Munich Cancer Registry

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- *Deutsch*

ICD-10 C91.0: Acute lymphobl. leukaemia

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	923
Diseases	923
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

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

https://www.tumorregister-muenchen.de/en/facts/base/bC910_E-ICD-10-C91.0-Acute-lymphobl.-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[#], 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 2015) used for specifying cancer site

Code	Description
C91.0	Acute lymphoblastic leukaemia [ALL]

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	15			0.0	3.8	60.0	100.0
1999	23	1	4.3	2.6	3.7	47.8	87.0
2000	23	2	8.7	3.3	3.6	52.2	100.0
2001	32	8	25.0	4.3	3.5	53.1	90.6
2002	40	5	12.5	8.3	3.4	55.0	92.5 #
2003	40	4	10.0	6.4	3.3	45.0	92.5
2004	45	3	6.7	7.3	3.0	35.6	88.9
2005	57	4	7.0	6.9	2.7	40.4	93.0
2006	53	8	15.1	7.6	2.8	45.3	88.7
2007	58	4	6.9	7.8	2.5	41.4	87.9 #
2008	61	5	8.2	7.8	2.8	32.8	100.0
2009	43	1	2.3	8.2	3.0	41.9	97.7
2010	53	4	7.5	7.9	3.0	37.7	100.0
2011	60	2	3.3	8.1	3.5	36.7	100.0
2012	78	8	10.3	8.2	2.8	33.3	94.9
2013	61	3	4.9	7.8	2.5	39.3	98.4
2014	38	1	2.6	7.8	2.8	55.3	89.5
2015	36	6	16.7	8.3	3.6	58.3	94.4
2016	36	7	19.4	9.0	1.9	75.0	100.0
2017	22	4	18.2	9.5	2.9	63.6	100.0
2018	19	2	10.5	9.4	2.1	52.6	100.0
2019	16			9.7	0.0	50.0	100.0
2020	14			9.8	0.0	28.6	100.0 ##
1998-2020	923	82	8.9	9.8	3.8	44.5	95.0

923 cases diagnosed 1998-2020 are related to a total of 923 patients. Currently, in 123 (13.3 %) of these 923 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 104 / 17 / 2 (11.3 % / 1.8 % / 0.2 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 19 cases has been diagnosed, of which 9.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.1 % 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 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	11	73.3			0.0	3.2	63.6	100.0
1999	9	39.1			0.0	3.1	66.7	100.0
2000	12	52.2	1	8.3	0.0	3.0	50.0	100.0
2001	22	68.8	7	31.8	3.7	2.8	63.6	90.9
2002	26	65.0	4	15.4	7.5	3.0	46.2	88.5 #
2003	24	60.0	3	12.5	5.8	2.9	45.8	91.7
2004	32	71.1	2	6.3	6.6	2.6	43.8	90.6
2005	37	64.9	3	8.1	6.9	2.3	37.8	94.6
2006	38	71.7	5	13.2	8.1	2.3	50.0	92.1
2007	23	39.7			7.3	1.9	34.8	82.6 #
2008	37	60.7	2	5.4	7.4	2.0	21.6	100.0
2009	16	37.2			7.0	1.9	43.8	100.0
2010	29	54.7	1	3.4	6.6	2.1	31.0	100.0
2011	32	53.3	1	3.1	7.2	2.4	40.6	100.0
2012	42	53.8	5	11.9	6.7	1.7	26.2	90.5
2013	33	54.1	1	3.0	6.4	1.4	33.3	100.0
2014	28	73.7			6.7	1.0	53.6	89.3
2015	18	50.0	3	16.7	7.2	1.3	50.0	94.4
2016	19	52.8	2	10.5	8.0	0.0	68.4	100.0
2017	12	54.5	3	25.0	8.2	0.0	58.3	100.0
2018	14	73.7	2	14.3	8.2	0.0	64.3	100.0
2019	7	43.8			8.3	0.0	57.1	100.0
2020	11	78.6			8.5	0.0	36.4	100.0 ##
1998-2020	532	57.6	45	8.5	8.5	3.2	43.4	94.9

532 cases diagnosed 1998-2020 are related to a total of 532 patients. Currently, in 62 (11.7 %) of these 532 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 53 / 7 / 2 (10.0 % / 1.3 % / 0.4 %) 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 14 cases has been diagnosed, of which 8.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.0 % 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	4	26.7			0.0	4.6	50.0	100.0	
1999	14	60.9	1	7.1	5.6	4.4	35.7	78.6	
2000	11	47.8	1	9.1	6.9	4.6	54.5	100.0	
2001	10	31.3	1	10.0	5.1	4.4	30.0	90.0	
2002	14	35.0	1	7.1	9.4	4.0	71.4	100.0	#
2003	16	40.0	1	6.3	7.2	3.9	43.8	93.8	
2004	13	28.9	1	7.7	8.5	3.4	15.4	84.6	
2005	20	35.1	1	5.0	6.9	3.2	45.0	90.0	
2006	15	28.3	3	20.0	6.8	3.5	33.3	80.0	
2007	35	60.3	4	11.4	8.6	3.3	45.7	91.4	#
2008	24	39.3	3	12.5	8.5	3.8	50.0	100.0	
2009	27	62.8	1	3.7	9.9	4.2	40.7	96.3	
2010	24	45.3	3	12.5	9.7	4.3	45.8	100.0	
2011	28	46.7	1	3.6	9.4	4.9	32.1	100.0	
2012	36	46.2	3	8.3	10.3	4.4	41.7	100.0	
2013	28	45.9	2	7.1	9.7	4.0	46.4	96.4	
2014	10	26.3	1	10.0	9.4	5.6	60.0	90.0	
2015	18	50.0	3	16.7	9.8	6.5	66.7	94.4	
2016	17	47.2	5	29.4	10.4	4.5	82.4	100.0	
2017	10	45.5	1	10.0	11.2	7.4	70.0	100.0	
2018	5	26.3			11.1	5.9	20.0	100.0	
2019	9	56.3			11.6	0.0	44.4	100.0	
2020	3	21.4			11.5	0.0		100.0	##
1998-2020	391	42.4	37	9.5	11.5	4.6	46.0	95.1	

391 cases diagnosed 1998-2020 are related to a total of 391 patients. Currently, in 61 (15.6 %) of these 391 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 51 / 10 / 0 (13.0 % / 2.6 % / 0.0 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 5 cases has been diagnosed, of which 11.1 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.9 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	11	4	1.0	0.3	1.6	0.7	1.2	0.5	0.9	0.3
1999	9	14	0.8	1.2	1.3	2.2	1.0	1.7	0.8	1.2
2000	12	11	1.1	0.9	1.7	1.3	1.4	1.1	1.3	0.9
2001	22	10	1.9	0.8	2.3	1.5	2.2	1.1	1.9	0.9
2002	26	14	1.4	0.7	1.9	0.9	1.6	0.8	1.4	0.8
2003	24	16	1.3	0.8	1.9	1.4	1.6	1.1	1.4	0.8
2004	32	13	1.7	0.7	2.4	1.2	2.0	0.9	1.7	0.7
2005	37	20	2.0	1.0	2.8	1.6	2.3	1.3	2.0	1.1
2006	38	15	2.0	0.7	2.8	1.3	2.3	1.0	2.0	0.8
2007	23	35	1.0	1.5	1.5	2.1	1.2	1.8	1.1	1.5
2008	37	24	1.7	1.0	2.8	1.5	2.1	1.3	1.6	1.1
2009	16	27	0.7	1.2	1.0	1.7	0.9	1.4	0.7	1.2
2010	29	24	1.3	1.0	1.9	1.5	1.6	1.3	1.3	1.0
2011	32	28	1.4	1.2	2.1	1.8	1.7	1.4	1.4	1.2
2012	42	36	1.9	1.5	2.6	2.4	2.2	2.0	1.9	1.6
2013	33	28	1.4	1.2	2.0	1.5	1.7	1.3	1.5	1.2
2014	28	10	1.2	0.4	1.3	0.4	1.2	0.4	1.2	0.4
2015	18	18	0.8	0.7	0.7	0.6	0.7	0.7	0.7	0.7
2016	19	17	0.8	0.7	0.6	0.4	0.7	0.5	0.8	0.6
2017	12	10	0.5	0.4	0.4	0.2	0.4	0.3	0.5	0.3
2018	14	5	0.6	0.2	0.5	0.1	0.5	0.2	0.6	0.2
2019	7	9	0.3	0.4	0.2	0.3	0.2	0.3	0.3	0.4
2020	11	3	0.5	0.1	0.4	0.1	0.4	0.1	0.4	0.1
1998–2020	532	391	1.1	0.8	1.5	1.1	1.3	0.9	1.2	0.8

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	15	19.5	21.8	1.4	65.0	2.0	4.3	6.6	36.3	52.9
1999	23	21.3	26.3	0.3	73.4	2.1	3.1	5.4	49.6	58.9
2000	23	30.7	26.7	2.1	77.3	2.7	3.6	19.7	60.7	69.3
2001	32	31.1	25.0	1.4	77.3	3.0	7.6	25.7	52.7	68.6
2002	40	31.3	26.6	2.6	88.2	3.4	5.4	26.4	51.9	72.1
2003	40	27.3	27.8	0.3	81.9	2.2	3.6	15.3	50.2	75.5
2004	45	24.6	22.3	1.4	82.8	2.3	6.8	16.1	36.6	63.5
2005	57	28.2	26.3	0.6	80.8	2.6	4.0	20.5	49.1	68.8
2006	53	31.5	30.9	1.3	92.2	2.7	4.0	17.6	65.6	78.3
2007	58	33.6	29.0	0.3	84.1	3.8	6.5	21.5	62.4	77.3
2008	61	25.5	24.8	0.4	88.3	3.0	4.6	13.9	39.6	64.6
2009	43	32.5	26.3	1.3	88.1	4.5	5.7	24.9	56.5	68.9
2010	53	29.5	27.6	0.3	89.5	1.6	4.2	19.7	50.6	72.8
2011	60	32.0	29.5	2.5	87.4	3.6	6.2	15.8	63.4	75.6
2012	78	31.2	28.1	0.6	87.1	3.2	6.5	18.8	56.2	73.4
2013	61	32.9	25.8	0.1	91.4	3.7	10.7	26.1	54.8	70.8
2014	38	42.0	26.5	2.7	87.7	5.5	19.1	36.6	66.2	78.6
2015	36	48.8	24.8	4.9	82.9	10.8	30.3	54.9	71.1	77.0
2016	36	55.6	22.8	17.5	94.5	24.2	33.3	58.9	75.7	80.1
2017	22	58.5	20.2	16.8	88.6	27.1	42.6	60.7	75.1	82.6
2018	19	49.6	20.5	8.3	77.0	18.5	34.5	47.8	69.2	76.4
2019	16	51.6	20.0	20.2	82.2	21.2	37.8	51.8	67.4	79.3
2020	14	50.6	20.0	18.5	83.5	25.6	35.6	55.4	66.9	72.7
1998–2020	923	33.7	27.6	0.1	94.5	3.3	6.6	27.1	58.0	74.3

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	11	21.6	23.9	2.0	65.0	2.4	4.3	6.6	47.9	52.9
1999	9	20.9	24.5	0.3	58.2	0.3	2.5	6.3	47.5	58.2
2000	12	27.9	23.0	2.6	69.3	3.3	12.5	18.9	48.7	61.6
2001	22	36.2	24.5	1.4	77.3	6.3	12.0	42.4	54.5	68.6
2002	26	28.5	28.2	2.6	88.2	3.1	5.2	22.0	36.2	79.8
2003	24	26.4	25.2	1.6	81.9	3.0	5.7	16.2	40.6	76.5
2004	32	26.2	22.1	1.4	77.3	2.0	6.2	22.4	37.8	63.5
2005	37	30.5	28.3	0.7	80.8	2.6	3.9	20.5	57.7	74.3
2006	38	33.1	31.0	1.3	92.2	2.7	4.4	19.3	66.4	79.7
2007	23	32.0	27.4	0.3	84.1	4.1	6.5	19.8	62.4	69.0
2008	37	21.7	22.9	0.4	74.0	2.9	4.3	11.8	30.7	63.7
2009	16	33.5	29.8	2.2	88.1	4.5	6.0	22.0	58.1	70.3
2010	29	27.2	26.3	0.3	80.5	1.5	3.8	17.9	47.3	72.8
2011	32	30.3	27.8	2.5	85.6	3.7	5.5	17.5	51.4	73.5
2012	42	33.1	30.7	2.4	87.1	2.9	5.5	20.0	65.6	78.9
2013	33	27.8	20.9	2.3	69.5	5.4	11.9	19.2	41.3	61.7
2014	28	42.2	26.1	3.7	85.4	5.5	17.3	46.4	61.8	76.8
2015	18	49.3	28.1	4.9	82.9	6.2	23.9	60.6	74.4	77.8
2016	19	50.3	22.8	17.5	87.3	21.2	27.1	49.0	75.6	80.1
2017	12	53.7	23.7	16.8	83.4	26.8	31.7	53.7	74.5	82.6
2018	14	50.1	22.6	8.3	77.0	18.5	33.6	52.4	69.2	76.4
2019	7	56.3	17.8	20.2	74.0	20.2	52.0	57.9	71.1	74.0
2020	11	53.4	20.5	18.5	83.5	26.3	35.6	60.3	68.8	72.7
1998–2020	532	33.2	27.2	0.3	92.2	3.3	6.6	25.4	57.5	73.9

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	4	13.6	15.8	1.4	36.3	1.4	3.0	8.4	24.2	36.3
1999	14	21.6	28.3	1.5	73.4	2.6	3.2	4.3	49.6	72.2
2000	11	33.8	31.1	2.1	77.3	2.7	3.3	38.5	62.4	71.7
2001	10	19.7	23.3	2.8	75.3	2.9	3.0	10.0	34.3	56.2
2002	14	36.5	23.3	2.9	69.9	12.6	14.6	31.5	59.8	67.2
2003	16	28.8	32.2	0.3	79.6	0.8	2.7	5.3	64.9	74.4
2004	13	20.6	23.4	4.3	82.8	4.4	6.8	11.4	24.6	54.7
2005	20	23.9	22.3	0.6	68.8	2.5	5.0	18.6	36.7	65.7
2006	15	27.4	31.3	2.5	90.7	3.3	3.6	8.0	58.0	75.4
2007	35	34.6	30.4	1.0	83.2	1.9	5.7	22.1	64.0	80.1
2008	24	31.3	27.1	1.4	88.3	3.0	7.3	20.6	52.4	68.8
2009	27	31.9	24.5	1.3	80.5	3.0	5.7	29.9	50.1	68.6
2010	24	32.3	29.5	0.8	89.5	2.3	5.4	28.7	54.3	82.3
2011	28	33.9	31.7	2.5	87.4	3.5	6.6	14.4	72.0	78.9
2012	36	29.0	25.0	0.6	87.1	3.8	7.8	18.6	49.7	70.1
2013	28	38.8	29.8	0.1	91.4	3.3	9.6	32.0	68.6	78.7
2014	10	41.5	29.1	2.7	87.7	10.9	26.7	30.9	71.8	86.1
2015	18	48.4	21.9	5.0	76.5	18.4	33.0	45.8	70.7	73.2
2016	17	61.5	22.1	28.4	94.5	28.7	39.8	71.7	77.4	87.3
2017	10	64.2	14.1	41.3	88.6	46.4	52.3	66.2	75.1	82.7
2018	5	48.3	15.2	34.5	70.0	34.5	36.5	42.8	57.7	70.0
2019	9	48.0	21.9	21.2	82.2	21.2	31.4	49.0	51.7	82.2
2020	3	40.0	17.0	25.6	58.7	25.6	25.6	35.7	58.7	58.7
1998-2020	391	34.5	28.1	0.1	94.5	3.2	6.5	29.5	60.7	75.3

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	91	15.3	15.3	53	16.5	16.5	38	13.9	13.9
5-9	60	10.1	25.4	30	9.3	25.9	30	10.9	24.8
10-14	39	6.6	31.9	22	6.9	32.7	17	6.2	31.0
15-19	41	6.9	38.8	26	8.1	40.8	15	5.5	36.5
20-24	26	4.4	43.2	16	5.0	45.8	10	3.6	40.1
25-29	22	3.7	46.9	11	3.4	49.2	11	4.0	44.2
30-34	30	5.0	51.9	14	4.4	53.6	16	5.8	50.0
35-39	24	4.0	56.0	11	3.4	57.0	13	4.7	54.7
40-44	27	4.5	60.5	12	3.7	60.7	15	5.5	60.2
45-49	18	3.0	63.5	11	3.4	64.2	7	2.6	62.8
50-54	27	4.5	68.1	15	4.7	68.8	12	4.4	67.2
55-59	30	5.0	73.1	16	5.0	73.8	14	5.1	72.3
60-64	22	3.7	76.8	14	4.4	78.2	8	2.9	75.2
65-69	30	5.0	81.8	18	5.6	83.8	12	4.4	79.6
70-74	42	7.1	88.9	22	6.9	90.7	20	7.3	86.9
75-79	29	4.9	93.8	14	4.4	95.0	15	5.5	92.3
80-84	19	3.2	97.0	8	2.5	97.5	11	4.0	96.4
85+	18	3.0	100.0	8	2.5	100.0	10	3.6	100.0
All ages	595	100.0		321	100.0		274	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=20 %	Females DCO rate n=27 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4	53	38	3.3	2.5		2.6	24.1	22.2
5- 9	30	30	1.9	2.0	3.3		25.6	30.0
10-14	22	17	1.4	1.1			16.1	13.3
15-19	26	15	1.5	0.9		6.7	8.2	5.7
20-24	16	10	0.8	0.5		10.0	2.5	1.9
25-29	11	11	0.5	0.5			1.2	0.9
30-34	14	16	0.6	0.7		6.3	1.1	0.7
35-39	11	13	0.5	0.6		7.7	0.6	0.4
40-44	12	15	0.5	0.6			0.4	0.2
45-49	11	7	0.4	0.3			0.2	0.1
50-54	15	12	0.6	0.5		16.7	0.2	0.1
55-59	16	14	0.8	0.6			0.1	0.1
60-64	14	8	0.8	0.4	14.3	25.0	0.1	0.1
65-69	18	12	1.1	0.7	16.7	8.3	0.1	0.1
70-74	22	20	1.5	1.2	4.5	10.0	0.1	0.1
75-79	14	15	1.2	1.0	28.6	26.7	0.1	0.1
80-84	8	11	1.1	1.0	37.5	36.4	0.1	0.1
85+	8	10	1.7	1.0	75.0	70.0	0.1	0.1
All ages	321	274			6.2	9.9	0.2	0.2
Incidence								
Raw			1.0	0.8				
WS			1.2	1.0				
ES			1.1	0.9				
BRD-S			1.0	0.8				

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).

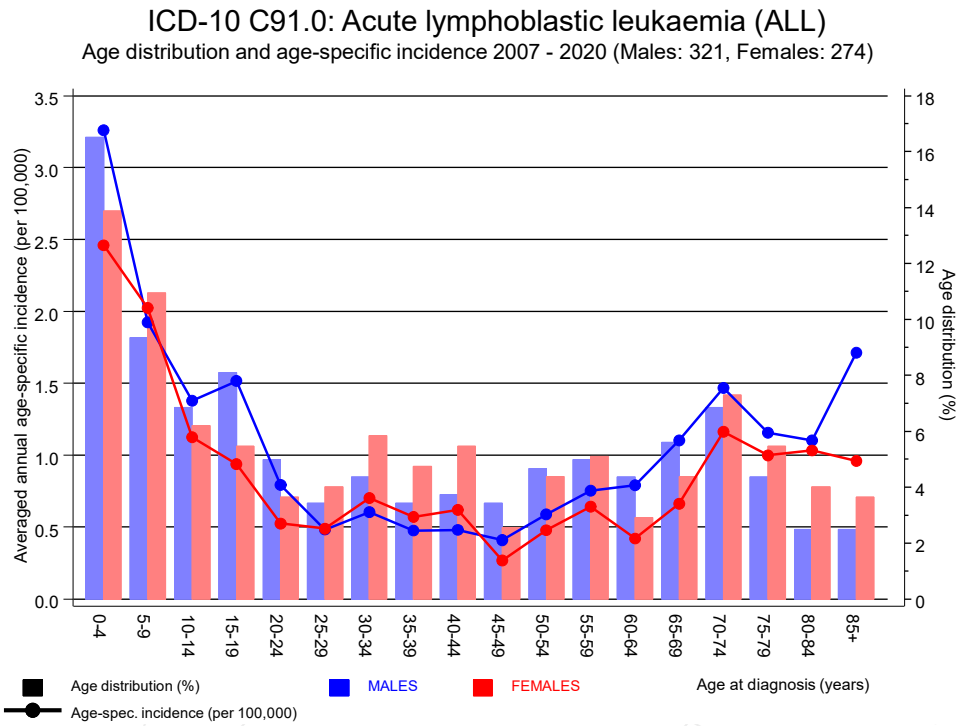


Figure 6. Age distribution (males: mean=35.8 yrs, median=30.3 yrs; females: mean=38.1 yrs, median=35.1 yrs) and age-specific incidence.

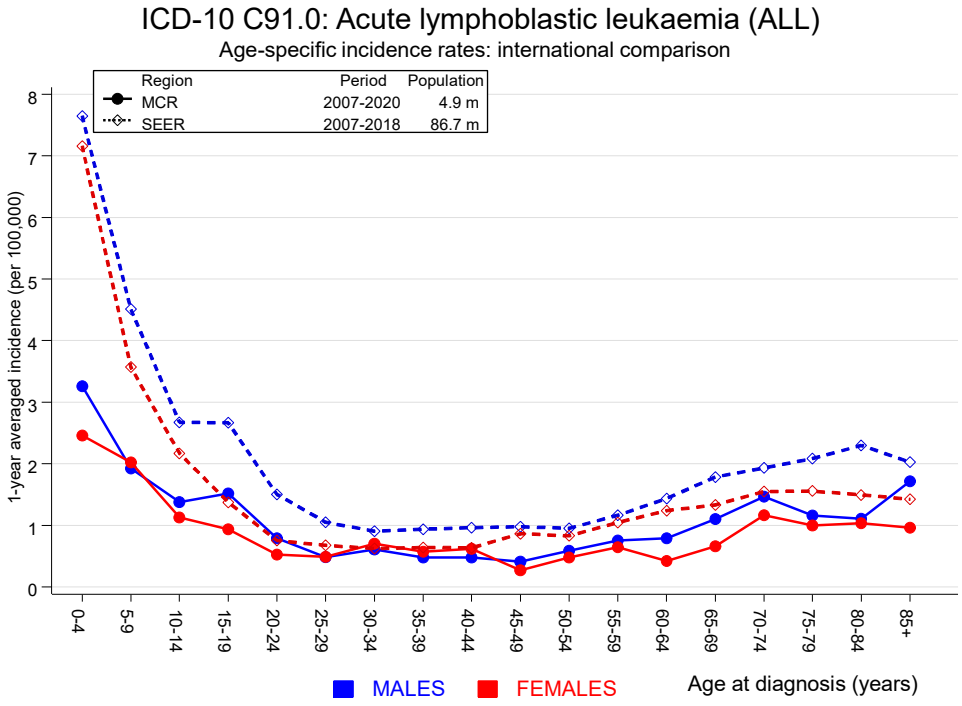


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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	1	0.1	18.6	0.5	103.6		5.1	
C15	Oesophagus	1	0.1	9.9	0.3	55.2		4.9	
C16	Stomach	1	0.2	6.6	0.2	36.7		4.6	
C18	Colon	1	0.4	2.7	0.1	15.0		3.4	
C19–C20	Rectum	1	0.2	4.2	0.1	23.3		4.1	
C25	Pancreas	1	0.2	6.1	0.2	34.1		4.5	
C33–C34	Lung	1	0.5	1.9	0.0	10.8		2.6	
C61	Prostate	2	1.1	1.7	0.2	6.3		4.6	
C62	Testis	1	0.1	8.1	0.2	45.2		4.7	
C64	Kidney	1	0.2	5.8	0.1	32.5		4.5	
C70–C72	CNS cancer	2	0.1	20.4	2.5	73.8	#	10.3	
C73	Thyroid	4	0.1	67.1	18.3	171.8	#	21.3	
C82–C85	NHL	5	0.2	24.0	7.8	56.1	#	25.9	
C91–C96	Leukaemia	2	0.1	18.7	2.3	67.6	#	10.2	
Not observed		0	1.2	0.0	0.0	3.2		-6.3	
All further malignancies		24	4.7	5.1	3.3	7.6	#	104.4	

Patients	497
Median age at next malignancy (years)	48.6
Person-years	1852
Mean observation time (years)	3.7
Median observation time (years)	1.4

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 %
C07–C08	Salivary gland	1	0.0	177.3	4.5	988.0	#	6.9	
C18	Colon	1	0.2	5.7	0.1	31.5		5.8	
C19–C20	Rectum	1	0.1	12.7	0.3	70.5		6.4	
C43	Malign. melanoma	2	0.1	15.0	1.8	54.2	#	13.0	
C46,C49	Soft tissue	1	0.0	50.0	1.3	278.8	#	6.8	
C50	Breast	4	0.9	4.6	1.3	11.8	#	21.9	
C53	Cervix uteri	1	0.1	16.8	0.4	93.7		6.6	
C73	Thyroid	3	0.1	31.4	6.5	91.8	#	20.3	
C82–C85	NHL	2	0.1	22.4	2.7	81.0	#	13.3	
Not observed		0	1.0	0.0	0.0	3.5		-7.3	
All further malignancies		16	2.6	6.2	3.6	10.1	#	93.8	

Patients	362
Median age at next malignancy (years)	48.9
Person-years	1431
Mean observation time (years)	4.0
Median observation time (years)	1.5

The occurrence of further specified malignancy is statistically significant.

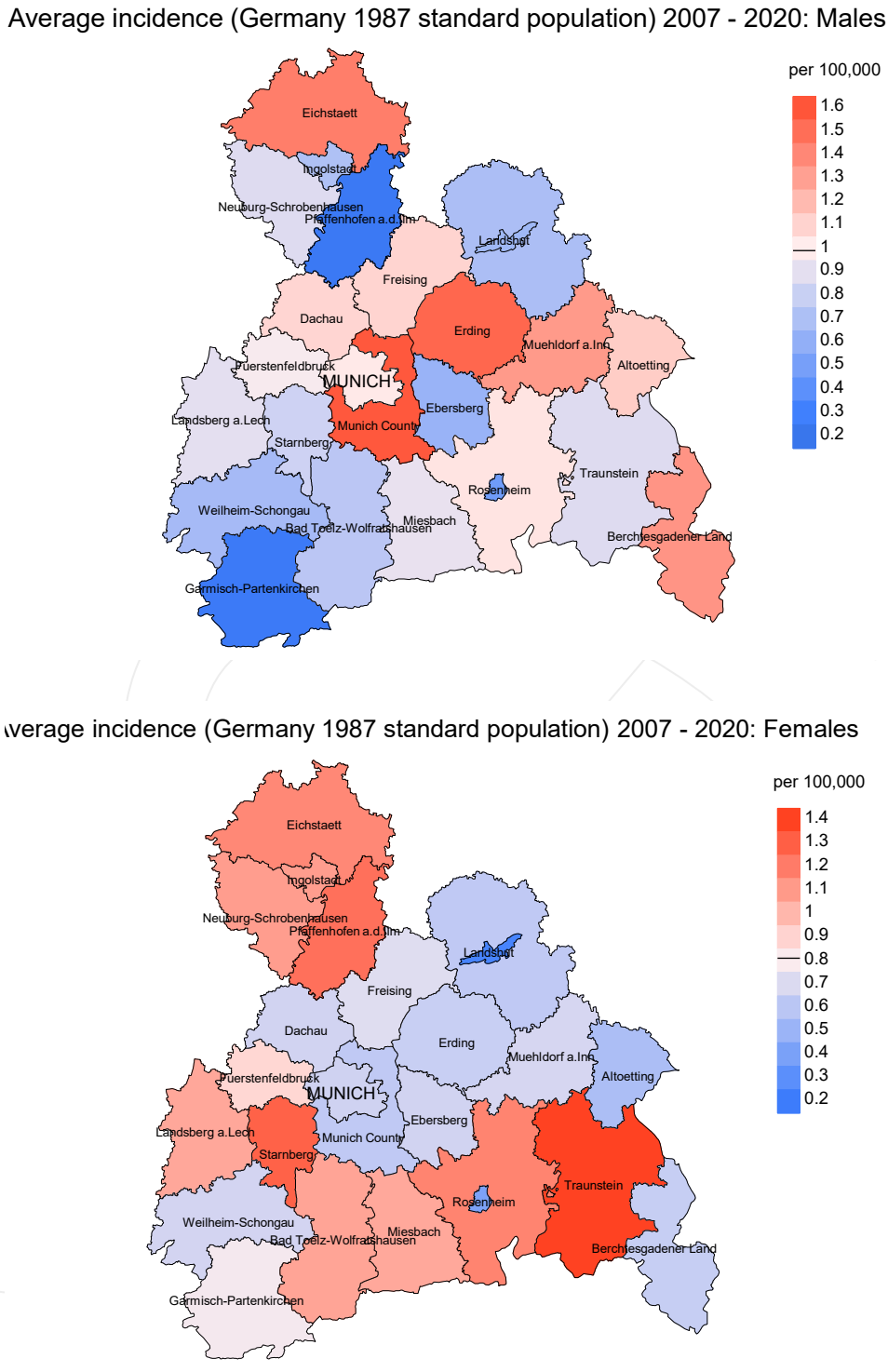
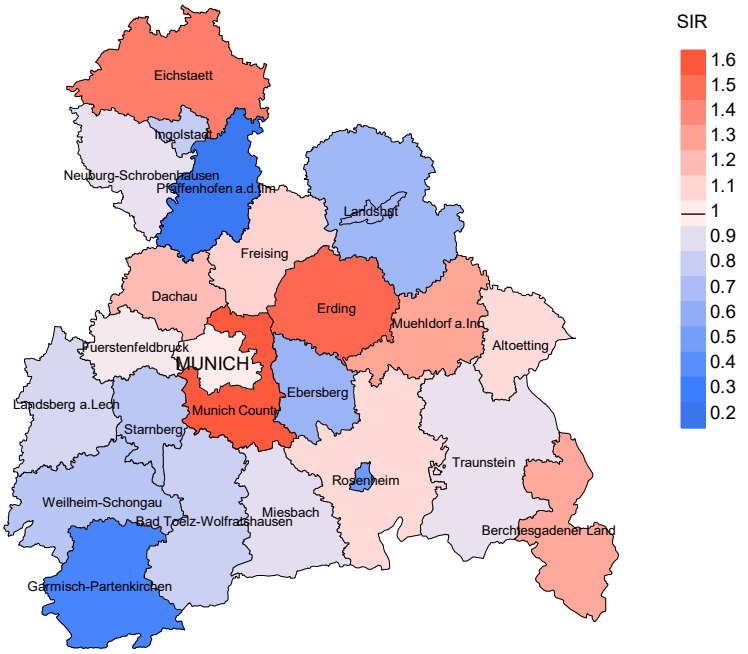


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 1.0/100,000 WS N=321, females 0.8/100,000 WS N=274).

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 7 women were identified with newly diagnosed acute lymphobl. leukaemia. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.2 and 1.7/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

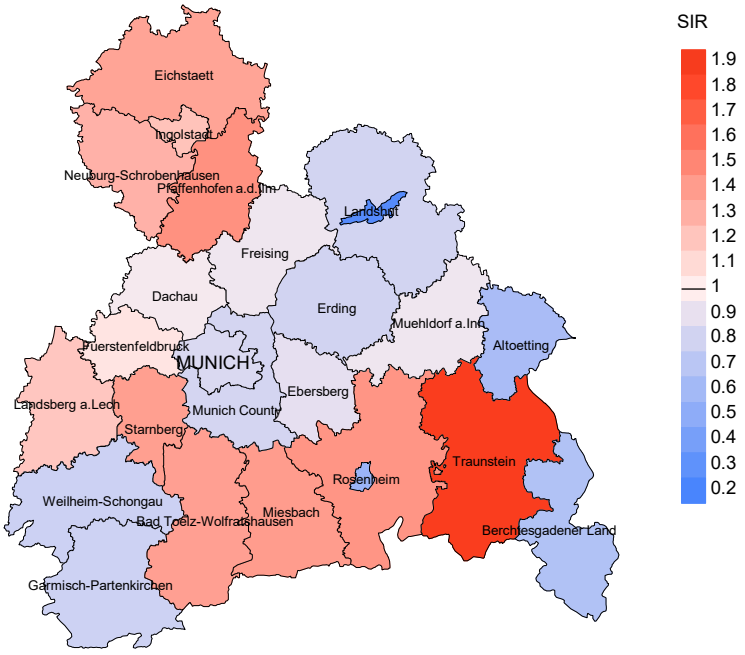


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=321, females N=274).

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 7 women were identified with newly diagnosed acute lymphobl. leukaemia. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.89. Though, the value of this parameter may vary with an underlying probability of 99% between 0.26 and 2.18, 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	15	100.0		9	60.0	88.9
1999	23	87.0	4.3	11	47.8	100.0
2000	23	100.0	8.7	12	52.2	91.7
2001	32	90.6	25.0	17	53.1	94.1
2002	40	92.5	12.5	22	55.0	100.0
2003	40	92.5	10.0	18	45.0	100.0
2004	45	88.9	6.7	16	35.6	100.0
2005	57	93.0	7.0	23	40.4	95.7
2006	53	88.7	15.1	24	45.3	87.5
2007	58	87.9	6.9	24	41.4	95.8
2008	61	100.0	8.2	20	32.8	100.0
2009	43	97.7	2.3	18	41.9	100.0
2010	53	100.0	7.5	20	37.7	100.0
2011	60	100.0	3.3	22	36.7	95.5
2012	78	94.9	10.3	26	33.3	96.2
2013	61	98.4	4.9	24	39.3	95.8
2014	38	89.5	2.6	21	55.3	90.5
2015	36	94.4	16.7	21	58.3	100.0
2016	36	100.0	19.4	27	75.0	92.6
2017	22	100.0	18.2	14	63.6	78.6
2018	19	100.0	10.5	10	52.6	90.0
2019	16	100.0		8	50.0	75.0
2020	14	100.0		4	28.6	100.0
1998-2020	923	95.0	8.9	411	44.5	94.9

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	15	7	100.0	3	20.0
1999	23	7	100.0	2	8.7
2000	23	12	100.0	5	21.7
2001	32	17	100.0	6	18.8
2002	40	17	100.0	9	22.5
2003	40	16	100.0	7	17.5
2004	45	19	100.0	7	15.6
2005	57	12	100.0	8	14.0
2006	53	18	100.0	11	20.8
2007	58	26	88.5	10	17.2
2008	61	22	100.0	9	14.8
2009	43	15	100.0	2	4.7
2010	53	18	100.0	10	18.9
2011	60	19	100.0	4	6.7
2012	78	23	100.0	9	11.5
2013	61	24	95.8	8	13.1
2014	38	25	96.0	6	15.8
2015	36	25	96.0	9	25.0
2016	36	29	100.0	15	41.7
2017	22	22	100.0	6	27.3
2018	19	23	78.3	7	36.8
2019	16	17	52.9	4	25.0
2020	14	9	88.9	2	14.3
1998–2020	923	422	95.3	159	17.2

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	7	85.7	14.3	100.0
1999	7	100.0		100.0
2000	12	83.3	16.7	100.0
2001	17	82.4	17.6	100.0
2002	17	94.1	5.9	100.0
2003	16	93.8	6.3	100.0
2004	19	100.0		94.7
2005	12	100.0		100.0
2006	18	100.0		100.0
2007	26	92.3	7.7	100.0
2008	22	90.9	9.1	95.5
2009	15	93.3	6.7	86.7
2010	18	88.9	11.1	100.0
2011	19	100.0		100.0
2012	23	82.6	17.4	100.0
2013	24	91.7	8.3	95.7
2014	25	84.0	16.0	91.7
2015	25	96.0	4.0	100.0
2016	29	93.1	6.9	100.0
2017	22	90.9	9.1	95.5
2018	23	87.0	13.0	88.9
2019	17	70.6	29.4	77.8
2020	9	88.9	11.1	100.0
1998-2020	422	90.8	9.2	97.0

Table 10a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	6	42.2	36.3	53.1	42.2
1999	5	20.2	20.2		20.2
2000	8	17.8	15.3	44.0	17.8
2001	10	56.5	62.5	47.7	56.5
2002	9	45.2	46.3	31.9	45.2
2003	10	54.9	54.0	78.6	54.9
2004	10	52.0	52.0		52.0
2005	8	24.4	24.4		24.4
2006	11	58.8	58.8		58.8
2007	18	55.3	59.2	1.4	59.5
2008	11	63.1	63.1		63.1
2009	6	41.3	41.3		42.5
2010	8	57.5	58.5	56.5	57.5
2011	7	30.8	30.8		30.8
2012	12	56.4	55.2	79.0	56.4
2013	10	65.2	65.2		65.2
2014	9	62.8	62.9	56.1	62.8
2015	16	45.5	46.9	44.1	44.1
2016	17	69.0	70.6	67.6	69.0
2017	13	76.1	76.5	75.1	75.6
2018	16	55.7	52.5	57.5	53.8
2019	10	53.0	44.4	74.2	51.4
2020	7	68.8	66.9	74.9	66.9
1998-2020	237	55.2	54.9	56.4	55.1

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	1	7.8	7.8		7.8
1999	2	34.4	34.4		34.4
2000	4	37.7	37.7		37.7
2001	7	63.3	63.3		63.3
2002	8	43.5	43.5		43.5
2003	6	53.5	53.5		53.5
2004	9	68.9	68.9		69.0
2005	4	65.0	65.0		65.0
2006	7	50.7	50.7		50.7
2007	8	64.7	63.3	77.9	66.0
2008	11	67.6	67.6	74.7	69.5
2009	9	45.5	40.8	59.2	40.8
2010	10	43.3	36.0	59.7	43.3
2011	12	46.9	46.9		46.9
2012	11	69.2	63.7	79.7	69.2
2013	14	64.3	64.3	64.9	59.1
2014	16	55.1	52.9	57.2	57.2
2015	9	69.5	69.5		69.5
2016	12	72.3	73.5	52.0	72.3
2017	9	36.3	35.3	67.4	36.3
2018	7	66.0	66.0		48.1
2019	7	69.9	70.1	54.6	69.9
2020	2	73.5	73.5		73.5
1998-2020	185	58.6	57.8	59.7	58.3

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	5	0.5	0.45	0.6	0.35	0.5	0.43	0.5	0.54
1999	5	0.4	0.56	0.7	0.52	0.5	0.53	0.5	0.67
2000	6	0.5	0.50	0.8	0.49	0.6	0.47	0.5	0.40
2001	7	0.6	0.32	0.5	0.21	0.6	0.27	0.6	0.33
2002	8	0.4	0.31	0.4	0.19	0.4	0.27	0.5	0.38
2003	9	0.5	0.38	0.4	0.23	0.5	0.31	0.5	0.39
2004	10	0.5	0.31	0.4	0.17	0.5	0.23	0.6	0.33
2005	8	0.4	0.22	0.6	0.20	0.5	0.22	0.4	0.22
2006	11	0.6	0.29	0.4	0.15	0.5	0.22	0.6	0.29
2007	17	0.8	0.74	0.7	0.47	0.7	0.59	0.8	0.71
2008	11	0.5	0.30	0.4	0.14	0.4	0.21	0.5	0.29
2009	6	0.3	0.38	0.2	0.17	0.2	0.26	0.2	0.31
2010	7	0.3	0.24	0.2	0.09	0.3	0.16	0.3	0.24
2011	7	0.3	0.22	0.3	0.15	0.3	0.19	0.4	0.25
2012	9	0.4	0.21	0.3	0.13	0.4	0.17	0.4	0.20
2013	10	0.4	0.30	0.3	0.14	0.4	0.21	0.4	0.27
2014	8	0.3	0.29	0.3	0.20	0.3	0.24	0.3	0.29
2015	15	0.6	0.83	0.5	0.77	0.6	0.80	0.6	0.87
2016	16	0.7	0.84	0.4	0.65	0.5	0.74	0.6	0.76
2017	12	0.5	1.00	0.2	0.68	0.3	0.81	0.5	0.97
2018	13	0.5	0.93	0.5	0.95	0.5	0.92	0.5	0.89
2019	7	0.3	1.00	0.3	1.36	0.3	1.12	0.3	1.12
2020	6	0.2	0.55	0.2	0.47	0.2	0.52	0.2	0.55
1998-2020	213	0.5	0.40	0.4	0.25	0.4	0.32	0.5	0.40

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	1	0.1	0.25	0.2	0.28	0.1	0.26	0.1	0.26
1999	2	0.2	0.14	0.2	0.10	0.2	0.12	0.2	0.13
2000	4	0.3	0.36	0.4	0.32	0.4	0.34	0.3	0.37
2001	7	0.6	0.70	0.3	0.22	0.4	0.38	0.5	0.61
2002	8	0.4	0.57	0.4	0.49	0.4	0.53	0.4	0.59
2003	6	0.3	0.38	0.3	0.20	0.3	0.29	0.3	0.41
2004	9	0.5	0.69	0.4	0.36	0.4	0.45	0.4	0.59
2005	4	0.2	0.20	0.1	0.07	0.1	0.11	0.2	0.14
2006	7	0.3	0.47	0.4	0.27	0.4	0.36	0.4	0.52
2007	7	0.3	0.20	0.3	0.14	0.3	0.16	0.3	0.18
2008	9	0.4	0.38	0.3	0.20	0.3	0.25	0.3	0.29
2009	8	0.3	0.30	0.4	0.24	0.4	0.27	0.4	0.32
2010	9	0.4	0.38	0.4	0.24	0.4	0.28	0.4	0.37
2011	12	0.5	0.43	0.4	0.25	0.5	0.34	0.5	0.41
2012	10	0.4	0.28	0.3	0.14	0.4	0.18	0.4	0.22
2013	12	0.5	0.43	0.4	0.28	0.4	0.34	0.4	0.37
2014	13	0.5	1.30	0.5	1.07	0.5	1.19	0.5	1.14
2015	9	0.4	0.50	0.3	0.46	0.3	0.46	0.4	0.50
2016	11	0.4	0.65	0.3	0.69	0.3	0.66	0.4	0.62
2017	8	0.3	0.80	0.2	1.12	0.3	0.94	0.3	0.97
2018	7	0.3	1.40	0.2	1.20	0.2	1.14	0.3	1.35
2019	5	0.2	0.56	0.1	0.27	0.1	0.36	0.2	0.41
2020	2	0.1	0.67	0.0	0.33	0.1	0.45	0.1	0.55
1998-2020	170	0.4	0.43	0.3	0.27	0.3	0.33	0.3	0.40

Table 12

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

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	3	1.1	1.1			0.0	3	2.5	2.5
5-9	9	3.4	4.5	5	3.5	3.5	4	3.3	5.7
10-14	11	4.1	8.6	3	2.1	5.6	8	6.6	12.3
15-19	9	3.4	12.0	6	4.2	9.7	3	2.5	14.8
20-24	14	5.3	17.3	10	6.9	16.7	4	3.3	18.0
25-29	7	2.6	19.9	5	3.5	20.1	2	1.6	19.7
30-34	15	5.6	25.6	7	4.9	25.0	8	6.6	26.2
35-39	16	6.0	31.6	10	6.9	31.9	6	4.9	31.1
40-44	13	4.9	36.5	9	6.3	38.2	4	3.3	34.4
45-49	11	4.1	40.6	3	2.1	40.3	8	6.6	41.0
50-54	10	3.8	44.4	6	4.2	44.4	4	3.3	44.3
55-59	21	7.9	52.3	13	9.0	53.5	8	6.6	50.8
60-64	15	5.6	57.9	9	6.3	59.7	6	4.9	55.7
65-69	20	7.5	65.4	11	7.6	67.4	9	7.4	63.1
70-74	30	11.3	76.7	13	9.0	76.4	17	13.9	77.0
75-79	34	12.8	89.5	21	14.6	91.0	13	10.7	87.7
80-84	15	5.6	95.1	8	5.6	96.5	7	5.7	93.4
85+	13	4.9	100.0	5	3.5	100.0	8	6.6	100.0
All ages	266	100.0		144	100.0		122	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.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4		3			0.2	0.08		18.8
5- 9	5	4	0.3	0.17	0.3	0.13	17.9	16.0
10-14	3	8	0.2	0.14	0.5	0.47	10.7	34.8
15-19	6	3	0.3	0.23	0.2	0.20	12.5	12.0
20-24	10	4	0.5	0.63	0.2	0.40	13.7	9.3
25-29	5	2	0.2	0.45	0.1	0.18	5.4	2.0
30-34	7	8	0.3	0.50	0.4	0.50	4.9	4.4
35-39	10	6	0.4	0.91	0.3	0.46	3.7	1.5
40-44	9	4	0.4	0.75	0.2	0.27	1.5	0.5
45-49	3	8	0.1	0.27	0.3	1.14	0.2	0.5
50-54	6	4	0.2	0.40	0.2	0.33	0.2	0.2
55-59	13	8	0.6	0.81	0.4	0.57	0.3	0.2
60-64	9	6	0.5	0.64	0.3	0.75	0.1	0.1
65-69	11	9	0.7	0.61	0.5	0.75	0.1	0.1
70-74	13	17	0.9	0.59	1.0	0.85	0.1	0.2
75-79	21	13	1.7	1.50	0.9	0.87	0.2	0.1
80-84	8	7	1.1	1.00	0.7	0.64	0.1	0.1
85+	5	8	1.1	0.63	0.8	0.80	0.1	0.1
All ages	144	122					0.2	0.2
Mortality								
Raw			0.4	0.45	0.4	0.45		
WS			0.3	0.27	0.3	0.28		
ES			0.4	0.35	0.3	0.35		
BRD-S			0.4	0.44	0.3	0.41		
PYLL-70								
per 100,000			9.6		8.4			
ES			10.1		9.7			
AYLL-70			28.4		30.7			

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	1	1.9					1	100.0
C12–C13 Hypopharynx	1	1.9					1	100.0
C15 Oesophagus	1	1.9					1	100.0
C16 Stomach	1	1.9					1	100.0
C18 Colon	1	1.9	1	100.0				
C19–C20 Rectum	2	3.7	1	50.0			1	50.0
C25 Pancreas	1	1.9			1	100.0		
C32 Larynx	1	1.9	1	100.0				
C33–C34 Lung	1	1.9					1	100.0
C43 Malign. melanoma	2	3.7	1	50.0			1	50.0
C44 Skin others	2	3.7	2	100.0				
C46,C49 Soft tissue	4	7.4	2	50.0			2	50.0
C61 Prostate	10	18.5	10	100.0				
C62 Testis	2	3.7	1	50.0			1	50.0
C64 Kidney	1	1.9					1	100.0
C67 Bladder	1	1.9					1	100.0
C70–C72 CNS cancer	2	3.7	1	50.0			1	50.0
C73 Thyroid	1	1.9					1	100.0
C81 Hodgkin lymphoma	1	1.9	1	100.0				
C82–C85 NHL	14	25.9	8	57.1	3	21.4	3	21.4
C91–C96 Leukaemia	4	7.4			2	50.0	2	50.0
All further malignancies	54	100.0	29	53.7	6	11.1	19	35.2

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 ←%
C12–C13	Hypopharynx	1	2.4	1	100.0				
C18	Colon	2	4.9	2	100.0				
C19–C20	Rectum	2	4.9	1	50.0			1	50.0
C25	Pancreas	1	2.4					1	100.0
C30–C31	Sinuses	1	2.4	1	100.0				
C33–C34	Lung	1	2.4					1	100.0
C40–C41	Bone	1	2.4	1	100.0				
C43	Malign. melanoma	1	2.4					1	100.0
C44	Skin others	3	7.3	1	33.3			2	66.7
C46,C49	Soft tissue	1	2.4					1	100.0
C50	Breast	9	22.0	8	88.9	1	11.1		
C51	Vulva	1	2.4	1	100.0				
C53	Cervix uteri	2	4.9	1	50.0			1	50.0
C56	Ovary	1	2.4	1	100.0				
C64	Kidney	1	2.4	1	100.0				
C67	Bladder	1	2.4	1	100.0				
C69	Eye lymphoma	1	2.4	1	100.0				
C70–C72	CNS cancer	5	12.2	1	20.0			4	80.0
C73	Thyroid	2	4.9	2	100.0				
C82–C85	NHL	3	7.3	2	66.7			1	33.3
C91–C96	Leukaemia	1	2.4			1	100.0		
All further malignancies		41	100.0	26	63.4	2	4.9	13	31.7

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 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		3			0.2	0.08		20.0
5- 9	5	4	0.3	0.17	0.3	0.14	18.5	16.0
10-14	3	8	0.2	0.14	0.5	0.47	10.7	42.1
15-19	6	2	0.3	0.23	0.1	0.14	13.0	8.7
20-24	10	4	0.5	0.63	0.2	0.40	15.2	9.8
25-29	4	2	0.2	0.40	0.1	0.18	4.7	2.2
30-34	7	8	0.3	0.50	0.4	0.50	5.1	5.0
35-39	10	6	0.4	0.91	0.3	0.50	4.0	1.6
40-44	8	3	0.3	0.80	0.1	0.25	1.4	0.4
45-49	3	7	0.1	0.30	0.3	1.40	0.2	0.5
50-54	5	4	0.2	0.36	0.2	0.44	0.2	0.2
55-59	12	4	0.6	0.86	0.2	0.40	0.3	0.1
60-64	5	5	0.3	0.50	0.3	1.67	0.1	0.1
65-69	7	7	0.4	0.50	0.4	0.70	0.1	0.1
70-74	9	13	0.6	0.53	0.8	0.76	0.1	0.2
75-79	17	10	1.4	1.70	0.7	0.83	0.2	0.1
80-84	7	5	1.0	1.17	0.5	0.63	0.1	0.1
85+	2	4	0.4	0.40	0.4	1.00	0.0	0.0
All ages	120	99					0.2	0.2
Mortality								
Raw			0.4	0.41	0.3	0.42		
WS			0.3	0.25	0.3	0.27		
ES			0.3	0.32	0.3	0.33		
BRD-S			0.4	0.41	0.3	0.38		
PYLL-70								
per 100,000			9.1		7.8			
ES			9.7		9.1			
AYLL-70			30.7		32.9			

* 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		3			0.2	0.08		20.0
5- 9	5	4	0.3	0.17	0.3	0.14	18.5	16.0
10-14	3	7	0.2	0.14	0.5	0.44	10.7	36.8
15-19	6	2	0.3	0.24	0.1	0.14	13.0	9.1
20-24	8	4	0.4	0.50	0.2	0.40	12.1	10.0
25-29	2	2	0.1	0.20	0.1	0.18	2.4	2.3
30-34	7	8	0.3	0.54	0.4	0.50	5.1	5.1
35-39	8	6	0.3	0.73	0.3	0.50	3.2	1.6
40-44	7	3	0.3	0.70	0.1	0.27	1.3	0.4
45-49	3	5	0.1	0.30	0.2	1.00	0.2	0.4
50-54	5	4	0.2	0.36	0.2	0.44	0.2	0.2
55-59	11	3	0.5	0.79	0.1	0.33	0.3	0.1
60-64	4	5	0.2	0.44	0.3	2.50	0.1	0.1
65-69	6	6	0.4	0.43	0.3	0.60	0.1	0.1
70-74	9	12	0.6	0.56	0.7	0.80	0.1	0.2
75-79	17	10	1.4	1.70	0.7	0.83	0.2	0.1
80-84	7	5	1.0	1.17	0.5	0.71	0.1	0.1
85+	2	4	0.4	0.40	0.4	1.00	0.0	0.0
All ages	110	93					0.2	0.2
Mortality								
Raw			0.3	0.39	0.3	0.41		
WS			0.3	0.23	0.2	0.26		
ES			0.3	0.30	0.3	0.31		
BRD-S			0.3	0.38	0.3	0.37		
PYLL-70								
per 100,000			8.1		7.4			
ES			8.7		8.6			
AYLL-70			30.9		33.6			

* See corresponding tables with multiple malignancies.

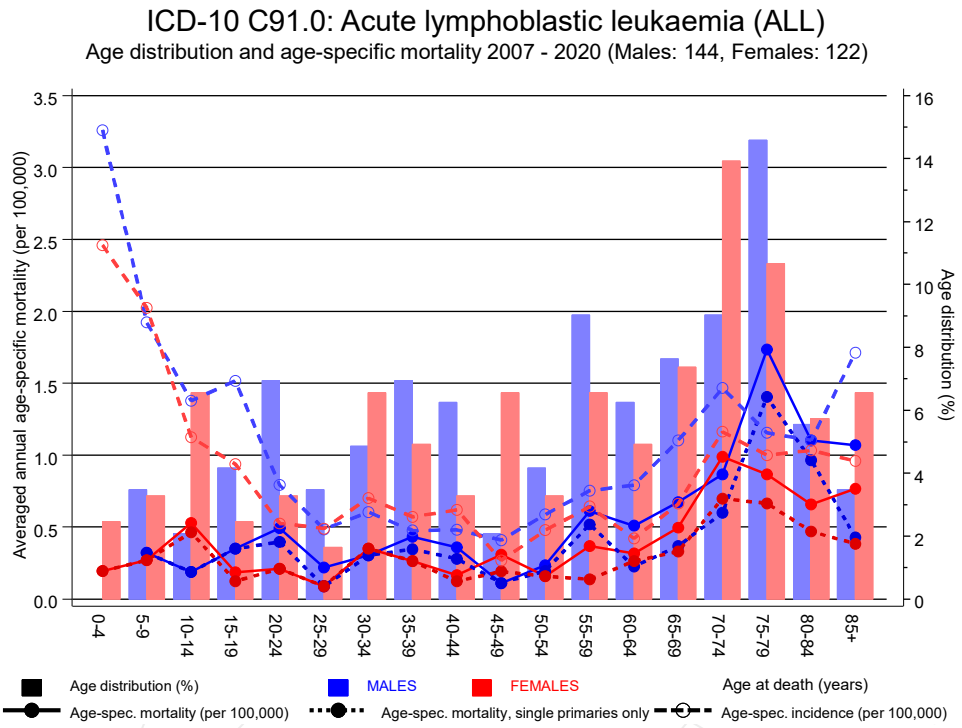


Figure 17. Distribution of age at death (bars; males: mean=50.4 yrs, median=55.9 yrs; females: mean=51.2 yrs, median=56.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

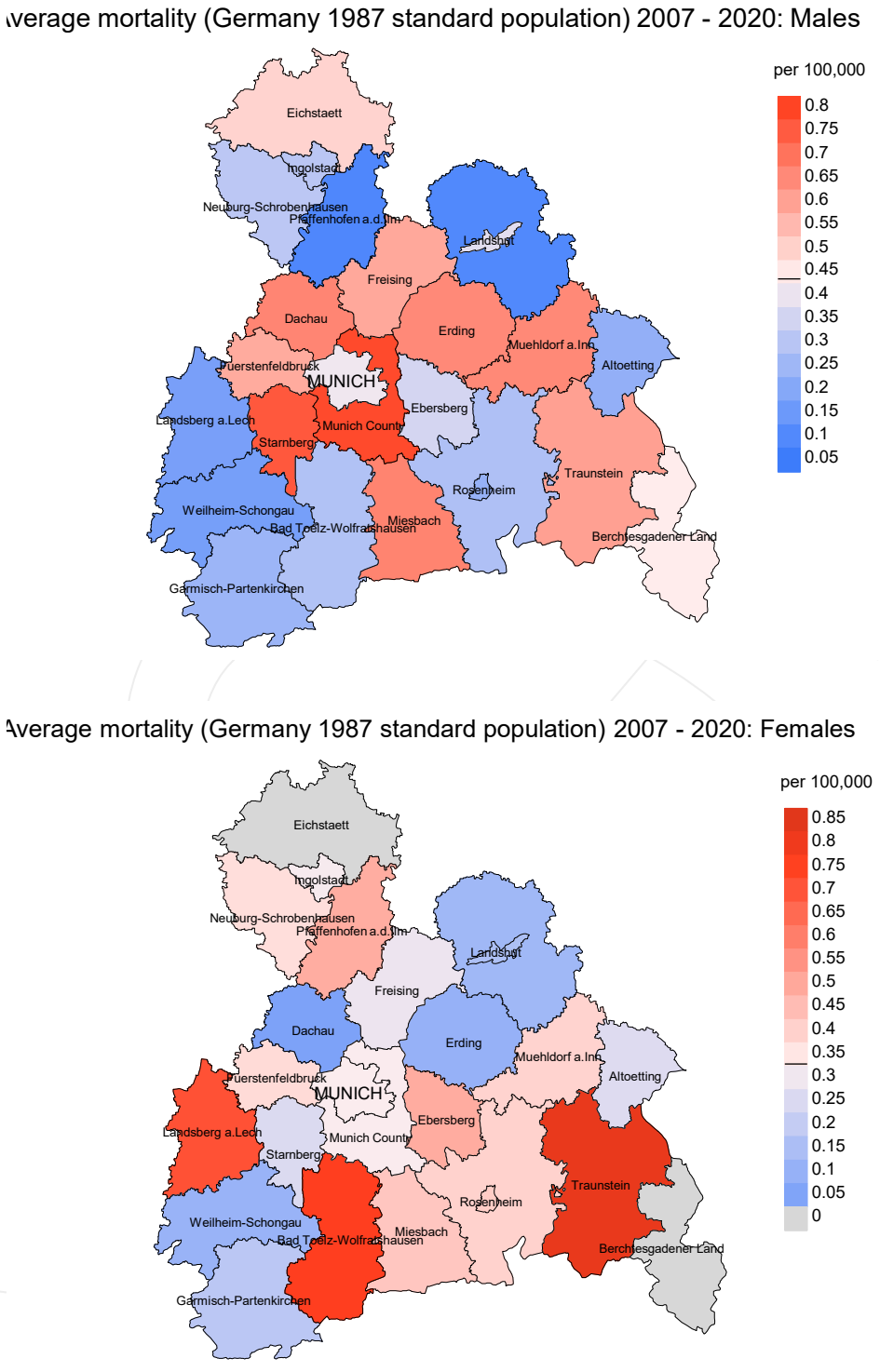
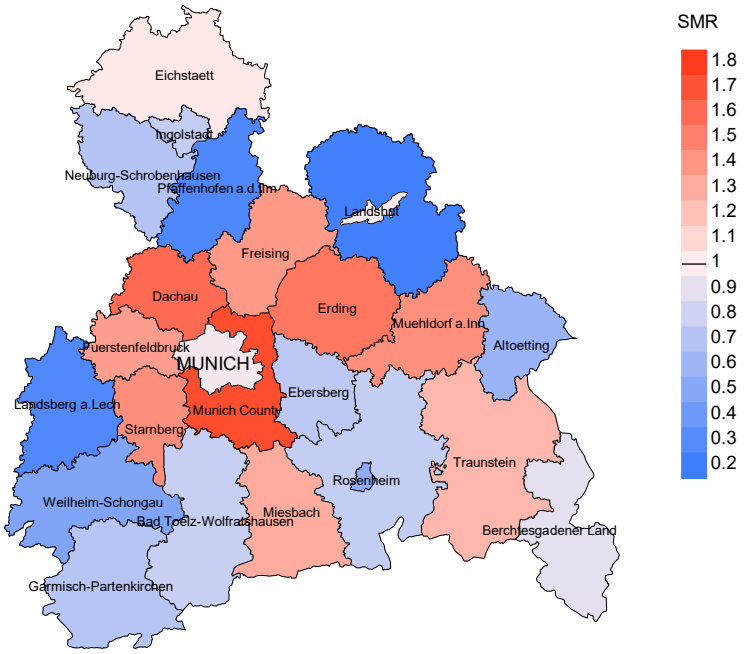


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.4/100,000 WS N=144, females 0.3/100,000 WS N=122).

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 5 women died from acute lymphobl. leukaemia. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.5/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.4/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

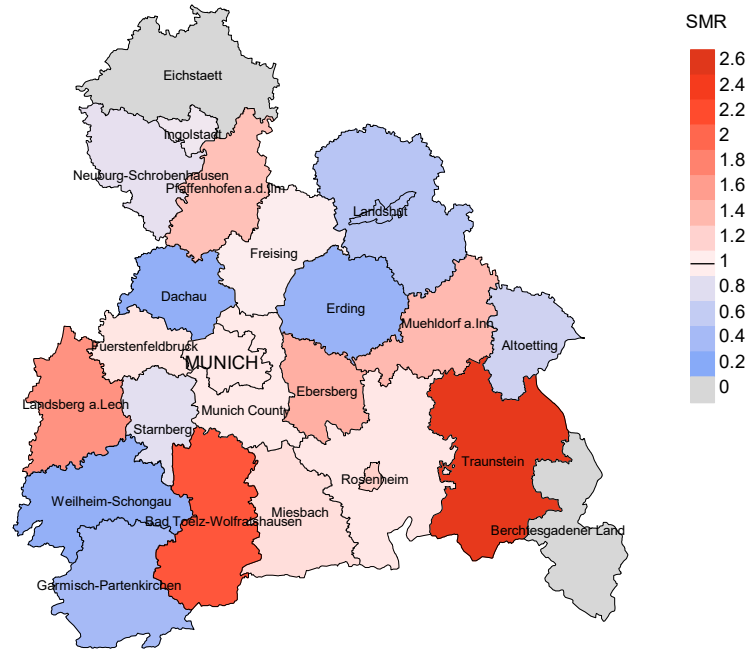


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=144, females N=122).

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 5 women died from acute lymphobl. leukaemia. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.46. Though, the value of this parameter may vary with an underlying probability of 99% between 0.32 and 4.14, 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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