

# Munich Cancer Registry



- Incidence and Mortality
- Selection Matrix
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- *Deutsch*

## ICD-10 C25: Pancreas cancer

### Survival

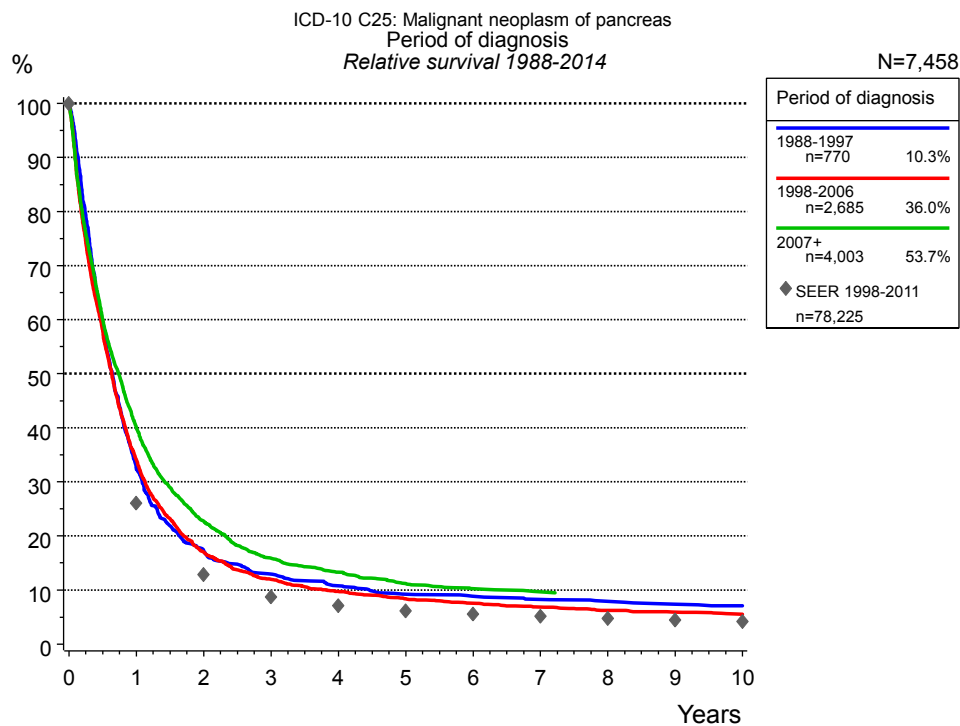
Year of diagnosis	1988-1997	1998-2014
Patients	867	11,685
Diseases	867	11,687
Cases evaluated	774	6,775
Creation date	04/11/2016	
Export date	12/23/2015	
Population	4.64 m	



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Germany

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

[http://www.tumorregister-muenchen.de/en/facts/surv/sC25\\_\\_E-ICD-10-C25-Pancreas-cancer-survival.pdf](http://www.tumorregister-muenchen.de/en/facts/surv/sC25__E-ICD-10-C25-Pancreas-cancer-survival.pdf)



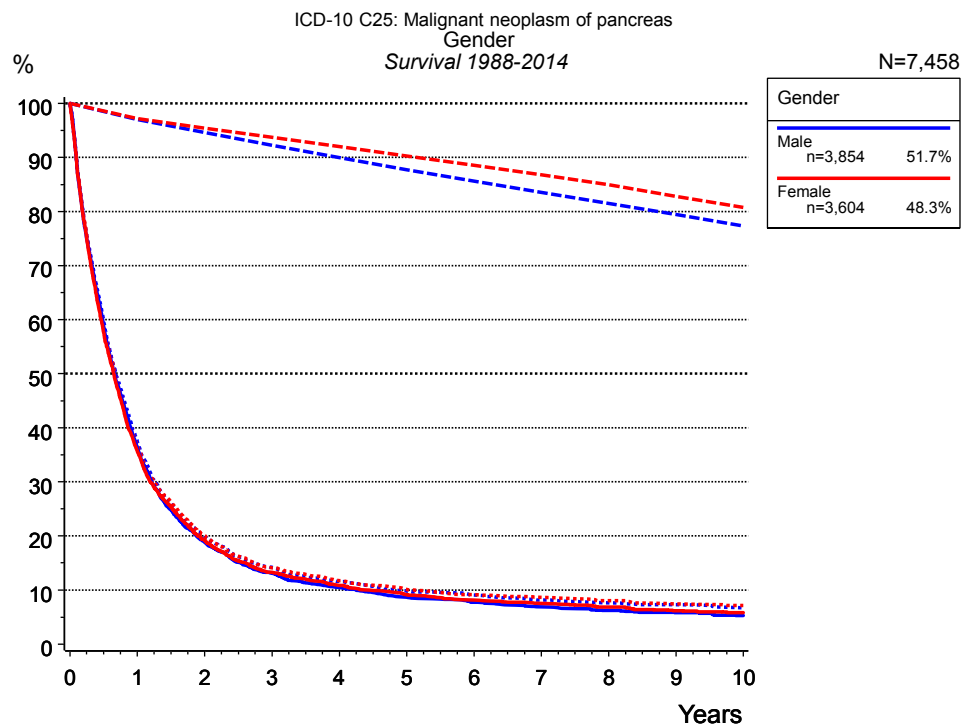
**Figure 1a.** Relative survival of patients with pancreas cancer by period of diagnosis. Included in the evaluation are 7,458 cases diagnosed between 1988 and 2014.

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=770		1998-2006 n=2,685		2007+ n=4,003	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	31.6	32.4	33.2	34.1	39.0	40.1
2	16.5	17.3	16.1	17.0	21.7	22.7
3	12.2	12.9	11.2	12.0	14.8	15.9
4	10.0	10.8	8.8	9.7	12.1	13.3
5	8.3	9.2	7.5	8.4	10.0	11.2
6	7.7	8.8	6.6	7.5	8.9	10.2
7	7.2	8.3	5.8	6.8	8.3	9.7
8	6.7	7.9	5.2	6.2		
9	6.0	7.4	4.8	5.9		
10	5.7	7.1	4.4	5.5		

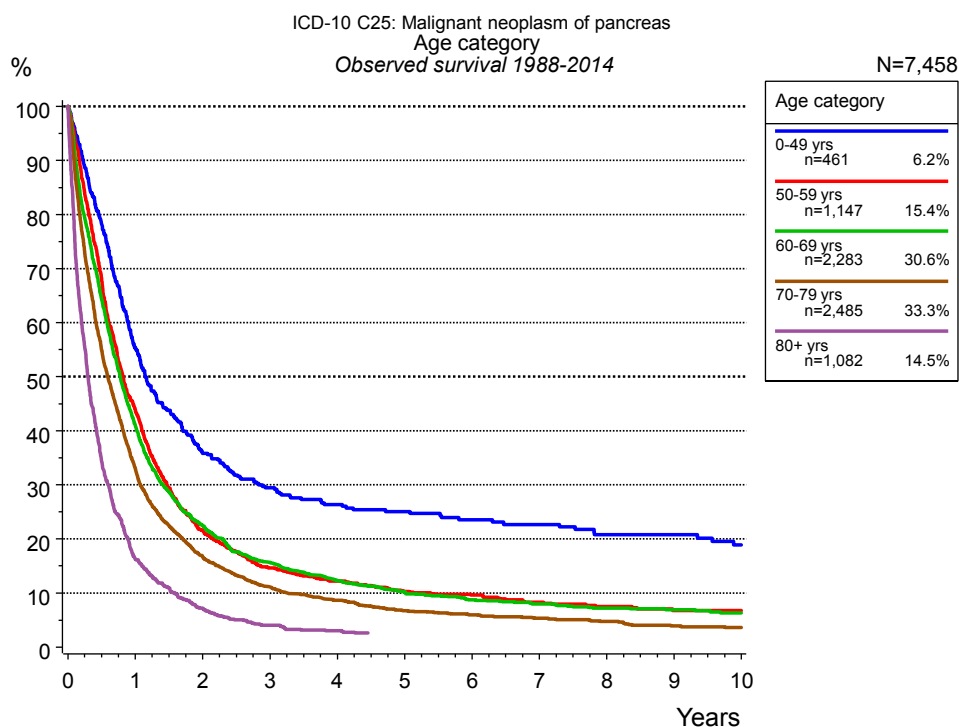
**Table 1b.** Observed (obs.) and relative (rel.) survival of patients with pancreas cancer by period of diagnosis for period 1988-2014 (N=7,458).



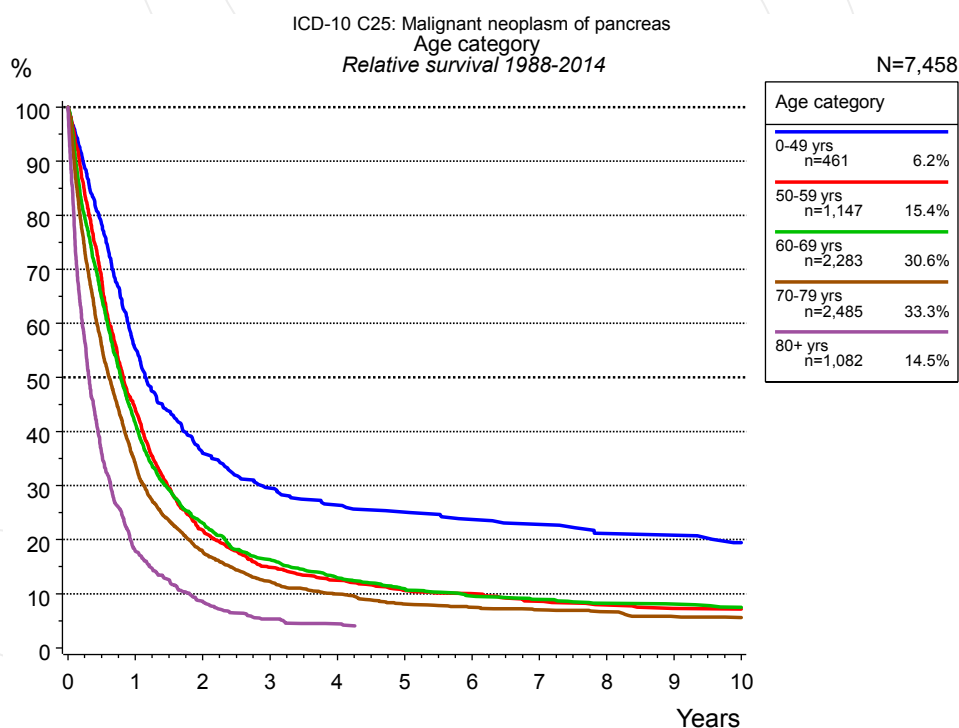
**Figure 2a.** Survival of patients with pancreas cancer by gender. Included in the evaluation are 7,458 cases diagnosed between 1988 and 2014.

Years	Gender			
	Male n=3,854		Female n=3,604	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	36.5	37.5	35.7	36.6
2	18.8	19.9	19.2	20.1
3	13.1	14.2	13.3	14.1
4	10.4	11.6	10.8	11.8
5	8.7	9.8	9.2	10.1
6	7.8	9.0	8.1	9.1
7	6.8	8.2	7.5	8.6
8	6.2	7.6	6.8	8.0
9	5.8	7.3	6.2	7.4
10	5.2	6.7	5.8	7.2

**Table 2b.** Observed (obs.) and relative (rel.) survival of patients with pancreas cancer by gender for period 1988-2014 (N=7,458).



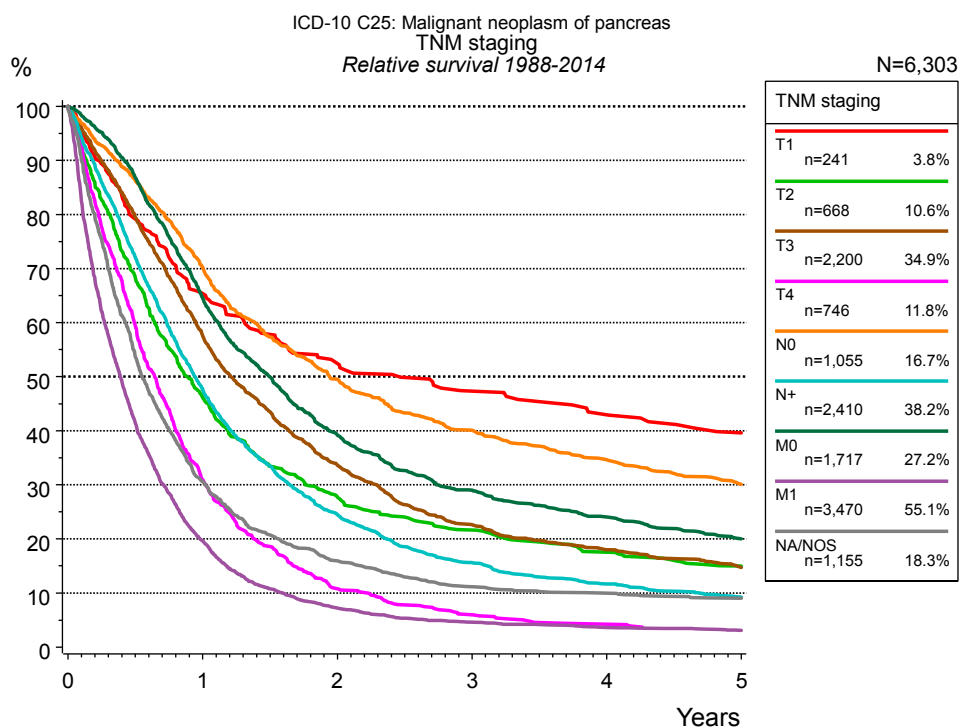
**Figure 3a.** Observed survival of patients with pancreas cancer by age category. Included in the evaluation are 7,458 cases diagnosed between 1988 and 2014.



**Figure 3b.** Relative survival of patients with pancreas cancer by age category. Included in the evaluation are 7,458 cases diagnosed between 1988 and 2014.

Years	Age category									
	0-49 yrs n=461		50-59 yrs n=1,147		60-69 yrs n=2,283		70-79 yrs n=2,485		80+ yrs n=1,082	
	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	55.1	55.3	43.9	44.1	41.0	41.5	33.1	34.0	16.2	17.8
2	35.8	36.0	21.6	21.8	22.5	23.1	16.7	17.8	7.2	8.6
3	29.5	29.5	14.6	14.9	15.7	16.3	11.1	12.3	4.0	5.3
4	26.4	26.4	12.2	12.5	12.2	13.0	8.7	9.9	3.0	4.4
5	25.1	25.1	10.3	10.6	10.2	10.9	6.7	8.1		
6	23.5	23.7	9.6	10.0	8.7	9.6	6.0	7.5		
7	22.7	22.8	8.3	8.6	8.0	8.9	5.3	7.0		
8	20.8	21.1	7.5	7.9	7.2	8.3	4.8	6.7		
9	20.8	20.8	6.8	7.3	6.9	8.1	3.9	5.8		
10	18.9	19.4	6.8	7.1	6.3	7.5	3.6	5.5		

**Table 3c.** Observed (obs.) and relative (rel.) survival of patients with pancreas cancer by age category for period 1988-2014 (N=7,458).

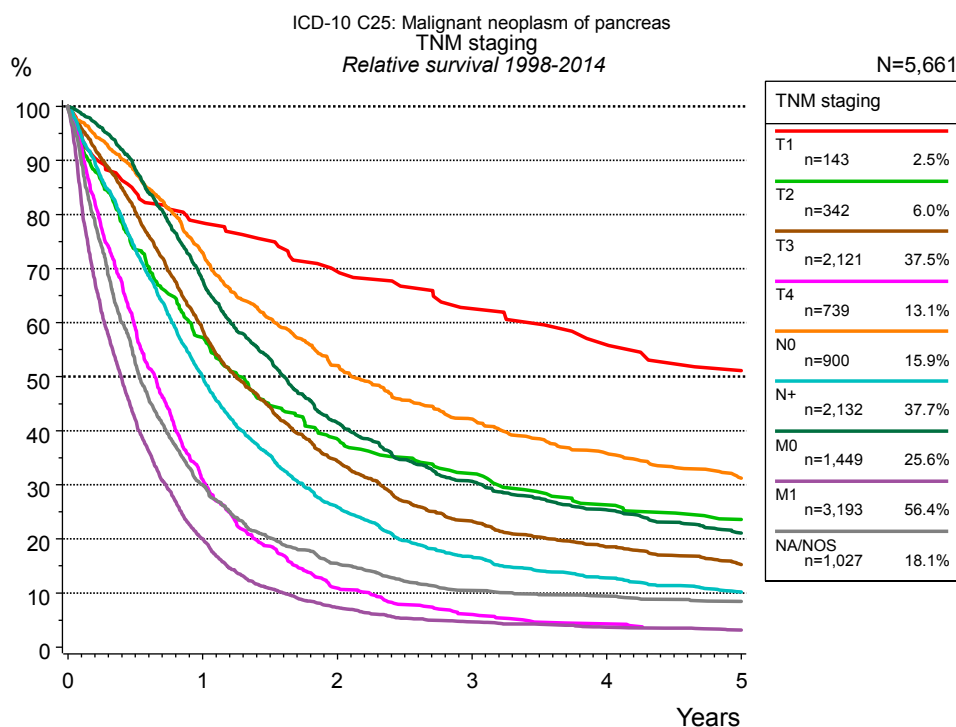


**Figure 4a.** Relative survival of patients with pancreas cancer by TNM staging. For 6,323 of 7,458 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 6,303 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 1,155 patients with missing values regarding TNM staging (15.5 % of 7,458 patients, the percent values of all other categories are related to n=6,303).

TNM staging														
Years	T1 n=241		T2 n=668		T3 n=2,200		T4 n=746		N0 n=1,055		N+ n=2,410		M0 n=1,717	
	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	64.1	65.4	45.1	46.1	56.5	57.6	30.2	31.0	68.6	70.2	46.7	47.6	63.1	64.5
2	51.1	52.4	26.7	27.7	32.3	33.6	10.4	10.8	47.4	49.5	23.5	24.5	37.7	39.2
3	44.7	47.3	20.5	21.6	21.2	22.7	5.8	6.0	37.7	40.1	14.7	15.6	27.2	29.0
4	40.1	43.0	16.4	17.5	16.5	18.0	4.1	4.3	31.8	34.6	10.8	11.7	22.1	24.1
5	35.9	39.6	13.7	15.0	13.3	14.7			27.1	30.1	8.4	9.3	18.1	20.0

TNM staging				
Years	M1 n=3,470		NA/NOS n=1,155	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	19.1	19.6	29.3	30.6
2	6.9	7.2	14.8	15.9
3	4.3	4.6	10.1	11.2
4	3.3	3.6	8.8	10.0
5	2.8	3.1	7.8	9.0

**Table 4b.** Observed (obs.) and relative (rel.) survival of patients with pancreas cancer by TNM staging for period 1988-2014 (N=6,303).

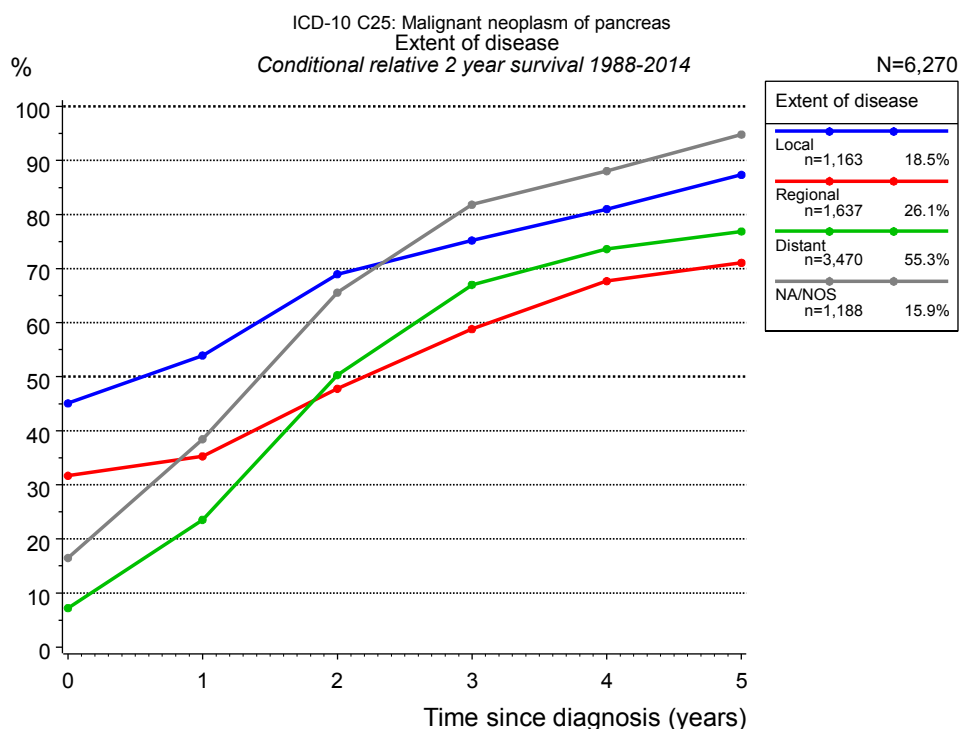


**Figure 4c.** Relative survival of patients with pancreas cancer by TNM staging. For 5,678 of 6,688 cases diagnosed between 1998 and 2014 valid data could be obtained for this item. For a total of 5,661 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 1,027 patients with missing values regarding TNM staging (15.4 % of 6,688 patients, the percent values of all other categories are related to n=5,661).

TNM staging														
Years	T1 n=143		T2 n=342		T3 n=2,121		T4 n=739		N0 n=900		N+ n=2,132		M0 n=1,449	
	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	77.5	78.5	56.2	57.3	57.6	58.6	30.2	31.0	71.4	72.9	49.0	50.0	66.5	67.9
2	67.5	69.5	37.0	38.5	33.0	34.4	10.5	10.9	49.9	52.1	24.9	25.9	39.8	41.5
3	59.4	62.6	30.5	32.0	21.8	23.3	5.9	6.1	39.6	42.1	15.7	16.7	28.8	30.7
4	52.9	55.9	24.7	26.3	17.0	18.6	4.1	4.3	32.9	35.8	11.8	12.8	23.3	25.4
5	47.2	51.1	21.7	23.6	13.8	15.2			28.2	31.2	9.3	10.2	19.0	21.1

TNM staging				
Years	M1 n=3,193		NA/NOS n=1,027	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	19.4	20.0	28.7	30.0
2	7.0	7.3	14.3	15.4
3	4.4	4.7	9.5	10.5
4	3.4	3.7	8.3	9.4
5	2.9	3.2	7.3	8.4

**Table 4d.** Observed (obs.) and relative (rel.) survival of patients with pancreas cancer by TNM staging for period 1998-2014 (N=5,661).



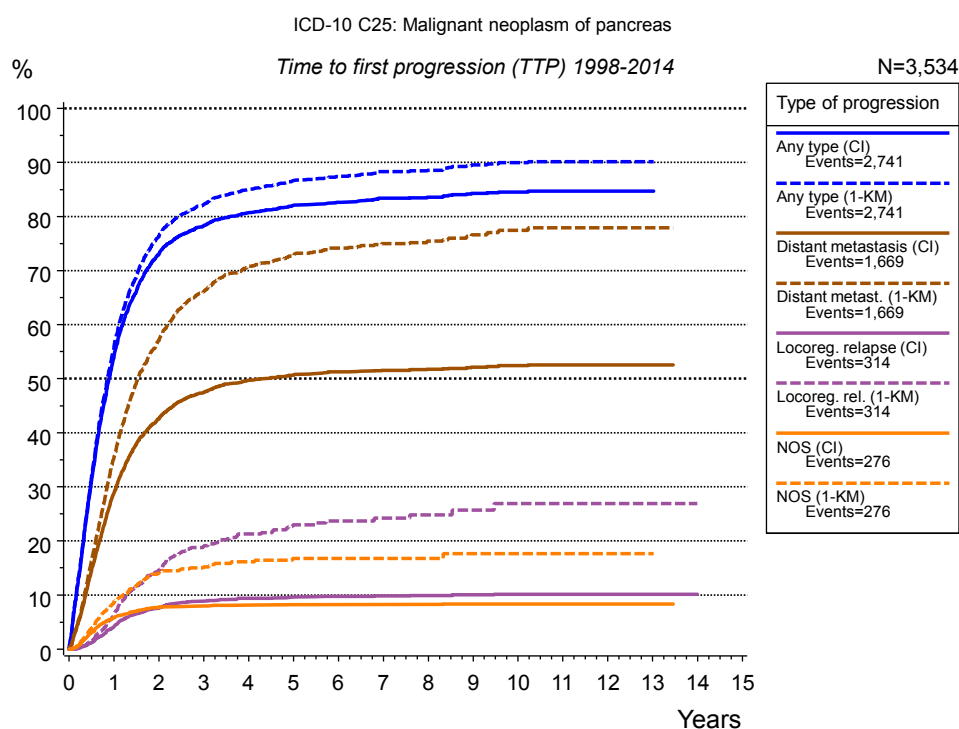
**Figure 4e.** Conditional relative 2-year survival of patients with pancreas cancer by extent of disease. For 6,323 of 7,458 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 6,270 cases an evaluable classification was established. The grey line represents the subgroup of 1,188 patients with missing values regarding extent of disease (15.9% of 7,458 patients, the percent values of all other categories are related to n=6,270).

Years	Extent of disease							
	Local		Regional		Distant		NA/NOS	
	n	Cond. surv. % 2 yrs	n	Cond. surv. % 2 yrs	n	Cond. surv. % 2 yrs	n	Cond. surv. % 2 yrs
0	1,163	45.1	1,637	31.7	3,470	7.2	1,188	16.5
1	706	53.9	859	35.3	624	23.5	343	38.5
2	422	69.0	413	47.8	197	50.3	167	65.6
3	290	75.2	231	58.8	111	67.0	113	81.8
4	218	81.0	141	67.7	75	73.6	94	88.0
5	165	87.4	92	71.1	55	76.9	78	94.8

**Table 4f.** Conditional relative 2-year survival of patients with pancreas cancer by extent of disease for period 1988-2014 (N=6,270).

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 4c). 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 extent of disease="Local", who are alive at least 3 years after cancer diagnosis, the conditional relative 2-year survival rate is 75.2% (n=290).



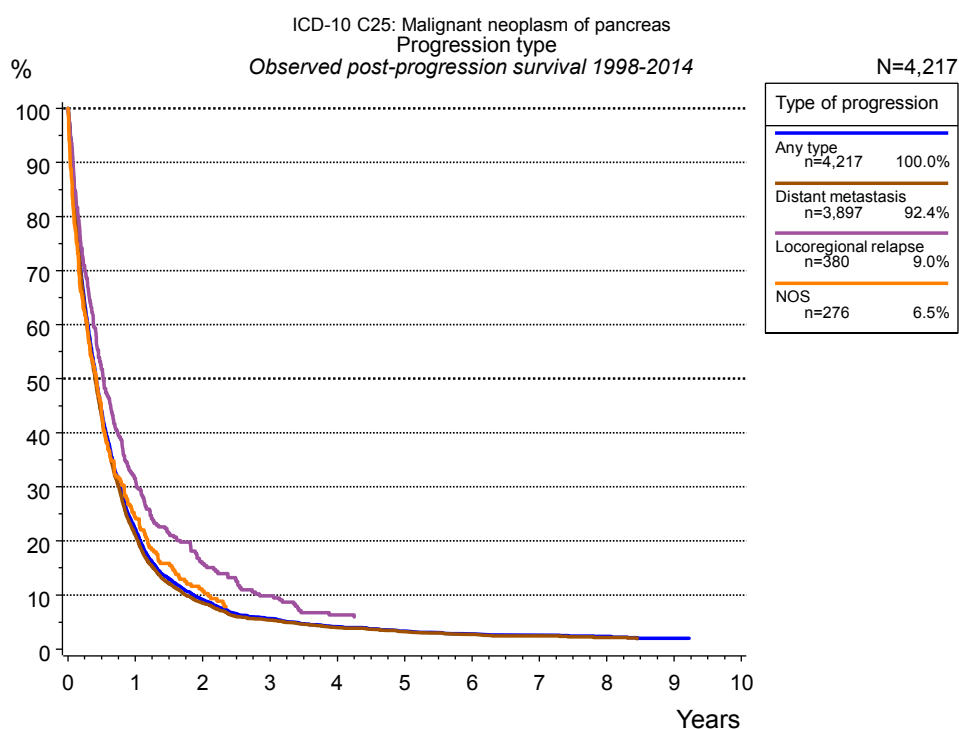


**Figure 5a.** Time to first progression of 3,534 patients with pancreas cancer diagnosed between 1998 and 2014 (M0 only in solid cancers) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency 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=3,534 %	n=3,534 %	n=3,534 %	n=3,534 %	n=3,534 %	n=3,534 %	n=3,534 %
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	54.0	55.7	28.9	35.5	4.2	6.4	5.8
2	73.0	76.3	42.6	57.1	7.7	14.6	7.7
3	78.2	82.2	47.4	66.0	8.9	19.0	8.0
4	80.7	85.1	49.8	70.8	9.4	21.3	8.2
5	82.1	86.7	50.7	72.8	9.7	23.0	8.2
6	82.6	87.4	51.2	74.1	9.8	23.7	8.2
7	83.4	88.3	51.6	75.0	9.8	24.2	8.2
8	83.5	88.5	51.7	75.4	9.9	24.9	8.2
9	84.2	89.6	52.1	76.7	10.0	25.7	8.3
10	84.5	89.9	52.4	77.5	10.2	27.0	8.3
11	84.7	90.2	52.6	78.0	10.2	27.0	8.3
12	84.7	90.2	52.6	78.0	10.2	27.0	8.3
13	84.7	90.2	52.6	78.0	10.2	27.0	8.3
14	84.7	90.2	52.6	78.0	10.2	27.0	8.3
15	84.7	90.2	52.6	78.0			8.3

Type of progression	
<i>cont'd</i>	NOS (1-KM) n=3,534
Years	%
0	0.0
1	8.6
2	14.1
3	15.2
4	16.1
5	16.8
6	16.8
7	16.8
8	16.8
9	17.7
10	17.7
11	17.7
12	17.7
13	17.7
14	17.7
15	17.7

**Table 5b.** Time to first progression of patients with pancreas cancer for period 1998-2014 (N=3,534).

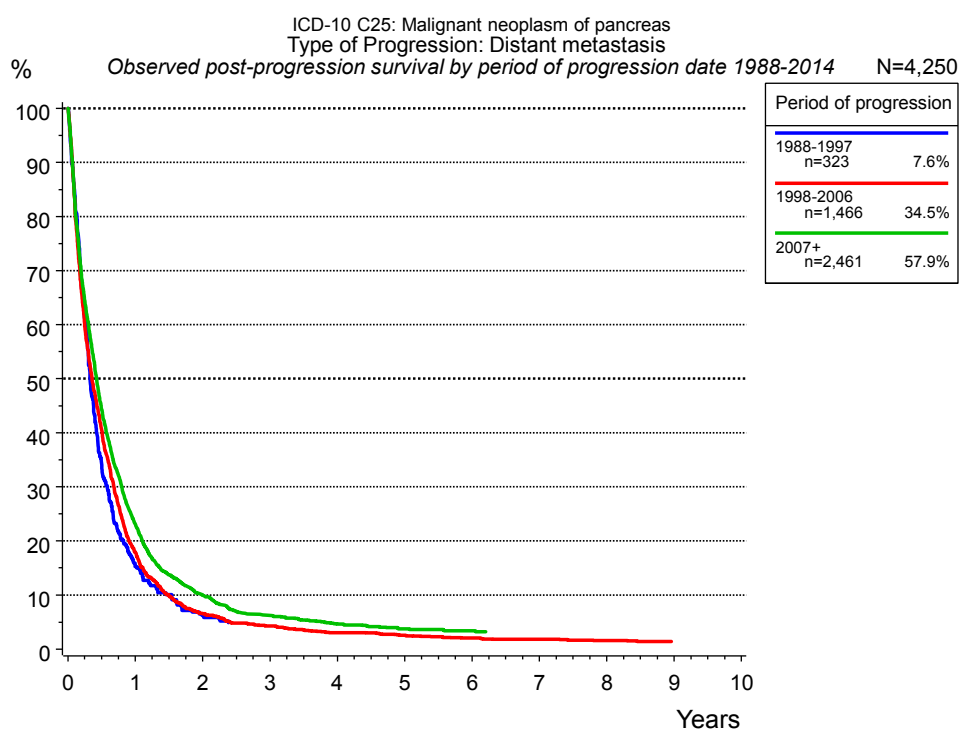


**Figure 5c.** Observed post-progression survival of 4,217 patients with pancreas cancer diagnosed between 1998 and 2014. These 4,217 patients with documented progression events during their course of disease represent 63.3% of the totally 6,657 evaluated cases (incl. M1, n=3,123, 46.9%). Patients with cancer relapse documented via death certificates only were excluded (n=1,647, 24.7%). 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=4,217 %	Distant metastasis n=3,897 %	Locoregional relapse n=380 %	NOS n=276 %
0	100.0	100.0	100.0	100.0
1	22.3	21.1	31.6	24.4
2	9.1	8.5	15.8	10.7
3	5.6	5.4	9.8	
4	4.1	3.9	6.3	
5	3.3	3.2		
6	2.8	2.7		
7	2.6	2.4		
8	2.3	2.2		
9	2.0	1.9		
10	2.0	1.9		

**Table 5d.** Observed post-progression survival of patients with pancreas cancer for period 1998-2014 (N=4,217).



**Figure 5e.** Observed post-progression (distant metastasis) survival of 4,250 patients with pancreas cancer diagnosed between 1988 and 2014 by period of progression.

Years	Period of progression		
	1988-1997 n=323	1998-2006 n=1,466	2007+ n=2,461
	%	%	%
0	100.0	100.0	100.0
1	15.3	18.0	23.1
2	6.2	6.6	10.0
3		4.3	6.2
4		3.1	4.6
5		2.5	3.8
6		2.0	3.4
7		1.8	3.2
8		1.6	3.2
9		1.4	
10		1.4	

**Table 5f.** Observed post-progression (distant metastasis) survival of patients with pancreas cancer for period 1988-2014 by period of progression (N=4,250).

## 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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