

Munich Cancer Registry



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ICD-10 C16: Stomach cancer

Survival

Year of diagnosis	1988-1997	1998-2020
Patients	2,569	16,717
Diseases	2,571	16,795
Cases evaluated	2,291	12,409
Creation date	04/15/2022	
Database export	12/20/2021	
Population	4.92 m	



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

https://www.tumorregister-muenchen.de/en/facts/surv/sC16__E-ICD-10-C16-Stomach-cancer-survival.pdf

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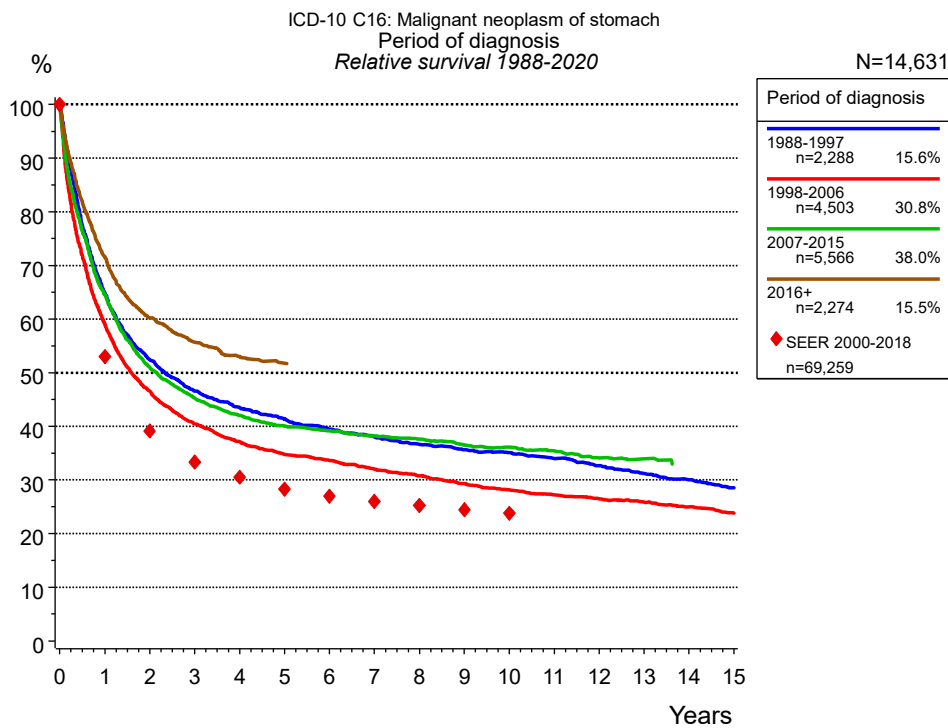


Figure 1a. Relative survival of patients with stomach cancer by period of diagnosis. Included in the evaluation are 14,631 cases diagnosed between 1988 and 2020.

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 2018, 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=2,288		1998-2006 n=4,503		2007-2015 n=5,566		2016+ n=2,274		
	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
1	62.3	64.8	56.4	59.1	62.0	64.5	69.2	71.6	
2	48.7	52.4	42.9	46.6	47.6	51.0	56.6	60.2	
3	41.9	46.6	36.0	40.4	41.0	45.3	50.8	55.7	
4	37.9	43.5	32.0	37.1	37.0	42.0	47.0	53.0	
5	34.9	41.3	28.9	34.8	34.2	40.0	44.8	51.8	
6	32.3	39.5	27.0	33.6	32.4	39.2			
7	30.1	38.0	24.8	32.0	30.6	38.2			
8	28.1	36.6	23.0	30.8	29.2	37.6			
9	26.5	35.7	21.2	29.3	27.4	36.5			
10	25.3	35.1	19.6	28.2	26.2	36.1			
11	23.7	34.0	18.3	27.2	24.8	35.4			
12	22.1	32.7	17.2	26.5	22.9	34.1			
13	20.4	31.2	16.2	25.9	21.8	33.9			
14	19.0	30.0	15.1	24.9					
15	17.5	28.5	13.8	23.8					
Median	1.9		1.4		1.8		3.2		

Table 1b. Observed (obs.) and relative (rel.) survival of patients with stomach cancer by period of diagnosis for period 1988-2020 (N=14,631).

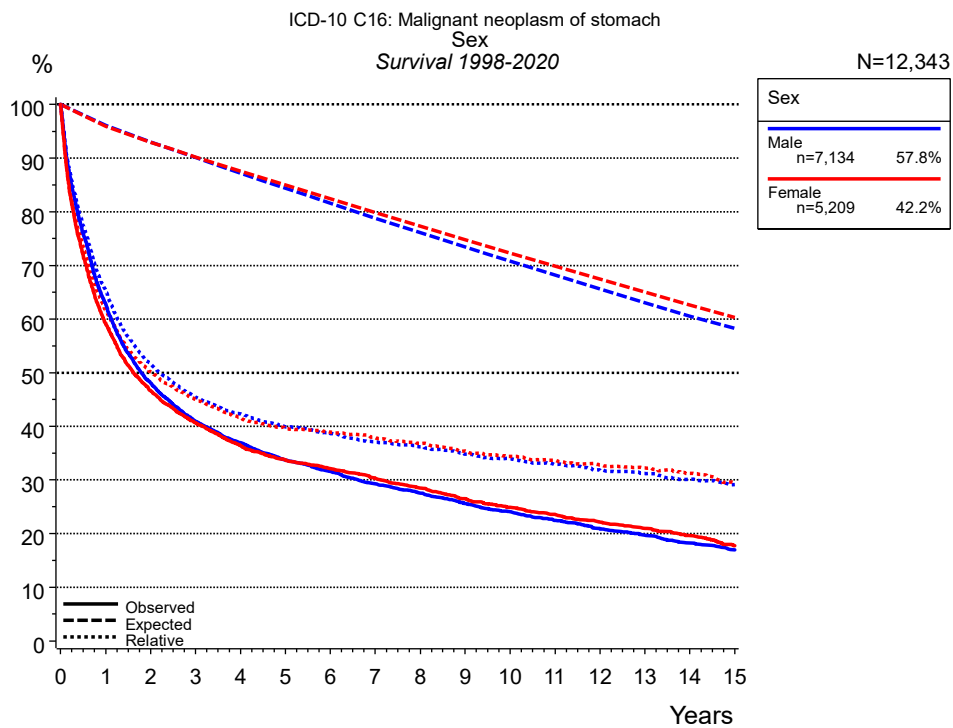


Figure 2a. Survival of patients with stomach cancer by sex. Included in the evaluation are 12,343 cases diagnosed between 1998 and 2020.

Years	Sex			
	Male n=7,134		Female n=5,209	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	62.8	65.4	59.2	61.7
2	48.1	51.7	46.6	50.2
3	41.0	45.4	40.6	45.0
4	36.9	42.3	36.4	41.6
5	33.7	39.9	33.7	39.7
6	31.6	38.7	32.1	38.9
7	29.3	37.1	30.3	37.9
8	27.6	36.2	28.5	36.8
9	25.6	34.8	26.5	35.4
10	24.1	34.0	24.9	34.4
11	22.5	33.0	23.6	33.7
12	20.9	31.8	22.1	32.8
13	19.7	31.2	20.9	32.2
14	18.3	30.1	19.6	31.2
15	17.0	29.1	17.8	29.4
Median	1.8		1.6	

Table 2b. Observed (obs.) and relative (rel.) survival of patients with stomach cancer by sex for period 1998-2020 (N=12,343).

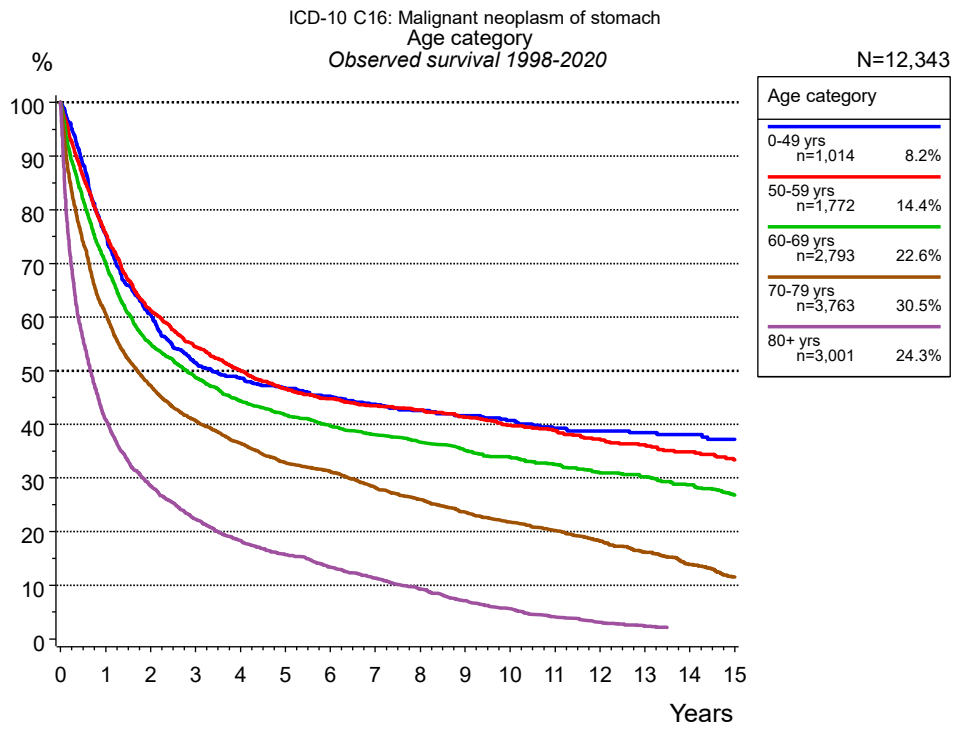


Figure 3a. Observed survival of patients with stomach cancer by age category. Included in the evaluation are 12,343 cases diagnosed between 1998 and 2020.

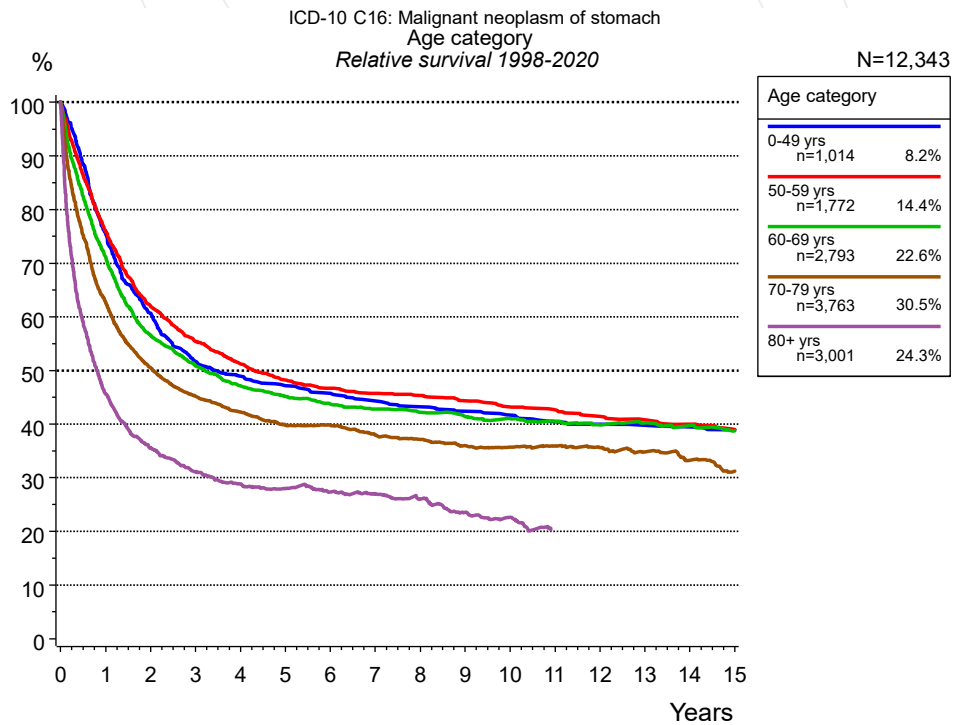


Figure 3b. Relative survival of patients with stomach cancer by age category. Included in the evaluation are 12,343 cases diagnosed between 1998 and 2020.

Years	Age category									
	0-49 yrs n=1,014		50-59 yrs n=1,772		60-69 yrs n=2,793		70-79 yrs n=3,763		80+ yrs n=3,001	
	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	75.3	75.5	75.5	76.0	70.2	71.2	60.7	62.7	40.8	45.7
2	60.6	60.7	61.2	61.9	55.0	56.5	47.2	50.5	28.5	35.6
3	51.5	51.7	54.4	55.4	48.7	50.9	40.6	45.2	22.3	31.1
4	48.6	48.9	50.0	51.3	44.4	47.1	36.5	42.3	18.3	28.8
5	46.7	47.1	46.6	48.2	41.8	45.1	32.8	39.8	15.6	28.0
6	45.3	45.7	44.8	46.7	39.6	43.7	31.2	39.7	13.4	27.4
7	43.8	44.4	43.5	45.7	38.0	42.8	28.2	37.9	11.3	27.0
8	42.5	43.2	42.7	45.4	36.7	42.2	26.0	37.2	9.3	26.1
9	41.6	42.4	41.3	44.4	35.1	41.4	23.6	36.0	7.1	23.6
10	40.7	41.7	39.8	43.2	33.9	41.1	21.8	35.7	5.5	22.6
11	39.3	40.4	38.9	42.7	32.6	40.6	20.2	35.9	4.0	20.2
12	38.8	40.0	37.3	41.5	31.0	39.8	18.2	35.6	3.0	19.2
13	38.4	39.8	36.2	40.8	30.2	40.2	16.1	34.8	2.4	19.5
14	38.1	39.5	34.9	39.9	28.7	39.7	13.9	33.3		
15	37.2	38.9	33.3	39.0	26.8	38.7	11.5	31.2		
Median	3.3		4.0		2.8		1.7		0.7	

Table 3c. Observed (obs.) and relative (rel.) survival of patients with stomach cancer by age category for period 1998-2020 (N=12,343).

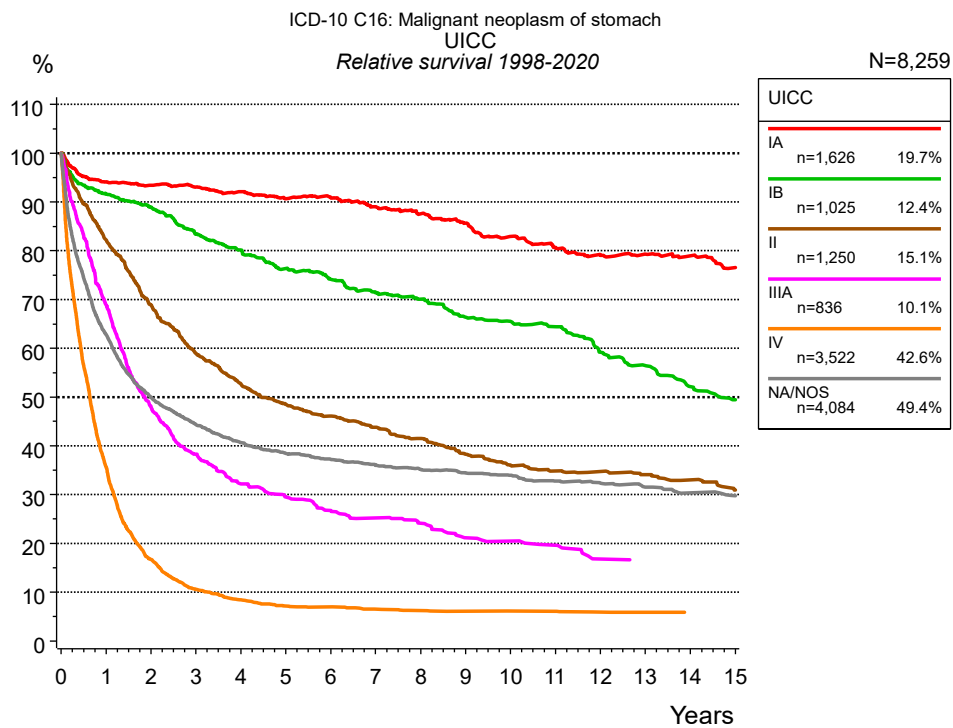


Figure 4a. Relative survival of patients with stomach cancer by UICC. For 10,166 of 12,343 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 8,259 cases an evaluable classification was established. The grey line represents the subgroup of 4,084 patients with missing values regarding UICC (33.1 % of 12,343 patients, the percent values of all other categories are related to n=8,259).

Years	UICC											
	IA n=1,626		IB n=1,025		II n=1,250		IIIA n=836		IV n=3,522		NA/NOS n=4,084	
	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	91.2	94.1	88.3	91.6	79.5	82.2	66.1	68.9	34.4	35.6	59.6	62.7
2	87.6	93.4	82.9	89.0	64.4	68.9	44.1	48.0	15.8	16.7	45.9	49.9
3	84.5	93.0	75.0	83.5	53.4	59.0	33.9	38.3	9.7	10.6	39.7	44.4
4	81.0	92.1	69.4	80.2	46.1	52.7	27.5	32.2	7.6	8.4	35.4	40.7
5	77.1	90.7	63.8	76.4	41.0	48.5	24.2	29.5	6.3	7.1	32.6	38.5
6	74.6	90.9	59.6	74.1	37.6	46.1	21.2	26.8	6.0	6.9	30.7	37.2
7	70.6	89.0	55.2	71.4	34.6	43.8	19.0	25.2	5.5	6.5	28.8	36.0
8	66.8	87.6	52.3	70.1	31.6	41.5	17.4	24.1	5.2	6.2	27.4	35.1
9	62.9	85.7	47.7	66.4	28.1	38.3	14.5	21.1	4.9	6.0	26.1	34.4
10	58.4	82.9	45.2	65.5	25.6	36.0	13.7	20.5	4.8	6.1	25.0	34.0
11	54.7	80.7	43.0	64.4	23.8	34.8	12.7	19.6	4.7	6.1	23.4	32.8
12	51.4	79.1	37.8	59.2	22.9	34.7	10.2	16.8	4.4	5.9	22.5	32.4
13	49.3	79.3	34.7	56.5	21.6	34.1			4.3	5.8	21.2	31.5
14	47.1	79.0	30.6	52.1	20.2	33.0			4.1	5.7	19.8	30.4
15	43.8	76.6	27.9	49.4	18.1	30.9					18.9	29.8
Median	12.7		8.5		3.5		1.6		0.6		1.6	

Table 4b. Observed (obs.) and relative (rel.) survival of patients with stomach cancer by UICC for period 1998-2020 (N=8,259).

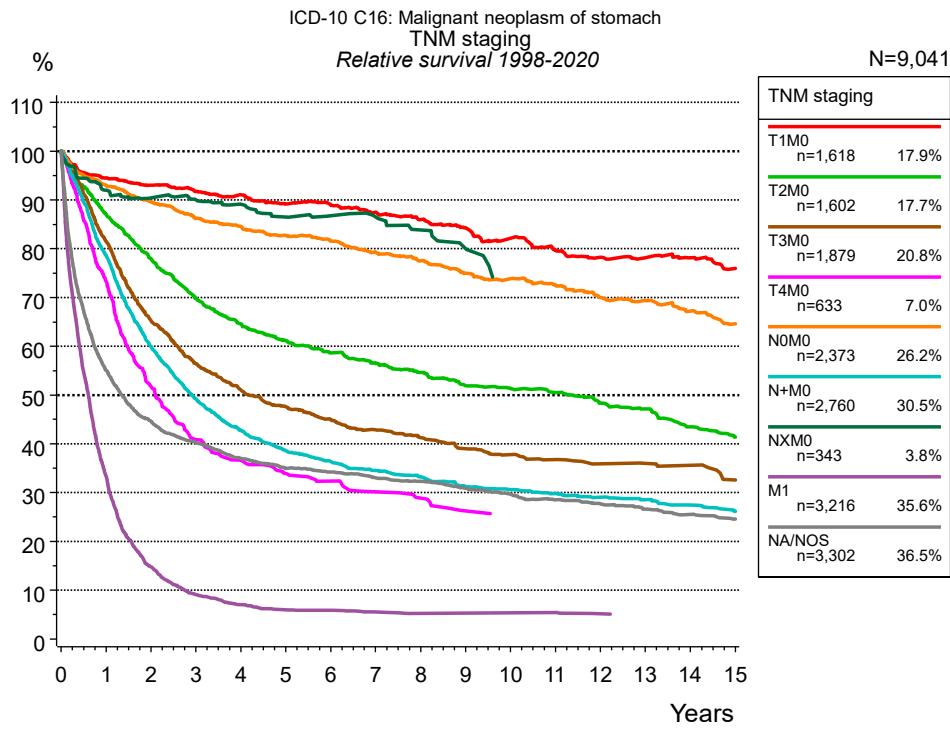


Figure 4e. Relative survival of patients with stomach cancer by TNM staging. For 10,166 of 12,343 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 9,041 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 3,302 patients with missing values regarding TNM staging (26.8 % of 12,343 patients, the percent values of all other categories are related to n=9,041).

Years	TNM staging													
	T1M0 n=1,618		T2M0 n=1,602		T3M0 n=1,879		T4M0 n=633		NOM0 n=2,373		N+M0 n=2,760		NXM0 n=343	
	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	91.7	94.5	84.2	87.1	79.1	81.5	71.1	73.3	90.0	93.0	76.3	78.6	89.5	92.0
2	87.5	93.0	73.1	78.0	61.6	65.3	48.9	51.8	84.1	89.6	56.6	59.9	85.4	90.4
3	83.7	91.7	63.5	69.9	51.9	56.5	37.5	40.9	78.4	86.2	45.3	49.3	82.8	90.0
4	80.6	91.0	56.8	64.6	45.7	51.0	33.1	36.7	74.5	84.6	38.4	42.8	79.5	89.1
5	76.5	89.2	51.9	61.1	41.5	47.6	29.7	33.9	70.5	82.7	33.7	38.6	75.2	86.5
6	73.9	89.0	48.1	58.7	38.1	45.1	27.7	32.3	67.2	81.6	30.9	36.4	73.0	86.8
7	70.3	87.5	44.8	56.5	35.2	42.9	25.3	30.2	63.1	79.3	28.5	34.5	70.9	86.5
8	66.7	86.0	41.8	54.6	33.0	41.3	23.5	28.9	59.6	77.5	26.6	33.2	66.8	83.8
9	63.1	84.3	38.4	51.9	30.2	39.0	20.6	26.3	55.7	75.0	24.3	31.2	62.5	80.1
10	59.2	82.2	36.6	51.4	28.5	37.8	19.7	25.4	52.8	73.9	23.1	30.6	55.8	73.1
11	55.3	79.8	34.8	50.5	27.0	36.8			50.0	72.6	21.8	29.8		
12	52.2	78.3	31.9	48.4	25.5	35.9			46.4	70.0	20.5	29.1		
13	49.8	78.2	30.0	47.1	24.9	36.0			44.2	69.4	19.4	28.5		
14	47.7	78.1	26.5	43.5	24.2	35.6			41.1	67.2	18.0	27.4		
15	44.6	76.0	24.2	41.4	21.5	32.6			37.9	64.6	16.6	26.1		
Median	12.8		5.5		3.3		1.9		11.0		2.5			

<i>cont'd</i>	TNM staging			
	M1 n=3,216		NA/NOS n=3,302	
	obs. %	rel. %	obs. %	rel. %
Years				
0	100.0	100.0	100.0	100.0
1	32.3	33.3	51.7	55.1
2	14.0	14.7	40.0	44.6
3	8.4	9.1	34.7	40.2
4	6.4	7.0	30.7	37.0
5	5.3	6.0	27.9	34.9
6	5.1	5.8	26.4	34.2
7	4.7	5.5	24.5	33.0
8	4.4	5.2	23.1	32.3
9	4.4	5.3	21.3	30.9
10	4.3	5.4	19.7	29.7
11	4.3	5.4	18.3	28.6
12	4.0	5.2	17.1	27.7
13	3.8	5.1	15.8	26.6
14			14.6	25.5
15			13.6	24.6
Median	0.6		1.1	

Table 4f. Observed (obs.) and relative (rel.) survival of patients with stomach cancer by TNM staging for period 1998-2020 (N=9,041).

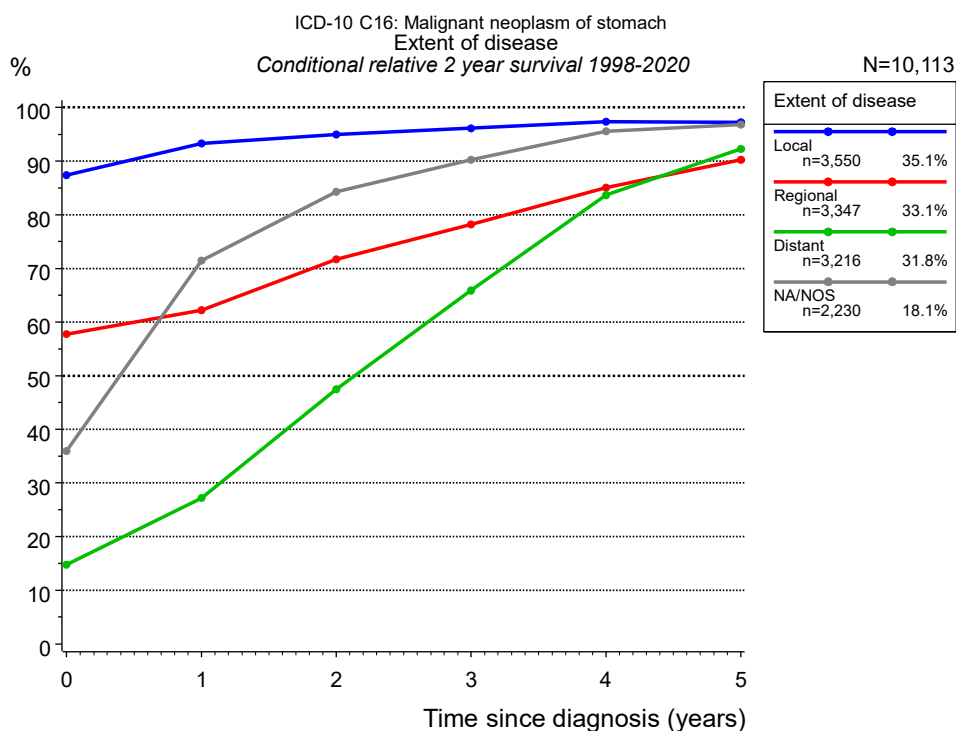


Figure 4i. Conditional relative 2-year survival of patients with stomach cancer by extent of disease. For 10,166 of 12,343 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 10,113 cases an evaluable classification was established. The grey line represents the subgroup of 2,230 patients with missing values regarding extent of disease (18.1 % of 12,343 patients, the percent values of all other categories are related to n=10,113).

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	3,550	87.4	3,347	57.8	3,216	14.7	2,230	35.9
1	2,997	93.3	2,416	62.2	1,011	27.2	915	71.5
2	2,670	95.0	1,709	71.7	423	47.5	674	84.3
3	2,375	96.1	1,300	78.2	228	65.9	562	90.2
4	2,090	97.4	1,025	85.1	149	83.6	475	95.6
5	1,832	97.2	831	90.2	112	92.3	412	96.8

Table 4j. Conditional relative 2-year survival of patients with stomach cancer by extent of disease for period 1998-2020 (N=10,113).

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 4g). 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 96.1% (n=2,375).

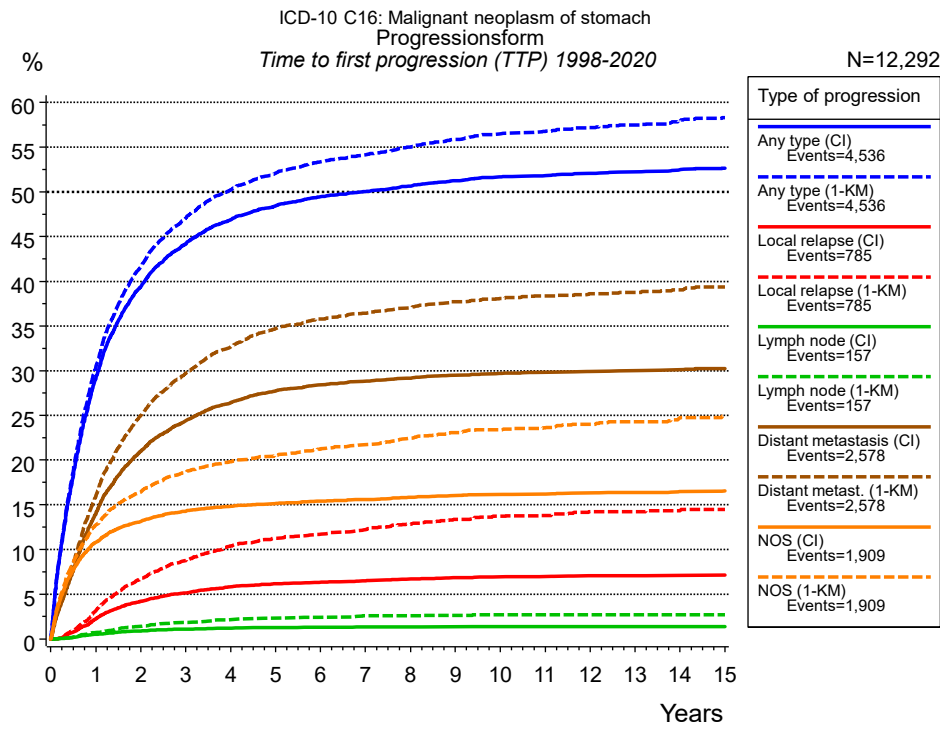


Figure 5a. Time to first progression of 12,292 patients with stomach cancer diagnosed between 1998 and 2020 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

	Type of progression						
	Any type (CI)	Any type (1-KM)	Local relapse (CI)	Local relapse (1-KM)	Lymph node (CI)	Lymph node (1-KM)	Distant metastasis (CI)
N	9,240	9,240	12,292	12,292	12,292	12,292	9,242
Events	4,529	4,529	784	784	157	157	2,577
compet.	1,813		8,193		8,689		3,545
Years	%	%	%	%	%	%	%
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	29.2	30.4	2.2	3.1	0.5	0.7	14.0
2	39.4	41.6	4.2	6.7	0.9	1.4	21.0
3	44.2	47.0	5.2	8.7	1.1	1.8	24.4
4	46.9	50.2	5.8	10.4	1.2	2.2	26.4
5	48.5	52.1	6.2	11.3	1.3	2.3	27.8
6	49.4	53.4	6.3	11.7	1.3	2.5	28.4
7	50.0	54.1	6.5	12.2	1.4	2.6	28.8
8	50.7	55.0	6.7	12.8	1.4	2.6	29.1
9	51.3	55.9	6.8	13.4	1.4	2.6	29.5
10	51.7	56.5	6.9	13.7	1.4	2.7	29.7
11	51.8	56.8	7.0	13.8	1.4	2.7	29.8
12	52.1	57.2	7.1	14.2	1.4	2.7	29.9
13	52.2	57.5	7.1	14.2	1.4	2.7	30.0
14	52.5	58.0	7.1	14.4	1.4	2.7	30.1
15	52.7	58.3	7.1	14.5	1.4	2.7	30.2

<i>cont'd</i>	Type of progression		
	Distant metast. (1- KM)	NOS (CI)	NOS (1-KM)
N	9,242	12,290	12,290
Events	2,577	1,903	1,903
compet.		7,066	
Years	%	%	%
0	0.0	0.0	0.0
1	16.0	10.8	12.7
2	25.0	13.1	16.4
3	29.7	14.3	18.6
4	32.7	14.8	19.8
5	34.7	15.1	20.5
6	35.8	15.4	21.2
7	36.4	15.6	21.8
8	37.0	15.8	22.5
9	37.7	16.0	23.1
10	38.1	16.2	23.4
11	38.4	16.2	23.6
12	38.6	16.3	24.0
13	38.8	16.4	24.3
14	39.0	16.5	24.7
15	39.3	16.5	24.9

Table 5b. Time to first progression of patients with stomach cancer for period 1998-2020 (N=12,292), also showing the total of progression events (Events) and of deaths as competing risk (compet.).

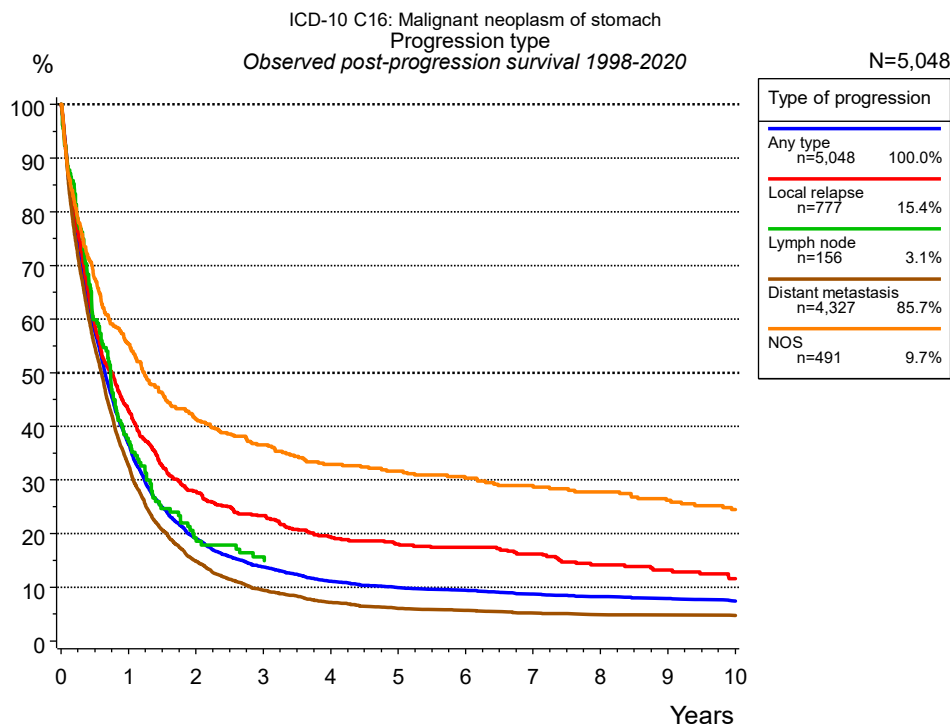


Figure 5c. Observed post-progression survival of 5,048 patients with stomach cancer diagnosed between 1998 and 2020. These 5,048 patients with documented progression events during their course of disease represent 41.1 % of the totally 12,292 evaluated cases (incl. M1, n=3,052, 24.8 %). Patients with cancer relapse documented via death certificates only were excluded (n=2,540, 20.7 %). 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=5,048 %	Local relapse n=777 %	Lymph node n=156 %	Distant metastasis n=4,327 %	NOS n=491 %
0	100.0	100.0	100.0	100.0	100.0
1	36.7	43.0	37.1	32.7	55.3
2	19.0	27.9	19.2	14.8	41.3
3	13.7	23.3	15.6	9.4	36.5
4	11.1	19.4		7.1	32.9
5	9.9	18.1		6.0	31.7
6	9.4	17.4		5.7	30.3
7	8.7	16.2		5.1	28.9
8	8.2	14.2		4.9	27.8
9	7.9	13.2		4.8	26.2
10	7.5	11.6		4.7	24.5

Table 5d. Observed post-progression survival of patients with stomach cancer for period 1998-2020 (N=5,048).

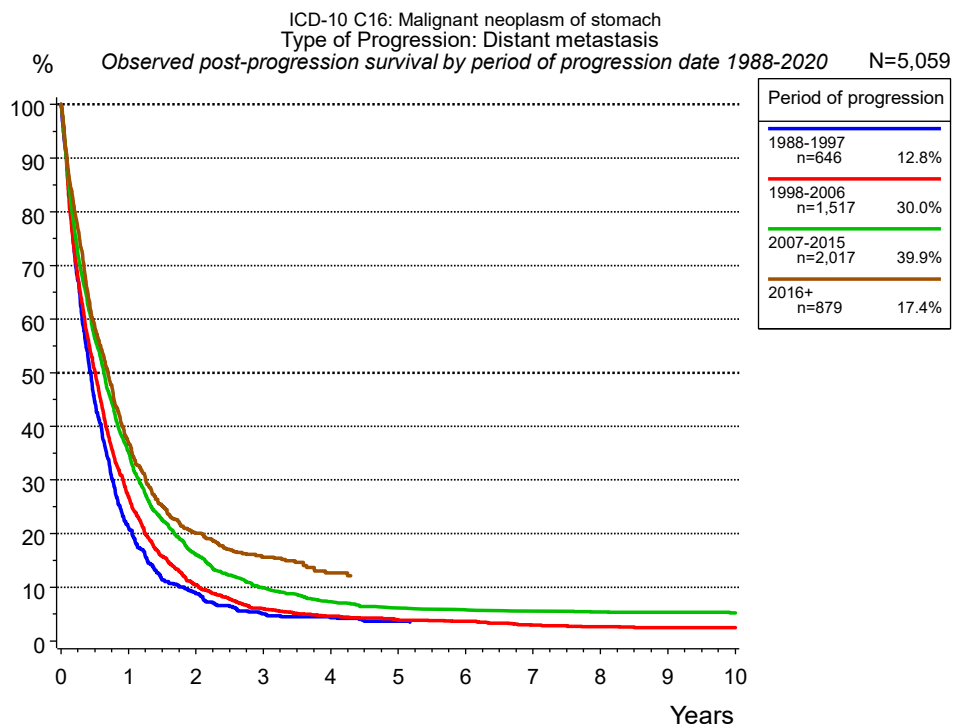


Figure 5e. Observed post-progression (distant metastasis) survival of 5,059 patients with stomach cancer diagnosed between 1988 and 2020 by period of progression.

Years	Period of progression			
	1988-1997 n=646 %	1998-2006 n=1,517 %	2007-2015 n=2,017 %	2016+ n=879 %
0	100.0	100.0	100.0	100.0
1	21.1	26.9	35.2	36.8
2	8.7	10.5	16.1	20.1
3	5.0	6.0	9.8	15.6
4	4.3	4.6	7.3	12.6
5	3.6	3.8	6.1	
6		3.6	5.7	
7		2.9	5.5	
8		2.6	5.4	
9		2.5	5.3	
10		2.5	5.2	

Table 5f. Observed post-progression (distant metastasis) survival of patients with stomach cancer for period 1988-2020 by period of progression (N=5,059).

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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