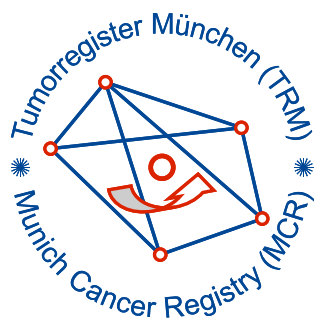


Munich Cancer Registry



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

ICD-10 C21: Anal cancer

Survival

Year of diagnosis	1988-1997	1998-2016
Patients	240	1,514
Diseases	240	1,514
Cases evaluated	224	1,181
Creation date	08/22/2018	
Export date	08/09/2018	
Population	4.81 m	



Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninstr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/surv/sC21__E-ICD-10-C21-Anal-cancer-survival.pdf

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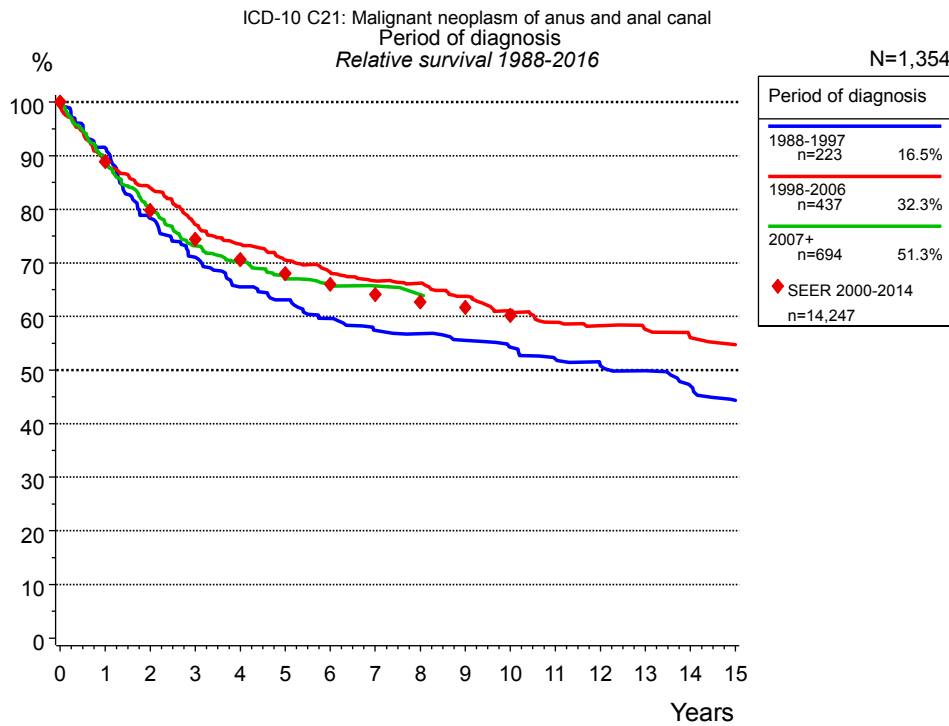


Figure 1a. Relative survival of patients with anal cancer by period of diagnosis. Included in the evaluation are 1,354 cases diagnosed between 1988 and 2016.

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=223		1998-2006 n=437		2007+ n=694	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	88.6	91.5	86.5	88.7	86.6	88.7
2	73.6	78.3	79.9	84.0	77.0	80.5
3	65.3	71.1	71.8	77.2	68.6	73.2
4	58.4	65.5	67.0	73.5	64.7	70.2
5	55.2	63.1	62.9	70.5	60.4	67.0
6	51.0	59.6	59.8	68.3	58.5	66.1
7	47.7	57.4	57.1	66.7	57.3	65.7
8	46.3	56.8	55.7	66.2	56.2	64.1
9	44.4	55.5	52.5	63.7		
10	42.0	54.3	49.3	61.1		
11	39.5	52.1	46.5	58.9		
12	37.5	50.8	45.1	58.3		
13	36.5	49.9	43.4	57.6		
14	33.5	47.1	41.4	56.0		
15	30.9	44.3	40.5	54.8		

Table 1b. Observed (obs.) and relative (rel.) survival of patients with anal cancer by period of diagnosis for period 1988-2016 (N=1,354).

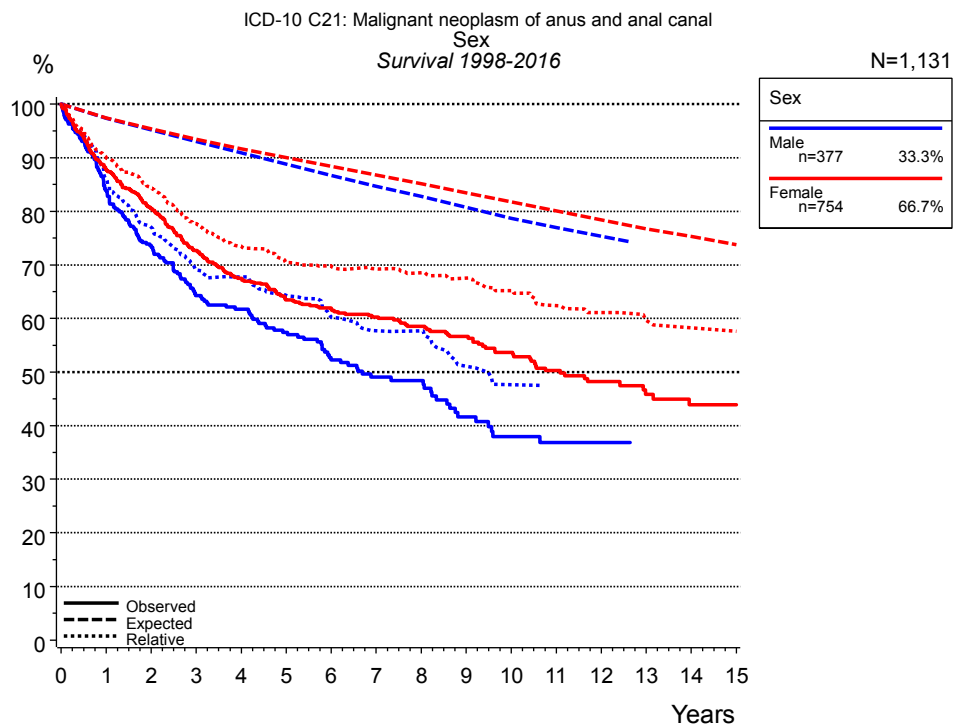


Figure 2a. Survival of patients with anal cancer by sex. Included in the evaluation are 1,131 cases diagnosed between 1998 and 2016.

Years	Sex			
	Male n=377		Female n=754	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	83.9	86.0	87.8	90.0
2	73.6	77.0	80.5	84.4
3	64.3	69.1	72.7	77.7
4	61.8	67.7	67.5	73.5
5	57.4	64.3	63.4	70.4
6	52.3	60.3	62.0	69.8
7	49.1	57.7	60.3	69.2
8	48.4	57.7	58.5	68.5
9	41.6	51.1	56.6	67.5
10	38.0	47.6	53.7	65.2
11	36.9	47.6	50.3	62.4
12	36.9	47.8	48.2	61.1
13	36.9	48.0	45.8	59.6
14			43.9	58.2
15			43.9	57.6

Table 2b. Observed (obs.) and relative (rel.) survival of patients with anal cancer by sex for period 1998-2016 (N=1,131).

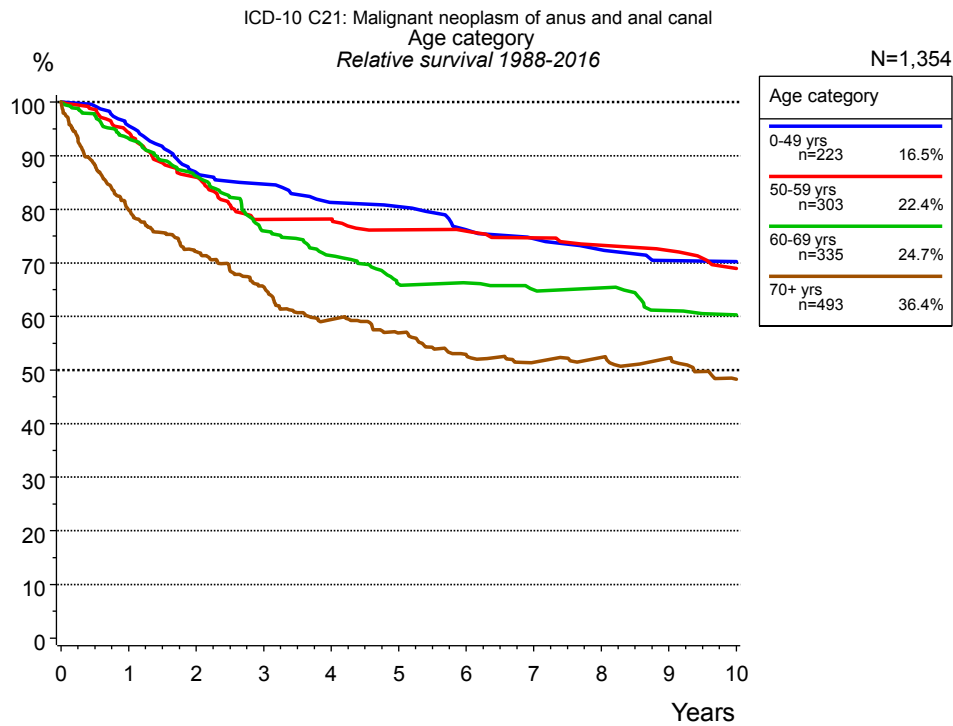


Figure 3a. Relative survival of patients with anal cancer by age category. Included in the evaluation are 1,354 cases diagnosed between 1988 and 2016.

Years	Age category							
	0-49 yrs n=223		50-59 yrs n=303		60-69 yrs n=335		70+ yrs n=493	
	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	95.8	95.6	94.1	94.3	92.3	93.2	74.9	79.9
2	86.6	86.8	85.4	86.0	84.4	86.2	63.7	72.1
3	84.6	84.7	76.9	78.1	73.3	76.0	54.5	65.5
4	80.7	81.3	76.9	78.2	68.1	71.3	46.4	59.4
5	80.0	80.5	74.2	76.2	62.1	66.0	41.7	57.0
6	75.9	76.2	73.6	76.0	61.3	66.3	36.3	52.9
7	73.6	74.5	71.9	74.7	59.3	65.0	32.9	51.4
8	71.9	72.4	69.9	73.3	58.8	65.3	31.4	52.3
9	69.0	70.4	68.4	72.3	53.8	61.1	29.1	52.2
10	69.0	70.3	64.2	69.0	52.4	60.3	24.6	48.3

Table 3b. Observed (obs.) and relative (rel.) survival of patients with anal cancer by age category for period 1988-2016 (N=1,354).

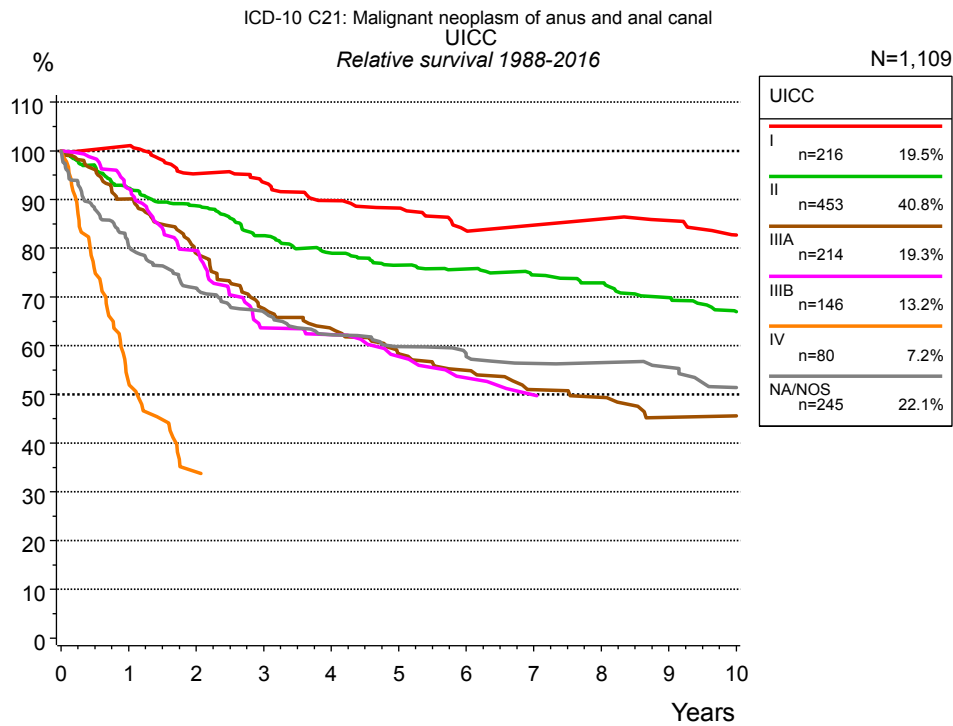


Figure 4a. Relative survival of patients with anal cancer by UICC. For 1,159 of 1,354 cases diagnosed between 1988 and 2016 valid data could be obtained for this item. For a total of 1,109 cases an evaluable classification was established. The grey line represents the subgroup of 245 patients with missing values regarding UICC (18.1 % of 1,354 patients, the percent values of all other categories are related to n=1,109).

Years	UICC											
	I n=216		II n=453		IIIA n=214		IIIB n=146		IV n=80		NA/NOS n=245	
	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	99.5	101.0	90.2	92.4	88.1	90.1	90.7	92.2	52.5	52.5	77.4	80.4
2	91.6	95.3	84.8	88.7	75.2	78.9	76.9	79.5	33.3	34.0	67.4	71.9
3	88.2	93.5	77.5	82.6	63.2	67.6	59.6	63.6			61.0	67.0
4	83.4	89.8	72.7	79.0	57.4	63.5	57.6	62.3			55.8	62.3
5	80.8	88.3	68.9	76.5	51.2	58.3	52.2	57.8			52.3	59.8
6	75.0	83.6	67.0	75.8	47.5	54.9	47.0	53.4			50.1	58.2
7	74.3	84.7	64.5	74.5	42.3	51.0	44.0	49.9			47.7	56.4
8	74.3	86.0	62.2	72.9	40.6	49.4					47.1	56.5
9	72.3	85.7	58.4	69.9	35.8	45.3					45.5	55.6
10	67.8	82.7	54.6	67.0	35.8	45.6					41.2	51.4

Table 4b. Observed (obs.) and relative (rel.) survival of patients with anal cancer by UICC for period 1988-2016 (N=1,109).

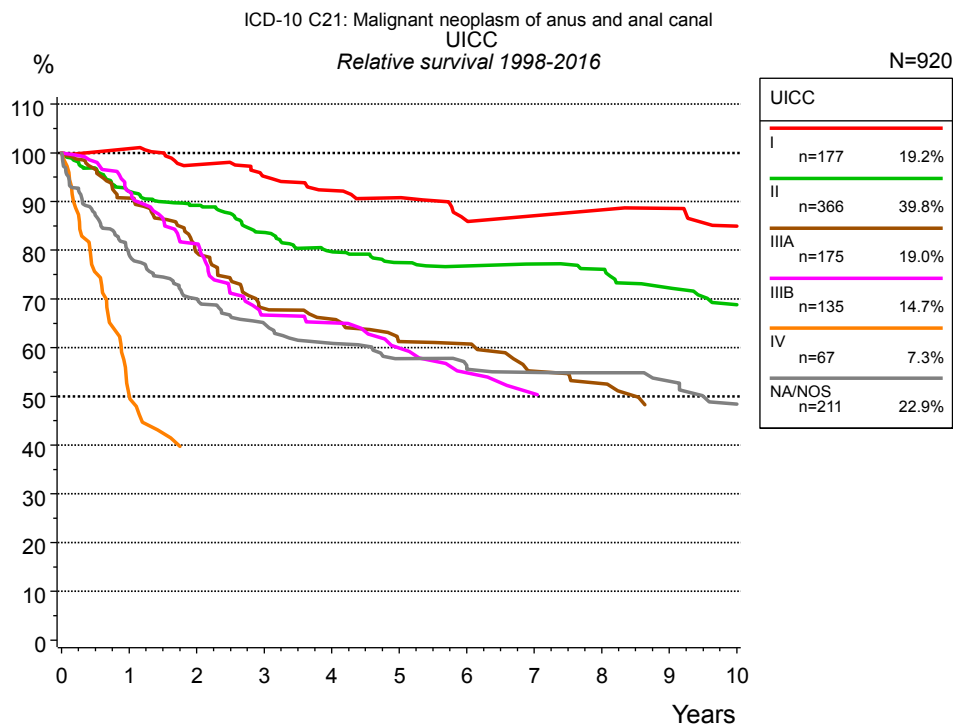


Figure 4c. Relative survival of patients with anal cancer by UICC. For 961 of 1,131 cases diagnosed between 1998 and 2016 valid data could be obtained for this item. For a total of 920 cases an evaluable classification was established. The grey line represents the subgroup of 211 patients with missing values regarding UICC (18.7 % of 1,131 patients, the percent values of all other categories are related to n=920).

Years	UICC											
	I n=177		II n=366		IIIA n=175		IIIB n=135		IV n=67		NA/NOS n=211	
	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	99.4	100.9	90.1	92.1	89.1	90.7	90.6	92.0	50.7	50.2	76.2	79.0
2	93.9	97.6	85.6	89.2	76.2	79.5	78.9	81.3	37.6	38.3	66.0	70.0
3	89.7	95.1	78.9	83.7	63.9	68.0	62.8	66.7			59.6	64.9
4	85.7	92.3	73.7	79.7	60.6	65.9	60.6	65.1			55.1	60.9
5	83.2	90.8	70.2	77.5	54.3	61.3	54.5	59.9			50.9	57.7
6	77.3	86.0	68.5	76.8	53.3	60.8	48.7	54.8			48.8	56.0
7	76.2	87.1	67.5	77.2	46.2	55.2	45.3	50.6			47.4	54.9
8	76.2	88.3	65.7	76.1	43.8	52.6					46.5	54.9
9	74.8	88.6	61.2	72.2	38.5	48.3					44.4	53.1
10	69.5	84.9	57.5	68.8	38.5	48.4					39.8	48.4

Table 4d. Observed (obs.) and relative (rel.) survival of patients with anal cancer by UICC for period 1998-2016 (N=920).

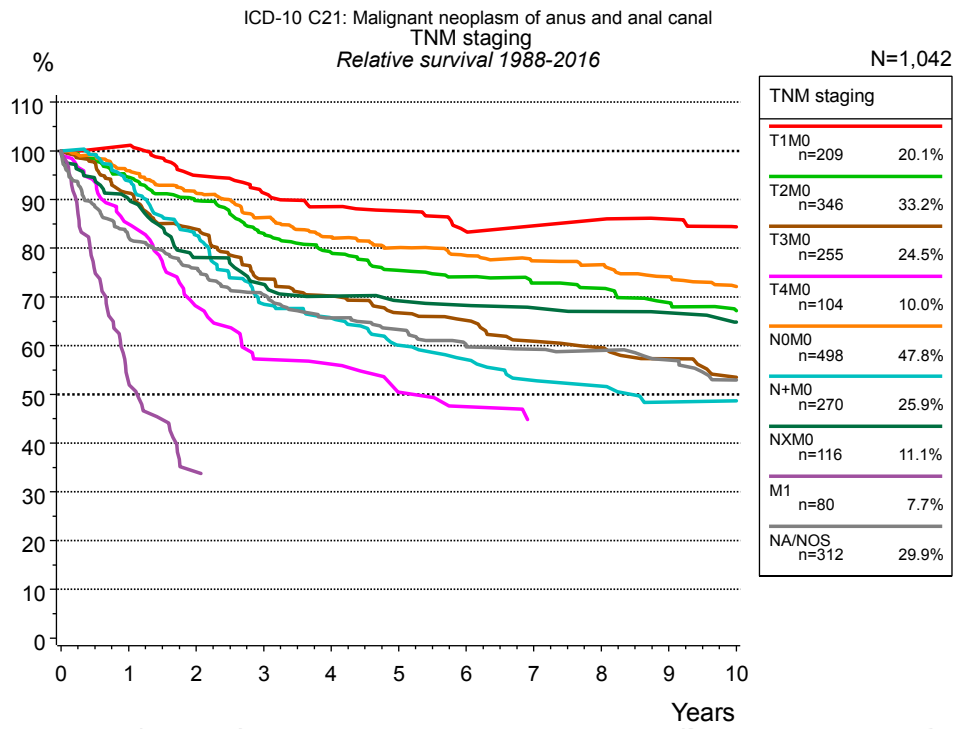


Figure 4e. Relative survival of patients with anal cancer by TNM staging. For 1,159 of 1,354 cases diagnosed between 1988 and 2016 valid data could be obtained for this item. For a total of 1,042 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 312 patients with missing values regarding TNM staging (23.0 % of 1,354 patients, the percent values of all other categories are related to n=1,042).

Years	TNM staging													
	T1M0 n=209		T2M0 n=346		T3M0 n=255		T4M0 n=104		NOM0 n=498		N+M0 n=270		NXM0 n=116	
	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	99.5	101.1	92.7	94.6	89.1	91.3	83.7	85.0	94.0	95.9	92.1	93.8	87.7	90.1
2	91.2	95.0	86.2	89.8	79.8	83.9	65.3	68.1	87.7	91.3	79.4	82.7	73.9	78.1
3	85.8	91.3	78.6	83.1	68.4	73.7	53.9	57.2	81.2	86.3	64.6	68.5	68.0	72.6
4	81.9	88.5	73.3	79.1	63.7	70.2	52.5	56.2	76.0	82.3	60.4	65.7	63.9	70.2
5	79.8	87.7	68.5	75.4	59.0	66.7	45.1	50.4	72.5	80.1	54.0	60.1	61.7	69.3
6	74.4	83.4	66.2	74.1	56.7	65.2	41.6	47.5	69.6	78.5	50.6	57.2	60.5	68.3
7	73.6	84.6	63.6	72.9	52.0	60.9	37.8	44.6	67.0	77.4	46.1	52.9	57.9	67.8
8	73.6	85.9	61.9	71.8	49.8	59.6			65.1	76.6	44.3	51.7	56.5	67.0
9	71.5	86.0	58.2	68.8	46.7	57.3			61.6	74.1	40.0	48.5	54.9	66.8
10	68.1	84.4	55.5	67.2	43.0	53.5			58.5	72.1	40.0	48.7	51.8	64.8

<i>cont'd</i>	TNM staging			
	M1 n=80		NA/NOS n=312	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	52.5	52.5	79.3	82.2
2	33.3	34.0	71.3	75.9
3			64.4	70.4
4			58.7	65.7
5			55.5	63.3
6			51.7	60.0
7			50.3	59.3
8			49.2	59.0
9			46.7	57.1
10			42.4	53.0

Table 4f. Observed (obs.) and relative (rel.) survival of patients with anal cancer by TNM staging for period 1988-2016 (N=1,042).

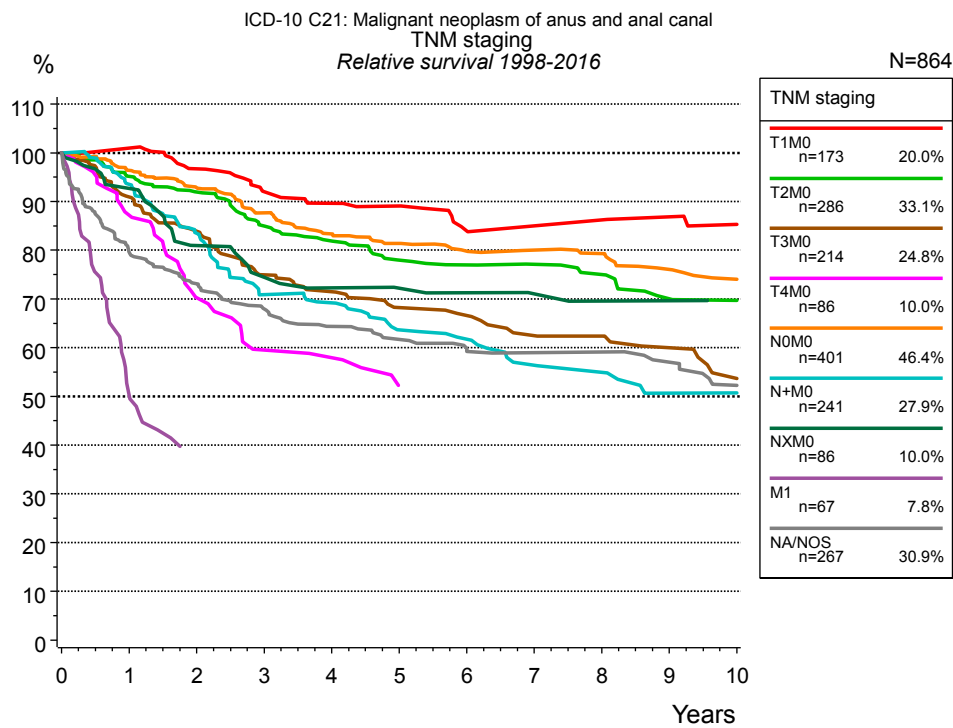


Figure 4g. Relative survival of patients with anal cancer by TNM staging. For 961 of 1,131 cases diagnosed between 1998 and 2016 valid data could be obtained for this item. For a total of 864 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 267 patients with missing values regarding TNM staging (23.6 % of 1,131 patients, the percent values of all other categories are related to n=864).

Years	TNM staging													
	T1M0 n=173		T2M0 n=286		T3M0 n=214		T4M0 n=86		NOM0 n=401		N+M0 n=241		NXM0 n=86	
	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	99.4	101.0	93.3	95.1	89.0	90.9	86.3	87.2	94.6	96.4	92.0	93.5	90.5	92.7
2	93.0	96.7	88.5	91.9	80.2	83.9	67.7	70.3	89.4	92.8	80.4	83.5	76.7	81.0
3	86.3	92.0	80.6	85.0	70.1	75.0	56.5	59.5	82.8	87.7	66.7	70.9	69.8	74.5
4	82.9	89.7	76.3	81.9	65.6	71.5	54.7	57.9	77.3	83.4	64.2	69.2	65.5	72.3
5	81.1	89.1	71.0	78.0	61.0	68.2	47.0	52.2	74.1	81.4	57.4	63.6	63.8	72.2
6	74.8	84.0	69.3	77.0	58.7	66.6			71.3	79.8	55.0	61.7	62.1	71.2
7	73.7	85.0	67.8	77.1	54.3	62.5			69.9	80.1	49.4	56.4	60.1	71.0
8	73.7	86.3	65.4	75.1	53.3	62.3			68.3	79.4	47.3	54.9	57.7	69.6
9	72.2	86.9	59.9	70.0	50.0	60.0			64.1	76.0	41.9	50.6	57.7	69.6
10	68.7	85.3	58.9	69.7	44.4	53.7			61.3	74.0	41.9	50.7	55.1	68.9

<i>cont'd</i>	TNM staging			
	M1 n=67		NA/NOS n=267	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	50.7	50.2	76.9	79.6
2	37.6	38.3	69.1	73.1
3			62.7	67.9
4			58.1	64.4
5			54.7	61.7
6			52.1	59.6
7			50.9	59.0
8			50.2	59.1
9			47.7	57.1
10			42.9	52.3

Table 4h. Observed (obs.) and relative (rel.) survival of patients with anal cancer by TNM staging for period 1998-2016 (N=864).

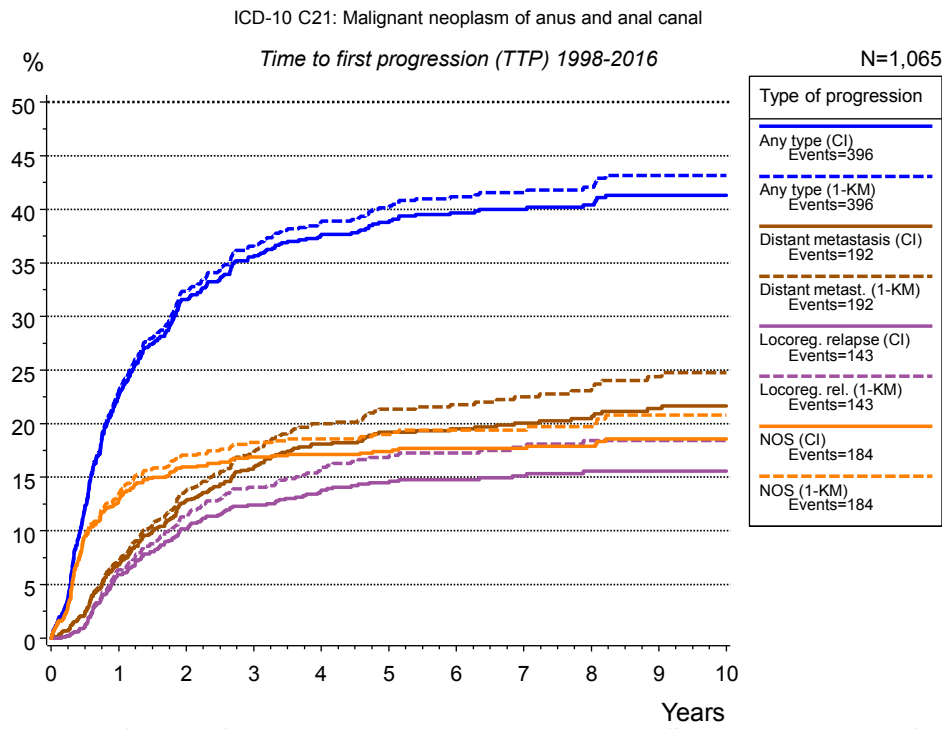


Figure 5a. Time to first progression of 1,065 patients with anal cancer diagnosed between 1998 and 2016 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

Years	Type of progression						
	Any type (CI)	Any type (1-KM)	Distant metastasis (CI)	Distant metast. (1-KM)	Locoreg. relapse (CI)	Locoreg. rel. (1-KM)	NOS (CI)
	n=1,065 %	n=1,065 %	n=1,065 %	n=1,065 %	n=1,065 %	n=1,065 %	n=1,065 %
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	22.6	23.0	6.8	7.2	5.9	6.4	12.9
2	31.6	32.3	12.8	13.8	10.2	11.3	16.0
3	35.5	36.6	15.9	17.3	12.4	14.1	16.9
4	37.5	38.7	18.1	20.0	13.7	15.7	17.1
5	38.8	40.1	19.2	21.4	14.5	16.8	17.4
6	39.7	41.2	19.5	21.8	14.8	17.3	17.7
7	40.0	41.6	20.1	22.5	15.1	17.8	17.7
8	40.4	42.1	20.5	23.1	15.6	18.4	17.9
9	41.3	43.2	21.4	24.4	15.6	18.4	18.6
10	41.3	43.2	21.7	24.8	15.6	18.4	18.6

Type of progression	
<i>cont'd</i>	NOS (1-KM) n=1,065
Years	%
0	0.0
1	13.4
2	17.0
3	18.2
4	18.6
5	19.0
6	19.4
7	19.4
8	19.7
9	20.8
10	20.8

Table 5b. Time to first progression of patients with anal cancer for period 1998-2016 (N=1,065).

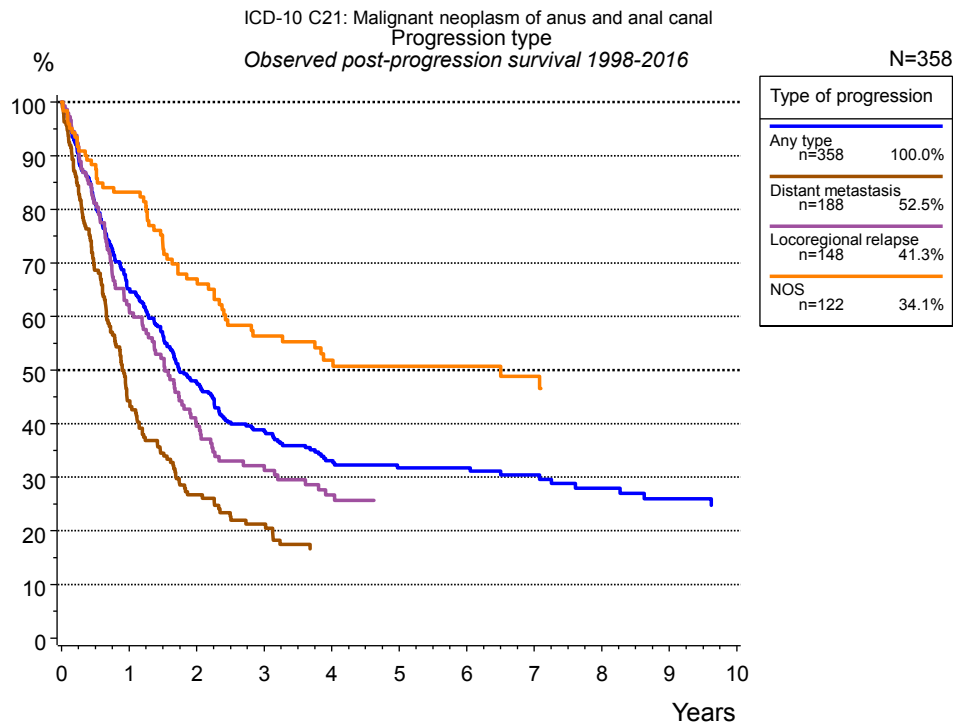


Figure 5c. Observed post-progression survival of 358 patients with anal cancer diagnosed between 1998 and 2016. These 358 patients with documented progression events during their course of disease represent 31.7 % of the totally 1,131 evaluated cases (incl. M1, n=66, 5.8 %). Patients with cancer relapse documented via death certificates only were excluded (n=104, 9.2 %). 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=358 %	Distant metastasis n=188 %	Locoregional relapse n=148 %	NOS n=122 %
0	100.0	100.0	100.0	100.0
1	65.2	44.3	61.4	83.2
2	47.6	26.7	39.5	67.0
3	38.8	21.2	32.2	56.3
4	33.1		26.7	51.9
5	31.8			50.7
6	31.8			50.7
7	30.4			48.8
8	28.0			
9	26.0			

Table 5d. Observed post-progression survival of patients with anal cancer for period 1998-2016 (N=358).

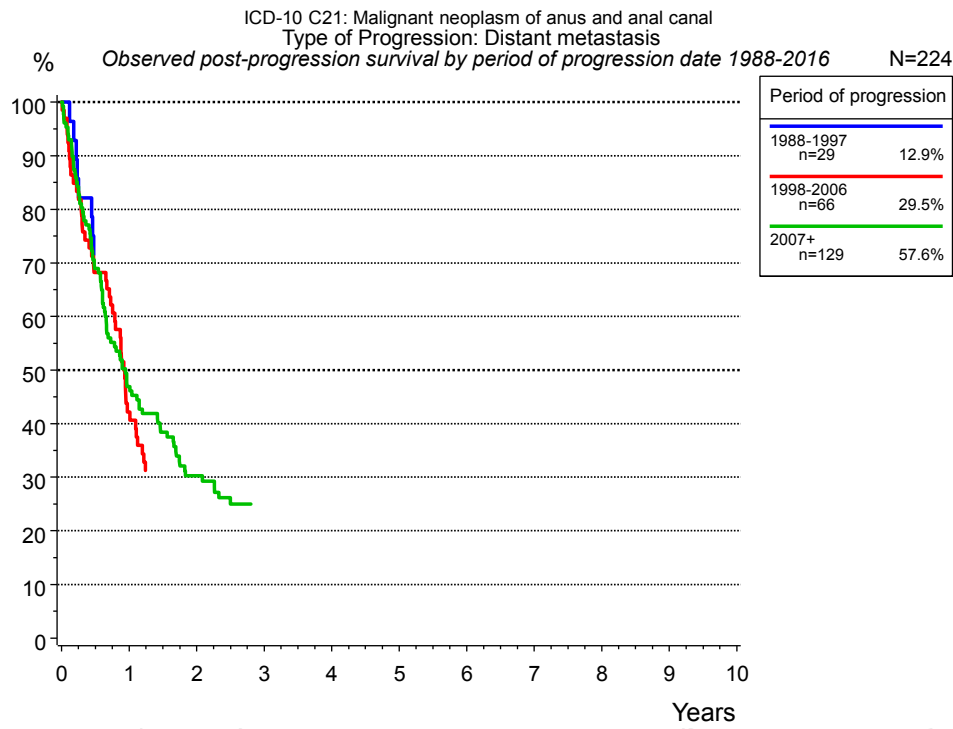


Figure 5e. Observed post-progression (distant metastasis) survival of 224 patients with anal cancer diagnosed between 1988 and 2016 by period of progression.

Years	Period of progression		
	1988-1997 n=29 %	1998-2006 n=66 %	2007+ n=129 %
0	100.0	100.0	100.0
1		42.2	46.9
2			30.3
3			25.0

Table 5f. Observed post-progression (distant metastasis) survival of patients with anal cancer for period 1988-2016 by period of progression (N=224).

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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