

# Munich Cancer Registry



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## ICD-10 C91.1: Chronic lymph. leukaemia

### Incidence and Mortality

Year of diagnosis	1998-2019
Patients	3,977
Diseases	3,981
Creation date	01/26/2021
Database export	01/07/2021
Population	4.92 m





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

[https://www.tumorregister-muenchen.de/en/facts/base/bC911\\_E-ICD-10-C91.1-Chronic-lymph.-leukaemia-incidence-and-mortality.pdf](https://www.tumorregister-muenchen.de/en/facts/base/bC911_E-ICD-10-C91.1-Chronic-lymph.-leukaemia-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<sup>#</sup>, with a total of 4.69 million inhabitants, account for the frequency of cancer diseases<sup>##</sup> and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

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

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

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

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

Munich Cancer Registry, January 2021

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

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

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

### 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 2015) used for specifying cancer site

Code	Description
C91.1	Chronic lymphocytic leukaemia of B-cell type

## 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	98	9	9.2	13.3	19.8	76.5	96.9
1999	96	7	7.3	14.4	19.9	71.9	100.0
2000	96	16	16.7	13.1	19.8	79.2	96.9
2001	140	36	25.7	12.8	19.6	80.7	97.1
2002	246	77	31.3	12.6	19.6	80.9	96.7 #
2003	217	64	29.5	13.2	19.5	78.3	97.2
2004	231	54	23.4	13.9	19.7	74.0	94.4
2005	213	59	27.7	15.0	19.7	76.1	95.3
2006	227	36	15.9	16.0	19.3	72.7	95.6
2007	262	57	21.8	16.5	18.5	70.6	95.0 #
2008	230	52	22.6	17.4	18.6	69.6	99.6
2009	254	50	19.7	17.7	17.6	60.6	97.6
2010	227	56	24.7	18.4	16.7	68.7	97.4
2011	223	52	23.3	19.2	16.3	57.8	97.8
2012	219	48	21.9	19.5	15.6	60.7	99.1
2013	209	47	22.5	20.0	14.0	57.9	94.3
2014	182	52	28.6	20.4	13.1	57.7	97.3
2015	177	41	23.2	20.6	12.5	49.7	97.2
2016	162	46	28.4	20.6	11.9	43.8	96.9
2017	163	62	38.0	21.1	10.0	49.1	98.8
2018	76	4	5.3	21.5	8.9	21.1	94.7
2019	33	2	6.1	21.6	3.4	21.2	81.8 ##
1998-2019	3981	927	23.3	21.6	19.8	65.4	96.8

3,981 cases diagnosed 1998-2019 are related to a total of 3,977 patients. Currently, in 1,549 (38.9 %) of these 3,977 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,106 / 305 / 138 (27.8 % / 7.7 % / 3.5 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 163 cases has been diagnosed, of which 21.1 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 10.0 % 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	51	52.0	3	5.9	15.7	23.0	72.5	94.1
1999	50	52.1	2	4.0	15.8	23.0	76.0	100.0
2000	58	60.4	10	17.2	13.8	23.0	82.8	96.6
2001	74	52.9	14	18.9	13.3	22.6	81.1	95.9
2002	137	55.7	33	24.1	13.2	22.5	80.3	95.6 #
2003	135	62.2	30	22.2	14.5	22.3	75.6	97.0
2004	131	56.7	27	20.6	14.9	22.1	76.3	92.4
2005	129	60.6	32	24.8	16.1	22.0	77.5	96.1
2006	141	62.1	19	13.5	17.7	21.7	71.6	94.3
2007	155	59.2	20	12.9	17.8	21.0	71.6	94.8 #
2008	132	57.4	24	18.2	18.5	21.0	69.7	100.0
2009	149	58.7	22	14.8	19.0	20.0	57.0	97.3
2010	134	59.0	31	23.1	19.7	18.6	69.4	97.0
2011	132	59.2	25	18.9	20.5	17.9	56.8	99.2
2012	127	58.0	22	17.3	20.8	16.3	61.4	100.0
2013	127	60.8	29	22.8	21.4	14.6	57.5	94.5
2014	112	61.5	24	21.4	21.6	13.8	53.6	98.2
2015	109	61.6	19	17.4	22.0	12.8	46.8	98.2
2016	96	59.3	25	26.0	21.8	11.3	39.6	99.0
2017	99	60.7	36	36.4	22.5	9.8	49.5	100.0
2018	40	52.6	3	7.5	23.0	5.3	22.5	97.5
2019	21	63.6	1	4.8	23.2	0.0	23.8	85.7 ##
1998–2019	2339	58.8	451	19.3	23.2	23.0	64.8	96.8

2,339 cases diagnosed 1998-2019 are related to a total of 2,336 patients. Currently, in 1,003 (42.9 %) of these 2,336 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 697 / 202 / 104 (29.8 % / 8.6 % / 4.5 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 99 cases has been diagnosed, of which 22.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 9.8 % 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	47	48.0	6	12.8	10.6	15.2	80.9	100.0
1999	46	47.9	5	10.9	12.9	15.4	67.4	100.0
2000	38	39.6	6	15.8	12.2	15.2	73.7	97.4
2001	66	47.1	22	33.3	12.2	15.2	80.3	98.5
2002	109	44.3	44	40.4	11.8	15.3	81.7	98.2 #
2003	82	37.8	34	41.5	11.6	15.5	82.9	97.6
2004	100	43.3	27	27.0	12.5	16.3	71.0	97.0
2005	84	39.4	27	32.1	13.6	16.3	73.8	94.0
2006	86	37.9	17	19.8	13.8	15.8	74.4	97.7
2007	107	40.8	37	34.6	14.6	14.9	69.2	95.3 #
2008	98	42.6	28	28.6	15.9	15.2	69.4	99.0
2009	105	41.3	28	26.7	15.9	14.0	65.7	98.1
2010	93	41.0	25	26.9	16.7	14.0	67.7	97.8
2011	91	40.8	27	29.7	17.4	14.0	59.3	95.6
2012	92	42.0	26	28.3	17.7	14.7	59.8	97.8
2013	82	39.2	18	22.0	18.1	13.2	58.5	93.9
2014	70	38.5	28	40.0	18.6	12.1	64.3	95.7
2015	68	38.4	22	32.4	18.7	12.2	54.4	95.6
2016	66	40.7	21	31.8	18.8	12.8	50.0	93.9
2017	64	39.3	26	40.6	19.0	10.3	48.4	96.9
2018	36	47.4	1	2.8	19.3	13.6	19.4	91.7
2019	12	36.4	1	8.3	19.4	10.0	16.7	75.0 ##
1998–2019	1642	41.2	476	29.0	19.4	15.2	66.4	96.7

1,642 cases diagnosed 1998-2019 are related to a total of 1,641 patients. Currently, in 546 (33.3 %) of these 1,641 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 409 / 103 / 34 (24.9 % / 6.3 % / 2.1 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 64 cases has been diagnosed, of which 19.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 10.3 % 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 4.92 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	51	47	4.6	4.0	2.7	1.8	4.1	2.7	5.4	3.4
1999	50	46	4.5	3.9	2.6	2.0	4.0	2.8	5.1	3.4
2000	58	38	5.1	3.2	3.1	1.4	4.5	2.1	5.4	2.6
2001	74	66	6.4	5.4	3.8	2.3	5.6	3.5	7.2	4.4
2002	137	109	7.4	5.6	4.2	2.2	6.2	3.3	7.9	4.3
2003	135	82	7.2	4.2	3.9	1.6	5.9	2.5	7.8	3.3
2004	131	100	7.0	5.1	3.8	2.2	5.6	3.2	7.3	4.0
2005	129	84	6.8	4.2	3.4	1.5	5.3	2.4	7.2	3.4
2006	141	86	7.4	4.3	3.8	1.6	5.8	2.5	7.6	3.3
2007	155	107	7.0	4.6	3.5	1.8	5.4	2.7	7.2	3.5
2008	132	98	5.9	4.2	2.8	1.6	4.3	2.4	5.8	3.1
2009	149	105	6.7	4.5	3.3	1.7	5.0	2.5	6.4	3.3
2010	134	93	5.9	4.0	2.7	1.3	4.3	2.1	5.8	2.8
2011	132	91	5.9	3.9	2.8	1.3	4.3	2.1	5.5	2.7
2012	127	92	5.6	3.9	2.4	1.4	3.7	2.1	5.2	2.7
2013	127	82	5.5	3.4	2.4	1.4	3.7	2.0	5.0	2.6
2014	112	70	4.8	2.9	2.3	0.9	3.4	1.5	4.4	2.0
2015	109	68	4.6	2.8	2.0	1.0	3.1	1.5	4.1	2.0
2016	96	66	4.0	2.7	1.7	0.8	2.7	1.3	3.6	1.8
2017	99	64	4.1	2.6	1.7	0.8	2.7	1.2	3.6	1.7
2018	40	36	1.6	1.5	0.7	0.6	1.1	0.9	1.5	1.1
2019	21	12	0.9	0.5	0.4	0.2	0.6	0.3	0.8	0.4
1998-2019	2339	1642	5.3	3.6	2.6	1.4	3.9	2.1	5.1	2.7

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

Table 3

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	98	68.4	12.4	38.2	95.8	54.7	59.7	67.4	77.8	84.2
1999	96	66.1	11.7	31.9	89.4	52.0	58.1	65.6	75.6	80.1
2000	96	68.7	11.1	46.5	91.2	54.7	60.5	67.5	77.1	86.5
2001	140	70.7	12.0	40.5	94.0	56.4	63.2	69.1	78.5	87.7
2002	246	71.4	12.5	28.6	95.0	55.8	63.3	71.2	80.5	88.3
2003	217	71.3	12.3	35.6	98.9	53.9	63.1	72.3	80.3	87.7
2004	231	70.3	12.5	29.8	98.6	54.7	63.1	70.6	79.4	85.7
2005	213	72.7	11.3	34.4	97.1	57.6	65.8	74.4	79.8	85.6
2006	227	71.8	11.4	30.0	95.4	56.9	64.8	72.5	80.2	86.0
2007	262	71.7	12.6	37.6	99.8	53.6	63.3	72.5	81.1	87.0
2008	230	73.5	10.6	42.6	97.4	60.6	66.9	72.9	80.8	87.1
2009	254	72.0	12.2	28.2	98.6	56.3	64.3	72.4	81.7	87.2
2010	227	74.2	12.7	37.1	101	54.7	67.0	75.7	83.3	89.3
2011	223	72.7	12.5	38.5	101	55.0	65.6	73.1	81.7	89.1
2012	219	73.9	11.8	28.2	96.9	59.0	68.1	74.1	82.5	87.9
2013	209	73.4	12.0	40.0	100	57.7	65.7	74.0	82.4	88.6
2014	182	73.6	12.7	39.4	98.3	55.7	66.3	74.3	82.8	90.7
2015	177	73.2	12.5	28.1	96.6	54.6	65.8	74.8	81.6	88.3
2016	162	74.4	12.1	38.2	97.5	57.6	66.3	76.1	83.3	88.8
2017	163	75.5	12.7	32.4	97.4	57.3	68.1	77.6	85.4	90.0
2018	76	70.5	12.4	37.2	90.8	48.4	63.5	73.0	79.3	83.0
2019	33	72.3	12.5	47.5	97.6	53.8	64.0	73.4	80.3	86.5
1998-2019	3981	72.2	12.2	28.1	101	55.8	64.3	73.1	81.1	87.7



Table 3a

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	51	66.8	12.5	38.2	95.8	54.0	57.7	64.6	76.2	82.5
1999	50	65.6	12.3	31.9	89.4	51.9	56.4	64.5	77.0	80.4
2000	58	67.6	10.3	46.5	91.1	55.1	61.0	67.1	72.9	85.0
2001	74	67.7	11.2	40.5	90.7	53.2	60.7	67.4	76.0	83.2
2002	137	68.4	12.0	28.6	90.9	54.0	61.9	68.6	76.8	84.1
2003	135	69.3	11.4	35.6	90.7	54.6	62.5	69.7	77.2	83.8
2004	131	69.3	12.0	29.8	95.2	56.4	62.4	70.1	77.3	82.4
2005	129	71.0	11.1	34.4	91.3	55.2	65.6	71.6	78.1	85.0
2006	141	70.6	11.1	30.0	95.4	56.8	64.3	71.2	78.0	85.1
2007	155	69.7	12.3	37.6	97.8	51.2	60.6	71.2	79.3	84.9
2008	132	72.2	9.2	49.5	93.7	60.5	66.6	71.8	78.0	84.5
2009	149	70.3	11.1	42.0	97.0	55.8	63.1	70.9	77.8	84.5
2010	134	72.3	12.8	37.1	101	53.7	63.5	73.6	81.5	87.8
2011	132	70.3	12.1	38.5	101	52.5	63.6	71.1	78.9	84.7
2012	127	73.3	10.4	39.0	95.2	60.7	68.2	73.5	80.7	84.9
2013	127	73.1	11.9	45.2	100	53.7	67.8	73.8	82.1	87.4
2014	112	71.3	12.5	39.4	95.9	54.7	63.7	72.0	80.4	85.4
2015	109	71.7	12.4	28.1	96.6	53.9	62.9	74.8	80.0	85.6
2016	96	72.9	11.5	40.4	97.5	57.6	64.3	75.1	80.5	87.4
2017	99	73.9	12.9	32.4	93.8	56.3	67.0	75.4	83.9	88.9
2018	40	70.6	12.7	37.2	85.9	47.6	65.1	75.4	78.9	82.9
2019	21	71.8	13.3	47.5	97.6	53.8	63.2	73.4	80.3	86.1
1998-2019	2339	70.7	11.8	28.1	101	54.7	63.5	71.6	79.1	85.3

Table 3b

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

Year of diagnosis	Cases n	Std.		Min.	Max.	10%	25%	Median		
		Mean	dev.					50%	75%	90%
1998	47	70.1	12.2	39.8	90.3	55.6	61.4	71.4	78.7	86.7
1999	46	66.7	11.2	39.1	88.4	52.3	60.1	67.7	75.1	78.2
2000	38	70.5	12.2	49.3	91.2	53.7	60.5	70.3	80.0	88.6
2001	66	74.0	12.0	49.6	94.0	59.0	64.8	73.5	84.7	92.5
2002	109	75.1	12.0	40.4	95.0	58.5	66.0	77.5	84.9	90.2
2003	82	74.6	13.2	47.3	98.9	53.7	65.0	76.9	83.2	91.5
2004	100	71.6	13.2	40.4	98.6	51.5	64.0	72.7	81.7	87.3
2005	84	75.2	11.2	43.7	97.1	62.3	67.3	76.5	82.2	89.8
2006	86	73.8	11.6	32.7	93.9	57.3	67.1	74.9	82.5	87.1
2007	107	74.5	12.5	39.5	99.8	57.2	64.8	76.8	85.0	89.0
2008	98	75.2	12.1	42.6	97.4	60.7	67.2	75.3	84.5	90.8
2009	105	74.4	13.3	28.2	98.6	57.5	69.1	75.8	84.5	88.2
2010	93	76.9	12.2	42.8	97.5	60.4	69.8	78.7	85.2	89.7
2011	91	76.3	12.4	44.4	96.7	57.2	69.1	77.2	87.5	90.8
2012	92	74.7	13.5	28.2	96.9	58.2	66.9	75.1	86.4	89.2
2013	82	73.9	12.1	40.0	97.3	61.4	65.4	75.2	83.5	90.6
2014	70	77.3	12.4	43.3	98.3	59.6	71.0	79.1	87.0	92.2
2015	68	75.6	12.2	43.1	95.9	56.1	66.8	74.9	86.1	92.1
2016	66	76.6	12.7	38.2	96.0	56.9	70.9	78.1	86.6	90.4
2017	64	77.9	12.1	43.0	97.4	61.2	73.3	79.8	86.5	90.8
2018	36	70.4	12.2	44.8	90.8	49.5	61.7	71.7	79.4	86.7
2019	12	73.3	11.5	51.4	93.8	63.4	65.7	74.1	80.3	86.5
1998-2019	1642	74.4	12.5	28.2	99.8	57.6	66.0	75.6	84.0	89.8

Table 4

Age distribution by 5-year age group and sex for period 2007–2019  
(incl. DCO)

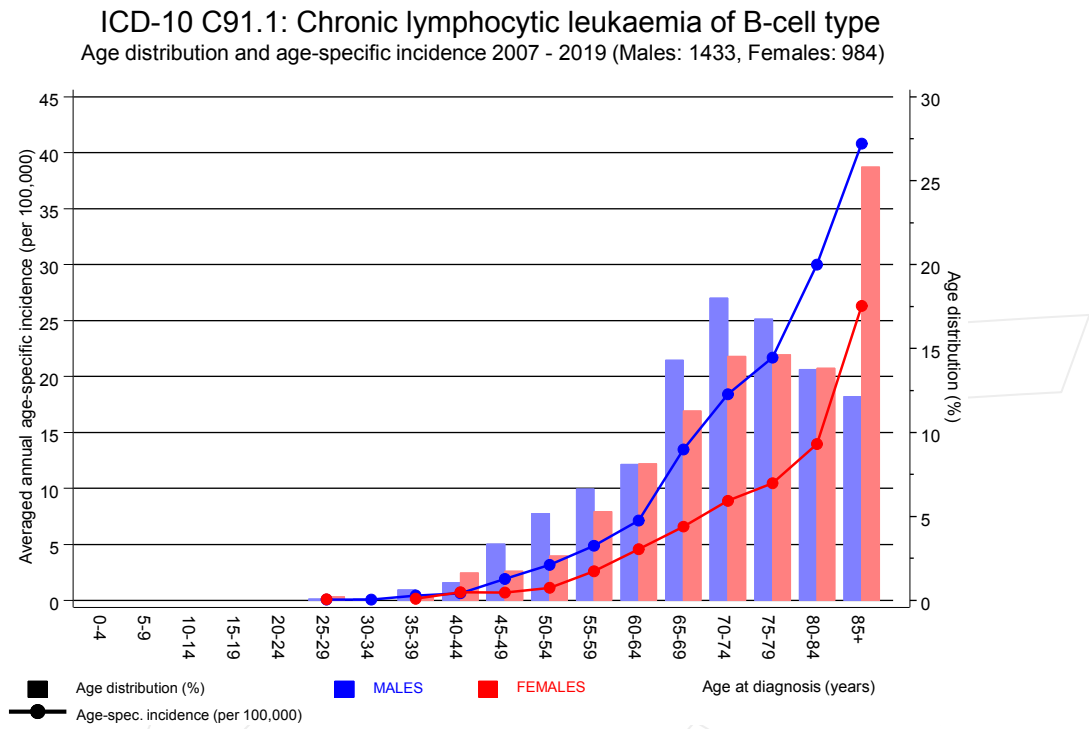
Age at diagnosis Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0–4									
5–9									
10–14									
15–19									
20–24									
25–29	3	0.1	0.1	1	0.1	0.1	2	0.2	0.2
30–34	1	0.0	0.2	1	0.1	0.1			0.2
35–39	12	0.5	0.7	9	0.6	0.8	3	0.3	0.5
40–44	31	1.3	1.9	15	1.0	1.8	16	1.6	2.1
45–49	65	2.7	4.6	48	3.3	5.2	17	1.7	3.9
50–54	100	4.1	8.8	74	5.2	10.3	26	2.6	6.5
55–59	147	6.1	14.9	95	6.6	17.0	52	5.3	11.8
60–64	196	8.1	23.0	116	8.1	25.1	80	8.1	19.9
65–69	316	13.1	36.0	205	14.3	39.4	111	11.3	31.2
70–74	401	16.6	52.6	258	18.0	57.4	143	14.5	45.7
75–79	384	15.9	68.5	240	16.7	74.1	144	14.6	60.4
80–84	333	13.8	82.3	197	13.7	87.9	136	13.8	74.2
85+	428	17.7	100.0	174	12.1	100.0	254	25.8	100.0
All ages	2417	100.0		1433	100.0		984	100.0	

Table 5

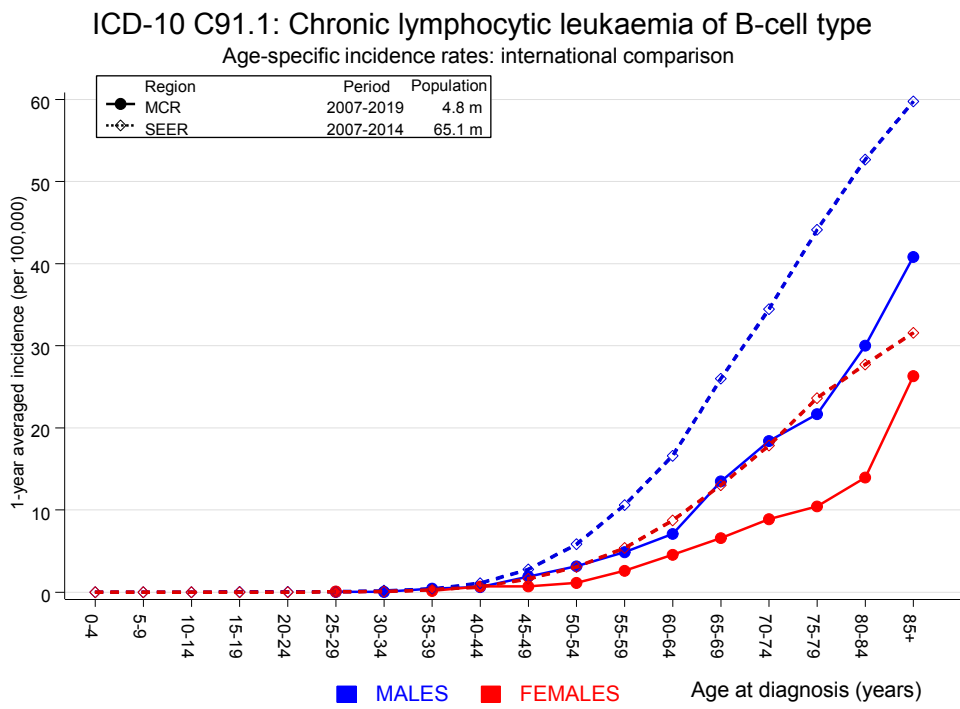
Age-specific incidence, DCO rate and proportion of all cancers  
for period 2007–2019

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid. %	Females Age- spec. incid. %	Males DCO rate n=281 %	Females DCO rate n=288 %	Males	Females
							Prop.all cancers n=143063 %	Prop.all cancers n=144724 %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29	1	2	0.0	0.1		50.0	0.1	0.2
30-34	1		0.0				0.1	
35-39	9	3	0.4	0.1			0.5	0.1
40-44	15	16	0.6	0.7			0.6	0.3
45-49	48	17	1.9	0.7			1.0	0.2
50-54	74	26	3.2	1.1	4.1		0.9	0.2
55-59	95	52	4.9	2.6	6.3	1.9	0.8	0.4
60-64	116	80	7.1	4.6	5.2	5.0	0.7	0.6
65-69	205	111	13.5	6.6	7.8	7.2	0.9	0.6
70-74	258	143	18.4	8.9	10.5	10.5	1.0	0.8
75-79	240	144	21.7	10.5	17.9	20.8	1.1	0.8
80-84	197	136	30.0	14.0	29.4	42.6	1.4	1.0
85+	174	254	40.8	26.3	70.1	67.3	1.8	1.6
All ages	1433	984			19.6	29.3	1.0	0.7
Incidence								
Raw			4.8	3.2				
WS			2.2	1.1				
ES			3.3	1.7				
BRD-S			4.4	2.2				

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



**Figure 6.** Age distribution (males: mean=71.7 yrs, median=72.8 yrs; females: mean=75.4 yrs, median=76.5 yrs) and age-specific incidence.



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

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER\*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2019, based on the November 2018 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 1998–2019

## MALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C00 Lip	3	0.2	15.6	3.2	45.5 #	3.0	
C03–C06 Oral cavity	2	1.3	1.5	0.2	5.5	0.7	
C07–C08 Salivary gland	6	0.4	15.3	5.6	33.4 #	5.9	
C15 Oesophagus	7	3.2	2.2	0.9	4.5	4.0	
C16 Stomach	16	6.7	2.4	1.4	3.9 #	9.8	
C17 Small intestine	3	1.0	3.0	0.6	8.9	2.1	
C18 Colon	29	16.5	1.8	1.2	2.5 #	13.2	3.4
C19–C20 Rectum	24	8.9	2.7	1.7	4.0 #	16.0	
C22 Liver	10	4.9	2.0	1.0	3.7	5.4	10.0
C25 Pancreas	13	6.6	2.0	1.0	3.4 #	6.7	
C33–C34 Lung	54	19.9	2.7	2.0	3.5 #	36.0	3.7
C38,C45 Mesothelioma	2	1.2	1.6	0.2	6.0	0.8	50.0
C43 Malign. melanoma	36	7.4	4.8	3.4	6.7 #	30.2	
C44 Skin others	2	0.0	42.3	5.1	152.8 #	2.1	
C46,C49 Soft tissue	5	0.9	5.3	1.7	12.4 #	4.3	
C50 Breast	2	0.5	4.4	0.5	15.8	1.6	
C60 Penis	3	0.4	7.1	1.5	20.7 #	2.7	
C61 Prostate	96	48.2	2.0	1.6	2.4 #	50.5	4.2
C62 Testis	2	0.3	6.1	0.7	22.2	1.8	
C64 Kidney	15	5.8	2.6	1.4	4.3 #	9.7	
C65 Renal pelvis	3	0.8	3.9	0.8	11.3	2.4	
C67 Bladder	19	8.0	2.4	1.4	3.7 #	11.6	
C70–C72 CNS cancer	7	2.1	3.3	1.3	6.9 #	5.2	
C76–C79 CUP	7	2.9	2.4	1.0	5.0	4.4	
C81 Hodgkin lymphoma	7	0.4	18.7	7.5	38.6 #	7.0	
C82–C85 NHL	34	7.2	4.7	3.3	6.6 #	28.3	8.8
C90 Mult. myeloma	6	2.3	2.6	1.0	5.7	3.9	
C91–C96 Leukaemia	11	2.6	4.2	2.1	7.5 #	8.9	27.3
Others, specified	10	6.1	1.6	0.8	3.0	4.1	
Not observed	0	3.7	0.0	0.0	1.0 #	-3.9	
All further malignancies	434	170.4	2.5	2.3	2.8 #	278.2	3.5
Patients		1928					
Median age at next malignancy (years)		73.5					
Person-years		9474					
Mean observation time (years)		4.9					
Median observation time (years)		4.1					

# The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 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 1998–2019

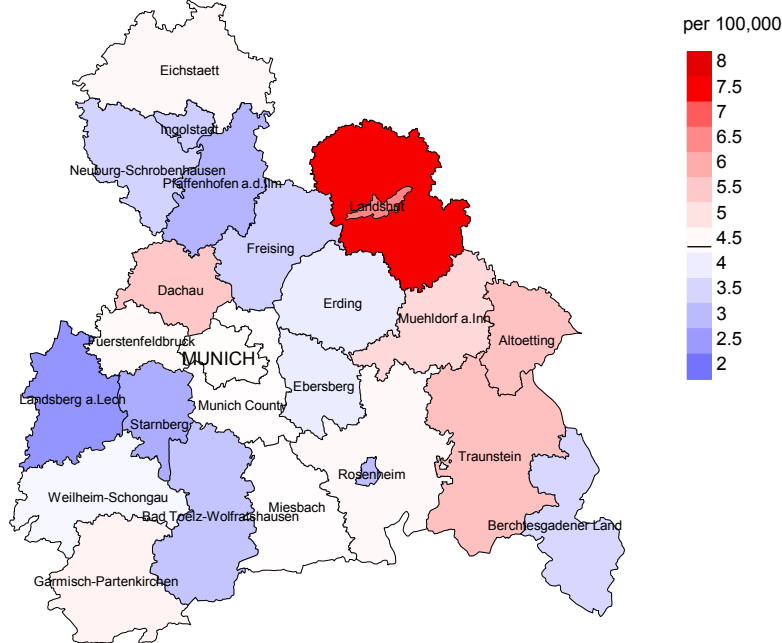
## FEMALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C00 Lip	1	0.1	18.5	0.5	103.3	1.7	
C03–C06 Oral cavity	2	0.4	5.0	0.6	18.2	2.8	
C07–C08 Salivary gland	1	0.1	8.6	0.2	47.9	1.6	
C09–C10 Oropharynx	2	0.3	7.5	0.9	27.1	3.0	
C14 ENT cancer	1	0.0	85.6	2.2	476.7 #	1.7	
C15 Oesophagus	1	0.5	2.2	0.1	12.3	1.0	
C16 Stomach	5	2.5	2.0	0.6	4.7	4.4	
C18 Colon	16	7.1	2.2	1.3	3.7 #	15.6	6.3
C19–C20 Rectum	5	2.9	1.7	0.6	4.0	3.7	
C21 Anus/canal	4	0.4	10.5	2.9	27.0 #	6.4	
C22 Liver	3	0.9	3.3	0.7	9.8	3.7	33.3
C23–C24 Bile	2	1.1	1.9	0.2	6.9	1.7	
C25 Pancreas	10	3.4	2.9	1.4	5.4 #	11.6	10.0
C33–C34 Lung	22	5.3	4.1	2.6	6.2 #	29.3	9.1
C43 Malign. melanoma	10	2.5	3.9	1.9	7.2 #	13.1	
C48 Peritoneal	1	0.3	3.5	0.1	19.3	1.3	
C50 Breast	52	20.8	2.5	1.9	3.3 #	54.9	
C54 Corpus uteri	11	4.0	2.8	1.4	5.0 #	12.4	
C56 Ovary	8	2.9	2.8	1.2	5.5 #	9.0	
C64 Kidney	7	1.7	4.0	1.6	8.2 #	9.2	
C67 Bladder	1	1.4	0.7	0.0	3.9	-0.8	
C69 Eye lymphoma	1	0.0	46.9	1.2	261.1 #	1.7	
C70–C72 CNS cancer	3	0.9	3.2	0.7	9.4	3.6	
C73 Thyroid	5	1.0	5.0	1.6	11.6 #	7.0	
C76–C79 CUP	5	1.3	3.7	1.2	8.7 #	6.4	
C81 Hodgkin lymphoma	2	0.1	16.5	2.0	59.5 #	3.3	
C82–C85 NHL	26	2.9	9.1	5.9	13.3 #	40.7	7.7
C90 Mult. myeloma	4	0.9	4.3	1.2	11.1 #	5.4	
C91–C96 Leukaemia	6	1.1	5.7	2.1	12.3 #	8.7	
Not observed	0	4.1	0.0	0.0	0.9 #	-7.2	
All further malignancies	217	71.0	3.1	2.7	3.5 #	256.9	3.2
Patients		1188					
Median age at next malignancy (years)		75.0					
Person-years		5686					
Mean observation time (years)		4.8					
Median observation time (years)		3.8					

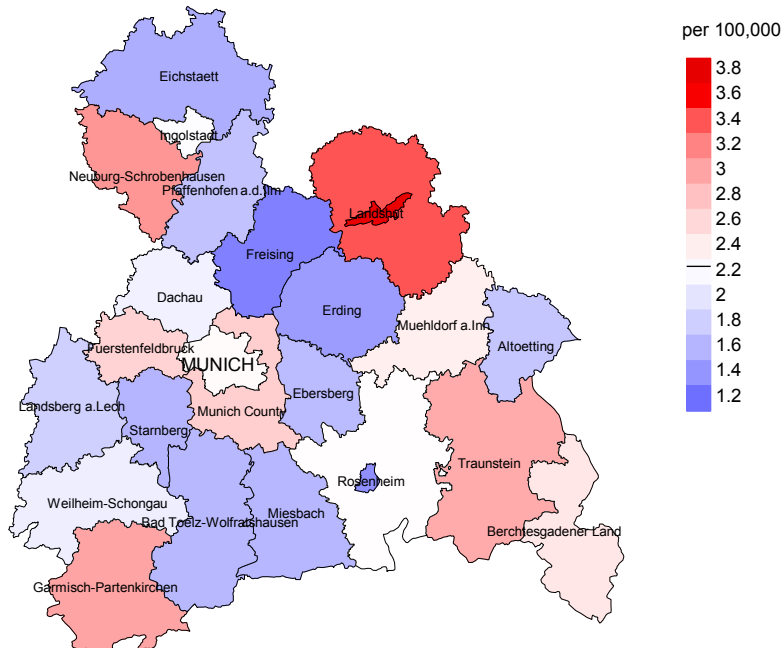
# The occurrence of further specified malignancy is statistically significant.



Average incidence (Germany 1987 standard population) 2007 - 2019: Males



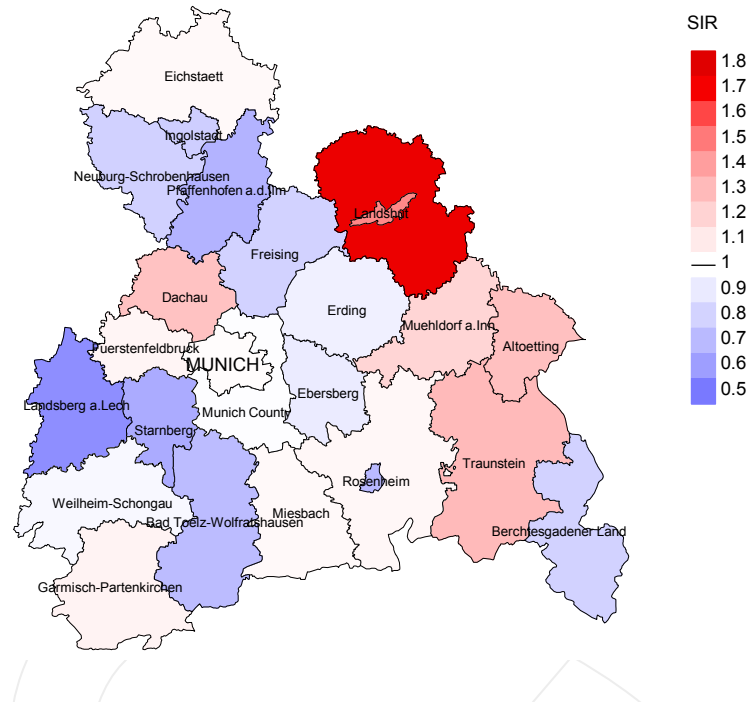
Average incidence (Germany 1987 standard population) 2007 - 2019: Females



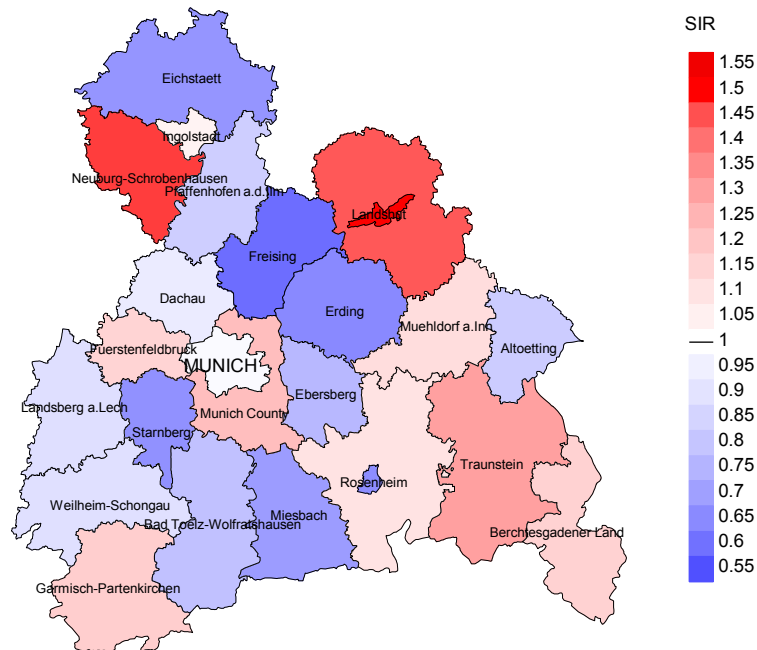
**Figure 8a.** Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 4.4/100,000 WS N=1,433, females 2.2/100,000 WS N=984).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 20 women were identified with newly diagnosed chronic lymph. leukaemia. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.8 and 3.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females



**Figure 8b.** Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. 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=1,433, females N=984).

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 2019 a total of 20 women were identified with newly diagnosed chronic lymph. leukaemia. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.76. Though, the value of this parameter may vary with an underlying probability of 99% between 0.39 and 1.32, 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 4.92 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	98	96.9	9.2	75	76.5	98.7
1999	96	100.0	7.3	69	71.9	95.7
2000	96	96.9	16.7	76	79.2	97.4
2001	140	97.1	25.7	113	80.7	96.5
2002	246	96.7	31.3	199	80.9	97.5
2003	217	97.2	29.5	170	78.3	96.5
2004	231	94.4	23.4	171	74.0	94.7
2005	213	95.3	27.7	162	76.1	96.9
2006	227	95.6	15.9	165	72.7	97.0
2007	262	95.0	21.8	185	70.6	95.1
2008	230	99.6	22.6	160	69.6	93.1
2009	254	97.6	19.7	154	60.6	95.5
2010	227	97.4	24.7	156	68.7	95.5
2011	223	97.8	23.3	129	57.8	93.8
2012	219	99.1	21.9	133	60.7	93.2
2013	209	94.3	22.5	121	57.9	92.6
2014	182	97.3	28.6	105	57.7	90.5
2015	177	97.2	23.2	88	49.7	89.8
2016	162	96.9	28.4	71	43.8	95.8
2017	163	98.8	38.0	80	49.1	92.5
2018	76	94.7	5.3	16	21.1	56.3
2019	33	81.8	6.1	7	21.2	71.4
1998-2019	3981	96.8	23.3	2605	65.4	94.7

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 4.92 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	98	40	97.5	7	7.1
1999	96	48	91.7	4	4.2
2000	96	49	91.8	13	13.5
2001	140	90	95.6	40	28.6
2002	246	131	98.5	82	33.3
2003	217	121	98.3	75	34.6
2004	231	117	100.0	53	22.9
2005	213	150	100.0	63	29.6
2006	227	138	97.8	49	21.6
2007	262	153	100.0	66	25.2
2008	230	154	98.7	53	23.0
2009	254	132	100.0	52	20.5
2010	227	153	99.3	62	27.3
2011	223	149	99.3	55	24.7
2012	219	166	98.8	55	25.1
2013	209	165	99.4	57	27.3
2014	182	163	99.4	57	31.3
2015	177	151	98.7	46	26.0
2016	162	160	98.8	50	30.9
2017	163	174	95.4	65	39.9
2018	76	108	32.4	8	10.5
2019	33	90	52.2	5	15.2
1998–2019	3981	2802	94.4	1017	25.5

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 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	40	57.5	42.5	89.7
1999	48	60.4	39.6	86.4
2000	49	61.2	38.8	97.8
2001	90	55.6	44.4	93.0
2002	131	76.3	23.7	96.1
2003	121	80.2	19.8	94.1
2004	117	85.5	14.5	95.7
2005	150	80.0	20.0	96.7
2006	138	76.1	23.9	92.6
2007	153	74.5	25.5	89.5
2008	154	81.8	18.2	89.5
2009	132	81.8	18.2	93.9
2010	153	79.7	20.3	94.1
2011	149	73.8	26.2	89.9
2012	166	78.3	21.7	89.0
2013	165	72.7	27.3	85.4
2014	163	67.5	32.5	84.6
2015	151	70.9	29.1	84.6
2016	160	64.4	35.6	86.7
2017	174	64.4	35.6	81.3
2018	108	42.6	57.4	74.3
2019	90	46.7	53.3	76.6
1998–2019	2802	71.5	28.5	89.6

Table 10a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	23	73.9	70.0	83.5	74.3
1999	27	75.6	67.4	82.7	72.9
2000	33	74.2	71.3	80.6	74.2
2001	43	75.0	73.9	79.3	74.0
2002	75	77.1	76.5	77.1	77.2
2003	67	74.2	72.8	75.8	74.2
2004	74	74.7	74.2	81.2	74.7
2005	90	77.2	75.9	79.4	77.1
2006	83	76.0	73.7	81.9	75.0
2007	82	78.1	77.3	81.6	78.0
2008	96	75.7	74.9	80.8	75.6
2009	77	78.8	76.6	84.0	78.8
2010	92	77.9	77.5	80.8	78.2
2011	95	77.3	76.4	79.0	77.3
2012	105	78.2	77.5	81.2	78.6
2013	107	77.9	74.8	83.2	78.6
2014	108	79.1	77.0	83.4	78.8
2015	86	79.7	78.2	85.6	79.0
2016	100	80.3	80.2	81.2	80.4
2017	100	81.9	80.6	83.4	79.1
2018	78	79.0	74.6	81.6	79.0
2019	67	79.4	79.4	79.4	79.3
1998-2019	1708	77.8	76.5	81.2	77.4

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

Table 10b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	17	79.9	79.9	80.4	78.6
1999	21	80.1	76.5	83.9	77.0
2000	16	85.5	83.1	88.6	85.5
2001	47	78.8	77.8	80.6	78.8
2002	56	83.1	76.1	88.7	82.9
2003	54	79.4	77.9	85.2	79.1
2004	43	79.7	77.3	84.5	78.9
2005	60	81.4	78.7	89.3	81.1
2006	55	79.9	78.4	81.7	78.4
2007	71	81.9	79.5	87.5	81.8
2008	58	82.8	81.7	91.3	81.9
2009	55	81.8	79.6	83.5	80.9
2010	61	82.4	82.2	89.6	82.4
2011	54	82.4	80.9	83.3	81.6
2012	61	81.9	80.8	84.2	80.5
2013	58	83.2	82.7	86.2	83.4
2014	55	85.6	83.4	87.6	84.2
2015	65	79.6	78.5	83.1	78.5
2016	60	80.9	79.3	81.9	80.5
2017	74	85.1	83.3	85.7	83.4
2018	30	81.7	80.4	82.5	80.5
2019	23	81.3	79.7	82.1	84.8
1998-2019	1094	81.8	79.9	85.5	81.2

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	16	1.4	0.31	0.9	0.32	1.3	0.32	1.6	0.30
1999	14	1.3	0.28	0.8	0.29	1.1	0.28	1.4	0.28
2000	23	2.0	0.40	1.2	0.39	1.8	0.41	2.3	0.43
2001	28	2.4	0.38	1.3	0.35	2.1	0.38	3.0	0.41
2002	62	3.3	0.45	1.7	0.40	2.8	0.45	4.0	0.51
2003	55	2.9	0.41	1.5	0.38	2.4	0.41	3.4	0.44
2004	64	3.4	0.49	1.7	0.45	2.7	0.49	3.8	0.52
2005	70	3.7	0.54	1.7	0.50	2.8	0.53	4.1	0.57
2006	63	3.3	0.45	1.5	0.40	2.4	0.42	3.5	0.46
2007	64	2.9	0.41	1.3	0.36	2.1	0.39	3.2	0.44
2008	77	3.5	0.58	1.5	0.54	2.5	0.58	3.5	0.61
2009	65	2.9	0.44	1.3	0.40	2.1	0.42	3.0	0.47
2010	74	3.3	0.55	1.3	0.47	2.2	0.50	3.3	0.57
2011	75	3.4	0.57	1.3	0.48	2.2	0.52	3.3	0.59
2012	79	3.5	0.62	1.4	0.57	2.3	0.61	3.4	0.64
2013	79	3.4	0.62	1.4	0.58	2.2	0.59	3.1	0.62
2014	76	3.3	0.68	1.2	0.54	2.0	0.59	3.0	0.69
2015	66	2.8	0.61	1.0	0.51	1.7	0.56	2.5	0.60
2016	69	2.9	0.72	0.9	0.51	1.6	0.59	2.5	0.71
2017	66	2.7	0.67	0.9	0.50	1.5	0.57	2.3	0.65
2018	32	1.3	0.80	0.6	0.78	0.9	0.81	1.1	0.78
2019	30	1.2	1.43	0.4	1.02	0.7	1.19	1.0	1.37
1998-2019	1247	2.8	0.53	1.2	0.46	2.0	0.50	2.8	0.55



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	7	0.6	0.15	0.2	0.11	0.3	0.12	0.5	0.13
1999	15	1.3	0.33	0.5	0.24	0.7	0.26	1.0	0.31
2000	7	0.6	0.18	0.2	0.14	0.3	0.15	0.4	0.16
2001	22	1.8	0.34	0.6	0.27	1.0	0.29	1.5	0.34
2002	38	1.9	0.35	0.7	0.31	1.1	0.33	1.5	0.35
2003	42	2.1	0.51	0.8	0.46	1.2	0.47	1.7	0.51
2004	36	1.8	0.36	0.6	0.29	1.0	0.31	1.4	0.35
2005	50	2.5	0.60	0.8	0.51	1.3	0.54	1.9	0.56
2006	42	2.1	0.49	0.6	0.39	1.1	0.42	1.6	0.48
2007	50	2.2	0.47	0.7	0.39	1.1	0.41	1.6	0.44
2008	49	2.1	0.50	0.6	0.39	1.0	0.42	1.5	0.48
2009	43	1.8	0.41	0.6	0.36	1.0	0.39	1.4	0.42
2010	48	2.1	0.52	0.5	0.41	0.9	0.45	1.4	0.49
2011	35	1.5	0.38	0.4	0.31	0.7	0.33	1.0	0.38
2012	51	2.2	0.55	0.5	0.36	0.9	0.43	1.4	0.53
2013	41	1.7	0.50	0.4	0.32	0.7	0.37	1.2	0.44
2014	34	1.4	0.49	0.4	0.40	0.6	0.43	0.9	0.45
2015	41	1.7	0.60	0.5	0.48	0.8	0.52	1.2	0.60
2016	34	1.4	0.52	0.4	0.50	0.7	0.50	0.9	0.53
2017	46	1.9	0.72	0.4	0.49	0.7	0.57	1.1	0.63
2018	14	0.6	0.39	0.1	0.21	0.2	0.25	0.4	0.31
2019	12	0.5	1.00	0.1	0.76	0.2	0.81	0.3	0.93
1998-2019	757	1.7	0.46	0.5	0.36	0.8	0.39	1.2	0.44

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019  
(incl. multiple malignancies)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29									
30-34	1	0.1	0.1	1	0.1	0.1			0.0
35-39	0	0.0	0.1			0.1			0.0
40-44	6	0.4	0.5	5	0.6	0.7	1	0.2	0.2
45-49	7	0.5	1.0	5	0.6	1.3	2	0.4	0.6
50-54	18	1.3	2.4	13	1.5	2.8	5	1.0	1.6
55-59	35	2.6	5.0	28	3.3	6.1	7	1.4	3.0
60-64	68	5.0	10.0	46	5.4	11.5	22	4.4	7.4
65-69	120	8.9	18.9	83	9.7	21.2	37	7.4	14.9
70-74	210	15.6	34.4	146	17.1	38.4	64	12.9	27.7
75-79	289	21.4	55.9	197	23.1	61.5	92	18.5	46.2
80-84	291	21.6	77.4	176	20.7	82.2	115	23.1	69.3
85+	305	22.6	100.0	152	17.8	100.0	153	30.7	100.0
All ages	1350	100.0		852	100.0		498	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007–2019  
(incl. multiple malignancies)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	Males MI-index	Females Age- spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34	1		0.0	1.00			0.8	
35-39								
40-44	5	1	0.2	0.33	0.0	0.06	0.9	0.1
45-49	5	2	0.2	0.10	0.1	0.12	0.4	0.1
50-54	13	5	0.6	0.18	0.2	0.19	0.5	0.2
55-59	28	7	1.4	0.29	0.4	0.13	0.7	0.2
60-64	46	22	2.8	0.40	1.3	0.28	0.8	0.5
65-69	83	37	5.5	0.40	2.2	0.33	1.0	0.6
70-74	146	64	10.4	0.57	4.0	0.45	1.3	0.8
75-79	197	92	17.8	0.82	6.7	0.64	1.7	1.0
80-84	176	115	26.8	0.89	11.8	0.85	1.9	1.4
85+	152	153	35.6	0.87	15.8	0.60	1.8	1.4
All ages	852	498					1.3	0.9
Mortality								
Raw			2.8	0.59	1.6	0.51		
WS			1.1	0.50	0.4	0.39		
ES			1.8	0.55	0.7	0.42		
BRD-S			2.6	0.60	1.1	0.48		
PYLL-70								
per 100,000			5.3		1.9			
ES			4.5		1.5			
AYLL-70			7.8		6.8			

Table 14a

Further malignancies in deaths in period 1998-2019  
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	7	0.8	2	28.6	2	28.6	3	42.9
C07-C08 Salivary gland	6	0.7			2	33.3	4	66.7
C09-C10 Oropharynx	1	0.1	1	100.0				
C12-C13 Hypopharynx	2	0.2			1	50.0	1	50.0
C15 Oesophagus	8	0.9	3	37.5	1	12.5	4	50.0
C16 Stomach	22	2.6	4	18.2	3	13.6	15	68.2
C17 Small intestine	2	0.2			1	50.0	1	50.0
C18 Colon	53	6.1	19	35.8	5	9.4	29	54.7
C19-C20 Rectum	31	3.6	10	32.3	6	19.4	15	48.4
C22 Liver	8	0.9			1	12.5	7	87.5
C23-C24 Bile	2	0.2	1	50.0			1	50.0
C25 Pancreas	15	1.7			3	20.0	12	80.0
C26 GI cancer	1	0.1			1	100.0		
C30-C31 Sinuses	1	0.1	1	100.0				
C32 Larynx	6	0.7	4	66.7	1	16.7	1	16.7
C33-C34 Lung	81	9.4	9	11.1	18	22.2	54	66.7
C38,C45 Mesothelioma	2	0.2					2	100.0
C40-C41 Bone	1	0.1	1	100.0				
C43 Malign. melanoma	44	5.1	17	38.6	3	6.8	24	54.5
C44 Skin others	262	30.4	29	11.1	18	6.9	215	82.1
C46,C49 Soft tissue	12	1.4	3	25.0	1	8.3	8	66.7
C50 Breast	3	0.3	1	33.3			2	66.7
C60 Penis	2	0.2					2	100.0
C61 Prostate	137	15.9	65	47.4	15	10.9	57	41.6
C62 Testis	4	0.5	3	75.0			1	25.0
C64 Kidney	19	2.2	9	47.4	1	5.3	9	47.4
C65 Renal pelvis	2	0.2					2	100.0
C66 Ureter	2	0.2			1	50.0	1	50.0
C67 Bladder	29	3.4	10	34.5	4	13.8	15	51.7
C68 Urethra	1	0.1			1	100.0		
C69 Eye melanoma	1	0.1	1	100.0				
C70-C72 CNS cancer	6	0.7					6	100.0
C74-C80 Cancer others	1	0.1					1	100.0
C76-C79 CUP	10	1.2			1	10.0	9	90.0
C81 Hodgkin lymphoma	13	1.5	3	23.1	2	15.4	8	61.5
C82-C85 NHL	43	5.0			2	4.7	41	95.3
C90 Mult. myeloma	7	0.8	2	28.6	2	28.6	3	42.9
C91-C96 Leukaemia	15	1.7	1	6.7	1	6.7	13	86.7
All further malignancies	862	100.0	199	23.1	97	11.3	566	65.7

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 1998-2019  
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C00 Lip	1	0.3					1	100.0
C03-C06 Oral cavity	1	0.3					1	100.0
C07-C08 Salivary gland	2	0.6	1	50.0			1	50.0
C09-C10 Oropharynx	1	0.3					1	100.0
C15 Oesophagus	1	0.3			1	100.0		
C16 Stomach	9	2.6	1	11.1	4	44.4	4	44.4
C17 Small intestine	1	0.3			1	100.0		
C18 Colon	23	6.6	9	39.1	2	8.7	12	52.2
C19-C20 Rectum	11	3.2	6	54.5	1	9.1	4	36.4
C21 Anus/canal	2	0.6					2	100.0
C22 Liver	3	0.9					3	100.0
C23-C24 Bile	3	0.9	1	33.3	1	33.3	1	33.3
C25 Pancreas	11	3.2					11	100.0
C33-C34 Lung	21	6.0	1	4.8	3	14.3	17	81.0
C43 Malign. melanoma	16	4.6	7	43.8			9	56.3
C44 Skin others	79	22.6	27	34.2	4	5.1	48	60.8
C46,C49 Soft tissue	2	0.6	1	50.0			1	50.0
C48 Peritoneal	2	0.6	1	50.0			1	50.0
C50 Breast	65	18.6	35	53.8	5	7.7	25	38.5
C51 Vulva	3	0.9	3	100.0				
C53 Cervix uteri	4	1.1	4	100.0				
C54 Corpus uteri	11	3.2	6	54.5	1	9.1	4	36.4
C55,C57 Fem. genitals un	1	0.3					1	100.0
C56 Ovary	12	3.4	2	16.7	3	25.0	7	58.3
C64 Kidney	12	3.4	3	25.0	3	25.0	6	50.0
C65 Renal pelvis	1	0.3					1	100.0
C67 Bladder	3	0.9	2	66.7	1	33.3		
C68 Urethra	1	0.3			1	100.0		
C69 Eye lymphoma	1	0.3					1	100.0
C69 Eye melanoma	1	0.3	1	100.0				
C70-C72 CNS cancer	6	1.7	1	16.7	3	50.0	2	33.3
C73 Thyroid	2	0.6	1	50.0			1	50.0
C74-C80 Cancer others	1	0.3	1	100.0				
C76-C79 CUP	3	0.9	1	33.3			2	66.7
C81 Hodgkin lymphoma	2	0.6	2	100.0				
C82-C85 NHL	24	6.9			2	8.3	22	91.7
C90 Mult. myeloma	2	0.6			1	50.0	1	50.0
C91-C96 Leukaemia	5	1.4	1	20.0	1	20.0	3	60.0
All further malignancies	349	100.0	118	33.8	38	10.9	193	55.3

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 2007-2019  
(**First primaries only \***)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	Males MI-index	Females Age- spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34	1		0.0	1.00			0.8	
35-39								
40-44	4	1	0.2	0.27	0.0	0.07	0.8	0.1
45-49	5	2	0.2	0.11	0.1	0.13	0.4	0.1
50-54	10	4	0.4	0.15	0.2	0.17	0.5	0.2
55-59	26	6	1.3	0.31	0.3	0.15	0.7	0.2
60-64	33	16	2.0	0.40	0.9	0.24	0.7	0.4
65-69	60	27	3.9	0.39	1.6	0.34	0.9	0.5
70-74	117	52	8.3	0.70	3.2	0.50	1.4	0.8
75-79	153	65	13.8	1.01	4.7	0.73	1.8	0.9
80-84	130	89	19.8	1.02	9.1	0.92	1.9	1.4
85+	104	127	24.4	0.94	13.2	0.61	1.8	1.5
All ages	643	389					1.3	0.9
Mortality								
Raw			2.1	0.63	1.3	0.52		
WS			0.8	0.51	0.3	0.39		
ES			1.4	0.57	0.6	0.43		
BRD-S			2.0	0.64	0.8	0.49		
PYLL-70								
per 100,000			4.4		1.5			
ES			3.7		1.2			
AYLL-70			8.3		7.2			

\* See corresponding tables with multiple malignancies.

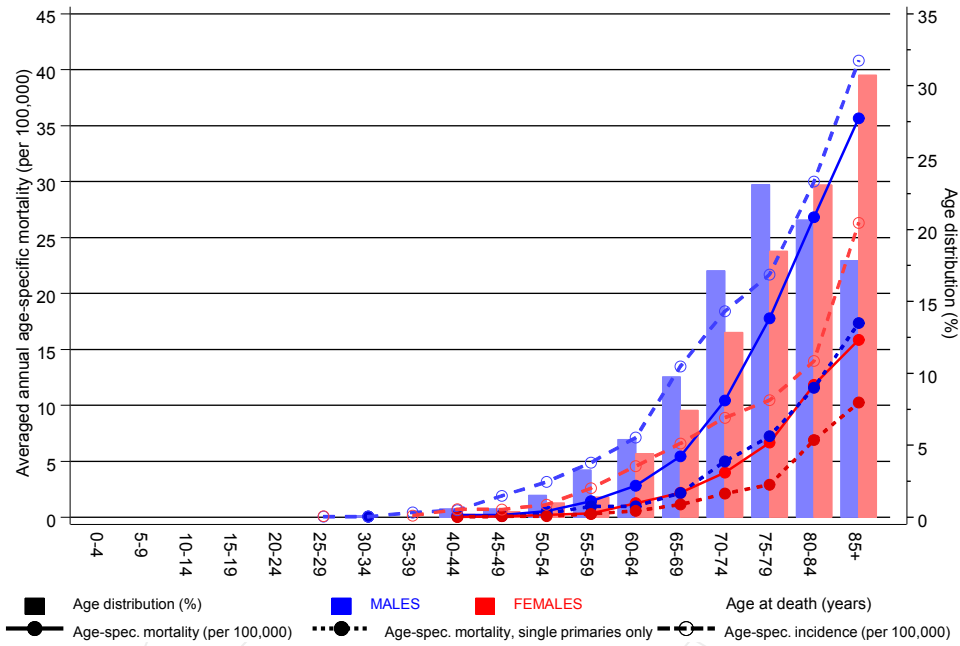
Table 16

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2019  
(**Single primaries only** \*)

Age at death Years	Males n	Females n	Males Age- spec. mortal. MI-index	Females Age- spec. mortal. MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4						
5- 9						
10-14						
15-19						
20-24						
25-29						
30-34	1		0.0	1.00	0.8	
35-39						
40-44	2	1	0.1	0.13	0.4	0.1
45-49	3	2	0.1	0.07	0.2	0.1
50-54	8	2	0.3	0.14	0.4	0.1
55-59	19	6	1.0	0.26	0.5	0.2
60-64	16	10	1.0	0.24	0.3	0.3
65-69	33	19	2.2	0.31	0.5	0.4
70-74	70	34	5.0	0.68	0.9	0.6
75-79	80	40	7.2	0.66	1.0	0.6
80-84	76	67	11.6	0.75	1.2	1.1
85+	74	99	17.4	0.71	1.4	1.2
All ages	382	280			0.8	0.6
Mortality						
Raw			1.3	0.48		
WS			0.5	0.39		
ES			0.8	0.43		
BRD-S			1.2	0.48		
PYLL-70						
per 100,000			2.8			1.2
ES			2.4			0.9
AYLL-70			9.0			7.6

\* See corresponding tables with multiple malignancies.

ICD-10 C91.1: Chronic lymphocytic leukaemia of B-cell type  
 Age distribution and age-specific mortality 2007 - 2019 (Males: 852, Females: 498)

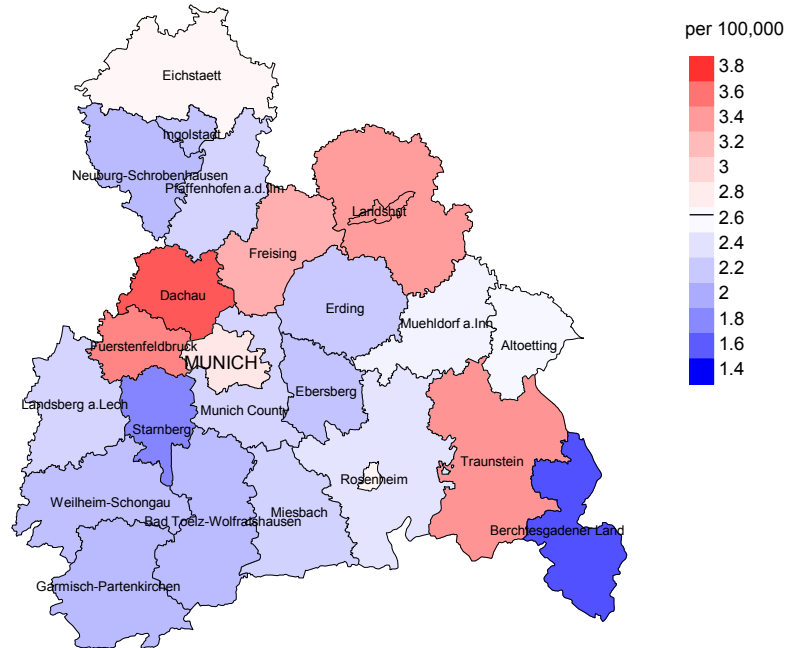


**Figure 17.** Distribution of age at death (bars; males: mean=69.5 yrs, median=70.1 yrs; females: mean=73.5 yrs, median=74.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

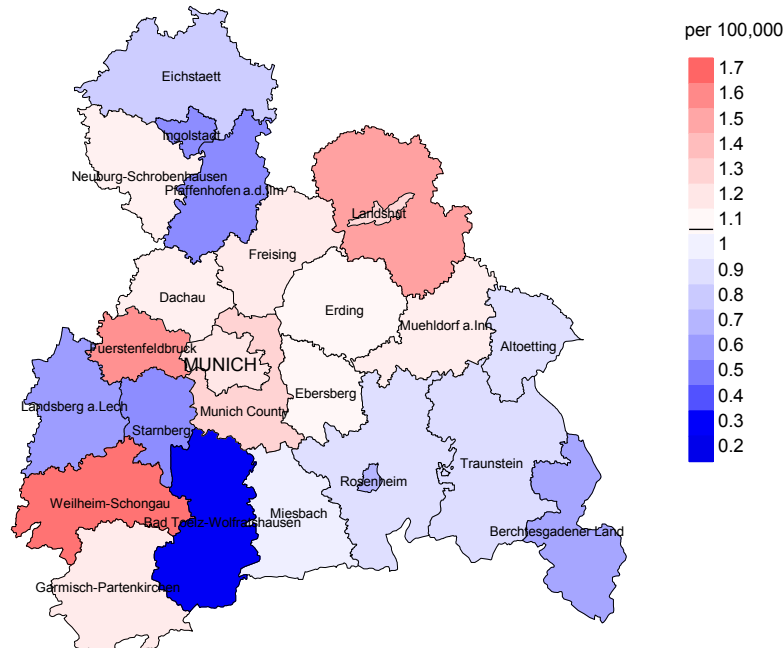
The difference between age at diagnosis (Table 3) and age at chronic lymph. leukaemia-related death (see Table 10) should be considered.



Average mortality (Germany 1987 standard population) 2007 - 2019: Males



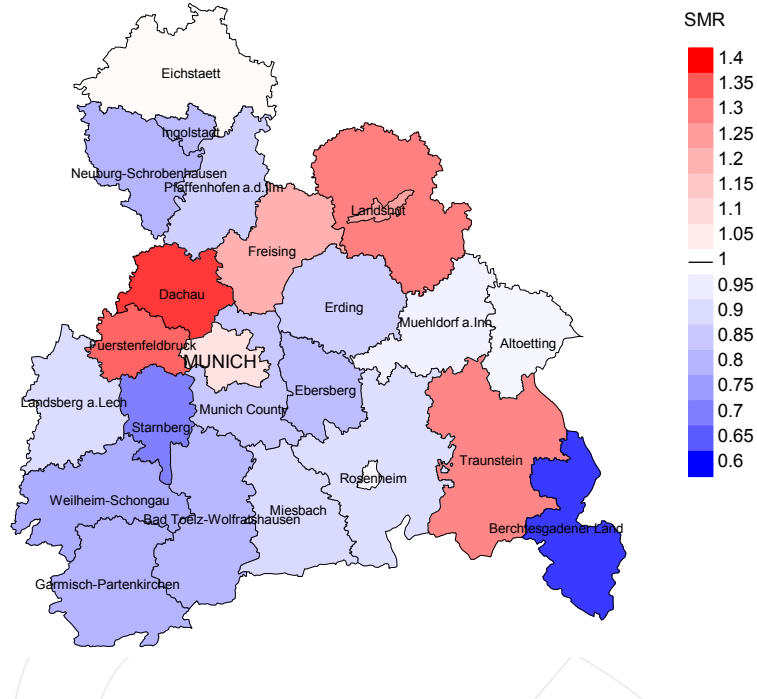
Average mortality (Germany 1987 standard population) 2007 - 2019: Females



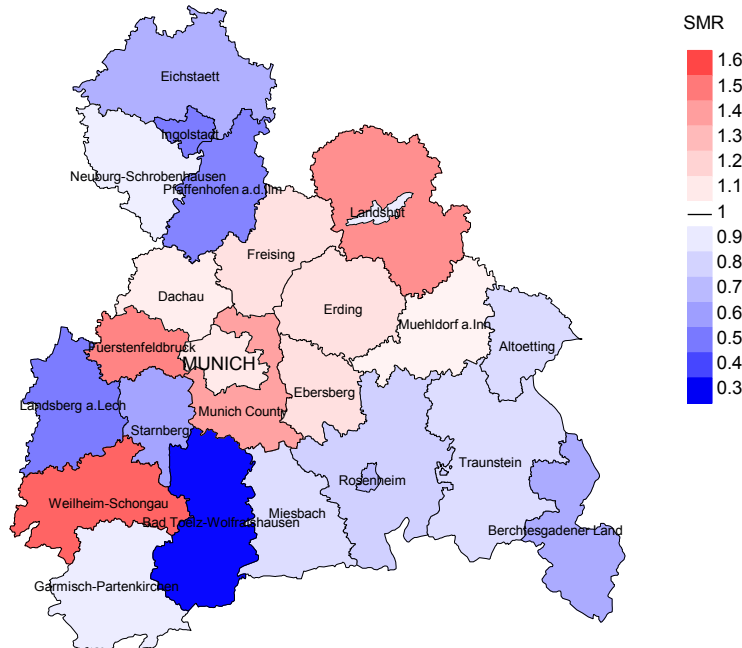
**Figure 18a.** Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 2.6/100,000 WS N=852, females 1.1/100,000 WS N=498).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 15 women died from chronic lymph. leukaemia. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.5 and 2.2/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females



**Figure 18b.** Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. 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=852, females N=498).

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 2019 a total of 15 women died from chronic lymph. leukaemia. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.14. Though, the value of this parameter may vary with an underlying probability of 99% between 0.53 and 2.15, and is therefore not statistically striking.

### Statistical Notes

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

#### 1. All multiple primaries included

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

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

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

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

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

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

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

The 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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