

Munich Cancer Registry



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- ▶ Selection Matrix
- ▶ Homepage
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ICD-10 C91-C95: Leukaemias

Survival

Year of diagnosis	1988-1997	1998-2019
Patients	1,204	11,121
Diseases	1,207	11,212
Cases evaluated	1,052	6,283
Creation date	01/28/2021	
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/surv/sC9195E-ICD-10-C91-C95-Leukaemias-survival.pdf>

Index of figures and tables

Fig./Tbl.		Page
1a	Relative survival by period of diagnosis (chart)	3
1b	Survival by period of diagnosis (table)	3
2a	Survival by sex (chart)	4
2b	Survival by sex (table)	4
2c	Conditional survival by sex (chart)	5
2d	Conditional survival by sex (table)	5
3a	Observed survival by age category (chart)	6
3b	Relative survival by age category (chart)	6
3c	Survival by age category (table)	7
4a	Relative survival by ICD-10 classification (chart)	8
4b	Survival by ICD-10 classification (table)	8
5a	Time to first progression (chart)	9
5b	Time to first progression (table)	9
5c	Observed post-progression survival (chart)	10
5d	Observed post-progression survival (table)	10
5e	Observed post-progression survival by period of progression (chart)	11
5f	Observed post-progression survival by period of progression (table)	11

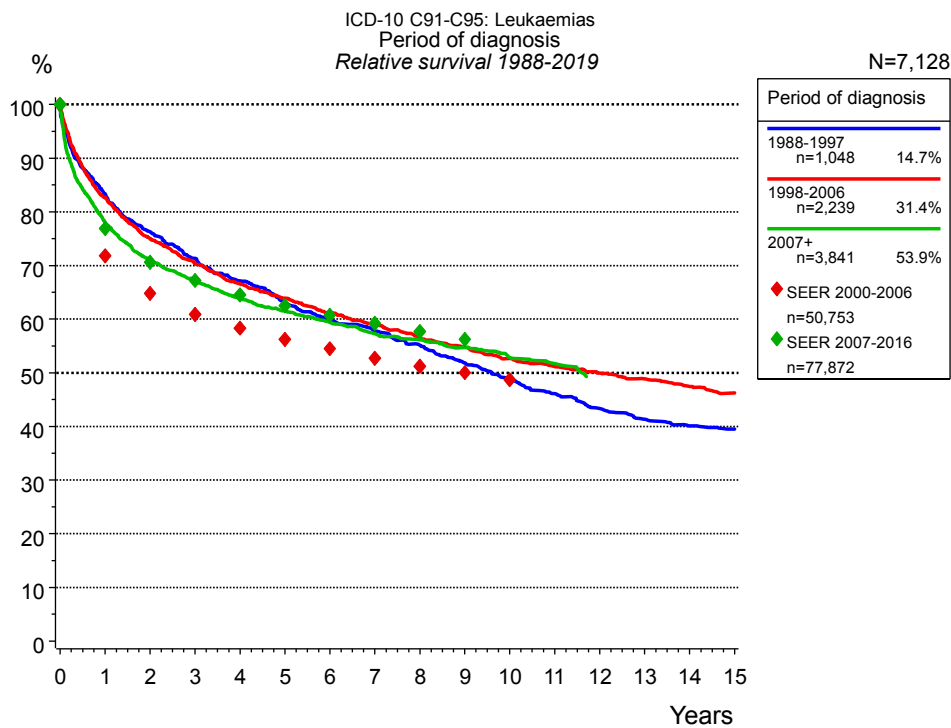


Figure 1a. Relative survival of patients with leukaemias by period of diagnosis. Included in the evaluation are 7,128 cases diagnosed between 1988 and 2019.

The survival results of the SEER program (Surveillance, Epidemiology, and End Results) of the American National Cancer Institute (NCI) are summarized as the period of diagnosis from 2000 to 2016, and are represented by colored diamonds in order to facilitate comparisons between MCR and SEER.

The presented survival curves are derived from clinical records with valid follow-up informations, which means that death certificate cases (DCO) cases are omitted from the analysis. With this one restriction, the MCR has provided population-based statistics since 1998, collecting data on all cancer cases in the region of southern Bavaria. Historical data of previous time periods can be heavily selected, therefore, univariate survival comparisons of the presented time periods must be carefully considered. Nonetheless, all calculable survival curves are depicted to facilitate the comparison of long time follow-up analyses of relative survival between particular cancers.

Years	Period of diagnosis					
	1988-1997 n=1,048		1998-2006 n=2,239		2007+ n=3,841	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	81.7	83.3	80.9	82.7	76.2	78.0
2	73.6	76.3	72.1	75.0	68.1	71.0
3	67.6	71.3	66.4	70.3	63.0	67.0
4	62.5	67.1	61.8	66.5	59.0	63.9
5	57.4	62.9	58.3	63.9	55.8	61.5
6	53.6	59.7	54.9	61.2	52.9	59.4
7	51.1	57.8	52.0	59.0	50.1	57.3
8	47.9	55.1	49.0	56.6	48.3	56.1
9	44.3	51.8	46.7	54.8	46.2	54.7
10	41.0	48.8	44.1	52.7	43.8	52.8
11	38.2	46.1	42.1	51.2	42.2	51.7
12	35.3	43.4	40.4	49.9		
13	33.2	41.3	38.8	48.9		
14	31.7	40.1	37.0	47.5		
15	30.8	39.5	35.4	46.3		
Median	7.3		7.7		7.0	

Table 1b. Observed (obs.) and relative (rel.) survival of patients with leukaemias by period of diagnosis for period 1988-2019 (N=7,128).

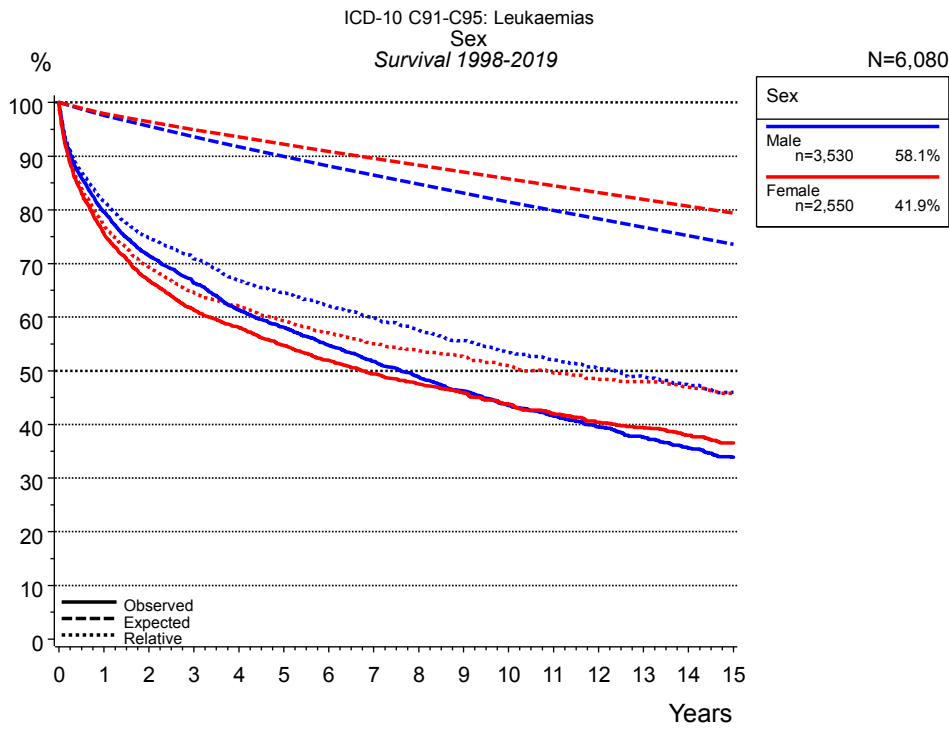


Figure 2a. Survival of patients with leukaemias by sex. Included in the evaluation are 6,080 cases diagnosed between 1998 and 2019.

Years	Male n=3,530		Female n=2,550	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	79.6	81.6	75.6	77.2
2	71.5	74.8	66.8	69.3
3	66.3	70.8	61.3	64.6
4	61.3	66.8	58.1	62.0
5	58.1	64.6	54.7	59.3
6	54.7	62.1	52.0	57.1
7	51.7	59.8	49.4	55.0
8	48.9	57.6	47.5	53.7
9	46.2	55.6	45.8	52.6
10	43.5	53.4	43.8	51.0
11	41.6	52.0	42.1	49.7
12	39.6	50.4	40.4	48.4
13	37.6	48.9	39.5	48.0
14	35.7	47.3	38.0	47.0
15	33.9	46.0	36.5	45.9
Median	7.6		6.7	

Table 2b. Observed (obs.) and relative (rel.) survival of patients with leukaemias by sex for period 1998-2019 (N=6,080).

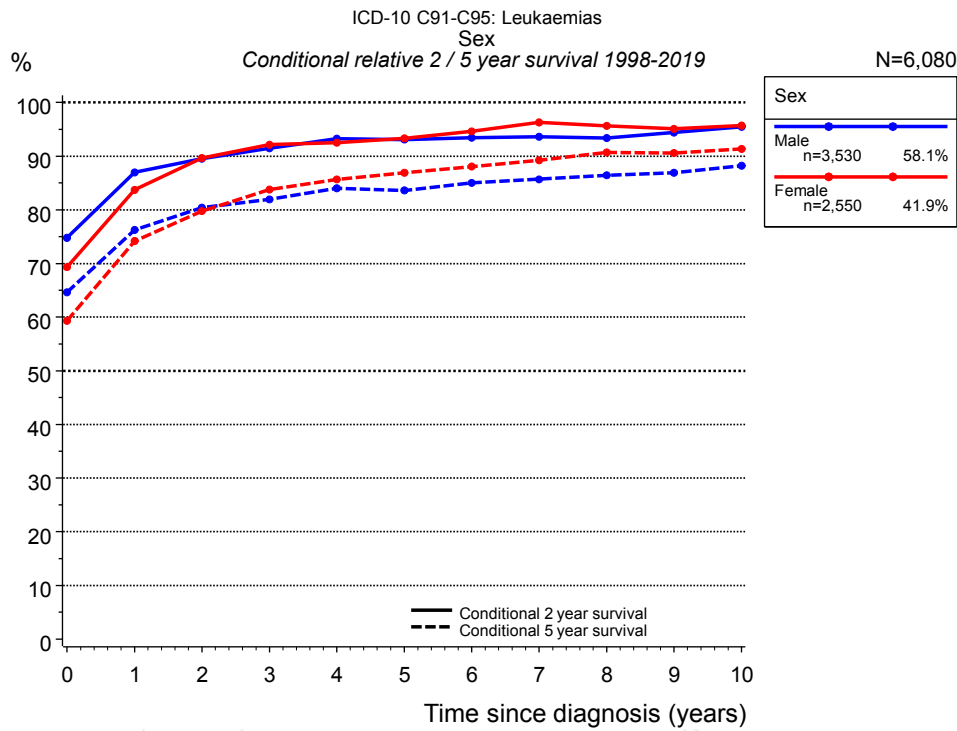


Figure 2c. Conditional relative 2 / 5-year survival of patients with leukaemias by sex. For 6,080 of 6,080 cases diagnosed between 1998 and 2019 valid data could be obtained for this item.

Years	Sex					
	n	Male		n	Female	
		Cond. surv. % 2 yrs	5 yrs		Cond. surv. % 2 yrs	5 yrs
0	3,530	74.8	64.6	2,550	69.3	59.3
1	2,686	87.0	76.3	1,832	83.7	74.2
2	2,334	89.5	80.4	1,555	89.7	79.8
3	2,058	91.5	81.9	1,351	92.1	83.8
4	1,795	93.3	84.0	1,219	92.5	85.7
5	1,600	93.1	83.6	1,094	93.3	86.9
6	1,401	93.5	85.0	989	94.6	88.0
7	1,220	93.6	85.7	860	96.3	89.2
8	1,032	93.4	86.4	753	95.7	90.7
9	879	94.4	86.9	629	95.1	90.6
10	727	95.5	88.3	519	95.7	91.4

Table 2d. Conditional relative 2 / 5-year survival of patients with leukaemias by sex for period 1998-2019 (N=6,080).

Conditional relative survival rates refer to the relative survival probability, in this case for 2 and 5 years after cancer diagnosis, compared to the age- and sex-matched population (=100 %) under the condition of being alive for a certain time period (x-axis in Figure 2a). The results illustrate to what extent the cancer induced mortality of particular subgroups declines in the subsequent years after detection of the malignancy. For instance, according to the presented survival statistics, patients in the subgroup sex="Male", who are alive at least 3 years after cancer diagnosis, the conditional relative 2-year survival rate is 91.5% (n=2,058).

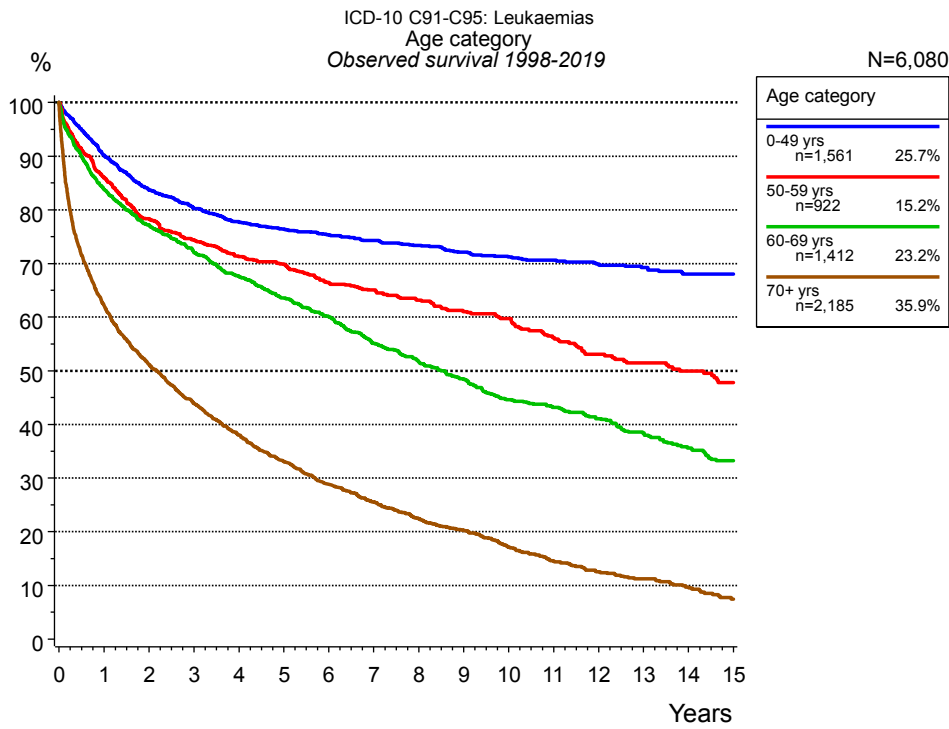


Figure 3a. Observed survival of patients with leukaemias by age category. Included in the evaluation are 6,080 cases diagnosed between 1998 and 2019.

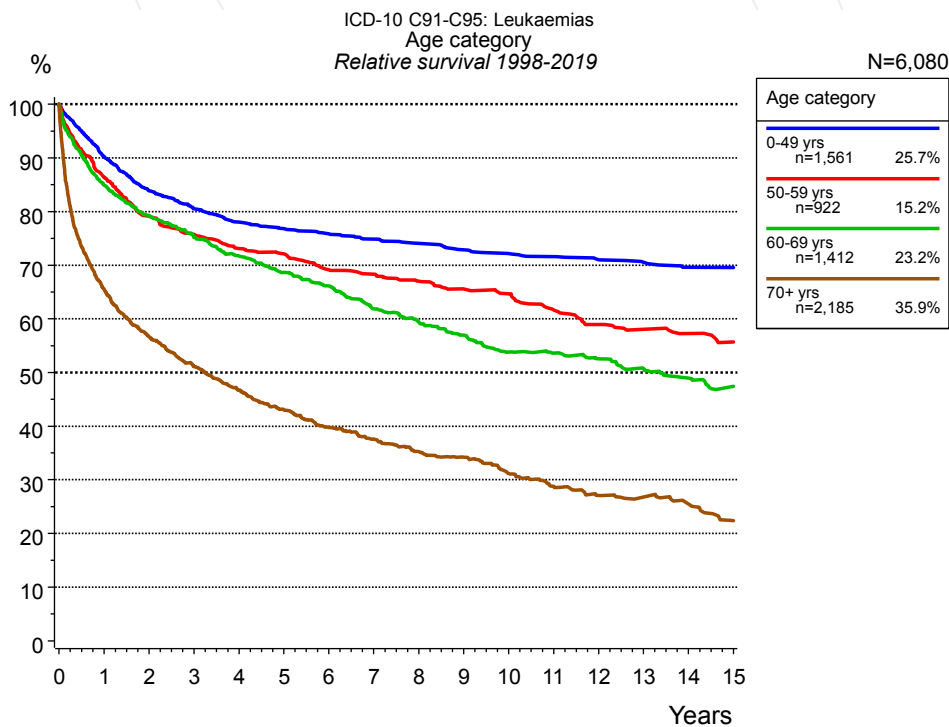


Figure 3b. Relative survival of patients with leukaemias by age category. Included in the evaluation are 6,080 cases diagnosed between 1998 and 2019.

Years	Age category							
	0-49 yrs n=1,561		50-59 yrs n=922		60-69 yrs n=1,412		70+ yrs n=2,185	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	90.2	90.3	86.0	86.4	83.8	84.9	62.2	65.6
2	83.7	83.8	78.3	79.1	77.1	79.2	51.2	56.7
3	80.2	80.5	74.4	75.7	72.0	75.2	43.9	51.2
4	77.8	78.0	71.3	73.1	67.6	71.7	38.0	46.7
5	76.4	76.8	69.9	72.1	63.6	68.6	33.1	43.0
6	75.3	75.8	66.5	69.2	60.1	66.1	28.8	39.8
7	74.3	74.9	65.0	68.3	55.1	61.9	25.6	37.6
8	73.4	74.0	63.1	67.0	51.7	59.4	22.5	35.3
9	72.1	72.9	61.0	65.5	48.4	57.0	20.3	34.2
10	71.2	72.2	59.7	64.7	44.6	53.8	17.1	31.2
11	70.6	71.6	56.2	61.7	43.2	53.7	14.6	28.8
12	69.9	71.0	53.1	59.0	41.1	52.6	12.5	27.1
13	69.3	70.5	51.5	58.1	38.4	50.7	11.2	26.8
14	68.0	69.6	49.9	57.2	35.6	49.0	9.7	25.4
15	68.0	69.5	47.8	55.7	33.2	47.4	7.4	22.4
Median			13.8		8.5		2.2	

Table 3c. Observed (obs.) and relative (rel.) survival of patients with leukaemias by age category for period 1998-2019 (N=6,080).

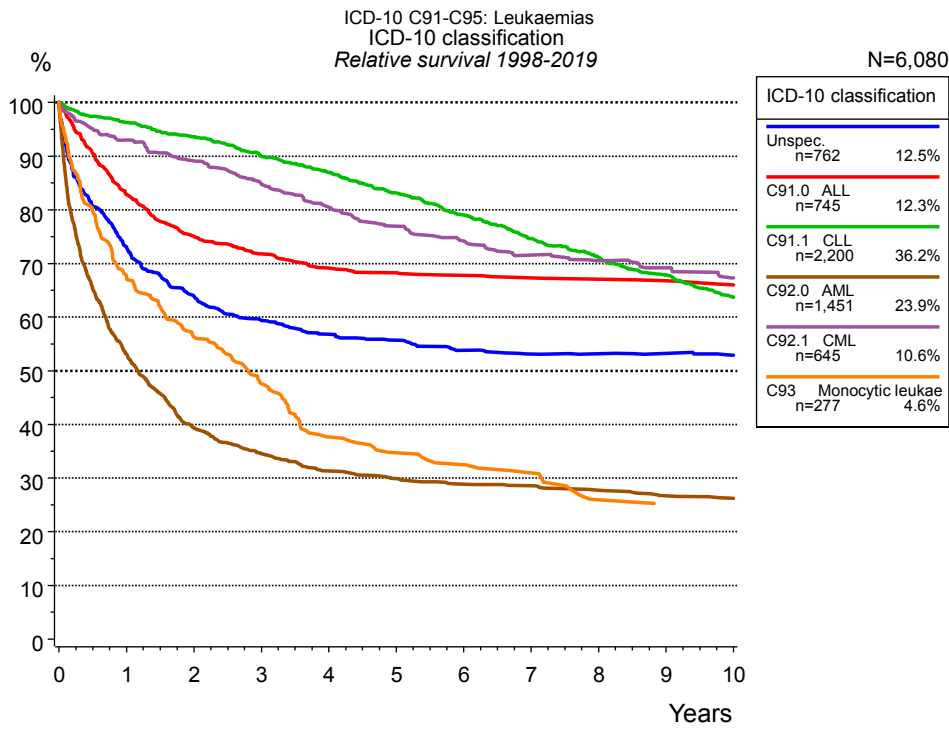


Figure 4a. Relative survival of patients with leukaemias by ICD-10 classification. Included in the evaluation are 6,080 cases diagnosed between 1998 and 2019.

Years	ICD-10 classification											
	Unspec.		C91.0 ALL		C91.1 CLL		C92.0 AML		C92.1 CML		C93 Monocytic leukaemia	
	n=762	n=762	n=745	n=745	n=2,200	n=2,200	n=1,451	n=1,451	n=645	n=645	n=277	n=277
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	71.6	73.1	82.4	82.8	93.7	96.3	51.8	53.1	91.4	93.0	65.5	67.4
2	61.6	63.9	74.7	75.1	88.7	93.6	37.9	39.4	86.1	89.1	53.5	56.3
3	56.5	59.4	71.2	71.8	83.0	89.9	32.9	34.6	80.7	84.8	44.1	47.6
4	53.5	56.8	68.5	69.1	78.1	86.9	29.4	31.3	75.5	80.5	34.1	37.7
5	51.7	55.7	67.5	68.3	72.7	83.1	27.9	29.9	71.0	77.0	31.0	34.7
6	49.2	53.8	66.9	67.8	67.3	79.0	26.6	28.8	67.7	74.2	28.9	32.5
7	47.9	53.1	66.3	67.3	61.9	74.6	26.1	28.5	64.4	71.5	27.1	30.9
8	47.3	53.1	65.9	67.1	57.4	71.2	25.1	27.7	62.5	70.5	22.2	25.9
9	46.6	53.2	65.7	66.8	53.1	67.8	23.9	26.7	60.7	69.2	21.3	25.2
10	45.6	52.9	64.8	66.0	48.5	63.7	23.4	26.2	58.0	67.3		
Median	5.7				9.7		1.1		15.3		2.5	

Table 4b. Observed (obs.) and relative (rel.) survival of patients with leukaemias by ICD-10 classification for period 1998-2019 (N=6,080).

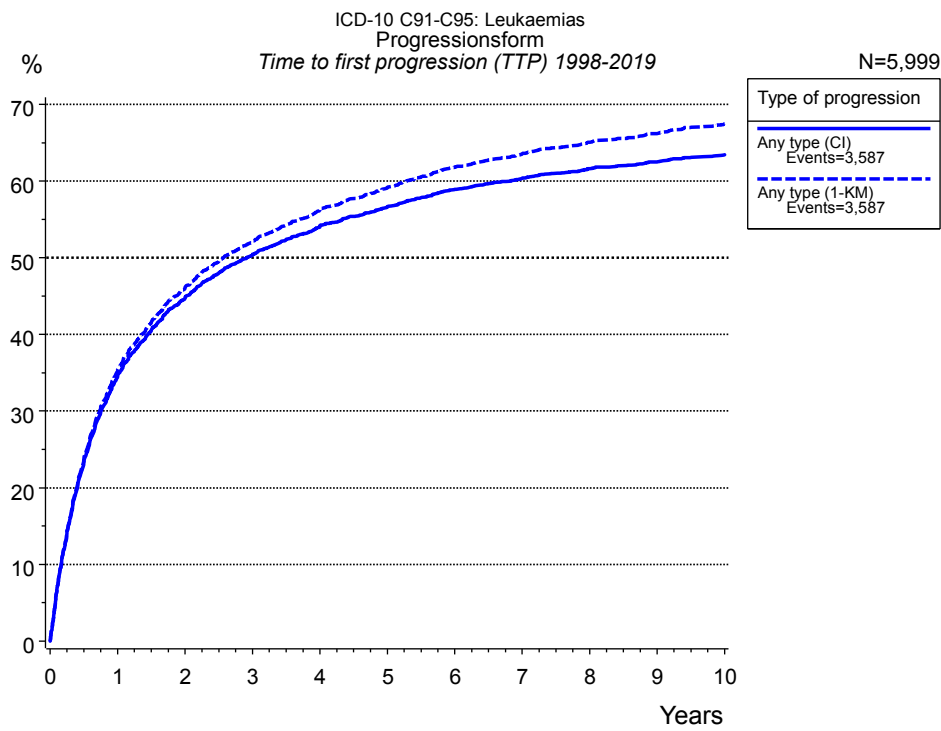


Figure 5a. Time to first progression of 5,999 patients with leukaemias diagnosed between 1998 and 2019 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

	Type of progression	
	Any type (CI)	Any type (1-KM)
N	5,999	5,999
Events	3,531	3,531
compet.	589	
Years	%	%
0	0.0	0.0
1	34.5	35.3
2	44.8	46.1
3	50.3	52.1
4	54.0	56.1
5	56.6	59.1
6	59.0	61.9
7	60.4	63.6
8	61.6	65.1
9	62.6	66.3
10	63.5	67.4

Table 5b. Time to first progression of patients with leukaemias for period 1998-2019 (N=5,999), also showing the total of progression events (Events) and of deaths as competing risk (compet.).

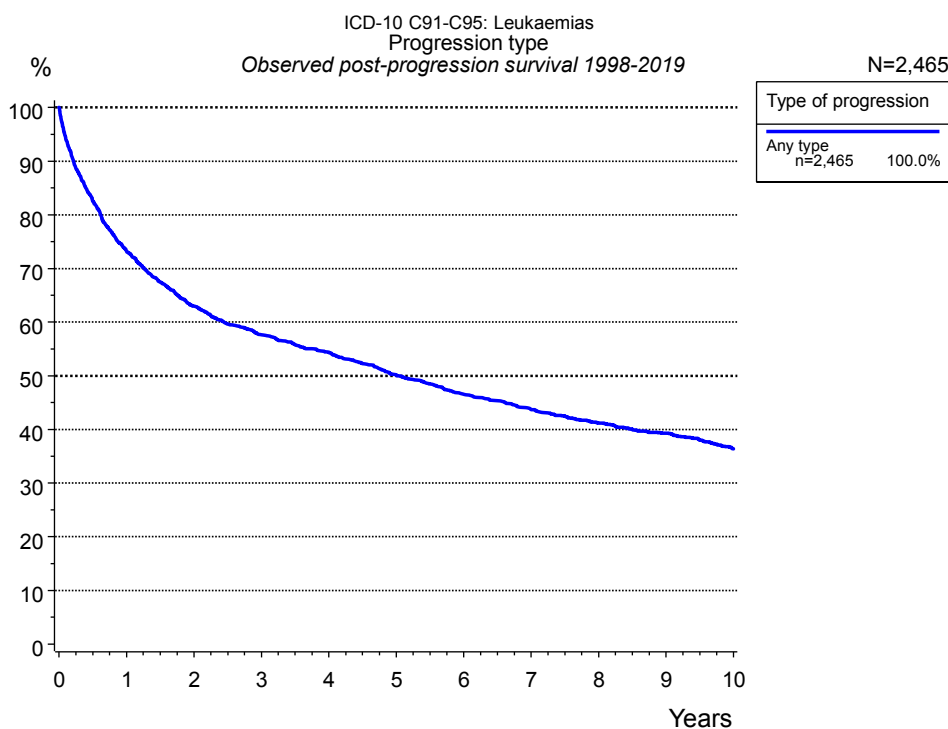


Figure 5c. Observed post-progression survival of 2,465 patients with leukaemias diagnosed between 1998 and 2019. These 2,465 patients with documented progression events during their course of disease represent 41.1 % of the totally 6,001 evaluated cases. Patients with cancer relapse documented via death certificates only were excluded (n=1,124, 18.7 %).

Medical record documentation often lacks the linguistic severity to distinguish between local relapse, regional lymph node metastasis and distant spread in solid cancers. Frequently, the statement “not specified” is the only information in registries regarding relapse of the disease. The category “Any type” denotes all cases who suffered from at least one relapse during the course of disease (incl. primary M1-status). Although, the real number of relapsed patients is likely to be much higher. The accumulated percentage of patients with local relapse or distant metastasis exceeds the 100 % value because patients are potentially considered in more than one subgroup.

Type of progression	
Years	Any type n=2,465 %
0	100.0
1	73.3
2	63.0
3	57.6
4	54.4
5	50.2
6	46.5
7	43.7
8	41.1
9	39.3
10	36.3

Table 5d. Observed post-progression survival of patients with leukaemias for period 1998-2019 (N=2,465).

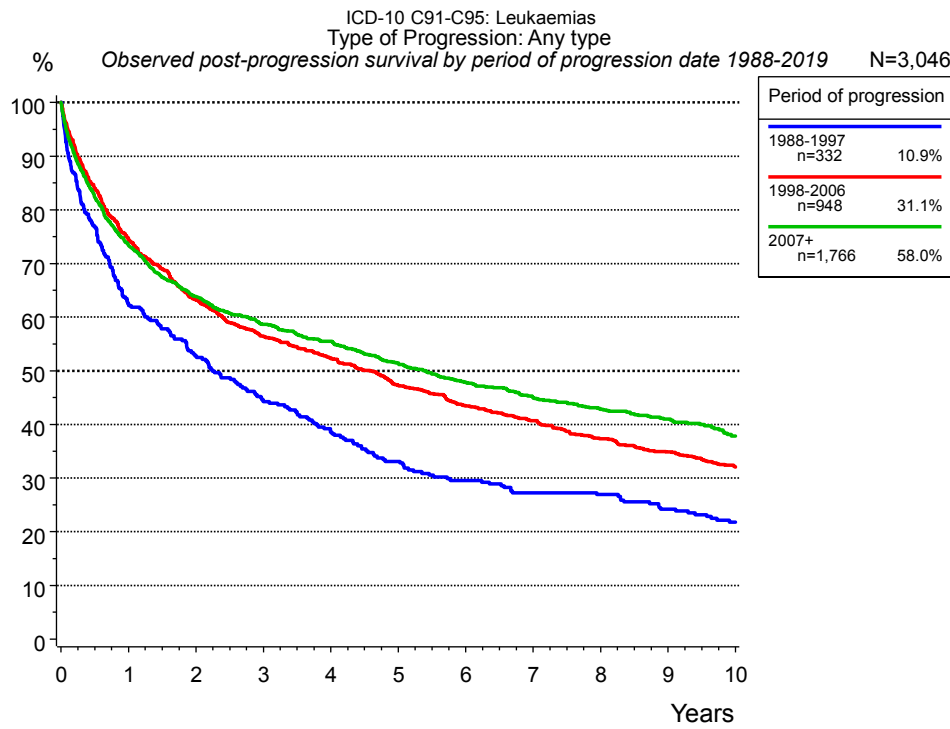


Figure 5e. Observed post-progression (any type) survival of 3,046 patients with leukaemias diagnosed between 1988 and 2019 by period of progression.

Years	Period of progression		
	1988-1997 n=332 %	1998-2006 n=948 %	2007+ n=1,766 %
0	100.0	100.0	100.0
1	62.5	74.5	73.4
2	52.8	63.3	63.8
3	44.3	56.5	58.7
4	38.6	52.4	55.5
5	33.1	47.3	51.5
6	29.6	43.4	47.9
7	27.3	40.7	45.0
8	26.9	37.3	42.9
9	24.2	34.9	41.0
10	21.8	32.0	37.8

Table 5f. Observed post-progression (any type) survival of patients with leukaemias for period 1988-2019 by period of progression (N=3,046).

Shortcuts

MCR Munich Cancer Registry, Germany

NCI National Cancer Institute, USA

SEER Surveillance, Epidemiology, and End Results, USA

UICC Union for International Cancer Control, Geneva

DCO Death certificate only Death certificate provides the only notification to the registry.

NA Not available

NOS Not otherwise specified

OS Overall/Observed survival Overall/Observed survival (Kaplan-Meier estimate)
Date of entry: diagnosis
Event: death from any cause

RS Relative survival Survival compared to “general population”,
ratio of observed to expected survival (Ederer II method),
reflecting cancer specific survival

AS Assembled survival Assembled chart of
observed, expected, relative survival

CS Conditional survival Survival probability under the condition of surviving
a given period of time

TTP Time to progression Time to first progression / relapse
Date of entry: diagnosis
Event: (progression / relapse): first local-, lymph node recurrence,
distant metastasis or unspecified progression

1-KM 1 minus Kaplan-Meier estimator
 (“inverse” Kaplan-Meier estimator)

CI Cumulative incidence
Death as competing risk (according to Kalbfleisch und Prentice)

PPS Post-progression survival Survival since first progression / relapse (Kaplan-Meier estimate)
Date of entry (progression / relapse): first local-, lymph node
recurrence, distant metastasis or unspecified progression
Event: death from any cause

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