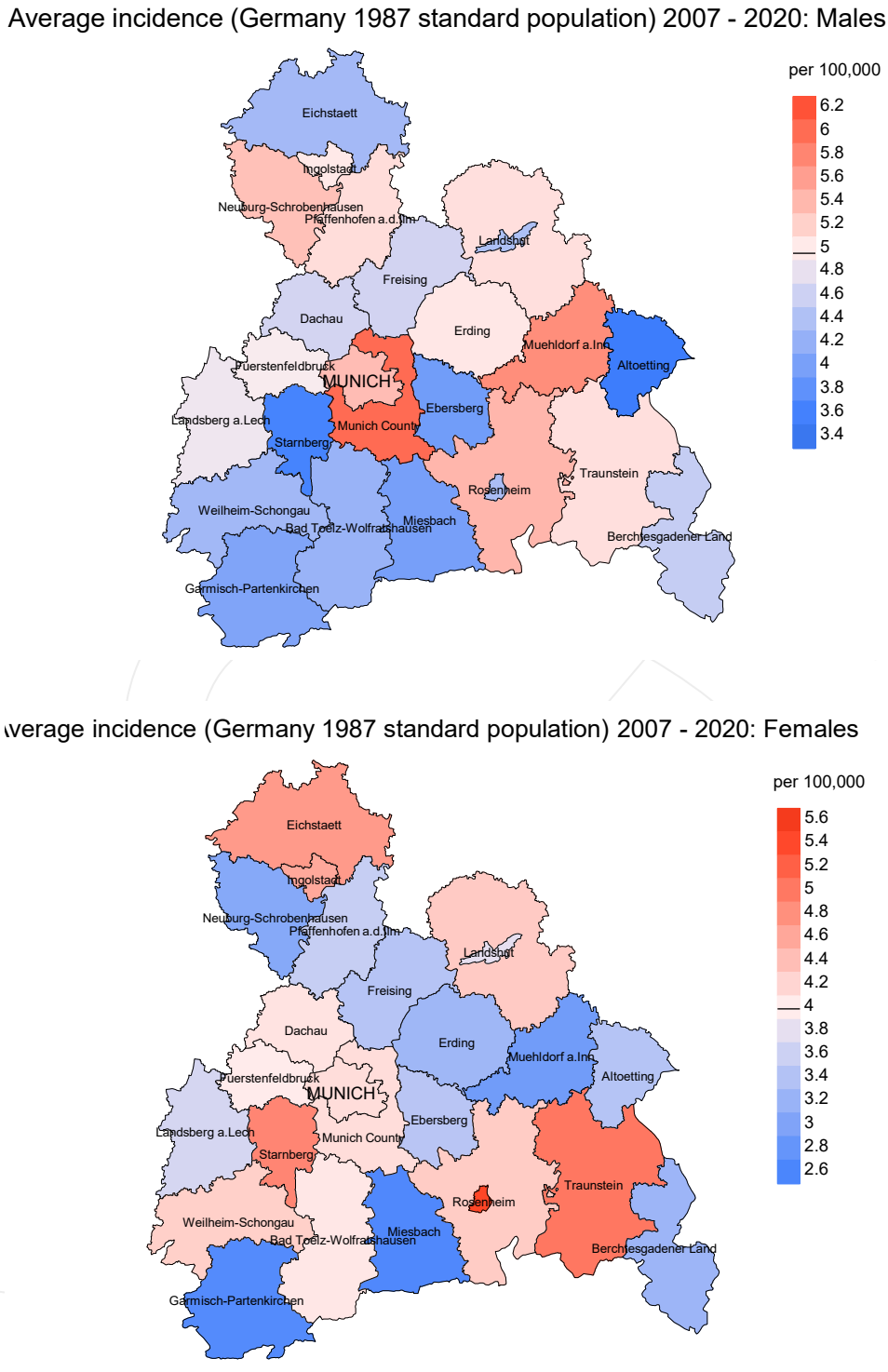

Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 5.0/100,000 WS N=1,710, females 4.0/100,000 WS N=1,599).

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 38 women were identified with newly diagnosed acute leukaemias. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 3.5/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.2 and 5.2/100,000.

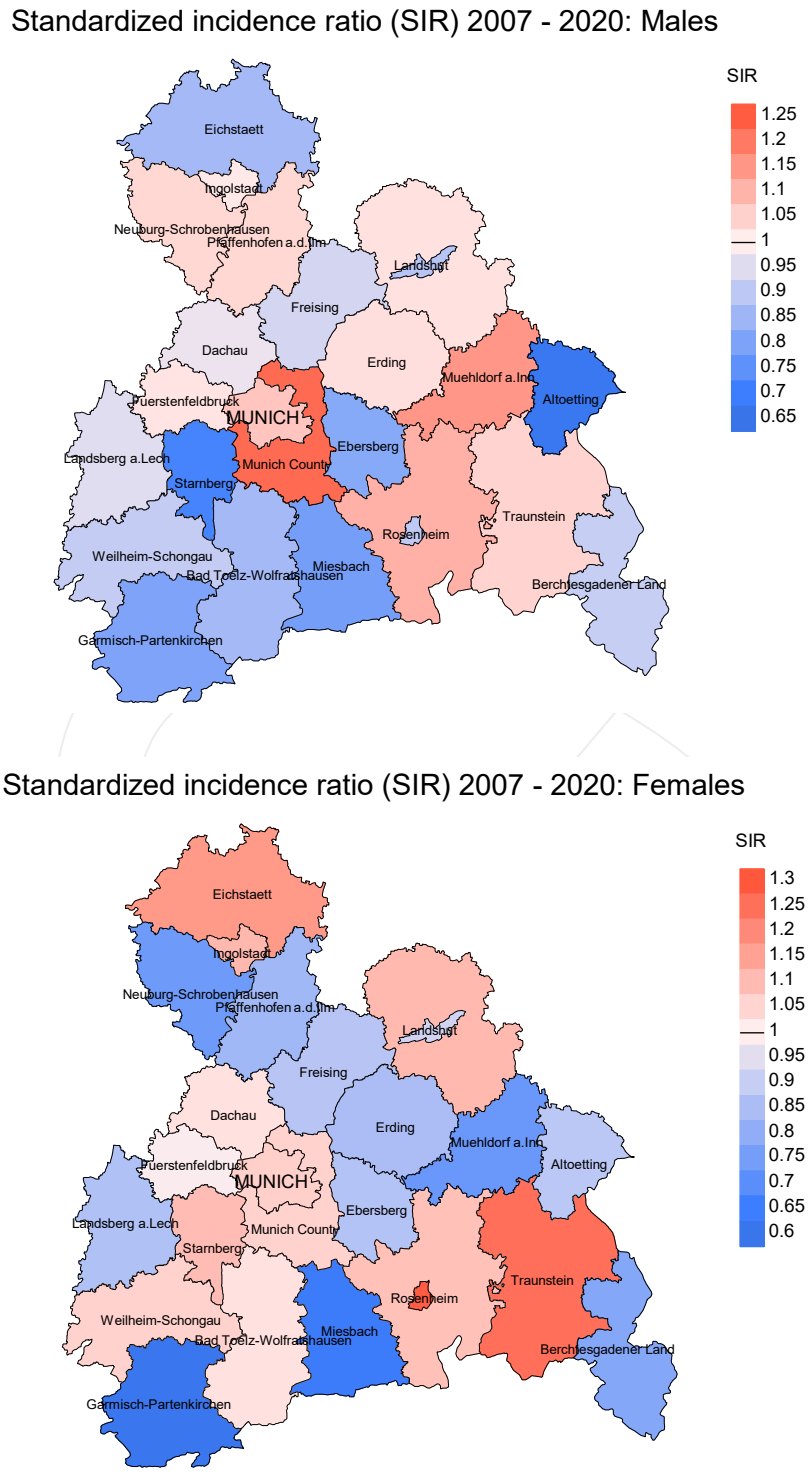

Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,710, females N=1,599).

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 38 women were identified with newly diagnosed acute leukaemias. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.86. Though, the value of this parameter may vary with an underlying probability of 99% between 0.55 and 1.29, and is therefore not statistically striking.

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	67	100.0	6.0	54	80.6	96.3
1999	70	94.3	4.3	49	70.0	93.9
2000	104	99.0	21.2	76	73.1	94.7
2001	128	96.1	41.4	103	80.5	99.0
2002	160	95.0	30.0	125	78.1	97.6
2003	201	97.5	32.8	158	78.6	98.7
2004	211	96.2	34.6	155	73.5	99.4
2005	222	96.4	28.4	160	72.1	98.1
2006	245	95.9	36.3	198	80.8	97.0
2007	235	95.7	25.5	176	74.9	97.2
2008	242	99.2	24.4	170	70.2	99.4
2009	236	99.2	18.2	178	75.4	98.9
2010	301	100.0	18.9	219	72.8	97.7
2011	257	99.2	15.2	178	69.3	96.1
2012	321	98.1	19.6	229	71.3	96.9
2013	292	99.0	21.6	216	74.0	95.8
2014	276	96.0	26.8	220	79.7	97.3
2015	259	98.8	22.8	219	84.6	97.3
2016	265	100.0	23.0	210	79.2	95.2
2017	237	99.6	20.3	183	77.2	86.3
2018	149	100.0	23.5	110	73.8	71.8
2019	111	100.0	5.4	68	61.3	76.5
2020	129	100.0	0.8	75	58.1	96.0
1998-2020	4718	98.1	23.1	3529	74.8	95.5

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	67	54	98.1	26	38.8
1999	70	37	97.3	12	17.1
2000	104	64	98.4	38	36.5
2001	128	103	98.1	57	44.5
2002	160	100	98.0	63	39.4
2003	201	129	98.4	89	44.3
2004	211	121	99.2	85	40.3
2005	222	153	99.3	94	42.3
2006	245	149	98.7	123	50.2
2007	235	165	97.0	96	40.9
2008	242	160	98.1	97	40.1
2009	236	151	97.4	93	39.4
2010	301	195	97.9	129	42.9
2011	257	184	97.3	91	35.4
2012	321	199	99.0	119	37.1
2013	292	212	97.6	124	42.5
2014	276	199	98.0	125	45.3
2015	259	204	98.5	128	49.4
2016	265	196	99.5	132	49.8
2017	237	206	98.1	116	48.9
2018	149	150	74.0	75	50.3
2019	111	114	46.5	36	32.4
2020	129	120	93.3	51	39.5
1998–2020	4718	3365	95.2	1999	42.4

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	54	81.5	18.5	96.2
1999	37	78.4	21.6	97.2
2000	64	92.2	7.8	100.0
2001	103	86.4	13.6	99.0
2002	100	93.0	7.0	100.0
2003	129	93.0	7.0	99.2
2004	121	96.7	3.3	98.3
2005	153	96.1	3.9	100.0
2006	149	95.3	4.7	98.6
2007	165	93.9	6.1	98.8
2008	160	92.5	7.5	96.2
2009	151	93.4	6.6	95.9
2010	195	94.4	5.6	99.0
2011	184	91.8	8.2	97.2
2012	199	94.0	6.0	99.5
2013	212	87.7	12.3	99.0
2014	199	87.9	12.1	96.4
2015	204	90.7	9.3	97.0
2016	196	89.8	10.2	97.4
2017	206	88.3	11.7	97.0
2018	150	77.3	22.7	86.5
2019	114	60.5	39.5	92.5
2020	120	80.8	19.2	91.1
1998-2020	3365	89.5	10.5	97.3

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	30	56.4	58.0	55.0	57.0
1999	21	59.6	59.6	65.6	59.8
2000	41	61.8	61.8	60.7	61.8
2001	54	69.2	71.5	61.1	69.7
2002	52	67.3	67.3	65.8	67.9
2003	74	68.9	68.5	75.2	68.7
2004	61	70.5	70.9	64.7	70.7
2005	77	69.9	69.9	70.9	69.9
2006	87	70.8	70.8	71.0	70.8
2007	88	68.9	69.0	3.4	69.0
2008	84	70.1	70.8	68.1	70.3
2009	73	71.9	72.0	67.6	72.4
2010	94	72.1	72.1	56.5	72.1
2011	86	72.0	72.9	66.4	72.4
2012	97	72.5	72.5	81.2	72.5
2013	117	75.0	75.0	76.3	75.0
2014	101	75.3	75.3	73.7	75.4
2015	108	74.1	74.5	59.0	73.9
2016	105	75.4	75.2	76.4	75.5
2017	102	74.5	74.5	74.4	74.5
2018	86	72.2	71.8	74.2	73.4
2019	59	74.8	74.5	76.9	76.7
2020	72	74.7	74.8	73.2	74.5
1998-2020	1769	72.2	72.3	71.6	72.2

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	24	61.7	57.4	83.7	59.5
1999	16	74.2	74.7	68.5	74.3
2000	23	63.2	63.9	29.9	63.2
2001	49	67.8	69.5	61.7	69.5
2002	48	70.1	69.9	81.1	69.9
2003	55	66.3	67.2	52.5	66.3
2004	60	73.4	73.4	76.9	74.3
2005	76	69.7	70.4	29.8	69.7
2006	62	75.5	75.4	76.7	75.5
2007	77	69.8	70.3	60.4	70.3
2008	76	72.9	72.8	84.3	72.8
2009	78	72.8	73.0	61.6	72.8
2010	101	76.8	77.7	68.0	77.3
2011	98	72.4	72.4	78.2	72.5
2012	102	72.1	72.1	72.1	72.0
2013	95	74.4	72.7	79.4	73.6
2014	98	74.4	74.6	63.3	74.6
2015	96	74.8	74.6	77.7	74.7
2016	91	75.3	75.1	75.9	74.9
2017	104	74.0	73.0	77.2	73.1
2018	64	75.2	75.1	77.6	73.9
2019	55	69.9	70.2	68.8	72.6
2020	48	76.9	76.5	91.0	76.9
1998–2020	1596	72.8	72.9	72.1	72.9

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	24	2.2	0.69	2.1	0.65	2.2	0.68	2.5	0.71
1999	17	1.5	0.43	1.3	0.43	1.4	0.42	1.6	0.44
2000	37	3.2	0.73	2.5	0.55	3.0	0.65	3.6	0.70
2001	46	4.0	0.62	2.4	0.49	3.5	0.59	4.8	0.70
2002	48	2.6	0.54	1.7	0.39	2.3	0.49	2.9	0.58
2003	68	3.6	0.64	2.2	0.50	3.1	0.59	4.0	0.65
2004	59	3.1	0.55	1.8	0.38	2.6	0.49	3.6	0.61
2005	73	3.9	0.61	2.3	0.42	3.2	0.54	4.1	0.62
2006	81	4.2	0.55	2.3	0.37	3.3	0.48	4.4	0.55
2007	85	3.8	0.69	2.3	0.54	3.1	0.62	4.0	0.71
2008	77	3.5	0.60	1.9	0.34	2.6	0.48	3.4	0.60
2009	69	3.1	0.63	1.6	0.46	2.3	0.56	3.0	0.64
2010	89	3.9	0.57	2.0	0.39	2.9	0.50	3.8	0.56
2011	78	3.5	0.61	1.8	0.40	2.5	0.51	3.4	0.63
2012	91	4.0	0.58	2.0	0.38	2.9	0.50	3.7	0.56
2013	104	4.5	0.62	1.9	0.40	3.0	0.51	4.2	0.60
2014	88	3.8	0.61	1.6	0.46	2.5	0.54	3.4	0.60
2015	96	4.0	0.74	2.1	0.70	2.8	0.71	3.7	0.74
2016	94	3.9	0.68	1.7	0.57	2.6	0.62	3.5	0.66
2017	91	3.8	0.73	1.7	0.65	2.5	0.68	3.4	0.73
2018	68	2.8	0.85	1.5	0.88	2.0	0.87	2.6	0.86
2019	40	1.6	0.75	0.8	0.74	1.1	0.75	1.5	0.76
2020	54	2.2	0.76	1.0	0.67	1.4	0.70	2.0	0.76
1998-2020	1577	3.4	0.64	1.8	0.47	2.5	0.56	3.3	0.64

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	20	1.7	0.63	1.4	0.61	1.5	0.62	1.6	0.66
1999	12	1.0	0.40	0.5	0.18	0.7	0.26	0.8	0.34
2000	22	1.8	0.42	1.1	0.31	1.3	0.34	1.5	0.38
2001	43	3.5	0.80	1.9	0.59	2.6	0.69	3.2	0.77
2002	45	2.3	0.63	1.3	0.55	1.7	0.58	2.1	0.64
2003	52	2.6	0.55	1.3	0.35	1.8	0.45	2.2	0.53
2004	58	2.9	0.56	1.5	0.39	2.0	0.46	2.4	0.52
2005	74	3.7	0.73	1.8	0.45	2.4	0.57	3.0	0.65
2006	61	3.0	0.63	1.4	0.44	2.0	0.55	2.6	0.64
2007	70	3.0	0.63	1.6	0.41	2.1	0.51	2.6	0.59
2008	71	3.1	0.63	1.4	0.41	1.9	0.50	2.4	0.56
2009	72	3.1	0.57	1.5	0.40	2.1	0.49	2.6	0.56
2010	95	4.1	0.65	1.7	0.41	2.3	0.50	3.1	0.60
2011	91	3.9	0.70	1.8	0.41	2.5	0.55	3.1	0.65
2012	96	4.1	0.59	1.9	0.36	2.6	0.45	3.2	0.53
2013	82	3.4	0.66	1.6	0.48	2.2	0.57	2.7	0.62
2014	87	3.6	0.66	1.6	0.57	2.2	0.60	2.7	0.61
2015	89	3.7	0.70	1.5	0.61	2.2	0.64	2.9	0.68
2016	82	3.3	0.65	1.5	0.62	2.1	0.62	2.5	0.62
2017	91	3.7	0.81	1.6	0.76	2.3	0.79	2.9	0.81
2018	48	1.9	0.70	0.8	0.63	1.2	0.64	1.5	0.69
2019	29	1.2	0.50	0.5	0.40	0.7	0.43	0.9	0.45
2020	43	1.7	0.74	0.7	0.60	1.0	0.64	1.3	0.69
1998-2020	1433	3.0	0.64	1.4	0.46	1.9	0.54	2.4	0.61

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	0.2	0.2	1	0.1	0.1	3	0.3	0.3
5-9	11	0.5	0.7	5	0.4	0.5	6	0.6	0.9
10-14	17	0.8	1.5	5	0.4	1.0	12	1.1	2.0
15-19	13	0.6	2.1	8	0.7	1.7	5	0.5	2.5
20-24	24	1.1	3.2	17	1.5	3.2	7	0.7	3.2
25-29	22	1.0	4.2	16	1.4	4.6	6	0.6	3.7
30-34	24	1.1	5.3	9	0.8	5.4	15	1.4	5.2
35-39	37	1.7	7.0	21	1.9	7.3	16	1.5	6.7
40-44	49	2.3	9.3	22	2.0	9.3	27	2.6	9.3
45-49	67	3.1	12.4	31	2.8	12.0	36	3.4	12.7
50-54	74	3.4	15.8	40	3.6	15.6	34	3.3	16.0
55-59	113	5.2	21.0	48	4.3	19.8	65	6.2	22.2
60-64	139	6.4	27.4	69	6.1	26.0	70	6.7	28.9
65-69	239	11.0	38.4	138	12.3	38.3	101	9.7	38.5
70-74	384	17.7	56.1	209	18.6	56.9	175	16.7	55.3
75-79	432	19.9	76.0	239	21.3	78.1	193	18.5	73.7
80-84	287	13.2	89.2	146	13.0	91.1	141	13.5	87.2
85+	234	10.8	100.0	100	8.9	100.0	134	12.8	100.0
All ages	2170	100.0		1124	100.0		1046	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	1	3	0.1	0.02	0.2	0.06	5.3	18.8
5- 9	5	6	0.3	0.14	0.4	0.18	17.9	24.0
10-14	5	12	0.3	0.18	0.8	0.52	17.9	52.2
15-19	8	5	0.5	0.22	0.3	0.23	16.7	20.0
20-24	17	7	0.8	0.59	0.4	0.32	23.3	16.3
25-29	16	6	0.7	0.62	0.3	0.19	17.2	6.1
30-34	9	15	0.4	0.27	0.7	0.38	6.3	8.3
35-39	21	16	0.9	0.66	0.7	0.32	7.9	3.9
40-44	22	27	0.9	0.40	1.1	0.48	3.6	3.2
45-49	31	36	1.2	0.50	1.4	0.59	2.2	2.2
50-54	40	34	1.6	0.47	1.4	0.45	1.5	1.3
55-59	48	65	2.3	0.55	3.0	0.62	1.1	1.7
60-64	69	70	3.9	0.58	3.7	0.67	1.1	1.4
65-69	138	101	8.5	0.68	5.6	0.65	1.5	1.4
70-74	209	175	13.9	0.83	10.2	0.85	1.8	2.0
75-79	239	193	19.8	0.91	12.9	0.82	1.9	2.0
80-84	146	141	20.2	0.81	13.2	0.82	1.4	1.5
85+	100	134	21.4	0.83	12.9	0.84	1.1	1.1
All ages	1124	1046					1.6	1.7
Mortality								
Raw			3.5	0.66	3.1	0.65		
WS			1.7	0.49	1.4	0.48		
ES			2.4	0.58	1.9	0.56		
BRD-S			3.2	0.65	2.4	0.61		
PYLL-70								
per 100,000			24.6		24.5			
ES			23.8		24.4			
AYLL-70			16.4		17.2			

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	3	0.5	2	66.7			1	33.3
C07–C08	Salivary gland	1	0.2	1	100.0				
C09–C10	Oropharynx	3	0.5	1	33.3	1	33.3	1	33.3
C12–C13	Hypopharynx	2	0.3					2	100.0
C15	Oesophagus	5	0.8	2	40.0			3	60.0
C16	Stomach	6	0.9	4	66.7	1	16.7	1	16.7
C17	Small intestine	2	0.3	2	100.0				
C18	Colon	43	6.6	35	81.4	3	7.0	5	11.6
C19–C20	Rectum	20	3.1	14	70.0	1	5.0	5	25.0
C22	Liver	1	0.2	1	100.0				
C23–C24	Bile	1	0.2					1	100.0
C25	Pancreas	6	0.9			2	33.3	4	66.7
C30–C31	Sinuses	1	0.2	1	100.0				
C32	Larynx	4	0.6	3	75.0	1	25.0		
C33–C34	Lung	24	3.7	9	37.5	7	29.2	8	33.3
C38,C45	Mesothelioma	2	0.3	1	50.0	1	50.0		
C40–C41	Bone	2	0.3	1	50.0			1	50.0
C43	Malign. melanoma	20	3.1	18	90.0			2	10.0
C44	Skin others	32	4.9	18	56.3	4	12.5	10	31.3
C46,C49	Soft tissue	12	1.8	5	41.7	1	8.3	6	50.0
C48	Peritoneal	2	0.3	2	100.0				
C61	Prostate	128	19.6	115	89.8	3	2.3	10	7.8
C62	Testis	5	0.8	4	80.0			1	20.0
C64	Kidney	14	2.1	13	92.9			1	7.1
C67	Bladder	14	2.1	11	78.6	2	14.3	1	7.1
C68	Urinary org.	2	0.3	1	50.0			1	50.0
C70–C72	CNS cancer	7	1.1	3	42.9	1	14.3	3	42.9
C73	Thyroid	5	0.8	4	80.0			1	20.0
C74–C80	Cancer others	1	0.2	1	100.0				
C76–C79	CUP	1	0.2	1	100.0				
C81	Hodgkin lymphoma	10	1.5	8	80.0			2	20.0
C82–C85	NHL	65	10.0	45	69.2	9	13.8	11	16.9
C90	Mult. myeloma	6	0.9	4	66.7	2	33.3		
C91–C96	Leukaemia	200	30.7			50	25.0	150	75.0
C96	Systemic	2	0.3	1	50.0	1	50.0		
All further malignancies		652	100.0	331	50.8	90	13.8	231	35.4

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	1	0.2					1	100.0
C07–C08	Salivary gland	2	0.4	2	100.0				
C09–C10	Oropharynx	1	0.2	1	100.0				
C12–C13	Hypopharynx	1	0.2	1	100.0				
C15	Oesophagus	3	0.6					3	100.0
C16	Stomach	5	0.9	5	100.0				
C18	Colon	16	3.0	14	87.5	1	6.3	1	6.3
C19–C20	Rectum	9	1.7	5	55.6	1	11.1	3	33.3
C21	Anus/canal	3	0.6	3	100.0				
C22	Liver	3	0.6					3	100.0
C23–C24	Bile	1	0.2	1	100.0				
C25	Pancreas	2	0.4					2	100.0
C26	GI cancer	1	0.2	1	100.0				
C30–C31	Sinuses	1	0.2	1	100.0				
C33–C34	Lung	15	2.8	9	60.0	2	13.3	4	26.7
C40–C41	Bone	1	0.2	1	100.0				
C43	Malign. melanoma	15	2.8	13	86.7	1	6.7	1	6.7
C44	Skin others	16	3.0	10	62.5	1	6.3	5	31.3
C46,C49	Soft tissue	5	0.9	3	60.0			2	40.0
C48	Peritoneal	3	0.6	3	100.0				
C50	Breast	134	24.8	123	91.8	7	5.2	4	3.0
C51	Vulva	3	0.6	2	66.7			1	33.3
C52	Vagina	1	0.2					1	100.0
C53	Cervix uteri	11	2.0	8	72.7	1	9.1	2	18.2
C54	Corpus uteri	26	4.8	21	80.8	2	7.7	3	11.5
C56	Ovary	8	1.5	7	87.5			1	12.5
C64	Kidney	6	1.1	4	66.7	2	33.3		
C65	Renal pelvis	1	0.2					1	100.0
C66	Ureter	1	0.2	1	100.0				
C67	Bladder	6	1.1	5	83.3	1	16.7		
C69	Eye lymphoma	1	0.2	1	100.0				
C70–C72	CNS cancer	8	1.5	3	37.5			5	62.5
C73	Thyroid	14	2.6	13	92.9	1	7.1		
C76–C79	CUP	5	0.9	1	20.0	1	20.0	3	60.0
C81	Hodgkin lymphoma	6	1.1	6	100.0				
C82–C85	NHL	31	5.7	25	80.6	3	9.7	3	9.7
C90	Mult. myeloma	7	1.3	5	71.4	2	28.6		
C91–C96	Leukaemia	165	30.6			42	25.5	123	74.5
C96	Systemic	2	0.4	1	50.0			1	50.0
All further malignancies		540	100.0	299	55.4	68	12.6	173	32.0

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	1	3	0.1	0.02	0.2	0.06	5.3	20.0
5- 9	5	6	0.3	0.14	0.4	0.19	18.5	24.0
10-14	5	10	0.3	0.19	0.7	0.45	17.9	52.6
15-19	8	4	0.5	0.23	0.2	0.20	17.4	17.4
20-24	15	6	0.7	0.56	0.3	0.27	22.7	14.6
25-29	14	5	0.6	0.56	0.2	0.20	16.5	5.5
30-34	8	14	0.3	0.28	0.6	0.37	5.8	8.8
35-39	19	16	0.8	0.61	0.7	0.33	7.6	4.3
40-44	20	22	0.8	0.40	0.9	0.49	3.6	2.9
45-49	26	27	1.0	0.51	1.0	0.59	2.0	1.9
50-54	31	27	1.2	0.42	1.1	0.50	1.3	1.2
55-59	40	41	1.9	0.56	1.9	0.55	1.0	1.3
60-64	45	52	2.5	0.50	2.7	0.73	0.8	1.3
65-69	81	68	5.0	0.65	3.8	0.70	1.1	1.2
70-74	119	96	7.9	0.81	5.6	0.74	1.3	1.4
75-79	138	119	11.4	0.95	7.9	0.82	1.5	1.6
80-84	86	99	11.9	0.83	9.3	0.86	1.2	1.4
85+	53	83	11.3	0.83	8.0	0.83	0.8	0.9
All ages	714	698					1.3	1.4
Mortality								
Raw			2.2	0.60	2.1	0.62		
WS			1.2	0.42	1.0	0.43		
ES			1.6	0.51	1.3	0.51		
BRD-S			2.1	0.59	1.7	0.57		
PYLL-70								
per 100,000			21.0		20.0			
ES			20.7		20.3			
AYLL-70			19.0		18.8			

* 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	1	3	0.1	0.02	0.2	0.06	5.3	20.0
5- 9	5	6	0.3	0.14	0.4	0.20	18.5	24.0
10-14	5	9	0.3	0.19	0.6	0.43	17.9	47.4
15-19	8	4	0.5	0.25	0.2	0.20	17.4	18.2
20-24	14	6	0.7	0.52	0.3	0.29	21.2	15.0
25-29	12	5	0.5	0.48	0.2	0.23	14.1	5.7
30-34	8	14	0.3	0.29	0.6	0.38	5.8	8.9
35-39	17	13	0.7	0.55	0.6	0.30	6.9	3.6
40-44	19	18	0.8	0.39	0.7	0.44	3.4	2.4
45-49	23	24	0.9	0.47	0.9	0.52	1.8	1.7
50-54	29	26	1.1	0.42	1.0	0.54	1.3	1.2
55-59	35	37	1.6	0.55	1.7	0.51	0.9	1.2
60-64	42	48	2.4	0.51	2.5	0.75	0.8	1.2
65-69	73	60	4.5	0.63	3.3	0.64	1.0	1.1
70-74	112	92	7.5	0.81	5.4	0.75	1.3	1.4
75-79	130	114	10.7	0.93	7.6	0.79	1.5	1.6
80-84	84	97	11.6	0.82	9.1	0.86	1.2	1.4
85+	50	81	10.7	0.82	7.8	0.82	0.8	0.9
All ages	667	657					1.3	1.4
Mortality								
Raw			2.0	0.59	2.0	0.60		
WS			1.1	0.41	0.9	0.42		
ES			1.5	0.50	1.3	0.50		
BRD-S			1.9	0.58	1.6	0.56		
PYLL-70								
per 100,000			19.5		18.4			
ES			19.3		18.8			
AYLL-70			19.2		19.1			

* See corresponding tables with multiple malignancies.

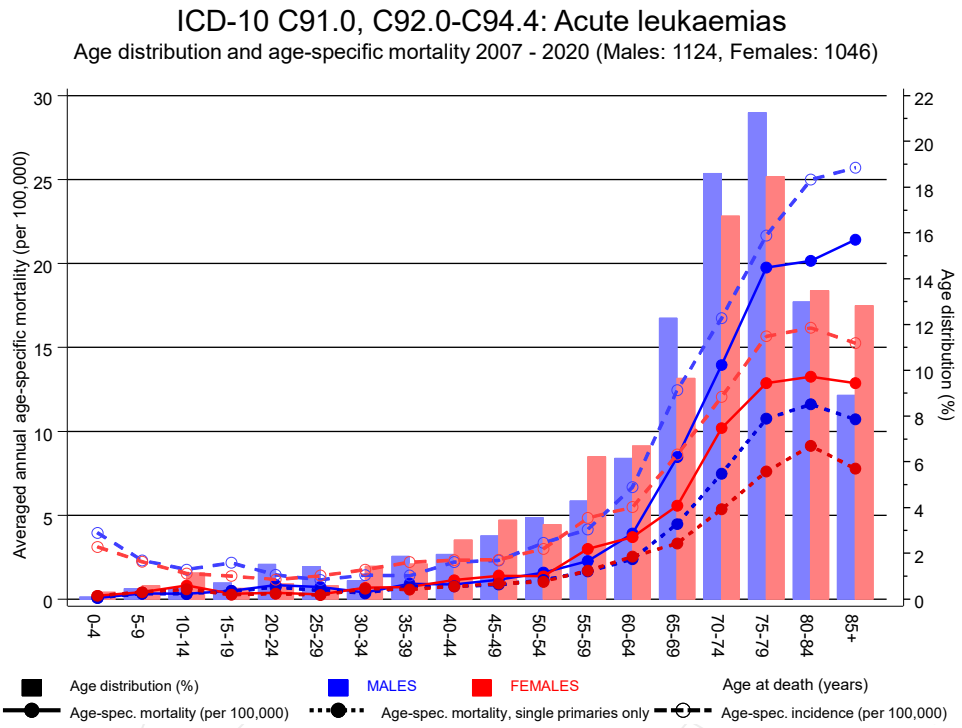

Figure 17. Distribution of age at death (bars; males: mean=67.6 yrs, median=72.2 yrs; females: mean=67.9 yrs, median=72.3 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

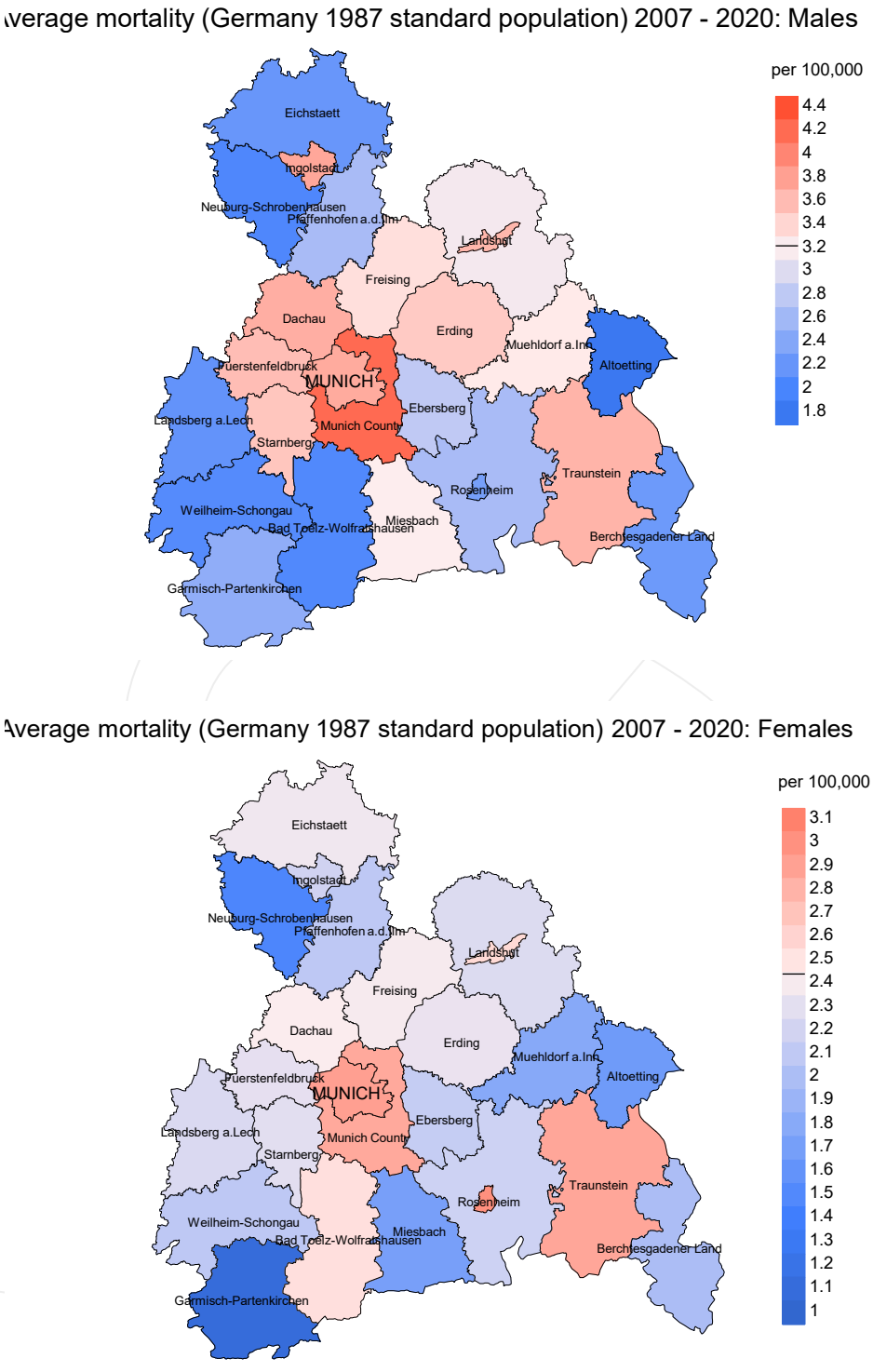

Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 3.2/100,000 WS N=1,124, females 2.4/100,000 WS N=1,046).

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 24 women died from acute leukaemias. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.2 and 3.6/100,000.

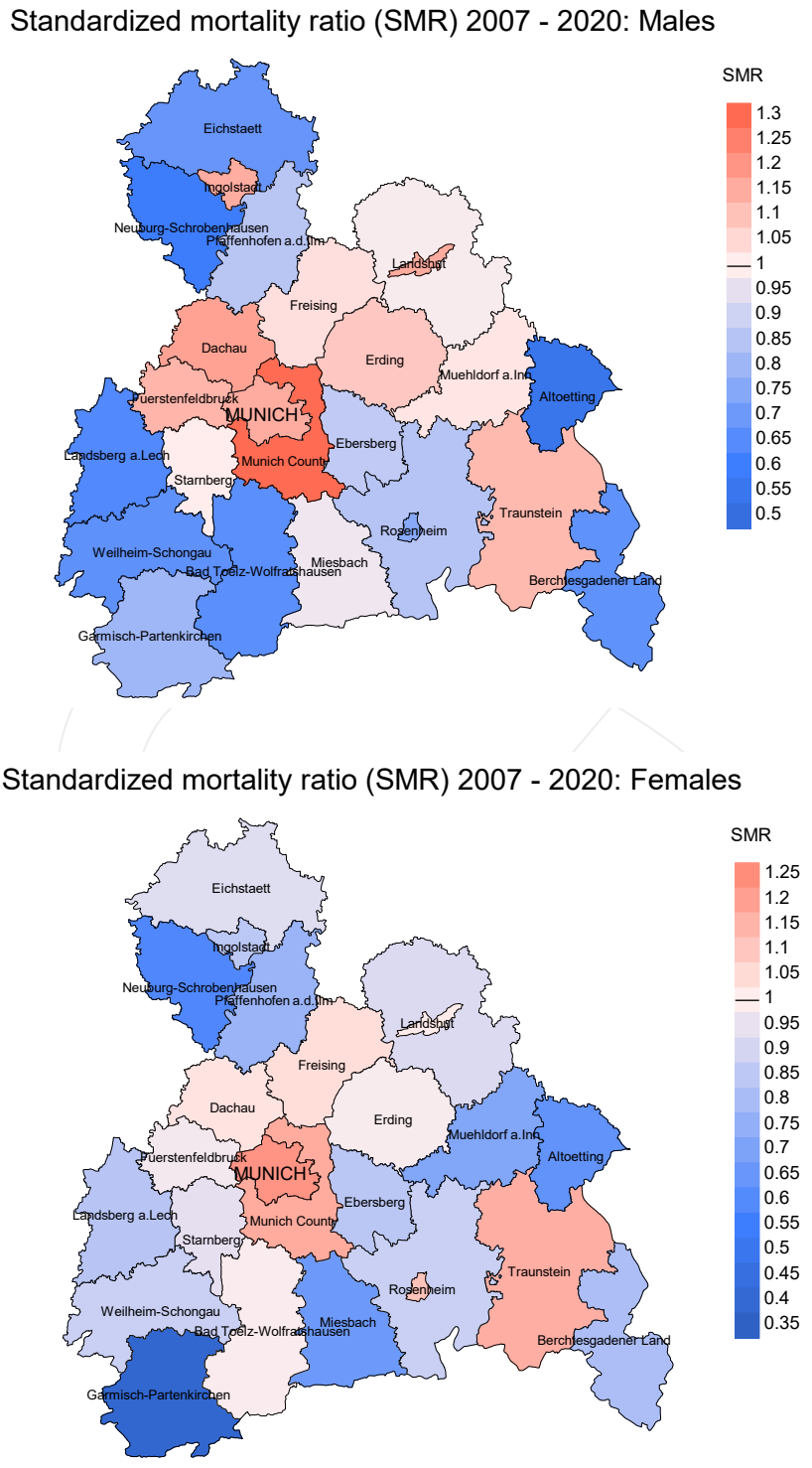

Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,124, females N=1,046).

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 24 women died from acute leukaemias. Therefore, the mean standardized mortality ratio (SMR) 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 0.46 and 1.39, 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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