

Munich Cancer Registry



- ▶ Incidence and Mortality
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ICD-10 C21: Anal cancer

Survival

Year of diagnosis	1988-1997	1998-2019
Patients	312	1,929
Diseases	312	1,929
Cases evaluated	285	1,504
Creation date	01/27/2021	
Database export	01/07/2021	
Population	4.92 m	



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<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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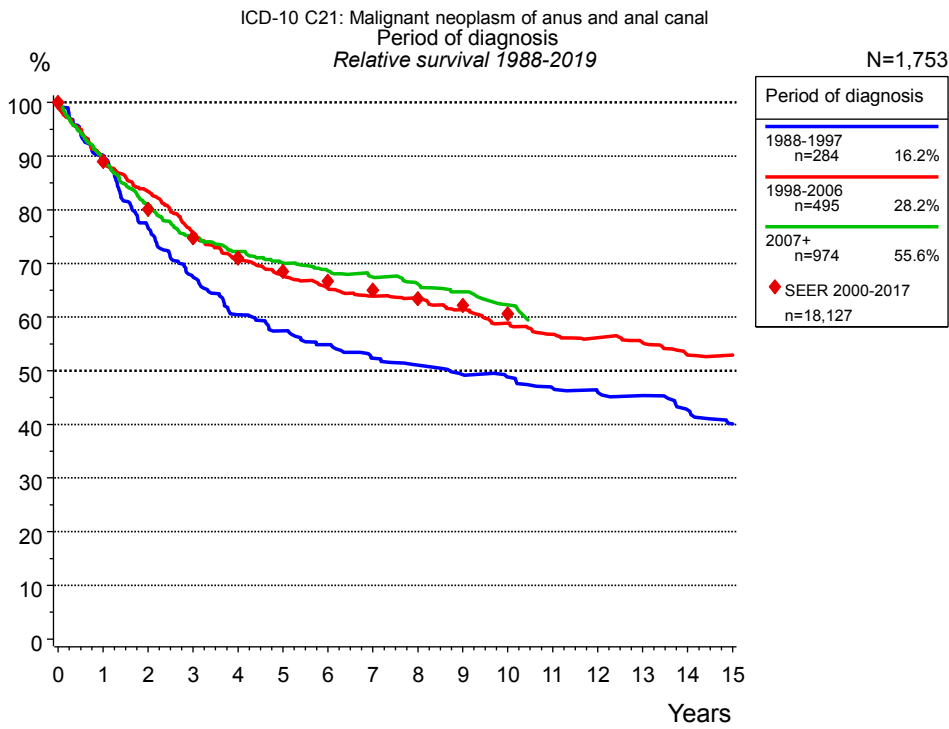


Figure 1a. Relative survival of patients with anal cancer by period of diagnosis. Included in the evaluation are 1,753 cases diagnosed between 1988 and 2019.

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 2017, 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=284		1998-2006 n=495		2007+ n=974	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	87.1	90.1	86.9	89.4	87.3	89.4
2	71.9	76.7	79.0	83.4	77.5	81.0
3	61.7	67.5	70.0	75.7	70.3	74.9
4	53.7	60.4	64.2	70.8	66.6	72.2
5	50.0	57.5	60.0	67.7	63.3	70.1
6	46.6	54.9	56.8	65.4	60.8	68.6
7	43.3	52.4	54.2	63.9	58.7	67.4
8	41.3	51.0	52.9	63.6	56.8	66.2
9	39.0	49.3	49.9	61.4	54.3	64.7
10	37.5	48.8	46.9	58.9	51.3	62.3
11	35.1	46.7	44.2	56.8		
12	33.5	45.9	42.6	56.1		
13	32.7	45.4	41.0	55.2		
14	29.9	42.7	38.3	52.9		
15	27.4	40.1	37.7	52.9		
Median	4.8		8.8		10.2	

Table 1b. Observed (obs.) and relative (rel.) survival of patients with anal cancer by period of diagnosis for period 1988-2019 (N=1,753).

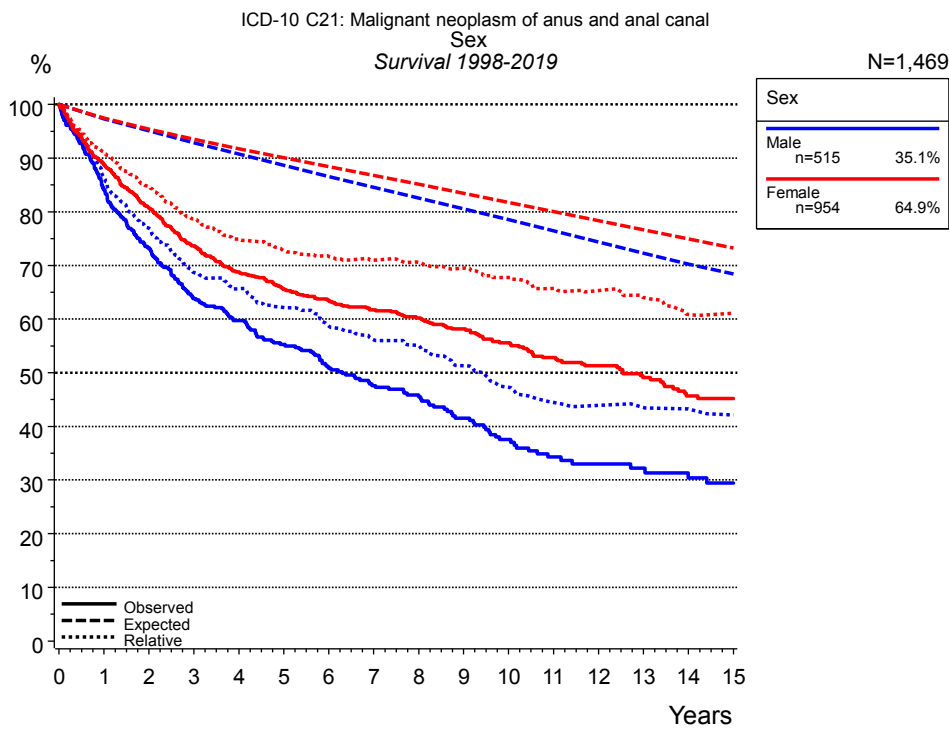


Figure 2a. Survival of patients with anal cancer by sex. Included in the evaluation are 1,469 cases diagnosed between 1998 and 2019.

Years	Sex			
	Male n=515		Female n=954	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	84.2	86.4	88.8	91.0
2	73.3	76.9	80.7	84.6
3	63.8	68.7	73.6	78.7
4	59.7	65.7	68.8	74.9
5	55.3	62.1	65.6	72.7
6	50.8	58.7	63.6	71.7
7	47.6	56.1	61.7	71.0
8	45.8	55.1	60.2	70.6
9	41.5	51.3	58.2	69.5
10	37.5	47.3	55.6	67.7
11	34.3	44.5	52.8	65.7
12	33.0	43.9	51.3	65.3
13	32.2	43.5	49.1	64.0
14	30.4	43.3	45.7	60.9
15	29.4	42.1	45.2	61.1
Median	6.3		12.5	

Table 2b. Observed (obs.) and relative (rel.) survival of patients with anal cancer by sex for period 1998-2019 (N=1,469).

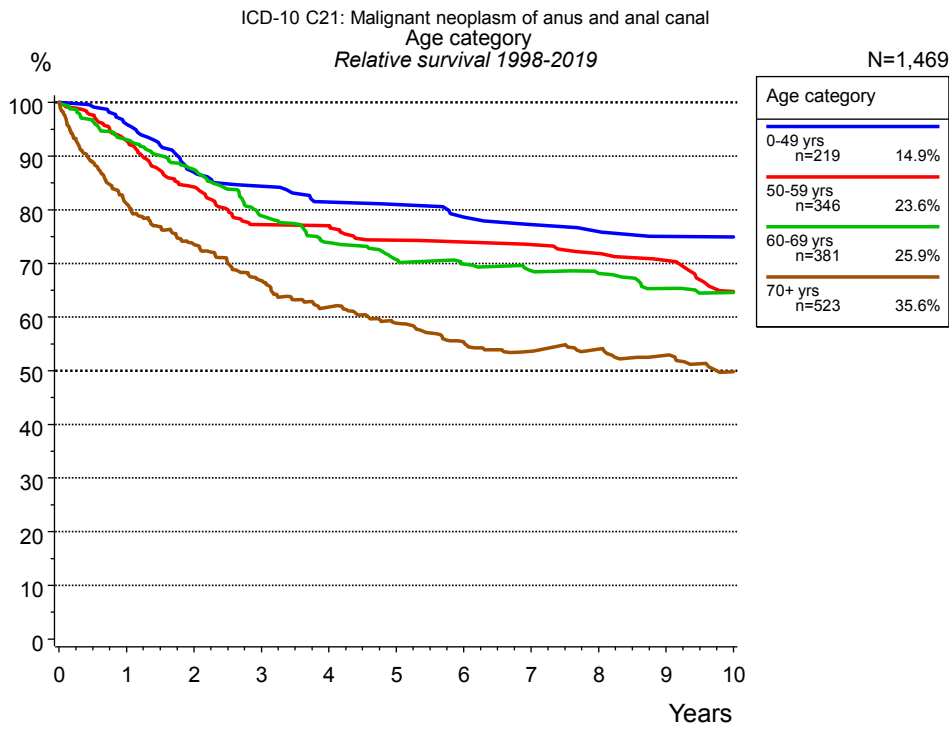


Figure 3a. Relative survival of patients with anal cancer by age category. Included in the evaluation are 1,469 cases diagnosed between 1998 and 2019.

Years	Age category							
	0-49 yrs n=219		50-59 yrs n=346		60-69 yrs n=381		70+ yrs n=523	
	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	96.2	96.0	92.7	92.9	92.1	93.0	76.2	81.1
2	86.8	87.0	83.7	84.2	85.7	87.5	65.4	73.6
3	84.3	84.4	76.1	77.2	76.2	78.9	56.0	66.8
4	81.0	81.4	75.8	77.0	70.5	73.9	49.2	61.8
5	80.4	81.0	72.5	74.3	66.6	70.7	44.1	58.9
6	78.4	78.6	71.6	74.0	64.6	69.8	39.1	55.4
7	76.2	77.2	70.6	73.5	62.6	68.6	35.7	53.6
8	75.4	76.0	68.9	71.9	61.2	68.1	33.6	54.0
9	73.6	75.1	66.9	70.6	57.4	65.3	30.7	52.9
10	73.6	74.9	60.7	64.8	55.8	64.6	26.8	49.8
Median				17.5		12.7		3.8

Table 3b. Observed (obs.) and relative (rel.) survival of patients with anal cancer by age category for period 1998-2019 (N=1,469).

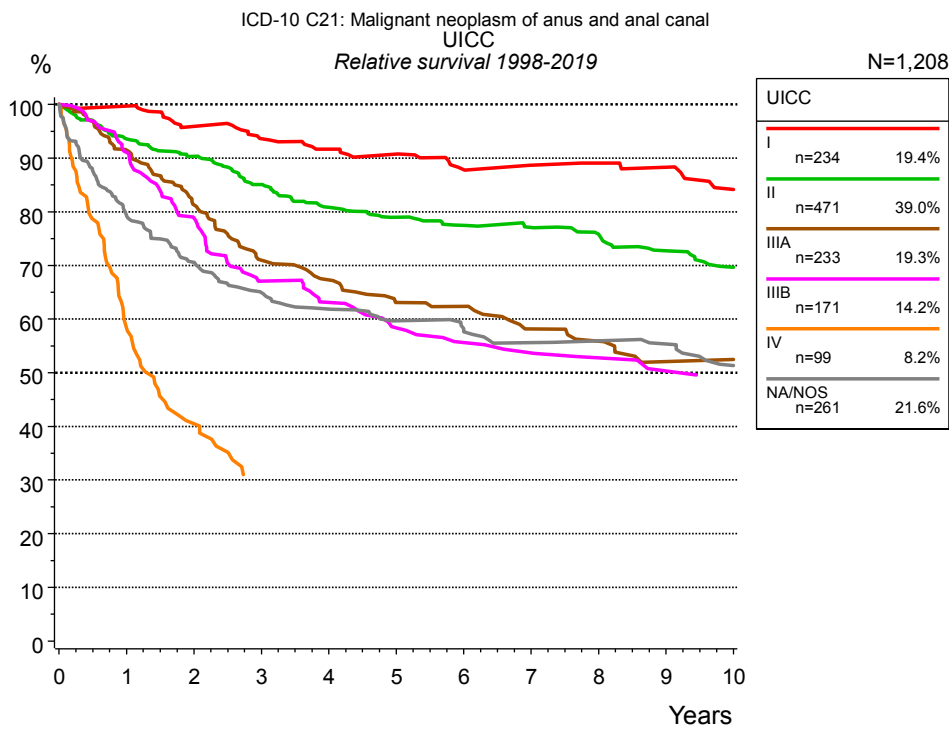


Figure 4a. Relative survival of patients with anal cancer by UICC. For 1,255 of 1,469 cases diagnosed between 1998 and 2019 valid data could be obtained for this item. For a total of 1,208 cases an evaluable classification was established. The grey line represents the subgroup of 261 patients with missing values regarding UICC (17.8 % of 1,469 patients, the percent values of all other categories are related to n=1,208).

Years	UICC											
	I n=234		II n=471		IIIA n=233		IIIB n=171		IV n=99		NA/NOS n=261	
	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	98.7	99.7	91.4	93.6	89.5	91.5	89.6	91.1	57.9	58.3	76.3	79.3
2	92.6	95.9	86.4	90.3	77.9	81.3	75.9	78.9	38.9	40.5	66.4	70.6
3	88.6	93.6	79.8	85.1	66.7	71.0	63.1	67.1	28.7	30.2	59.4	64.9
4	85.3	91.7	74.3	80.8	62.1	67.3	58.3	63.1			55.8	61.9
5	83.0	90.8	71.1	79.0	56.5	63.1	52.9	58.4			52.4	59.7
6	78.5	87.8	68.6	77.5	55.1	62.4	49.5	55.6			50.3	58.0
7	77.1	88.7	67.0	77.1	49.4	58.1	47.6	53.7			47.6	55.6
8	76.2	89.0	64.8	75.9	46.9	55.9	45.4	52.8			47.1	56.0
9	74.4	88.3	60.8	72.7	42.1	52.1	42.5	50.3			45.8	55.4
10	69.3	84.2	57.1	69.7	42.1	52.5	41.0	49.2			41.6	51.4
Median	17.5		13.5		6.9		5.9		1.2		6.0	

Table 4b. Observed (obs.) and relative (rel.) survival of patients with anal cancer by UICC for period 1998-2019 (N=1,208).

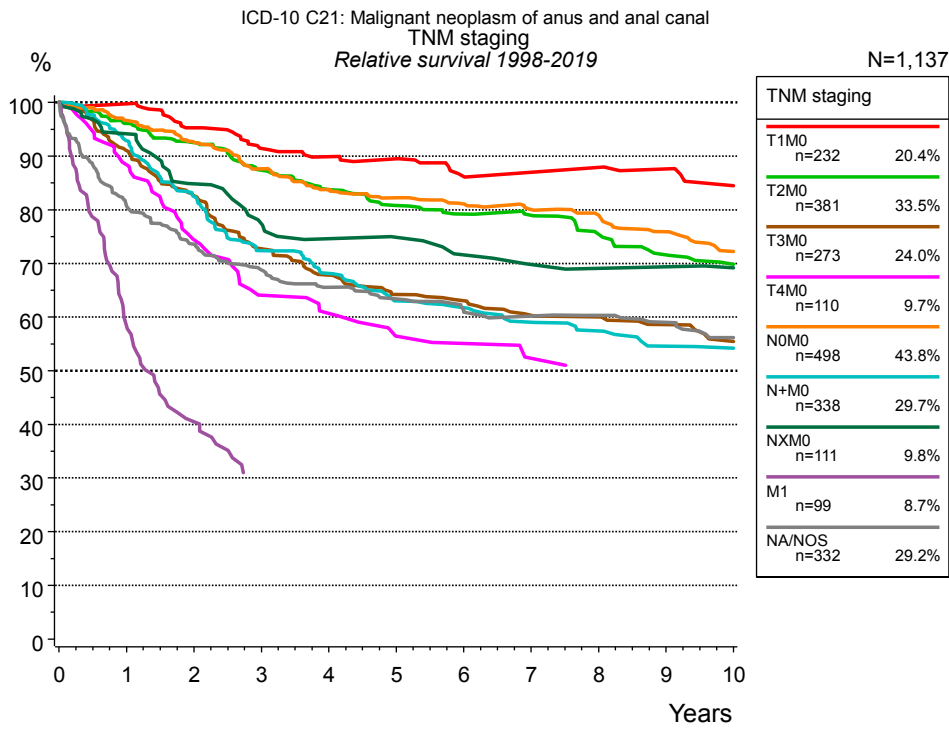


Figure 4e. Relative survival of patients with anal cancer by TNM staging. For 1,255 of 1,469 cases diagnosed between 1998 and 2019 valid data could be obtained for this item. For a total of 1,137 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 332 patients with missing values regarding TNM staging (22.6 % of 1,469 patients, the percent values of all other categories are related to n=1,137).

Years	TNM staging													
	T1M0 n=232		T2M0 n=381		T3M0 n=273		T4M0 n=110		NOM0 n=498		N+M0 n=338		NXM0 n=111	
	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	98.7	99.7	94.2	96.1	88.8	91.1	87.4	88.4	94.8	96.6	91.2	92.9	91.7	94.2
2	92.0	95.3	88.9	92.5	78.6	82.6	71.9	74.4	89.1	92.6	79.3	82.5	80.1	84.8
3	86.3	91.4	82.5	87.4	67.8	72.7	60.7	64.1	82.7	87.7	68.3	72.4	71.6	77.4
4	83.5	89.9	77.7	83.8	61.9	67.8	57.0	60.7	77.6	83.8	63.3	68.1	67.2	74.6
5	81.8	89.5	73.3	80.8	57.2	64.2	51.3	56.4	74.7	82.3	57.2	63.0	65.9	74.9
6	77.0	86.2	70.7	79.2	55.3	63.1	49.6	55.1	72.1	81.1	55.2	61.7	61.9	71.6
7	75.4	87.0	69.3	79.0	51.7	60.3	45.7	52.3	69.6	80.0	51.8	59.0	59.0	69.8
8	75.4	87.9	65.1	75.4	51.2	60.0	43.7	50.2	67.5	79.1	49.3	57.4	57.5	69.1
9	73.5	87.6	60.6	71.6	48.1	58.6			63.4	75.9	45.8	54.6	57.5	69.4
10	69.0	84.5	58.0	69.9	44.9	55.5			59.1	72.2	44.9	54.2	55.5	69.2
Median	14.2		13.9		8.1		5.5		14.0		7.7		11.2	

<i>cont'd</i>	TNM staging			
	M1 n=99		NA/NOS n=332	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	57.9	58.3	77.9	80.7
2	38.9	40.5	69.3	73.6
3	28.7	30.2	63.2	68.8
4			58.9	65.6
5			55.9	63.4
6			53.0	61.2
7			51.4	60.2
8			50.5	60.3
9			48.5	59.0
10			45.2	56.1
Median	1.2		8.2	

Table 4f. Observed (obs.) and relative (rel.) survival of patients with anal cancer by TNM staging for period 1998-2019 (N=1,137).

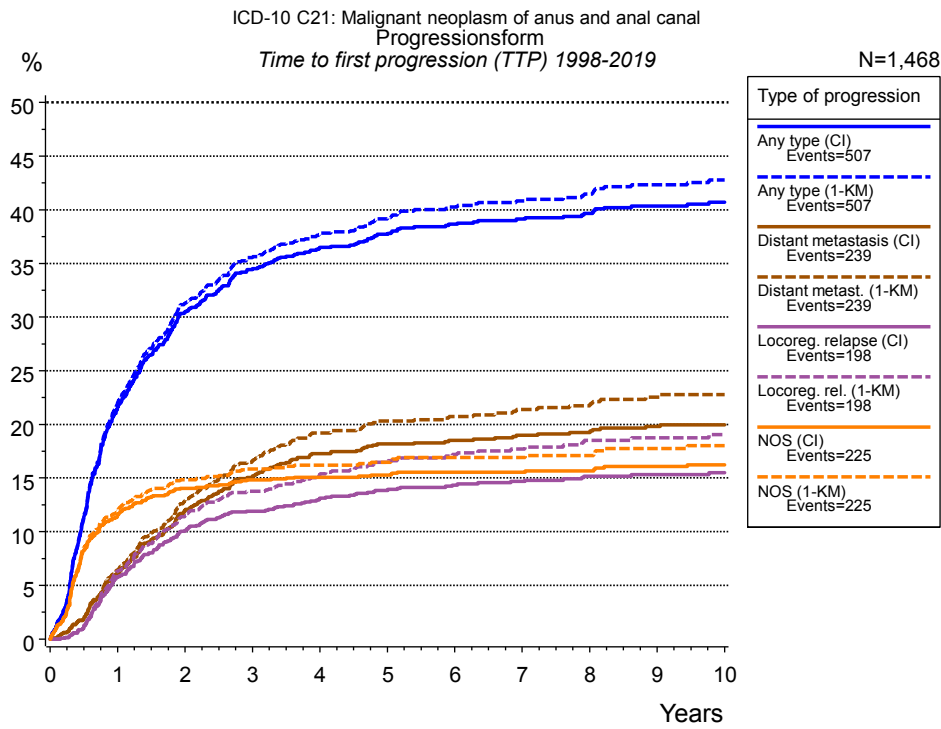


Figure 5a. Time to first progression of 1,468 patients with anal cancer diagnosed between 1998 and 2019 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

	Type of progression							
	Any type (CI)	Any type (1-KM)	Distant metastasis (CI)	Distant metast. (1-KM)	Locoreg. relapse (CI)	Locoreg. rel. (1-KM)	NOS (CI)	
N	1,370	1,370	1,370	1,370	1,468	1,468	1,468	
Events	503	503	238	238	198	198	221	
compet.	165		313		465		456	
Years	%	%	%	%	%	%	%	%
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	21.6	22.0	6.1	6.4	5.8	6.4	11.5	
2	30.5	31.3	12.0	13.0	10.1	11.5	14.0	
3	34.4	35.5	15.1	16.6	11.9	13.8	14.8	
4	36.4	37.7	17.3	19.2	13.0	15.3	15.1	
5	37.7	39.2	18.2	20.3	13.8	16.5	15.3	
6	38.6	40.3	18.5	20.7	14.3	17.2	15.6	
7	39.1	40.8	19.0	21.4	14.7	17.7	15.6	
8	39.7	41.5	19.2	21.7	15.2	18.5	15.7	
9	40.4	42.3	19.8	22.5	15.3	18.7	16.1	
10	40.7	42.8	20.0	22.8	15.5	19.0	16.2	

Type of progression	
<i>cont'd</i>	NOS (1-KM)
N	1,468
Events	221
compet.	
Years	%
0	0.0
1	12.0
2	14.8
3	15.9
4	16.2
5	16.5
6	16.9
7	16.9
8	17.1
9	17.7
10	18.0

Table 5b. Time to first progression of patients with anal cancer for period 1998-2019 (N=1,468), also showing the total of progression events (Events) and of deaths as competing risk (compet.).

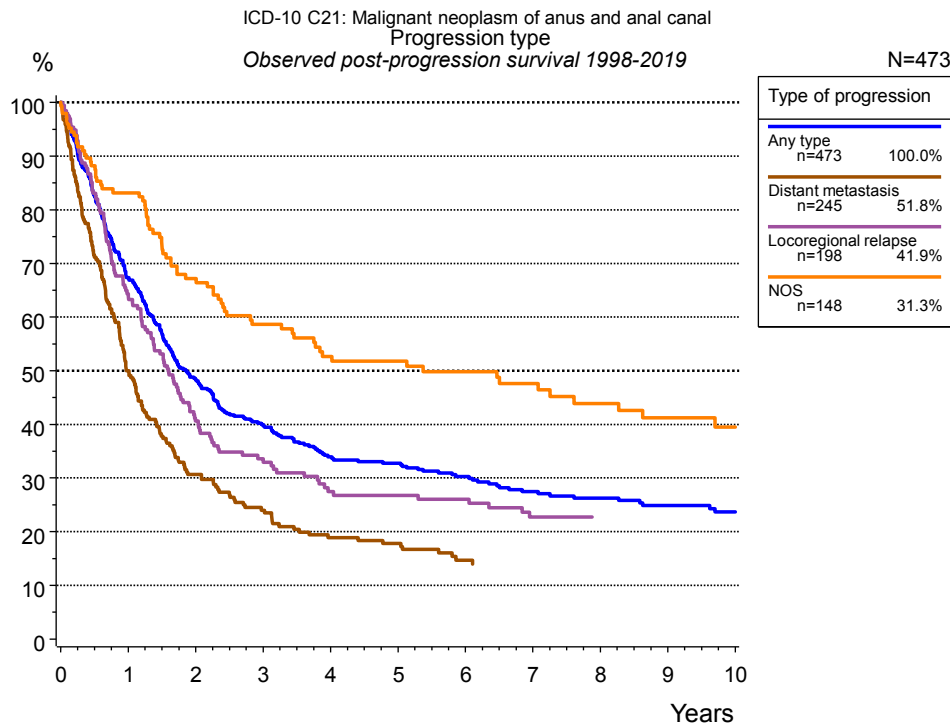


Figure 5c. Observed post-progression survival of 473 patients with anal cancer diagnosed between 1998 and 2019. These 473 patients with documented progression events during their course of disease represent 32.2 % of the totally 1,468 evaluated cases (incl. M1, n=98, 6.7 %). Patients with cancer relapse documented via death certificates only were excluded (n=132, 9.0 %). 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=473 %	Distant metastasis n=245 %	Locoregional relapse n=198 %	NOS n=148 %
0	100.0	100.0	100.0	100.0
1	67.4	50.0	63.8	83.2
2	48.3	30.7	40.6	67.2
3	40.0	24.0	33.6	58.6
4	33.9	18.9	27.5	52.7
5	32.8	17.8	26.8	51.8
6	30.3	14.7	26.1	49.8
7	27.5		22.7	47.6
8	26.3			43.9
9	24.8			41.2
10	23.7			39.5

Table 5d. Observed post-progression survival of patients with anal cancer for period 1998-2019 (N=473).

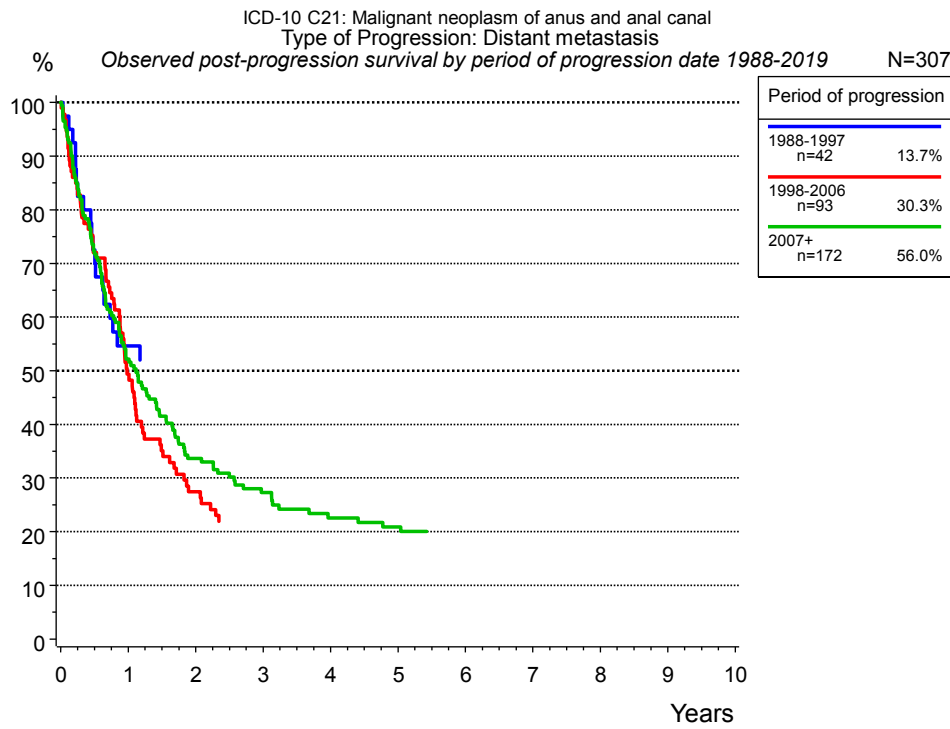


Figure 5e. Observed post-progression (distant metastasis) survival of 307 patients with anal cancer diagnosed between 1988 and 2019 by period of progression.

Years	Period of progression		
	1988-1997 n=42 %	1988-2006 n=93 %	2007+ n=172 %
0	100.0	100.0	100.0
1	54.6	49.3	52.2
2		27.4	33.7
3			27.3
4			22.6
5			20.9

Table 5f. Observed post-progression (distant metastasis) survival of patients with anal cancer for period 1988-2019 by period of progression (N=307).

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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