

# Munich Cancer Registry



- ▶ Incidence and Mortality
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## ICD-10 C56: Ovarian cancer

### Survival

Year of diagnosis	1988-1997	1998-2016
Patients	1,547	7,273
Diseases	1,547	7,275
Cases evaluated	1,350	5,179
Creation date	08/22/2018	
Export date	08/09/2018	
Population (females)	2.43 m	



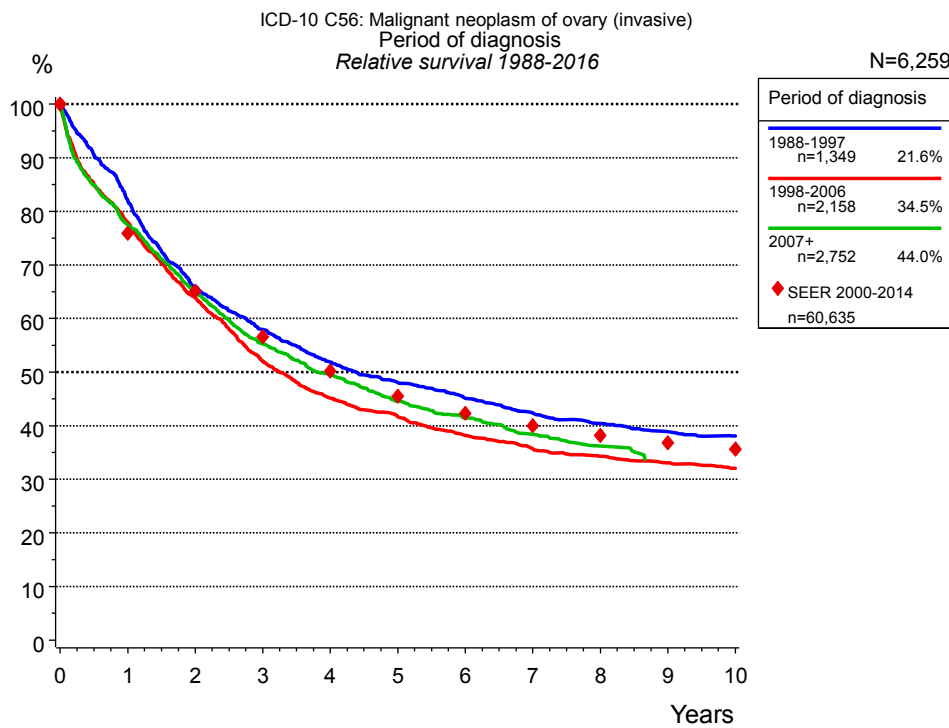
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<https://www.tumorregister-muenchen.de/en>

[https://www.tumorregister-muenchen.de/en/facts/surv/sC56\\_\\_E-ICD-10-C56-Ovarian-cancer-survival.pdf](https://www.tumorregister-muenchen.de/en/facts/surv/sC56__E-ICD-10-C56-Ovarian-cancer-survival.pdf)

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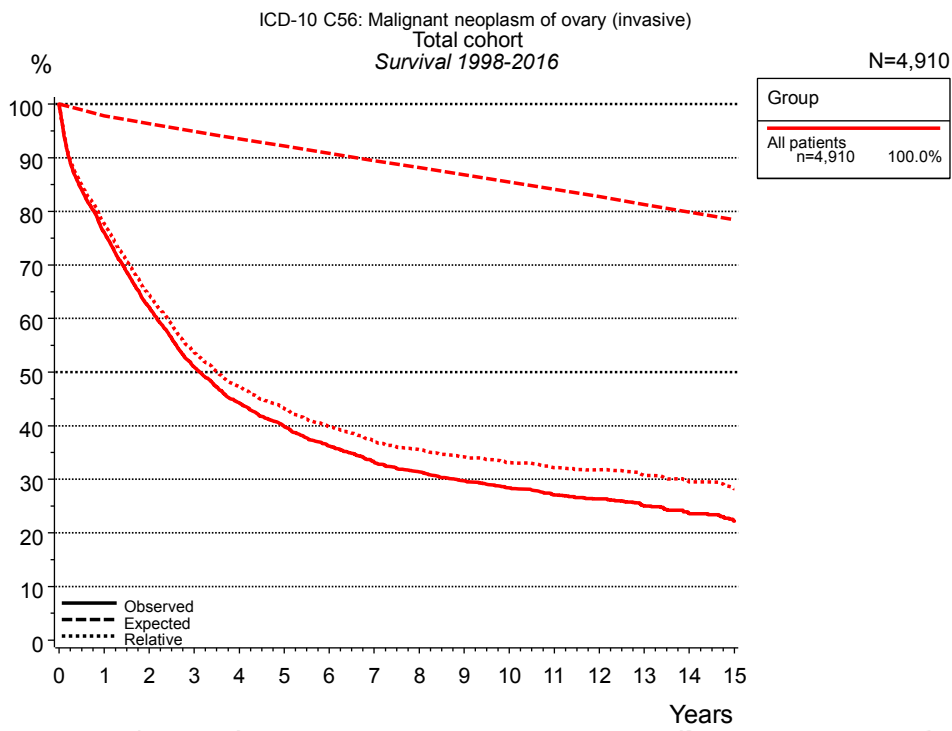
**Figure 1a.** Relative survival of patients with ovarian cancer by period of diagnosis. Included in the evaluation are 6,259 cases diagnosed between 1988 and 2016.

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=1,349		1998-2006 n=2,158		2007+ n=2,752	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	80.6	82.0	76.3	78.0	75.9	77.5
2	64.0	66.0	61.4	63.8	62.7	65.0
3	55.4	58.0	49.4	52.1	52.7	55.3
4	48.8	51.9	42.2	45.1	46.5	49.6
5	44.7	48.1	38.4	41.7	41.1	44.5
6	41.3	45.1	34.7	38.2	37.7	41.5
7	38.2	42.4	31.9	35.6	34.4	38.4
8	36.0	40.4	30.3	34.3	32.1	36.2
9	34.1	38.9	28.7	33.1		
10	32.9	38.1	27.4	32.0		

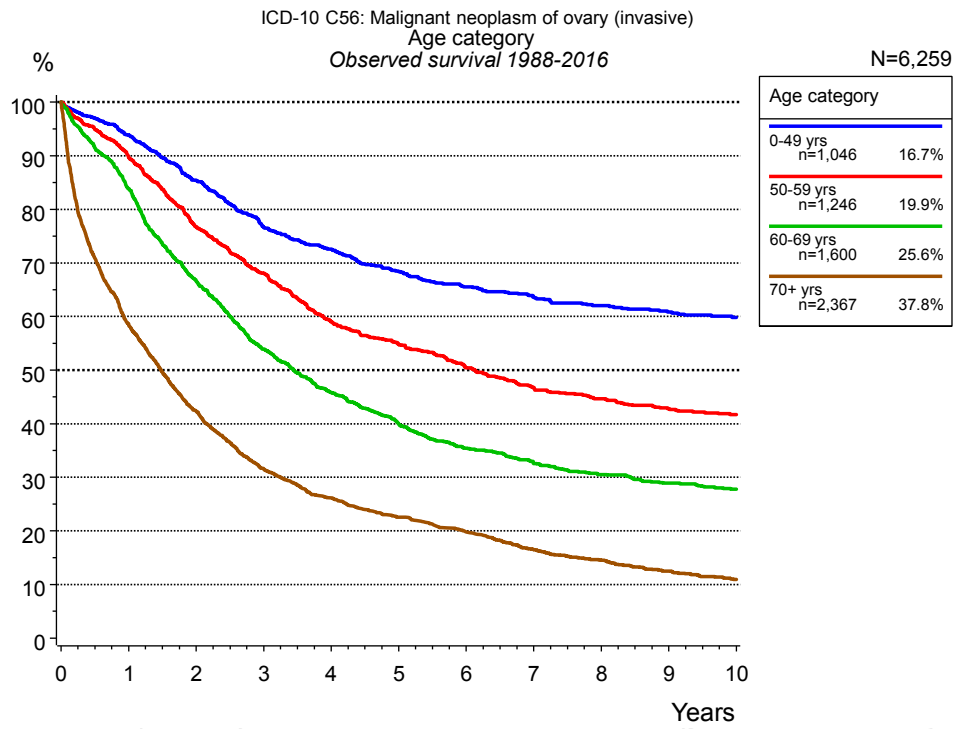
**Table 1b.** Observed (obs.) and relative (rel.) survival of patients with ovarian cancer by period of diagnosis for period 1988-2016 (N=6,259).



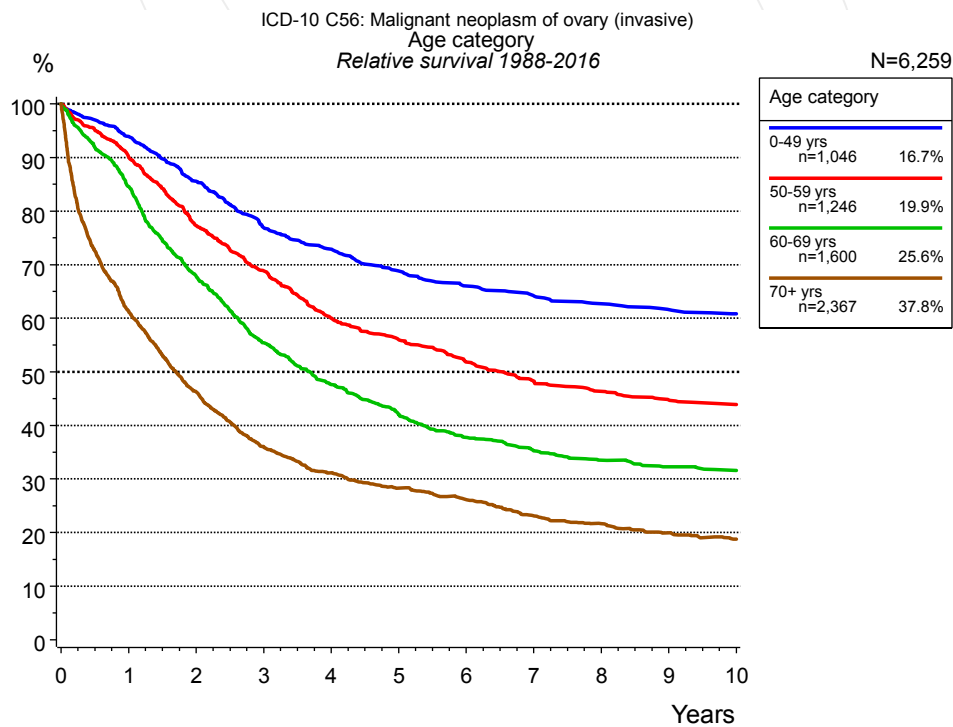
**Figure 2a.** Observed, expected and relative survival of the total cohort with ovarian cancer. Included in the evaluation are 4,910 cases diagnosed between 1998 and 2016.

Years	Group	
	obs. %	rel. %
0	100.0	100.0
1	76.1	77.7
2	62.1	64.5
3	51.0	53.7
4	44.3	47.3
5	39.8	43.2
6	36.2	39.8
7	33.2	37.0
8	31.3	35.5
9	29.7	34.2
10	28.3	33.1
11	27.1	32.2
12	26.4	31.8
13	25.0	30.7
14	23.5	29.5
15	22.2	28.3

**Table 2b.** Observed (obs.) and relative (rel.) survival of the total cohort with ovarian cancer for period 1998-2016 (N=4,910).



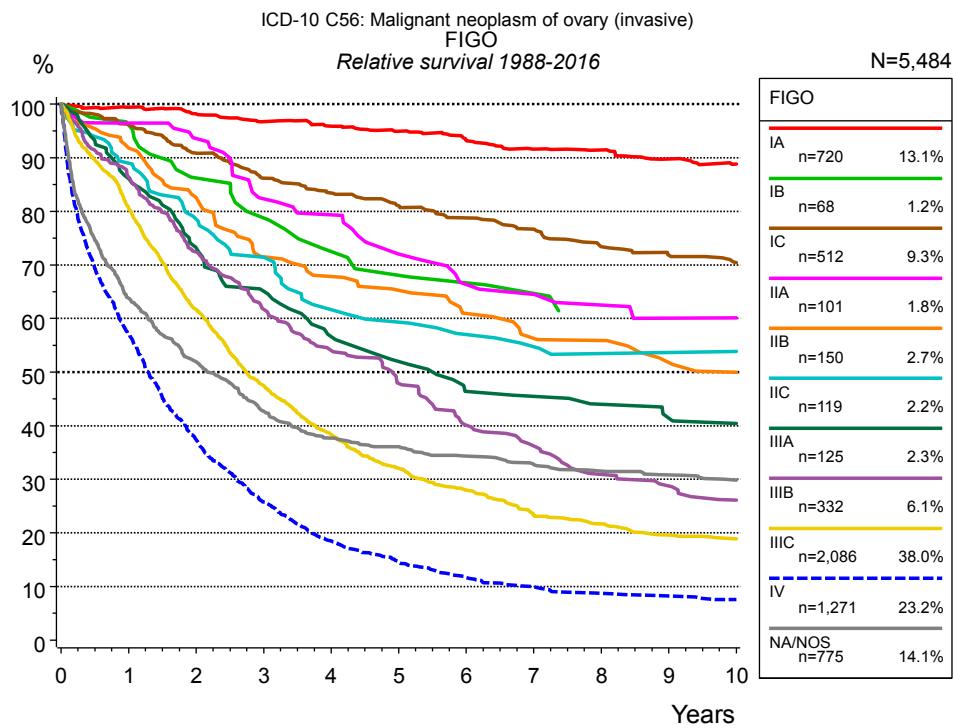
**Figure 3a.** Observed survival of patients with ovarian cancer by age category. Included in the evaluation are 6,259 cases diagnosed between 1988 and 2016.



**Figure 3b.** Relative survival of patients with ovarian cancer by age category. Included in the evaluation are 6,259 cases diagnosed between 1988 and 2016.

Years	Age category							
	0-49 yrs n=1,046		50-59 yrs n=1,246		60-69 yrs n=1,600		70+ yrs n=2,367	
	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	93.8	93.9	89.8	90.1	83.9	84.6	58.5	61.3
2	85.5	85.6	76.7	77.3	66.7	67.9	42.3	46.2
3	76.7	76.9	68.0	68.8	53.9	55.4	31.7	36.1
4	72.6	72.9	59.0	60.0	45.8	47.6	26.1	31.1
5	68.4	68.8	54.8	56.0	40.0	42.1	22.6	28.3
6	65.5	66.0	50.4	51.8	35.4	37.7	19.8	26.2
7	63.6	64.2	46.7	48.2	32.6	35.3	16.5	23.1
8	62.0	62.7	44.7	46.4	30.5	33.5	14.5	21.6
9	60.8	61.6	42.8	44.7	28.9	32.3	12.5	19.9
10	59.9	60.9	41.7	43.9	27.8	31.6	10.9	18.8

**Table 3c.** Observed (obs.) and relative (rel.) survival of patients with ovarian cancer by age category for period 1988-2016 (N=6,259).



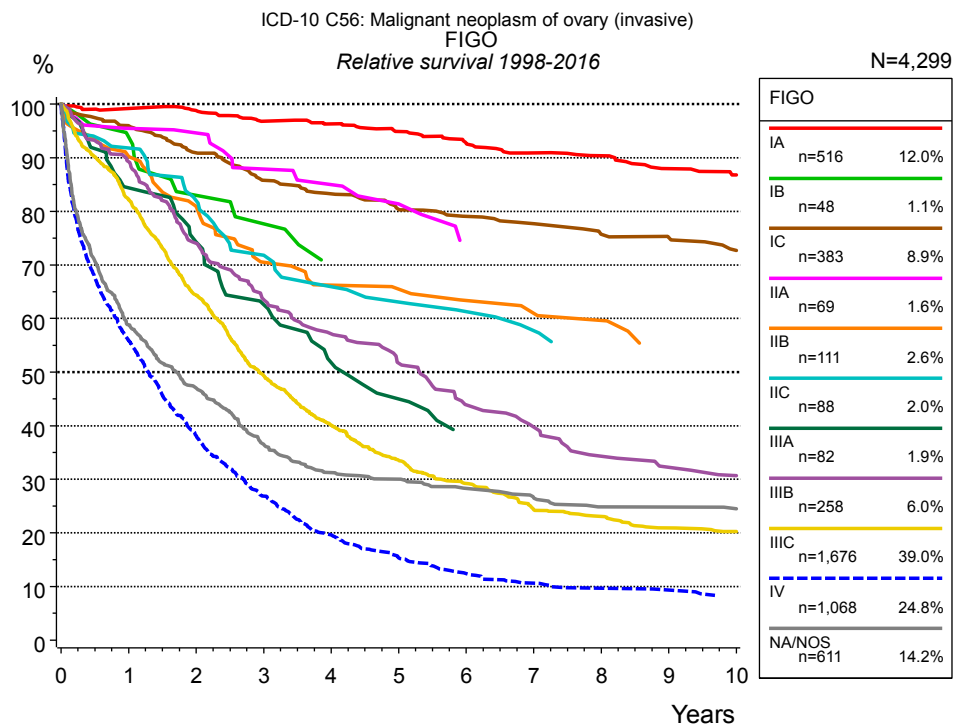
**Figure 4a.** Relative survival of patients with ovarian cancer by FIGO. For 5,839 of 6,259 cases diagnosed between 1988 and 2016 valid data could be obtained for this item. For a total of 5,484 cases an evaluable classification was established. The grey line represents the subgroup of 775 patients with missing values regarding FIGO (12.4 % of 6,259 patients, the percent values of all other categories are related to n=5,484).

Years	FIGO													
	IA n=720		IB n=68		IC n=512		IIA n=101		IIB n=150		IIC n=119		IIIA n=125	
	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	98.2	99.4	95.4	96.1	94.8	96.1	95.0	96.4	90.1	91.8	88.1	89.0	85.6	86.1
2	95.6	98.2	84.0	86.2	88.5	90.9	90.8	93.6	79.7	82.6	76.6	78.6	71.1	73.1
3	92.9	96.7	76.9	78.8	82.7	86.2	78.7	82.3	68.1	71.5	69.1	71.5	62.7	65.1
4	90.9	95.9	69.3	72.5	79.1	83.4	75.3	79.4	64.0	67.8	58.0	61.6	53.9	56.6
5	88.6	94.9	65.2	68.1	75.9	81.0	66.5	72.0	60.5	65.2	55.9	59.3	48.9	52.0
6	85.8	93.2	63.1	66.7	72.7	78.8	60.9	66.3	55.5	60.9	52.7	57.0	42.6	46.3
7	83.0	91.6	60.8	64.7	70.0	76.7	59.4	64.5	51.2	56.3	50.5	54.7	41.5	45.5
8	81.7	91.4	55.7	61.0	65.8	73.4	56.1	62.5	50.1	55.9	48.3	53.5	39.3	44.0
9	78.9	89.8	55.7	60.3	63.7	71.8	52.2	60.1	45.5	51.8	48.3	53.7	36.9	41.4
10	76.8	88.8			61.8	70.5	52.2	60.2	42.9	50.0	48.3	53.9	35.7	40.4

<i>cont'd</i>	FIGO							
	IIIB n=332		IIIC n=2,086		IV n=1,271		NA/NOS n=775	
Years	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	85.0	86.4	79.3	80.6	55.6	57.1	61.7	63.8
2	70.4	72.4	59.8	61.7	35.9	37.4	49.1	51.9
3	59.2	61.7	45.4	47.5	24.3	25.8	39.8	42.7
4	51.5	54.0	36.1	38.3	17.2	18.5	34.5	37.7
5	44.7	47.9	29.8	32.0	13.2	14.4	32.6	36.1
6	36.9	40.1	25.7	28.0	10.5	11.6	30.4	34.3
7	33.3	36.2	21.0	23.3	8.8	9.9	28.6	32.7
8	28.0	30.9	19.4	21.7	7.6	8.7	27.1	31.5
9	25.9	28.7	17.3	19.6	7.0	8.2	26.1	30.8
10	23.0	26.1	16.4	18.9	6.2	7.6	25.0	29.9

**Table 4b.** Observed (obs.) and relative (rel.) survival of patients with ovarian cancer by FIGO for period 1988-2016 (N=5,484).



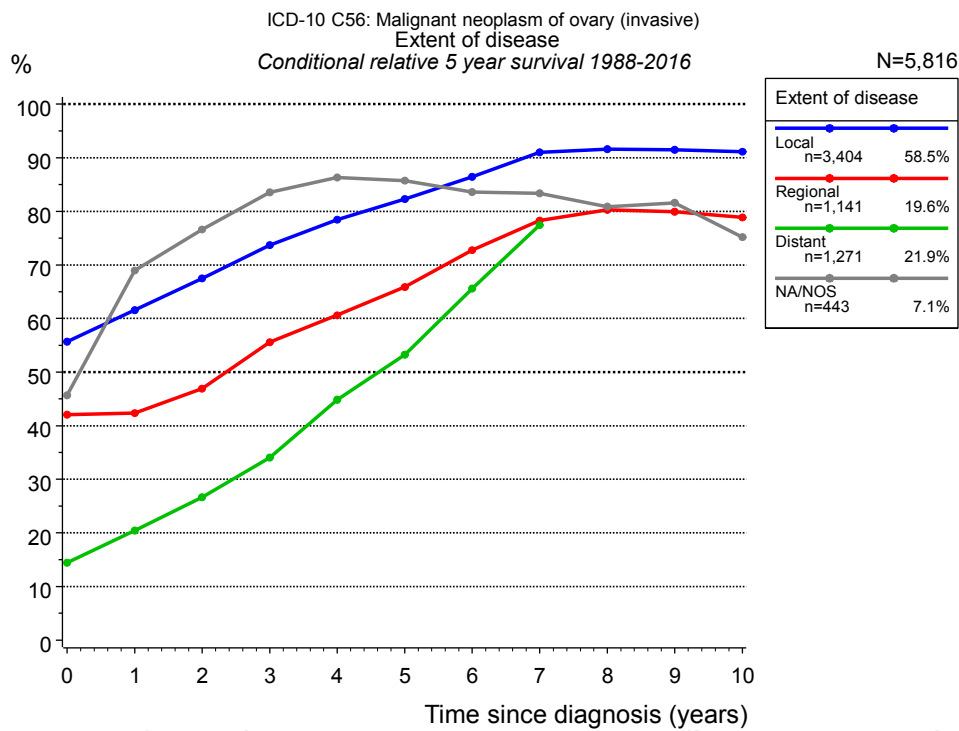


**Figure 4c.** Relative survival of patients with ovarian cancer by FIGO. For 4,580 of 4,910 cases diagnosed between 1998 and 2016 valid data could be obtained for this item. For a total of 4,299 cases an evaluable classification was established. The grey line represents the subgroup of 611 patients with missing values regarding FIGO (12.4 % of 4,910 patients, the percent values of all other categories are related to n=4,299).

Years	FIGO													
	IA n=516		IB n=48		IC n=383		IIA n=69		IIB n=111		IIC n=88		IIIA n=82	
	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	98.0	99.2	93.5	93.8	94.6	95.9	94.1	95.5	88.4	90.2	90.9	91.8	83.3	84.4
2	96.3	98.8	81.7	82.9	88.6	90.9	92.5	94.6	78.1	80.9	80.0	82.0	72.1	74.2
3	93.1	96.8	76.3	77.7	82.4	85.8	84.4	87.9	67.1	70.5	69.8	71.8	60.6	62.6
4	91.3	96.3	67.4	70.6	79.0	83.3	80.9	85.0	62.3	66.2	62.9	65.9	49.8	51.8
5	88.7	94.9	67.4	68.7	75.4	80.3	74.8	81.4	60.9	65.5	59.9	63.1	43.3	45.0
6	85.4	92.7			73.0	79.1	67.6	74.6	57.7	63.4	56.8	61.3	36.4	39.1
7	82.4	90.9			71.1	77.7	67.6	74.3	55.8	61.0	53.7	57.7		
8	80.9	90.4			68.0	75.7			54.0	59.6	50.5	55.3		
9	77.5	88.0			66.8	75.1			47.9	53.5	50.5	54.7		
10	75.3	86.8			64.0	72.7					50.5	54.2		

<i>cont'd</i>	FIGO							
	IIIB n=258		IIIC n=1,676		IV n=1,068		NA/NOS n=611	
Years	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	87.9	89.2	80.9	82.3	54.4	55.9	56.6	58.8
2	72.0	74.0	62.4	64.4	36.6	38.1	44.2	47.0
3	61.0	63.5	47.3	49.4	25.3	26.9	33.8	36.5
4	54.2	57.1	37.8	40.1	18.2	19.6	28.3	31.2
5	48.2	51.7	31.2	33.6	14.0	15.3	26.8	30.0
6	40.4	43.9	26.8	29.2	11.2	12.4	24.7	28.3
7	36.6	39.7	22.0	24.3	9.4	10.6	23.0	26.5
8	31.0	34.3	20.6	23.1	8.4	9.7	21.1	24.9
9	28.7	32.2	18.4	20.9	7.9	9.3	20.7	24.8
10	26.9	30.7	17.5	20.2	6.7	8.3	20.4	24.5

**Table 4d.** Observed (obs.) and relative (rel.) survival of patients with ovarian cancer by FIGO for period 1998-2016 (N=4,299).

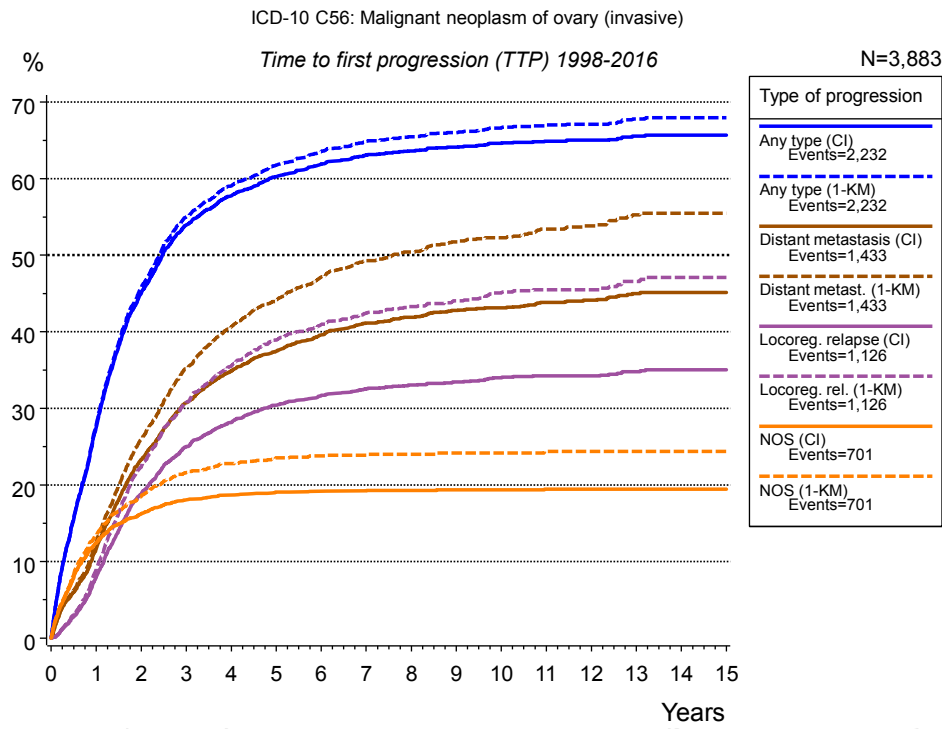


**Figure 4e.** Conditional relative 5-year survival of patients with ovarian cancer by extent of disease. For 5,839 of 6,259 cases diagnosed between 1988 and 2016 valid data could be obtained for this item. For a total of 5,816 cases an evaluable classification was established. The grey line represents the subgroup of 443 patients with missing values regarding extent of disease (7.1 % of 6,259 patients, the percent values of all other categories are related to n=5,816).

Years	Extent of disease							
	Local		Regional		Distant		NA/NOS	
	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs
0	3,404	55.7	1,141	42.1	1,271	14.4	443	45.7
1	2,708	61.6	930	42.3	665	20.4	257	68.9
2	2,178	67.5	696	46.9	411	26.6	207	76.6
3	1,800	73.7	505	55.6	257	34.1	174	83.5
4	1,524	78.4	387	60.6	169	44.9	155	86.4
5	1,320	82.3	304	65.9	118	53.3	145	85.7
6	1,137	86.4	247	72.8	89	65.6	131	83.6
7	983	91.0	201	78.3	63	77.4	116	83.4
8	866	91.6	161	80.3			99	80.9
9	752	91.5	130	79.9			88	81.6
10	658	91.1	110	78.9			82	75.2

**Table 4f.** Conditional relative 5-year survival of patients with ovarian cancer by extent of disease for period 1988-2016 (N=5,816).

Conditional relative survival rates refer to the relative survival probability, in this case for 5 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 5-year survival rate is 73.7% (n=1,800).

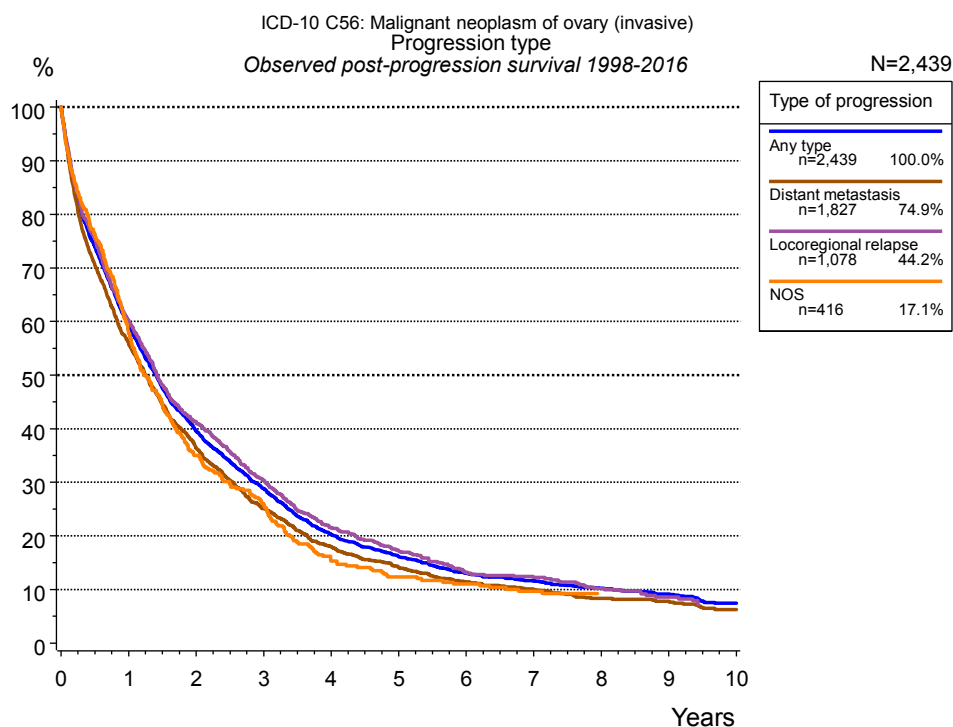


**Figure 5a.** Time to first progression of 3,883 patients with ovarian cancer diagnosed between 1998 and 2016 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency 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=3,883 %	n=3,883 %	n=3,883 %	n=3,883 %	n=3,883 %	n=3,883 %	n=3,883 %
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	27.6	27.9	11.7	12.5	8.0	9.0	12.5
2	45.0	45.7	23.3	26.0	18.8	22.4	16.2
3	53.9	55.0	30.7	35.2	25.0	30.8	18.1
4	57.8	59.1	34.9	40.6	28.2	35.5	18.7
5	60.3	61.8	37.5	44.1	30.4	39.0	19.1
6	61.9	63.6	39.7	47.2	31.7	41.0	19.2
7	63.1	64.8	41.1	49.3	32.6	42.5	19.2
8	63.6	65.5	41.9	50.4	33.0	43.3	19.3
9	64.1	66.0	42.8	51.8	33.4	44.0	19.3
10	64.6	66.6	43.1	52.3	34.0	45.1	19.3
11	64.9	67.0	43.8	53.4	34.2	45.5	19.4
12	65.0	67.1	44.1	53.8	34.2	45.5	19.4
13	65.6	67.8	45.0	55.3	34.8	46.6	19.4
14	65.7	68.0	45.1	55.5	35.1	47.1	19.4
15	65.7	68.0	45.1	55.5	35.1	47.1	19.4

Type of progression	
<i>cont'd</i>	NOS (1-KM) n=3,883
Years	%
0	0.0
1	13.5
2	18.5
3	21.6
4	22.8
5	23.5
6	23.8
7	23.9
8	24.0
9	24.2
10	24.2
11	24.4
12	24.4
13	24.4
14	24.4
15	24.4

**Table 5b.** Time to first progression of patients with ovarian cancer for period 1998-2016 (N=3,883).

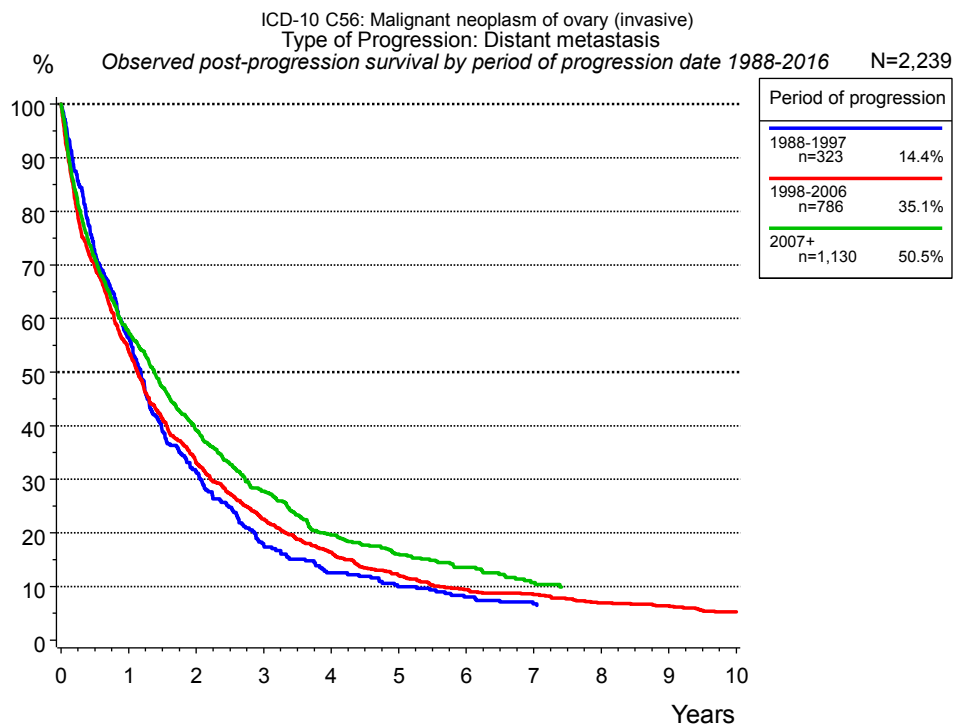


**Figure 5c.** Observed post-progression survival of 2,439 patients with ovarian cancer diagnosed between 1998 and 2016. These 2,439 patients with documented progression events during their course of disease represent 49.9 % of the totally 4,891 evaluated cases (incl. M1, n=1,008, 20.6 %). Patients with cancer relapse documented via death certificates only were excluded (n=801, 16.4 %). 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=2,439 %	Distant metastasis n=1,827 %	Locoregional relapse n=1,078 %	NOS n=416 %
0	100.0	100.0	100.0	100.0
1	59.3	55.9	60.2	58.0
2	39.7	36.5	41.2	35.0
3	28.8	25.1	30.4	25.8
4	20.3	18.0	21.5	15.3
5	16.1	14.1	17.2	12.3
6	13.1	11.4	13.2	11.0
7	11.6	10.0	12.2	9.6
8	10.2	8.3	10.2	
9	9.2	7.8	8.6	
10	7.4	6.3		

**Table 5d.** Observed post-progression survival of patients with ovarian cancer for period 1998-2016 (N=2,439).



**Figure 5e.** Observed post-progression (distant metastasis) survival of 2,239 patients with ovarian cancer diagnosed between 1988 and 2016 by period of progression.

Years	Period of progression		
	1988-1997 n=323 %	1988-2006 n=786 %	2007+ n=1,130 %
0	100.0	100.0	100.0
1	56.2	54.0	57.5
2	31.5	33.1	39.2
3	18.0	22.5	27.7
4	12.5	16.4	19.6
5	10.0	12.0	16.1
6	8.0	9.4	13.5
7	6.7	8.5	10.7
8		6.9	
9		6.4	
10		5.2	

**Table 5f.** Observed post-progression (distant metastasis) survival of patients with ovarian cancer for period 1988-2016 by period of progression (N=2,239).

## 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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