

# Munich Cancer Registry



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## ICD-10 C91-C95: Leukaemias

### Survival

Year of diagnosis	1988-1997	1998-2016
Patients	1,265	10,227
Diseases	1,268	10,328
Cases evaluated	1,116	5,748
Creation date	08/22/2018	
Export date	08/09/2018	
Population	4.81 m	



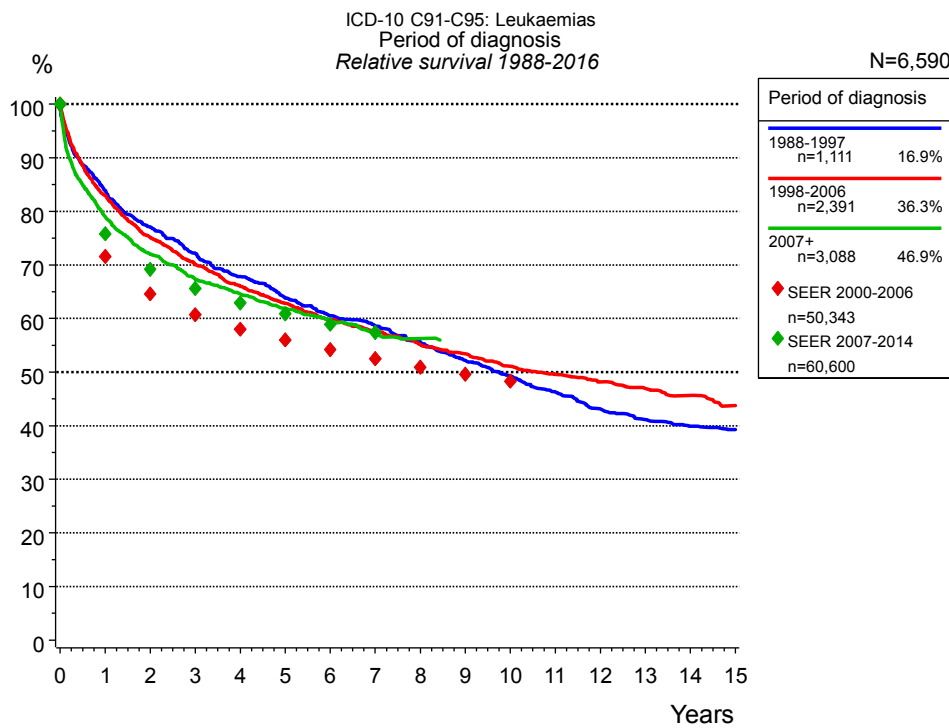
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<https://www.tumorregister-muenchen.de/en>

<https://www.tumorregister-muenchen.de/en/facts/surv/sC9195E-ICD-10-C91-C95-Leukaemias-survival.pdf>

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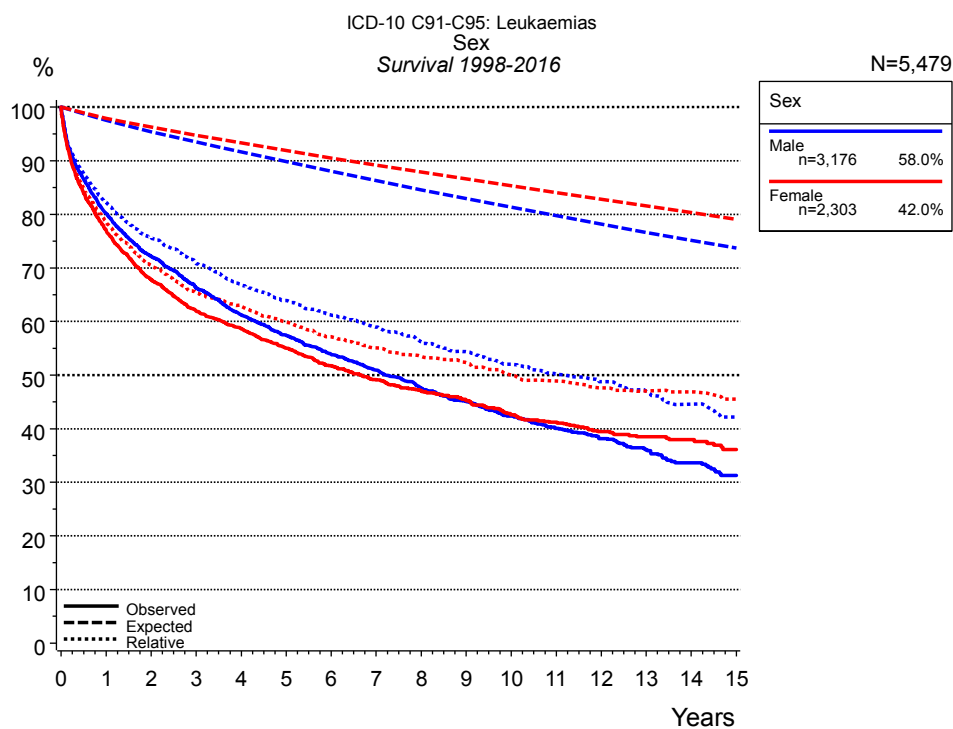
**Figure 1a.** Relative survival of patients with leukaemias by period of diagnosis. Included in the evaluation are 6,590 cases diagnosed between 1988 and 2016.

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 2014, 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=1,111		1998-2006 n=2,391		2007+ n=3,088	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	82.2	83.9	81.2	83.0	77.1	79.0
2	74.3	77.1	72.1	75.2	69.0	72.1
3	68.4	72.2	66.0	70.0	63.3	67.4
4	63.1	67.8	61.1	66.0	59.6	64.6
5	58.2	63.8	57.1	62.9	56.0	61.9
6	54.2	60.5	53.4	59.8	53.1	59.6
7	51.6	58.6	50.6	57.6	50.2	57.4
8	48.2	55.7	47.6	55.2	48.3	56.3
9	44.4	52.2	45.2	53.4		
10	41.2	49.3	42.5	51.1		
11	38.2	46.3	40.6	49.6		
12	34.9	43.1	38.8	48.2		
13	32.8	41.2	37.2	47.0		
14	31.3	39.9	35.6	45.7		
15	30.4	39.3	33.5	43.8		

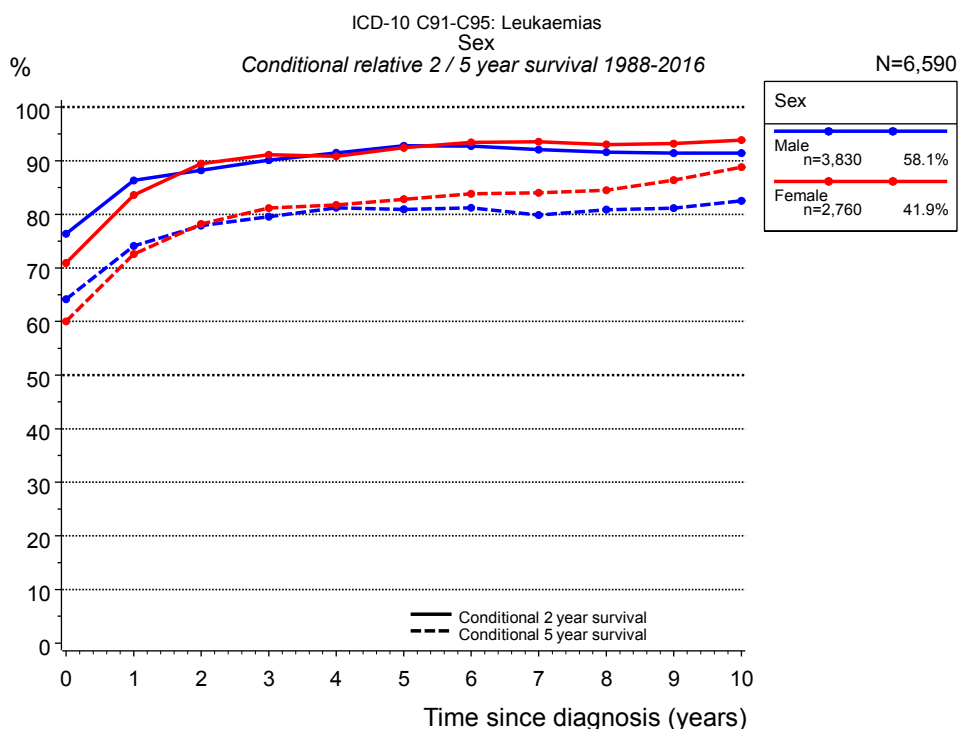
**Table 1b.** Observed (obs.) and relative (rel.) survival of patients with leukaemias by period of diagnosis for period 1988-2016 (N=6,590).



**Figure 2a.** Survival of patients with leukaemias by sex. Included in the evaluation are 5,479 cases diagnosed between 1998 and 2016.

Years	Sex			
	Male n=3,176		Female n=2,303	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	80.1	82.2	77.1	78.7
2	72.2	75.6	67.8	70.4
3	66.2	70.8	62.0	65.4
4	61.3	66.8	58.7	62.8
5	57.5	63.9	55.0	59.8
6	53.9	61.2	51.8	57.2
7	50.9	59.0	49.2	55.1
8	47.6	56.2	47.1	53.4
9	45.1	54.4	45.3	52.3
10	42.4	52.0	42.6	49.9
11	40.0	50.2	41.2	48.9
12	38.2	48.7	39.5	47.6
13	36.1	47.0	38.5	47.0
14	33.6	44.6	37.9	46.9
15	31.3	42.2	36.1	45.5

**Table 2b.** Observed (obs.) and relative (rel.) survival of patients with leukaemias by sex for period 1998-2016 (N=5,479).

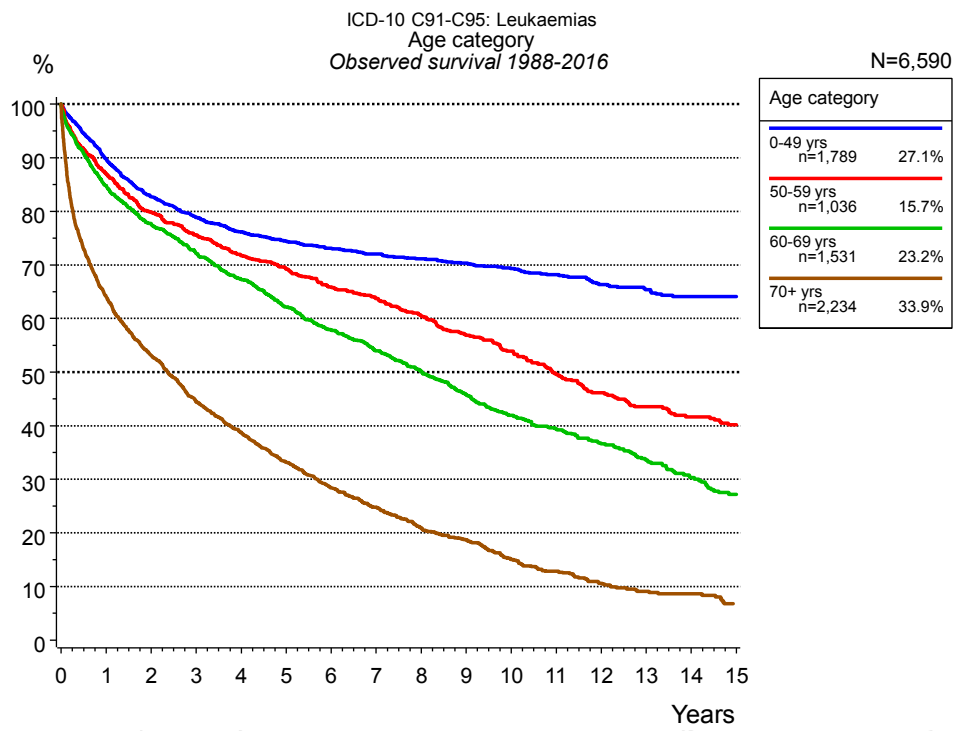


**Figure 2c.** Conditional relative 2 / 5-year survival of patients with leukaemias by sex. For 6,590 of 6,590 cases diagnosed between 1988 and 2016 valid data could be obtained for this item.

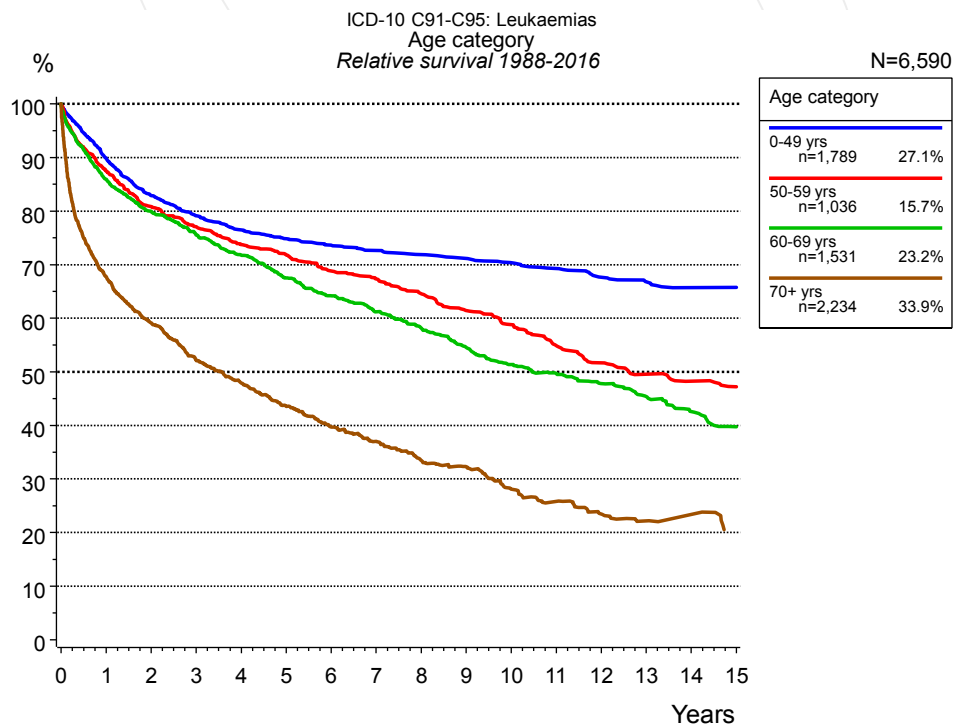
Years	Sex					
	n	Male		n	Female	
		Cond. surv. % 2 yrs	Cond. surv. % 5 yrs		Cond. surv. % 2 yrs	Cond. surv. % 5 yrs
0	3,830	76.3	64.2	2,760	70.9	60.0
1	2,939	86.3	74.1	2,053	83.6	72.6
2	2,529	88.2	77.9	1,744	89.5	78.2
3	2,209	90.1	79.6	1,509	91.1	81.1
4	1,903	91.5	81.2	1,343	90.8	81.8
5	1,641	92.8	80.9	1,167	92.4	82.8
6	1,414	92.7	81.2	989	93.4	83.8
7	1,219	92.1	79.8	855	93.6	84.0
8	1,022	91.6	80.9	726	93.0	84.5
9	837	91.4	81.2	628	93.2	86.4
10	704	91.4	82.5	531	93.9	88.8

**Table 2d.** Conditional relative 2 / 5-year survival of patients with leukaemias by sex for period 1988-2016 (N=6,590).

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 90.1% (n=2,209).



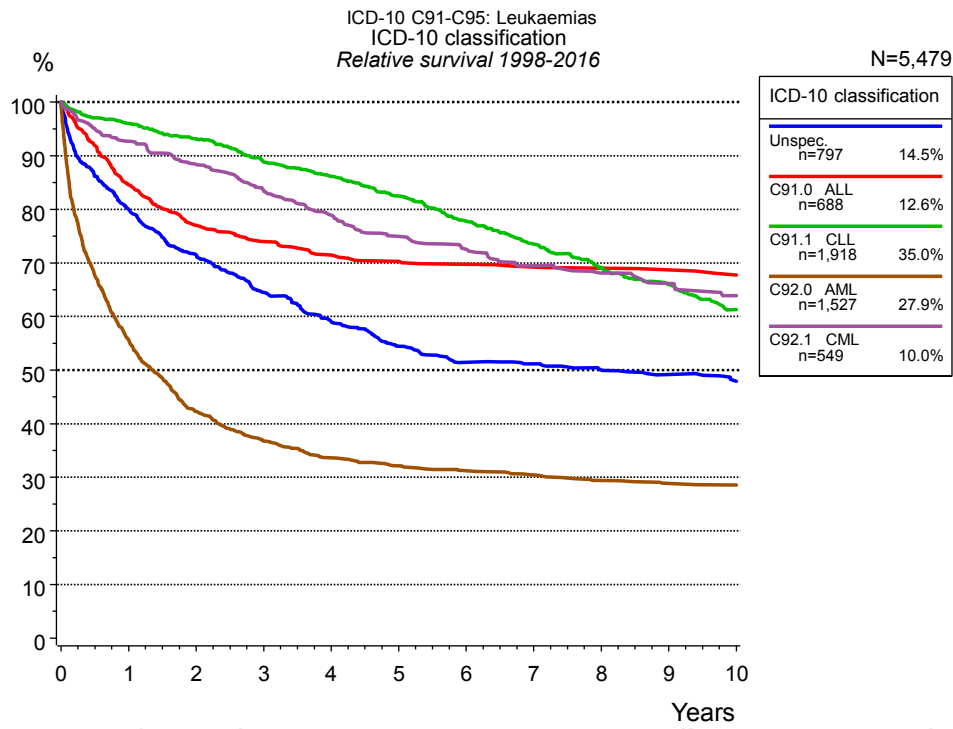
**Figure 3a.** Observed survival of patients with leukaemias by age category. Included in the evaluation are 6,590 cases diagnosed between 1988 and 2016.



**Figure 3b.** Relative survival of patients with leukaemias by age category. Included in the evaluation are 6,590 cases diagnosed between 1988 and 2016.

Years	Age category							
	0-49 yrs n=1,789		50-59 yrs n=1,036		60-69 yrs n=1,531		70+ yrs n=2,234	
	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	89.8	89.9	87.0	87.5	84.7	85.9	64.2	67.8
2	82.7	82.9	79.9	80.8	77.7	80.0	53.1	59.1
3	78.9	79.1	75.6	77.1	72.1	75.5	44.6	52.3
4	76.2	76.5	71.7	73.7	67.3	71.8	38.8	47.9
5	74.5	74.9	69.2	71.8	62.2	67.5	33.2	43.6
6	73.1	73.6	65.9	68.8	57.9	64.2	28.4	39.7
7	72.1	72.7	63.8	67.3	54.0	61.2	24.8	37.0
8	71.2	71.9	60.5	64.5	50.2	58.2	20.9	33.5
9	70.3	71.2	56.9	61.4	45.8	54.5	18.7	32.3
10	69.3	70.4	53.9	58.8	41.9	51.4	15.0	28.1
11	68.2	69.3	49.7	54.9	39.5	49.7	12.8	25.8
12	66.3	67.7	46.2	51.7	36.6	47.8	10.6	23.4
13	65.4	66.8	43.5	49.6	33.7	45.4	9.1	22.2
14	64.1	65.7	41.7	48.2	30.3	42.6	8.6	23.4
15	64.1	65.8	40.2	47.2	27.2	39.7	6.8	20.7

**Table 3c.** Observed (obs.) and relative (rel.) survival of patients with leukaemias by age category for period 1988-2016 (N=6,590).

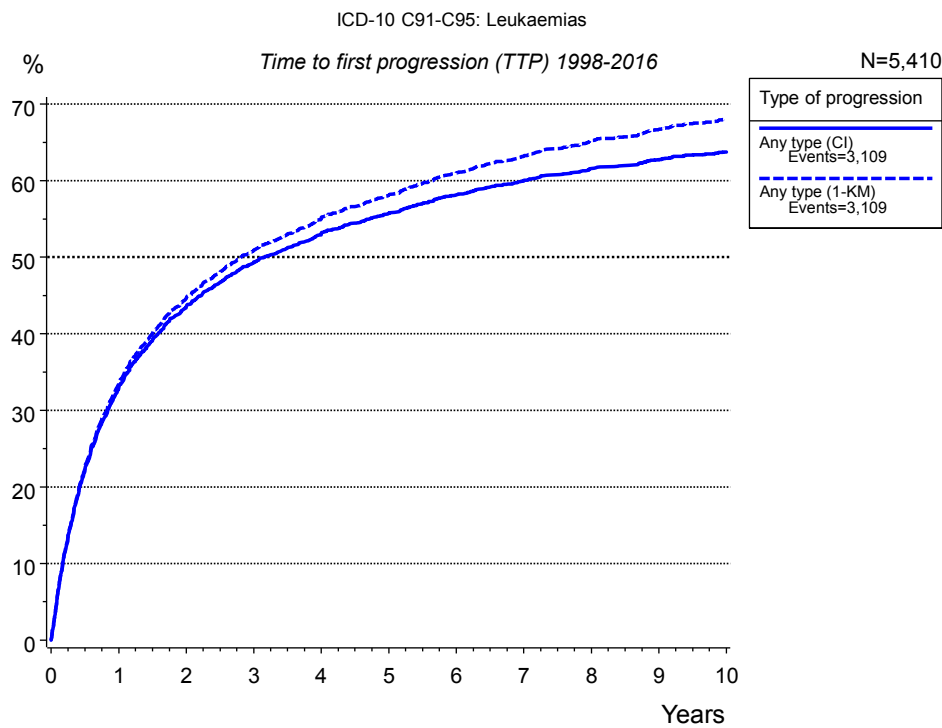


**Figure 4a.** Relative survival of patients with leukaemias by ICD-10 classification. Included in the evaluation are 5,479 cases diagnosed between 1998 and 2016.

Years	ICD-10 classification									
	Unspec. n=797		C91.0 ALL n=688		C91.1 CLL n=1,918		C92.0 AML n=1,527		C92.1 CML n=549	
	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
1	77.8	80.0	84.2	84.5	93.3	96.0	54.3	55.7	91.1	92.7
2	67.9	71.5	76.6	77.0	88.1	93.1	40.7	42.3	85.4	88.4
3	60.0	64.5	73.4	74.0	81.8	88.8	35.1	36.8	79.5	83.4
4	54.0	59.1	70.9	71.5	77.2	86.1	31.8	33.7	74.1	78.9
5	48.7	54.5	69.6	70.3	72.0	82.5	30.2	32.1	69.3	74.9
6	45.1	51.5	68.9	69.7	66.1	77.8	29.0	31.2	66.4	72.6
7	44.1	51.2	68.4	69.2	60.8	73.5	28.0	30.4	62.7	69.5
8	42.2	50.0	68.1	69.0	55.7	69.2	26.9	29.4	60.5	68.1
9	40.6	49.2	67.7	68.7	51.7	66.0	26.1	28.8	58.3	66.2
10	38.6	47.9	66.7	67.7	46.7	61.3	25.8	28.6	55.4	63.8

**Table 4b.** Observed (obs.) and relative (rel.) survival of patients with leukaemias by ICD-10 classification for period 1998-2016 (N=5,479).

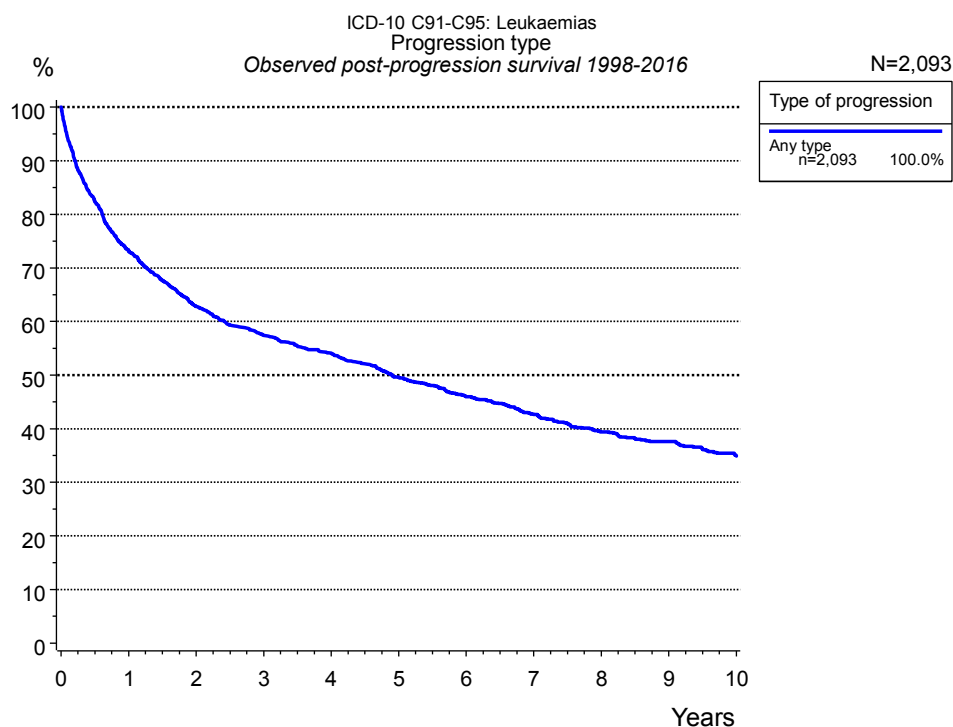




**Figure 5a.** Time to first progression of 5,410 patients with leukaemias diagnosed between 1998 and 2016 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

Years	Type of progression	
	Any type (CI)	Any type (1-KM)
	n=5,410 %	n=5,410 %
0	0.0	0.0
1	32.9	33.5
2	43.5	44.6
3	49.3	50.9
4	53.0	55.0
5	55.7	58.1
6	58.2	61.1
7	60.0	63.2
8	61.6	65.2
9	62.8	66.7
10	63.8	68.0

**Table 5b.** Time to first progression of patients with leukaemias for period 1998-2016 (N=5,410).

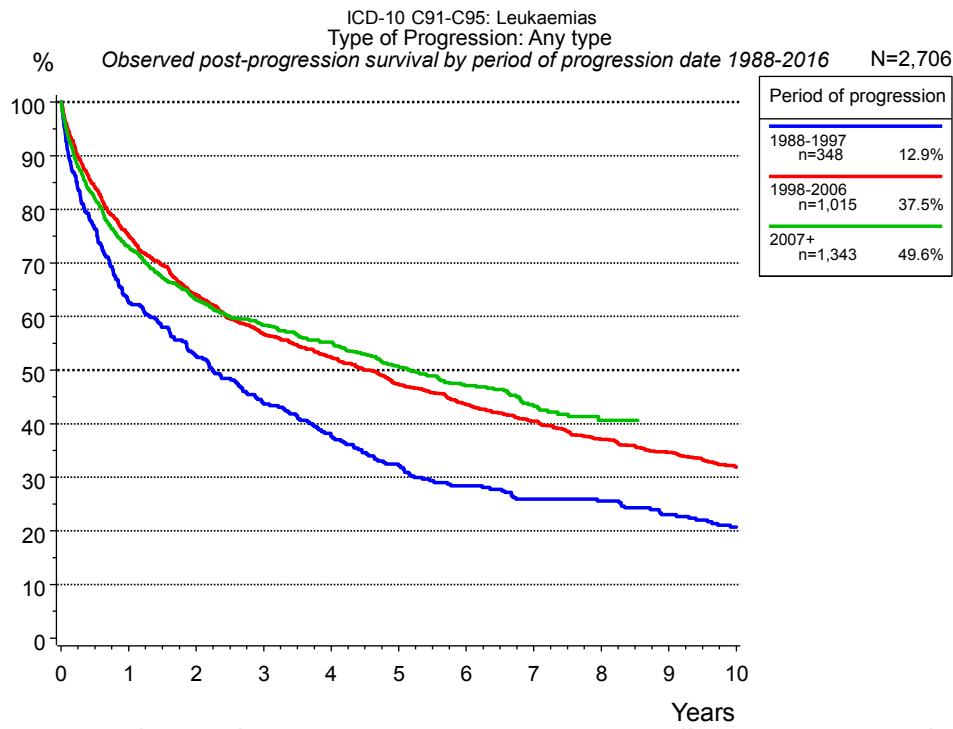


**Figure 5c.** Observed post-progression survival of 2,093 patients with leukaemias diagnosed between 1998 and 2016. These 2,093 patients with documented progression events during their course of disease represent 38.7 % of the totally 5,411 evaluated cases. Patients with cancer relapse documented via death certificates only were excluded (n=1,017, 18.8 %).

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	
Any type n=2,093	
Years	%
0	100.0
1	73.1
2	62.8
3	57.4
4	54.1
5	49.6
6	46.0
7	42.6
8	39.4
9	37.6
10	34.9

**Table 5d.** Observed post-progression survival of patients with leukaemias for period 1998-2016 (N=2,093).



**Figure 5e.** Observed post-progression (any type) survival of 2,706 patients with leukaemias diagnosed between 1988 and 2016 by period of progression.

Years	Period of progression		
	1988-1997 n=348 %	1998-2006 n=1,015 %	2007+ n=1,343 %
0	100.0	100.0	100.0
1	62.8	75.1	72.9
2	52.6	64.1	63.1
3	43.6	56.8	58.4
4	37.6	52.5	55.2
5	32.1	47.3	50.8
6	28.4	43.5	47.1
7	25.9	40.4	43.2
8	25.6	37.1	40.6
9	23.0	34.7	
10	20.7	31.9	

**Table 5f.** Observed post-progression (any type) survival of patients with leukaemias for period 1988-2016 by period of progression (N=2,706).

## 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

## Recommended Citation

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