

# Munich Cancer Registry



- ▶ Incidence and Mortality
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

## ICD-10 C22: Liver cancer

### Survival

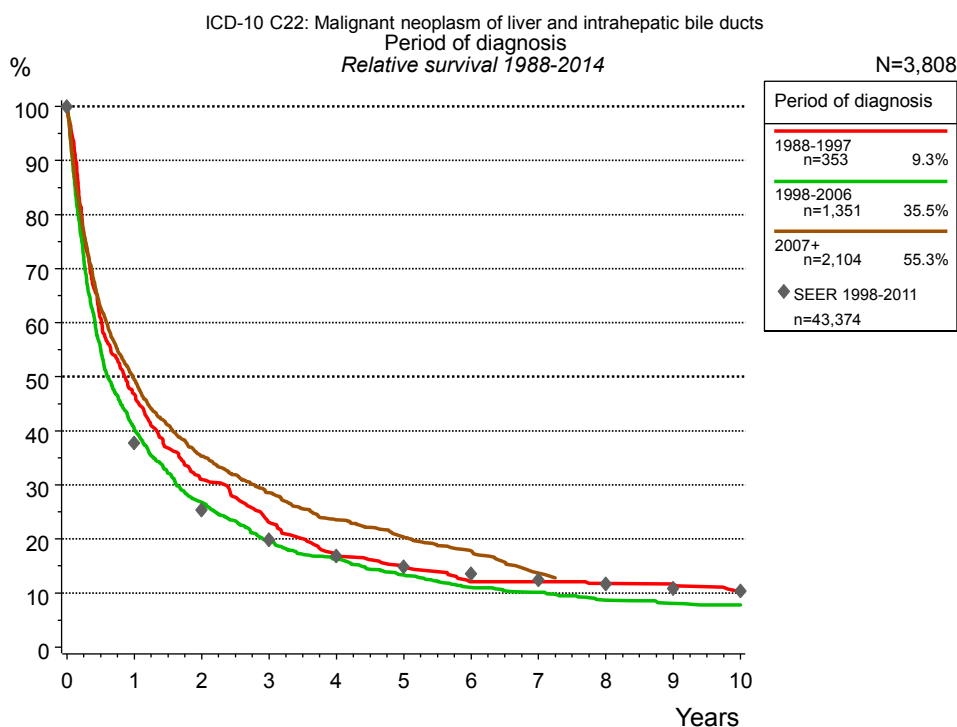
Year of diagnosis	1988-1997	1998-2014
Patients	390	6,111
Diseases	390	6,119
Cases evaluated	355	3,516
Creation date	04/11/2016	
Export date	12/23/2015	
Population	4.64 m	



Munich Cancer Registry at Munich Cancer Center  
Marchioninstr. 15  
Munich, 81377  
Germany

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

[http://www.tumorregister-muenchen.de/en/facts/surv/sC22\\_\\_E-ICD-10-C22-Liver-cancer-survival.pdf](http://www.tumorregister-muenchen.de/en/facts/surv/sC22__E-ICD-10-C22-Liver-cancer-survival.pdf)



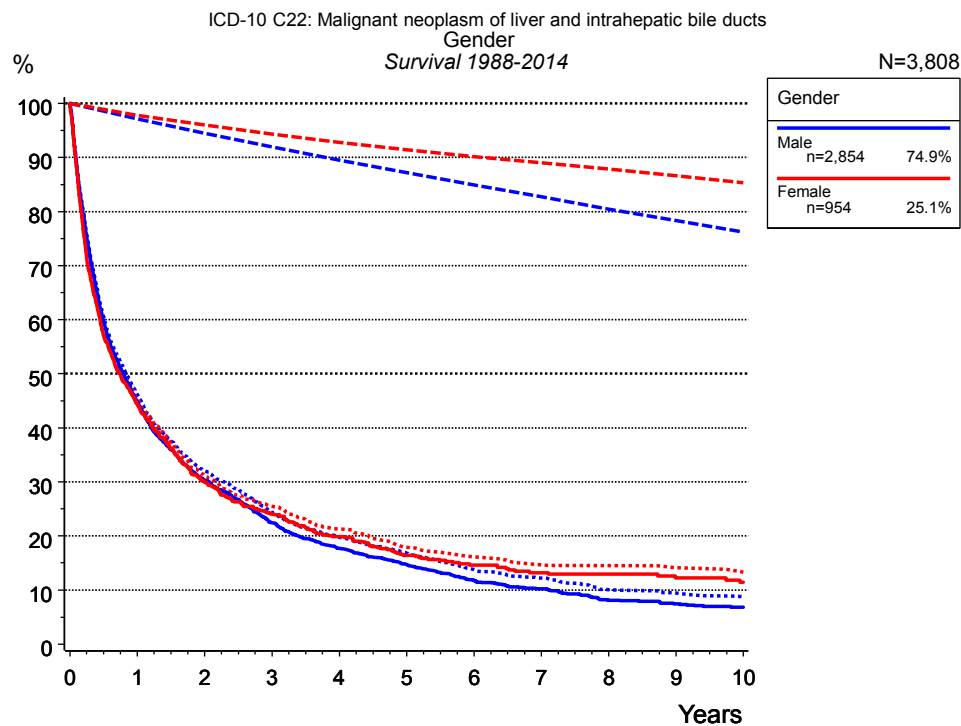
**Figure 1a.** Relative survival of patients with liver cancer by period of diagnosis. Included in the evaluation are 3,808 cases diagnosed between 1988 and 2014.

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 1998 to 2011, and are represented by gray 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=353		1998-2006 n=1,351		2007+ n=2,104	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	45.7	46.8	39.0	40.1	48.2	49.4
2	29.5	31.0	25.4	26.8	33.5	35.3
3	21.5	23.1	18.1	19.6	26.5	28.5
4	15.6	16.9	14.8	16.3	21.2	23.5
5	13.7	15.0	11.8	13.3	17.9	20.3
6	10.6	12.1	9.6	11.1	15.3	17.8
7	10.6	12.1	8.6	10.2	11.7	13.7
8	10.0	11.8	7.2	8.7		
9	9.7	11.6	6.6	8.1		
10	8.4	10.3	6.2	7.8		

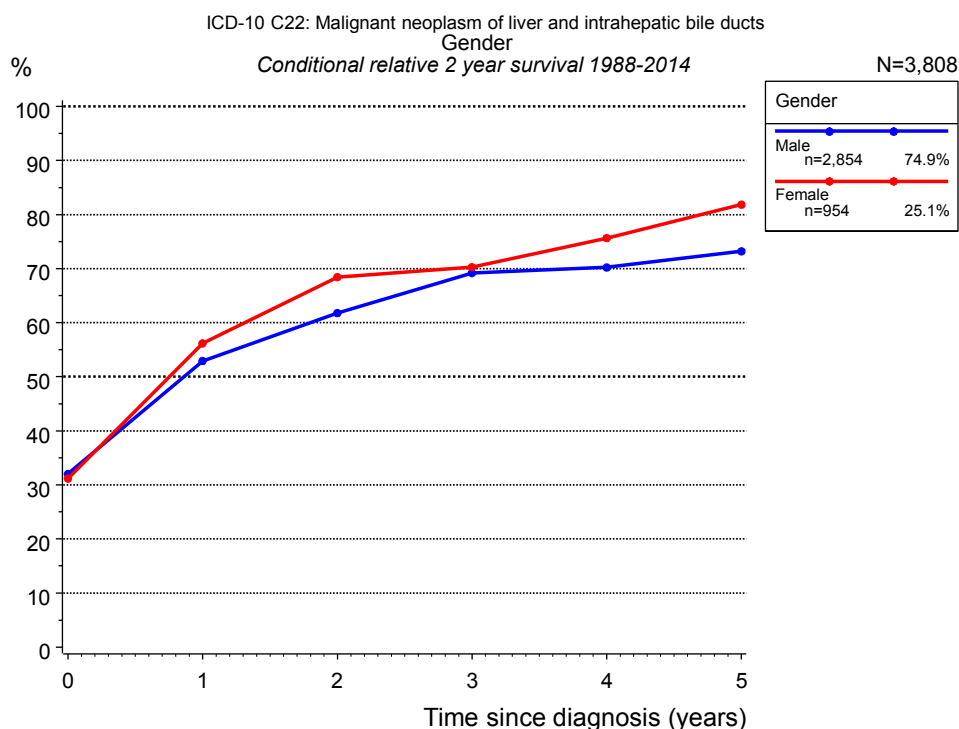
**Table 1b.** Observed (obs.) and relative (rel.) survival of patients with liver cancer by period of diagnosis for period 1988-2014 (N=3,808).



**Figure 2a.** Survival of patients with liver cancer by gender. Included in the evaluation are 3,808 cases diagnosed between 1988 and 2014.

Years	Gender			
	Male n=2,854		Female n=954	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	44.8	46.1	44.4	45.4
2	30.3	32.0	30.0	31.2
3	22.4	24.4	24.1	25.5
4	17.7	19.8	19.9	21.3
5	14.7	16.8	16.4	17.9
6	11.8	13.8	14.6	16.2
7	10.2	12.3	13.2	14.7
8	8.1	10.1	13.0	14.5
9	7.4	9.4	12.3	14.2
10	6.8	8.8	11.5	13.4

**Table 2b.** Observed (obs.) and relative (rel.) survival of patients with liver cancer by gender for period 1988-2014 (N=3,808).

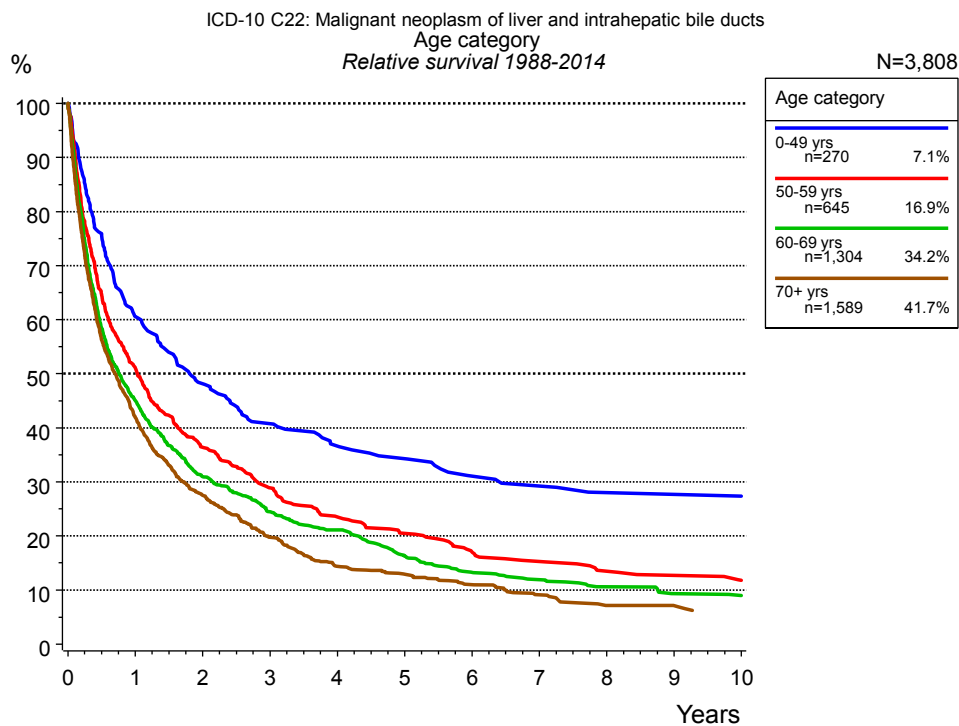


**Figure 2c.** Conditional relative 2-year survival of patients with liver cancer by gender. For 3,808 of 3,808 cases diagnosed between 1988 and 2014 valid data could be obtained for this item.

Years	Gender			
	Male		Female	
	n	Cond. surv. % 2 yrs	n	Cond. surv. % 2 yrs
0	2,854	32.0	954	31.2
1	1,213	52.9	402	56.2
2	749	61.8	245	68.4
3	495	69.2	170	70.3
4	340	70.2	120	75.7
5	255	73.2	90	81.8

**Table 2d.** Conditional relative 2-year survival of patients with liver cancer by gender for period 1988-2014 (N=3,808).

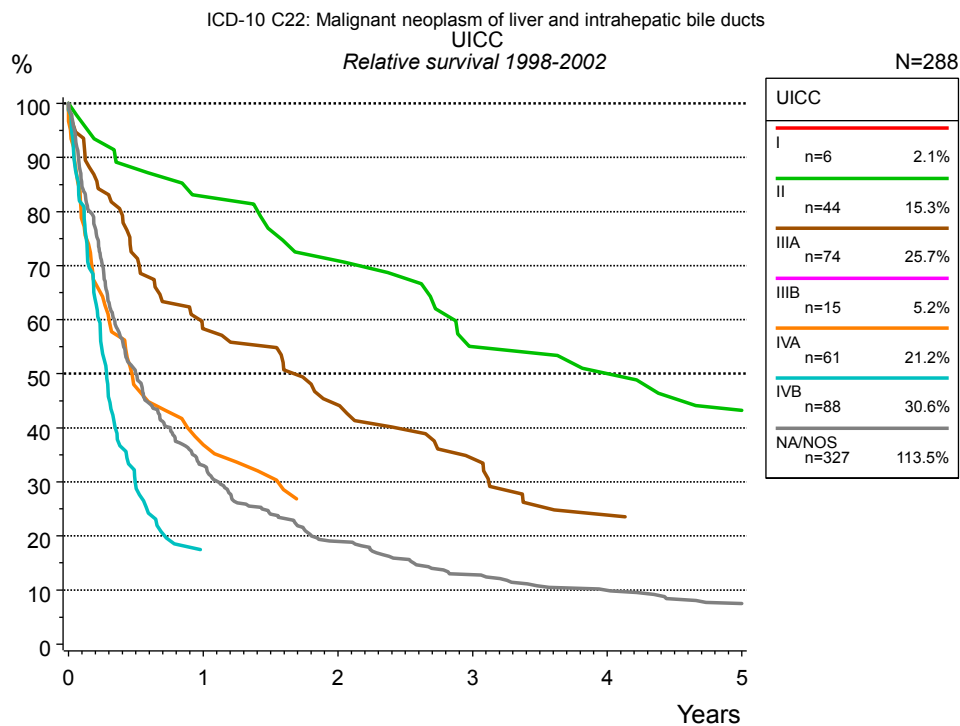
Conditional relative survival rates refer to the relative survival probability, in this case for 2 years after cancer diagnosis, compared to the age- and sex-matched population (=100%) under the condition of being alive for a certain time period (x-axis in Figure 2a). The results illustrate to what extent 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 gender="Male", who are alive at least 3 years after cancer diagnosis, the conditional relative 2-year survival rate is 69.2% (n=495).



**Figure 3a.** Relative survival of patients with liver cancer by age category. Included in the evaluation are 3,808 cases diagnosed between 1988 and 2014.

Years	Age category							
	0-49 yrs n=270		50-59 yrs n=645		60-69 yrs n=1,304		70+ yrs n=1,589	
	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	60.5	60.6	50.7	51.0	44.4	45.0	39.8	41.8
2	48.2	48.1	36.0	36.4	30.0	31.0	24.9	27.5
3	40.9	40.8	28.3	28.9	23.4	24.5	17.0	19.8
4	36.8	36.6	23.0	23.5	19.8	21.1	11.7	14.4
5	34.5	34.3	19.8	20.5	14.9	16.3	10.0	12.9
6	30.7	31.0	16.4	17.0	12.0	13.3	8.1	11.0
7	29.4	29.2	14.7	15.3	10.5	11.9	6.3	9.1
8	27.6	28.0	12.8	13.5	9.1	10.6	4.6	7.2
9	27.6	27.7	12.0	12.7	7.7	9.3	4.4	7.1
10	27.6	27.4	10.9	11.8	7.4	9.0		

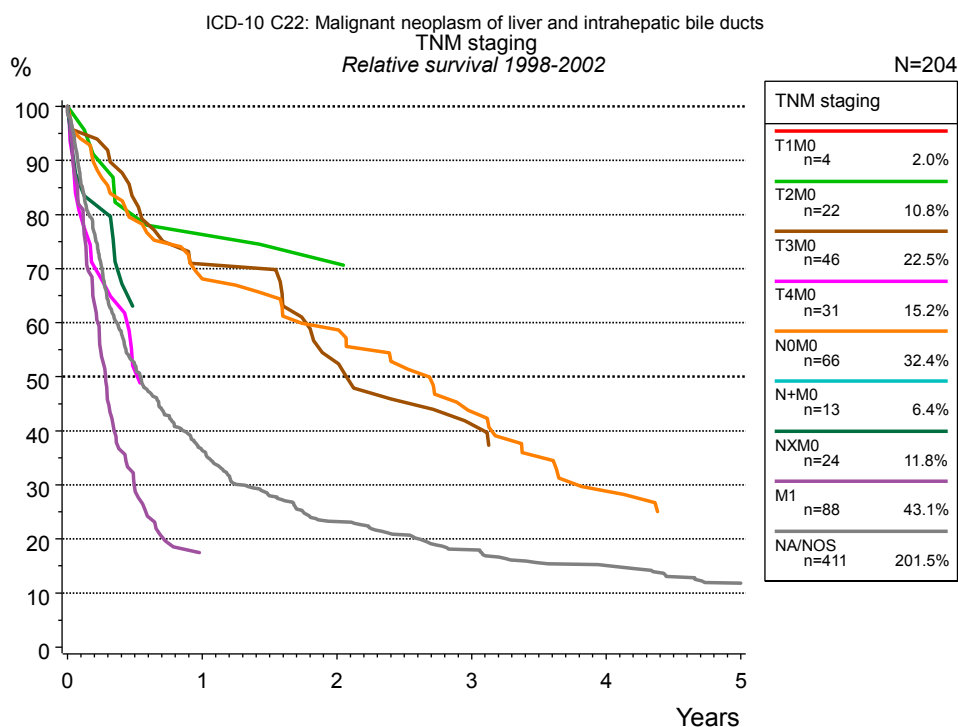
**Table 3b.** Observed (obs.) and relative (rel.) survival of patients with liver cancer by age category for period 1988-2014 (N=3,808).



**Figure 4a.** Relative survival of patients with liver cancer by UICC. For 299 of 615 cases diagnosed between 1998 and 2002 valid data could be obtained for this item. For a total of 288 cases an evaluable classification was established. The grey line represents the subgroup of 327 patients with missing values regarding UICC (53.2% of 615 patients, the percent values of all other categories are related to n=288). Subgroups with sample size <15 are dropped from the chart.

		UICC													
		I n=6		II n=44		IIIA n=74		IIIB n=15		IVA n=61		IVB n=88		NA/NOS n=327	
Years		obs. %	rel. %	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	100.0	100.0
1		100.0	88.1	81.8	82.8	56.8	58.3			36.1	36.9			32.2	33.0
2				70.5	70.9	43.2	44.2							17.9	19.0
3				52.3	55.0	32.4	34.3							11.9	12.8
4				47.6	50.0	22.8	23.9							9.1	10.0
5				40.5	43.2									6.7	7.5

**Table 4b.** Observed (obs.) and relative (rel.) survival of patients with liver cancer by UICC for period 1998-2002 (N=288).

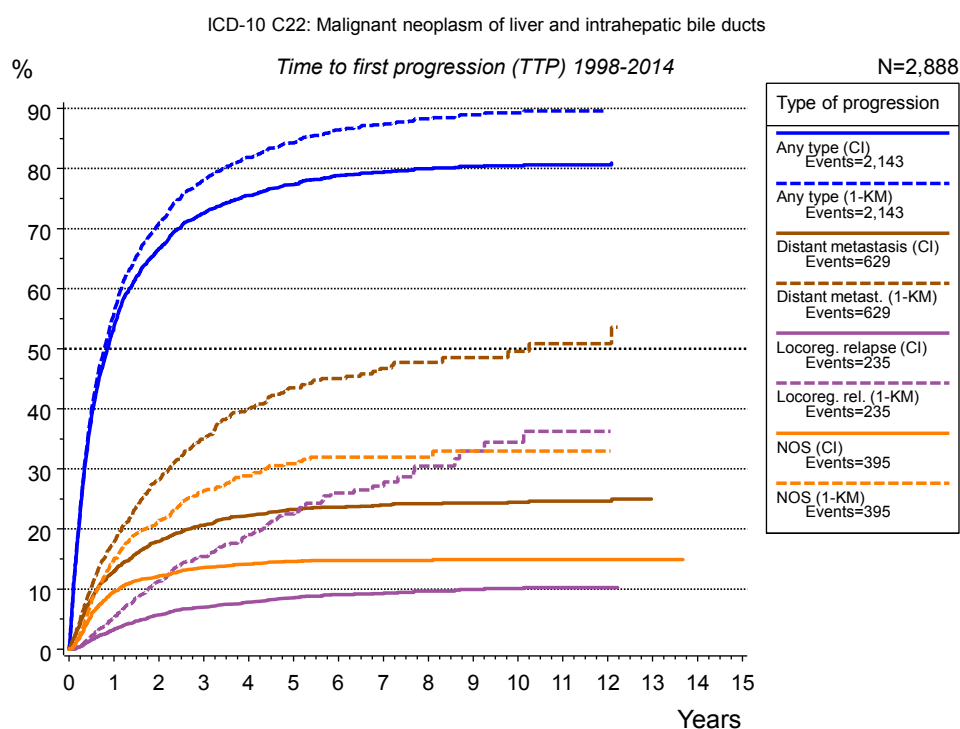


**Figure 4c.** Relative survival of patients with liver cancer by TNM staging. For 299 of 615 cases diagnosed between 1998 and 2002 valid data could be obtained for this item. For a total of 204 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 411 patients with missing values regarding TNM staging (66.8 % of 615 patients, the percent values of all other categories are related to n=204). Subgroups with sample size <15 are dropped from the chart.

TNM staging														
Years	T1M0 n=4		T2M0 n=22		T3M0 n=46		T4M0 n=31		N0M0 n=66		N+M0 n=13		NXM0 n=24	
	obs. %	rel. %	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	100.0	100.0
1	100.0	81.8	77.3	76.3	69.6	70.8			66.7	68.1		100.0		100.0
2			72.7	71.0	52.2	52.6			57.6	58.7				
3					39.1	41.2			40.9	43.6				
4									27.3	28.9				
5									22.7	23.7				

TNM staging				
Years	M1 n=88		NA/NOS n=411	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1			35.4	36.4
2			22.0	23.3
3			16.8	18.0
4			13.8	15.1
5			10.6	11.8

**Table 4d.** Observed (obs.) and relative (rel.) survival of patients with liver cancer by TNM staging for period 1998-2002 (N=204).



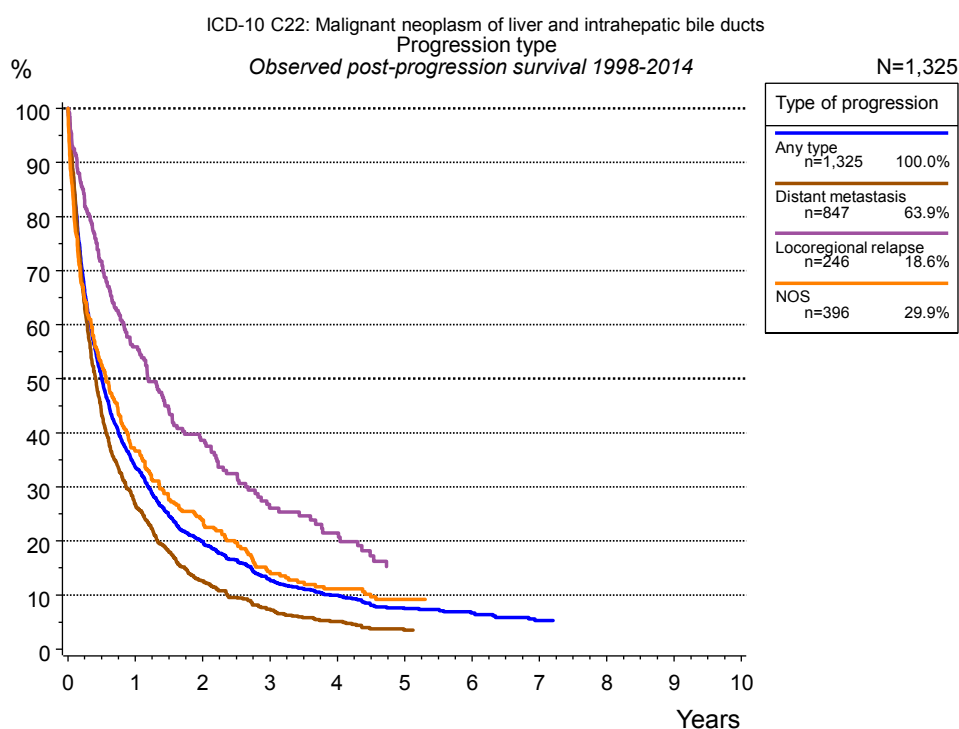
**Figure 5a.** Time to first progression of 2,888 patients with liver cancer diagnosed between 1998 and 2014 (M0 only in solid cancers) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

Years	Type of progression						
	Any type (CI)	Any type (1-KM)	Distant metastasis (CI)	Distant metast. (1-KM)	Locoreg. relapse (CI)	Locoreg. rel. (1-KM)	NOS (CI)
	n=2,888 %	n=2,888 %	n=2,888 %	n=2,888 %	n=2,888 %	n=2,888 %	n=2,888 %
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	53.7	56.1	13.0	17.8	3.3	5.3	9.7
2	66.6	70.8	18.0	28.2	5.7	11.3	12.2
3	72.6	78.1	20.6	34.9	7.0	15.5	13.6
4	75.5	81.9	22.2	39.9	7.8	19.1	14.2
5	77.3	84.3	23.3	43.5	8.5	22.5	14.6
6	78.8	86.4	23.6	45.0	9.1	26.0	14.8
7	79.3	87.3	24.0	46.7	9.3	27.2	14.8
8	79.9	88.3	24.2	47.7	9.7	30.5	14.8
9	80.3	89.0	24.3	48.5	9.9	33.0	14.9
10	80.5	89.2	24.5	49.6	10.1	34.4	14.9
11	80.6	89.6	24.6	50.8	10.3	36.3	14.9
12	80.6	89.6	24.6	50.8	10.3	36.3	14.9
13	80.9		25.0	53.6	10.3	36.3	14.9
14	80.9		25.0	53.6	10.3	36.3	14.9
15	80.9		25.0	53.6	10.3	36.3	14.9



Type of progression	
<i>cont'd</i>	NOS (1-KM) n=2,888
Years	%
0	0.0
1	15.2
2	21.3
3	26.4
4	28.8
5	30.9
6	32.0
7	32.0
8	32.0
9	33.0
10	33.0
11	33.0
12	33.0
13	33.0
14	33.0
15	33.0

**Table 5b.** Time to first progression of patients with liver cancer for period 1998-2014 (N=2,888).

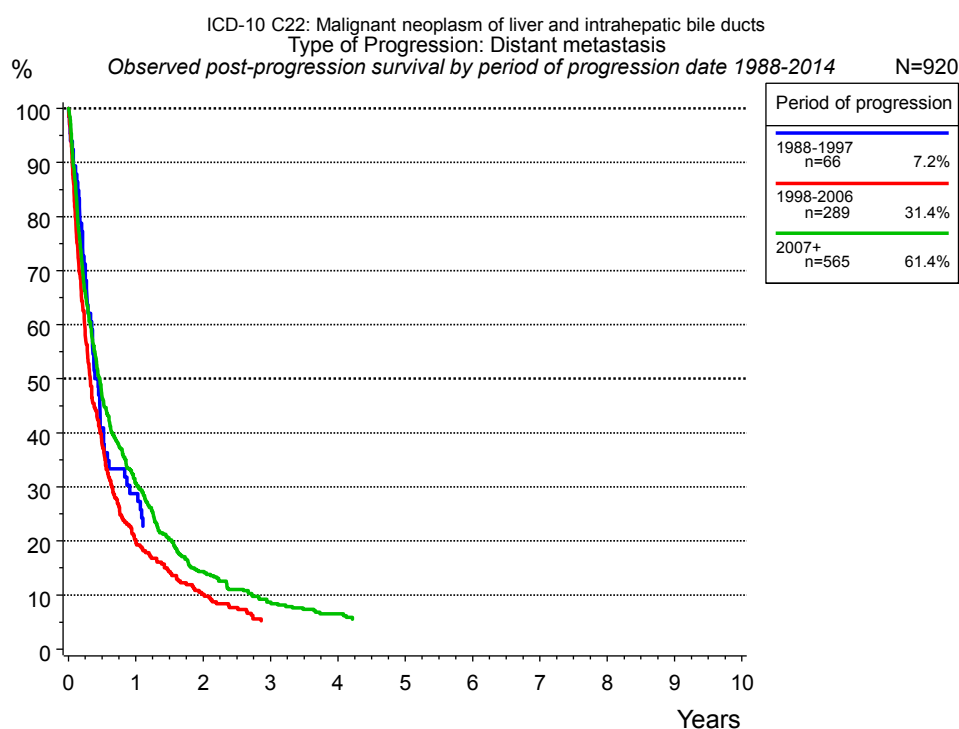


**Figure 5c.** Observed post-progression survival of 1,325 patients with liver cancer diagnosed between 1998 and 2014. These 1,325 patients with documented progression events during their course of disease represent 38.7 % of the totally 3,425 evaluated cases (incl. M1, n=537, 15.7 %). Patients with cancer relapse documented via death certificates only were excluded (n=1,355, 39.6 %). Multiple progression types on different sites are included in the evaluation even when not occurring synchronously. The NOS (not otherwise specified) class is included under the condition, that it is the one and only progression type during the course of disease.

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.

Years	Type of progression			
	Any type n=1,325 %	Distant metastasis n=847 %	Locoregional relapse n=246 %	NOS n=396 %
0	100.0	100.0	100.0	100.0
1	33.6	26.5	55.9	36.7
2	19.9	12.6	38.6	23.9
3	12.8	7.4	26.1	14.4
4	10.0	5.1	21.5	11.1
5	7.5	3.5	15.3	9.2
6	6.7			
7	5.2			

**Table 5d.** Observed post-progression survival of patients with liver cancer for period 1998-2014 (N=1,325).



**Figure 5e.** Observed post-progression (distant metastasis) survival of 920 patients with liver cancer diagnosed between 1988 and 2014 by period of progression.

Years	Period of progression		
	1988-1997 n=66	1998-2006 n=289	2007+ n=565
0	100.0	100.0	100.0
1	28.8	19.6	30.6
2		10.1	14.3
3		5.2	8.7
4			6.5

**Table 5f.** Observed post-progression (distant metastasis) survival of patients with liver cancer for period 1988-2014 by period of progression (N=920).

## 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

Munich Cancer Registry. Survival ICD-10 C22: Liver cancer [Internet]. 2016 [updated 2016 Apr 11; cited 2016 Jun 1]. Available from: [http://www.tumorregister-muenchen.de/en/facts/surv/sC22\\_\\_E-ICD-10-C22-Liver-cancer-survival.pdf](http://www.tumorregister-muenchen.de/en/facts/surv/sC22__E-ICD-10-C22-Liver-cancer-survival.pdf)

## Copyright

The content of the public web site provided by the Munich Cancer Registry is available worldwide and free of charge. All documents are free to download, utilize, copy, print-out and distribute, providing that the MCR is referenced.

## Disclaimer

The Munich Cancer Registry reserves the right to not be responsible for the topicality, correctness, completeness or quality of the information provided. Liability claims regarding damage caused by the use of any information provided, including any kind of information which is incomplete or incorrect, will therefore be rejected.

# Index of figures and tables

Fig./Tbl.	Page
1a Relative survival by period of diagnosis (chart)	2
1b Survival by period of diagnosis (table)	2
2a Survival by gender (chart)	3
2b Survival by gender (table)	3
2c Conditional survival by gender (chart)	4
2d Conditional survival by gender (table)	4
3a Relative survival by age category (chart)	5
3b Survival by age category (table)	5
4a Relative survival by UICC (chart)	6
4b Survival by UICC (table)	6
4c Relative survival by TNM staging (chart)	7
4d Survival by TNM staging (table)	7
5a Time to first progression (chart)	8
5b Time to first progression (table)	8
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