

# Munich Cancer Registry



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## ICD-10 C18-C21: Colorectal cancer

### Survival

Year of diagnosis	1988-1997	1998-2016
Patients	10,358	52,059
Diseases	10,530	53,494
Cases evaluated	9,273	40,541
Creation date	08/22/2018	
Export date	08/09/2018	
Population	4.81 m	



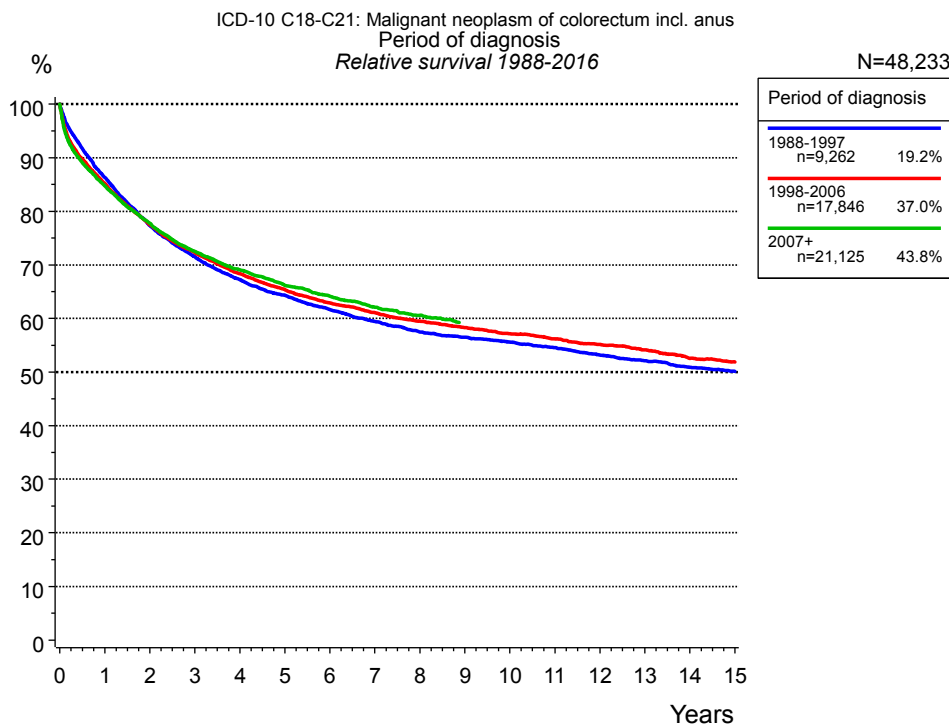
Munich Cancer Registry  
Cancer Registry Bavaria - Upper Bavaria Regional Center  
at Klinikum Grosshadern/IBE  
Marchioninstr. 15  
Munich, 81377  
Germany

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

<https://www.tumorregister-muenchen.de/en/facts/surv/sC1821E-ICD-10-C18-C21-Colorectal-cancer-survival.pdf>

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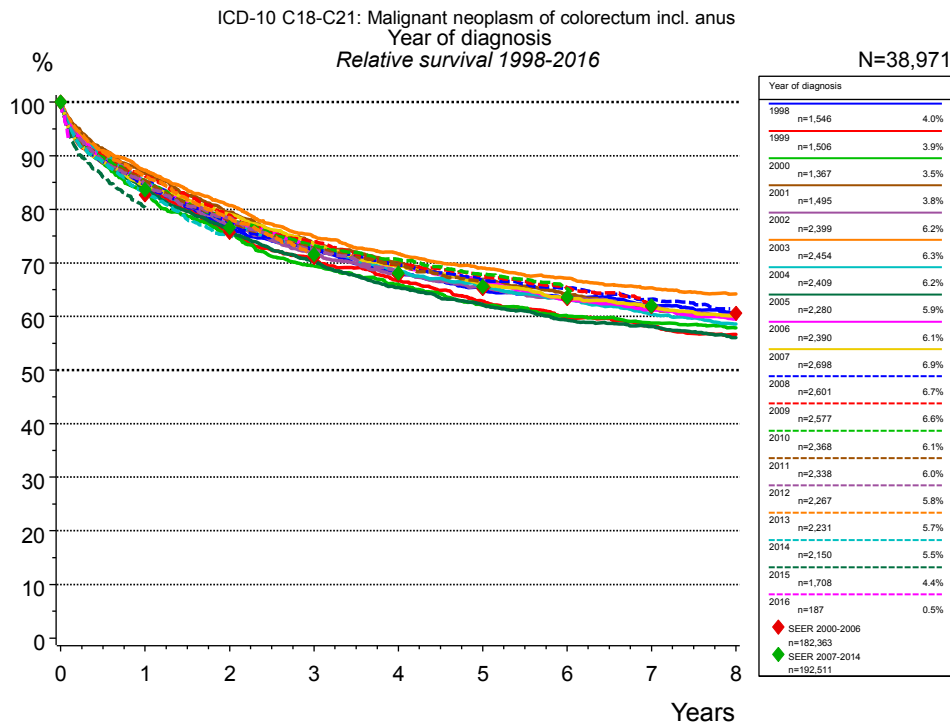


**Figure 1a.** Relative survival of patients with colorectal cancer by period of diagnosis. Included in the evaluation are 48,233 cases diagnosed between 1988 and 2016.

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=9,262		1998-2006 n=17,846		2007+ n=21,125	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	83.2	86.3	82.1	85.2	81.8	84.8
2	72.0	77.3	72.2	77.5	72.7	77.8
3	64.4	71.5	65.2	72.3	65.7	72.5
4	58.5	67.2	59.7	68.4	60.6	69.1
5	54.1	64.4	55.2	65.4	56.2	66.2
6	50.0	61.7	51.4	62.9	52.7	64.1
7	46.6	59.4	48.3	61.1	49.3	62.1
8	43.5	57.5	45.5	59.5	46.6	60.6
9	41.3	56.5	43.0	58.3		
10	39.2	55.6	40.7	57.1		
11	37.1	54.6	38.6	56.2		
12	34.9	53.2	36.6	55.1		
13	33.1	52.2	34.6	54.1		
14	31.1	50.9	32.4	52.6		
15	29.5	50.1	30.8	51.9		

**Table 1b.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by period of diagnosis for period 1988-2016 (N=48,233).



**Figure 1c.** Relative survival of patients with colorectal cancer by year of diagnosis. Included in the evaluation are 38,971 cases diagnosed between 1998 and 2016.

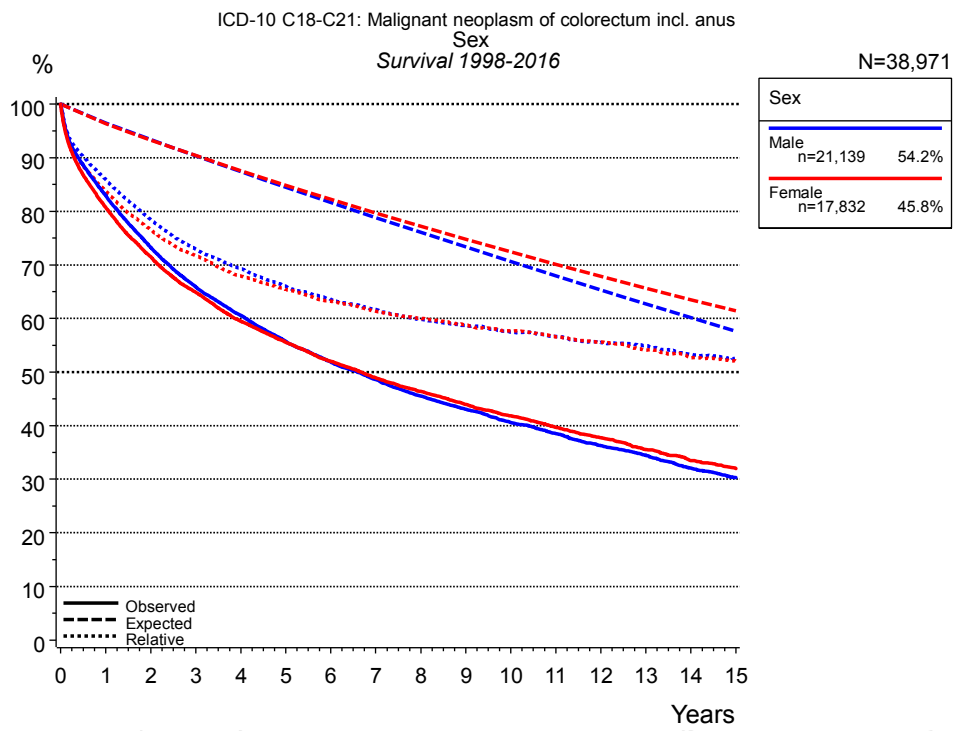
The survival results of the SEER program (Surveillance, Epidemiology, and End Results) of the American National Cancer Institute (NCI) are summarized as the period of diagnosis from 2000 to 2014, and are represented by colored diamonds in order to facilitate comparisons between MCR and SEER.

Years	Year of diagnosis													
	1998		1999		2000		2001		2002		2003		2004	
	n=1,546		n=1,506		n=1,367		n=1,495		n=2,399		n=2,454		n=2,409	
	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	81.9	85.2	80.9	84.3	80.0	83.2	83.5	86.7	81.9	85.1	84.2	87.3	82.0	85.1
2	71.0	76.5	70.3	75.7	70.1	75.4	74.0	79.4	71.6	77.1	75.4	80.7	72.2	77.4
3	64.8	72.2	63.0	70.4	62.4	69.4	66.4	73.7	64.4	71.7	67.8	75.0	65.7	72.9
4	59.0	68.1	57.7	66.7	57.4	66.0	61.2	70.1	59.2	68.1	62.8	71.7	59.8	68.5
5	54.7	65.3	52.5	62.8	52.3	62.1	56.6	66.9	55.0	65.4	58.5	69.0	55.5	65.8
6	51.3	63.4	48.3	59.8	49.0	60.1	52.6	64.1	51.6	63.4	55.0	67.1	51.8	63.4
7	48.6	62.1	45.5	58.3	46.4	58.8	49.0	61.7	48.7	62.0	51.7	65.3	47.6	60.4
8	45.9	60.6	42.8	56.6	44.2	57.9	46.3	60.1	45.7	60.3	49.1	64.2	44.7	58.6

cont'd Years	Year of diagnosis													
	2005		2006		2007		2008		2009		2010		2011	
	n=2,280		n=2,390		n=2,698		n=2,601		n=2,577		n=2,368		n=2,338	
	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	81.0	84.0	82.4	85.2	81.4	84.3	81.7	84.8	83.2	86.2	82.3	85.4	82.3	85.3
2	70.9	75.9	72.9	77.7	74.1	79.1	72.4	77.5	73.7	78.9	73.0	78.2	72.6	77.7
3	63.6	70.2	66.7	73.3	66.6	73.4	65.6	72.7	66.9	73.9	66.1	73.3	65.8	72.7
4	57.3	65.4	61.2	69.4	61.0	69.5	60.9	69.6	61.1	69.7	61.7	70.7	61.0	69.6
5	52.8	62.3	57.0	66.7	56.2	66.0	56.4	66.7	57.3	67.5	57.3	67.8	56.5	66.4
6	48.7	59.3	52.3	63.1	52.3	63.5	53.4	65.3	53.6	65.3	53.5	65.2		
7	46.1	58.1	49.1	61.3	49.1	61.7	50.1	63.2						
8	42.9	56.0	46.1	59.5	46.4	60.1								

<i>cont'd</i>	Year of diagnosis									
	2012 n=2,267		2013 n=2,231		2014 n=2,150		2015 n=1,708		2016 n=187	
Years	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	81.8	84.7	83.3	86.2	80.4	83.2	77.5	80.3		
2	73.4	78.4	73.6	78.5	70.9	75.3				
3	65.8	72.5	64.9	71.4						

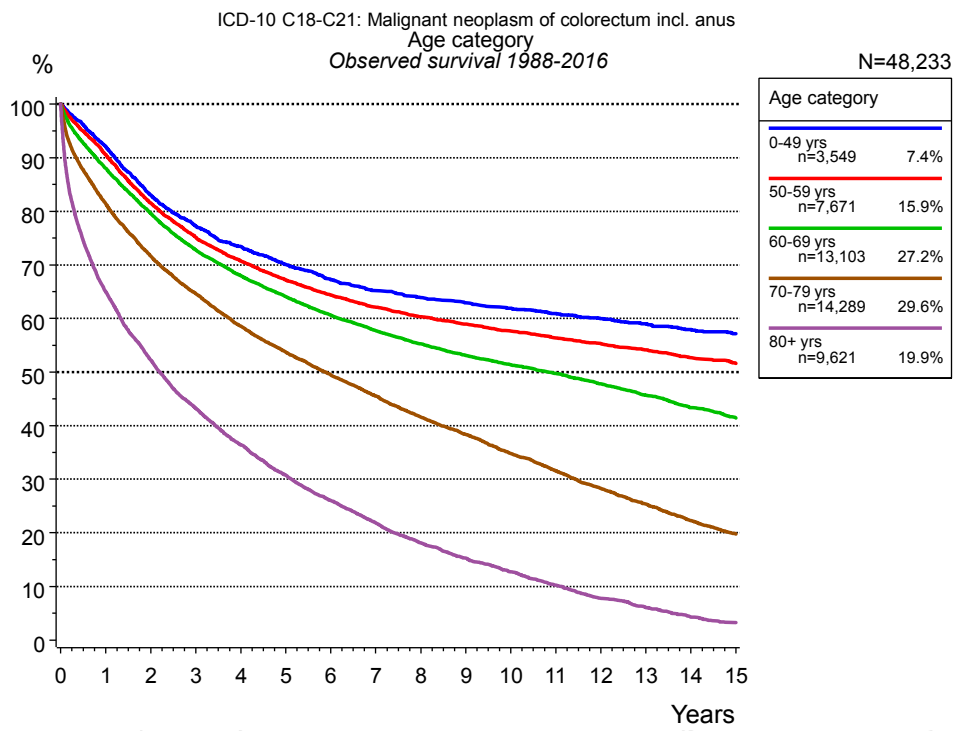
**Table 1d.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by year of diagnosis for period 1998-2016 (N=38,971).



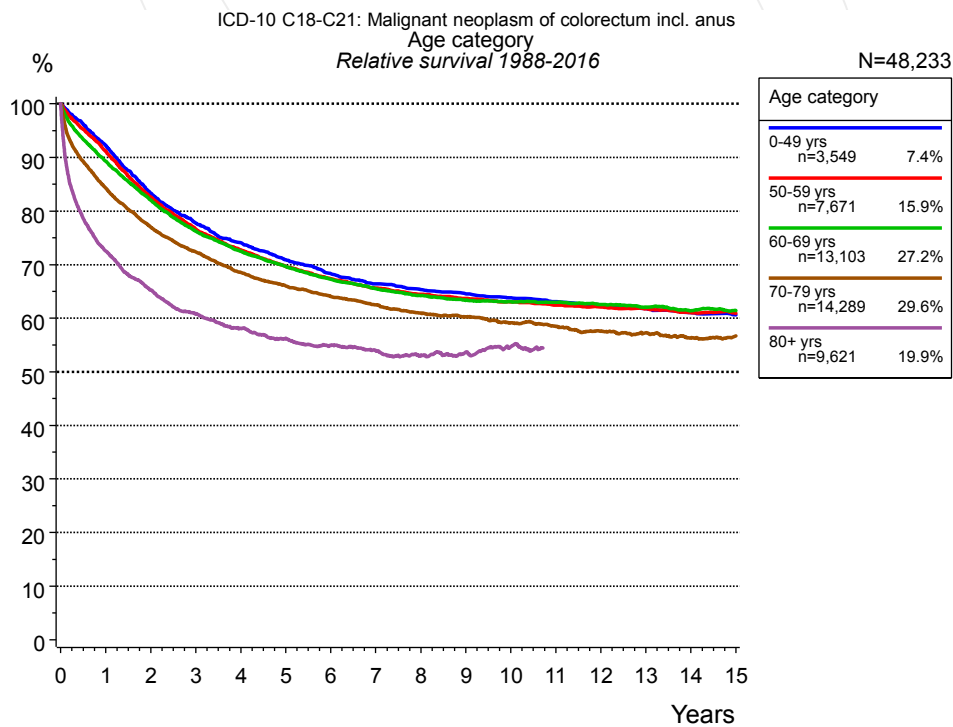
**Figure 2a.** Survival of patients with colorectal cancer by sex. Included in the evaluation are 38,971 cases diagnosed between 1998 and 2016.

Years	Sex			
	Male n=21,139		Female n=17,832	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	83.0	86.0	80.7	83.8
2	73.3	78.5	71.5	76.6
3	65.9	72.9	64.9	71.7
4	60.6	69.3	59.5	67.9
5	55.7	66.0	55.6	65.5
6	51.9	63.6	52.0	63.2
7	48.6	61.7	48.9	61.4
8	45.5	59.9	46.4	60.1
9	43.1	58.7	44.0	58.8
10	40.6	57.5	41.8	57.7
11	38.5	56.7	39.7	56.6
12	36.3	55.5	37.7	55.6
13	34.5	55.0	35.5	54.1
14	32.1	53.3	33.5	52.7
15	30.3	52.6	32.0	52.0

**Table 2b.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by sex for period 1998-2016 (N=38,971).



**Figure 3a.** Observed survival of patients with colorectal cancer by age category. Included in the evaluation are 48,233 cases diagnosed between 1988 and 2016.

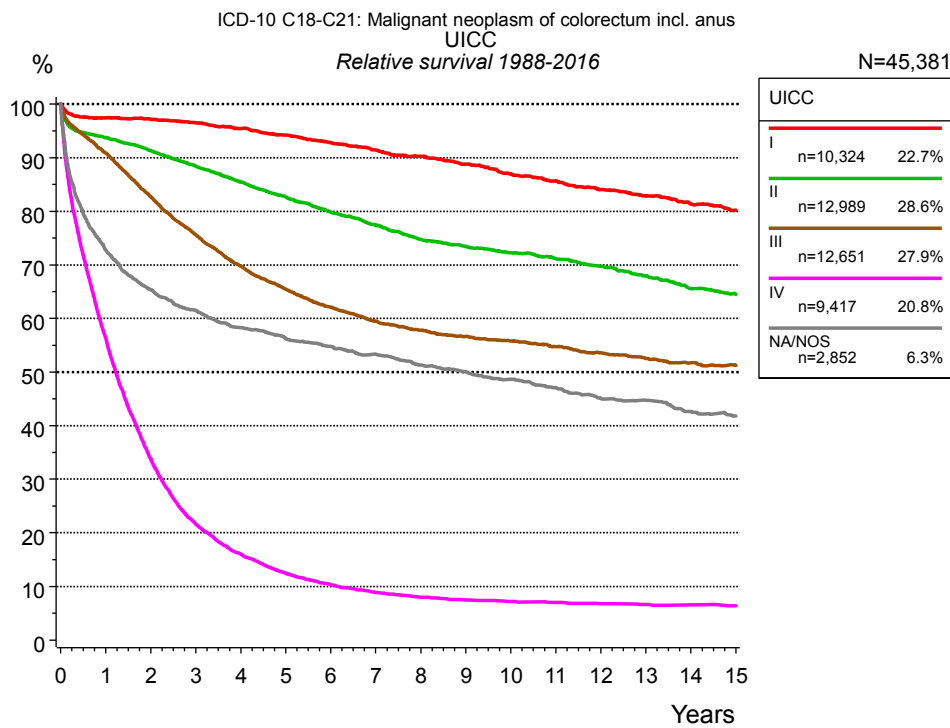


**Figure 3b.** Relative survival of patients with colorectal cancer by age category. Included in the evaluation are 48,233 cases diagnosed between 1988 and 2016.

Years	Age category									
	0-49 yrs n=3,549		50-59 yrs n=7,671		60-69 yrs n=13,103		70-79 yrs n=14,289		80+ yrs n=9,621	
	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	92.0	92.2	90.6	91.1	88.0	89.3	81.4	84.3	65.0	72.5
2	83.0	83.3	81.5	82.6	79.6	82.0	71.6	77.0	52.3	65.3
3	77.2	77.7	75.1	76.6	72.8	76.2	64.6	72.4	43.3	60.8
4	73.4	74.1	70.7	72.7	68.0	72.5	58.6	68.5	36.4	58.1
5	70.0	70.9	67.2	69.7	64.1	69.7	53.7	66.0	30.8	56.3
6	67.3	68.3	64.3	67.3	60.6	67.3	49.4	64.1	26.0	54.9
7	65.2	66.4	62.1	65.6	57.7	65.5	45.5	62.5	21.8	53.9
8	63.9	65.3	60.3	64.4	55.3	64.2	41.6	60.9	18.1	53.1
9	62.9	64.6	58.9	63.7	53.1	63.4	38.3	60.2	15.2	53.7
10	61.9	63.8	57.6	63.0	51.4	63.1	34.8	59.1	12.7	54.7
11	60.9	63.1	56.4	62.5	49.7	63.0	31.6	58.5	10.2	54.5
12	60.0	62.5	55.2	62.1	47.8	62.6	28.3	57.5	7.8	52.6
13	59.0	61.8	54.1	61.8	45.7	62.1	25.4	57.3	6.1	53.3
14	57.9	61.0	52.7	61.1	43.4	61.4	22.3	56.3	4.3	50.0
15	57.1	60.6	51.6	60.9	41.4	61.4	19.8	56.7	3.2	50.6

**Table 3c.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by age category for period 1988-2016 (N=48,233).

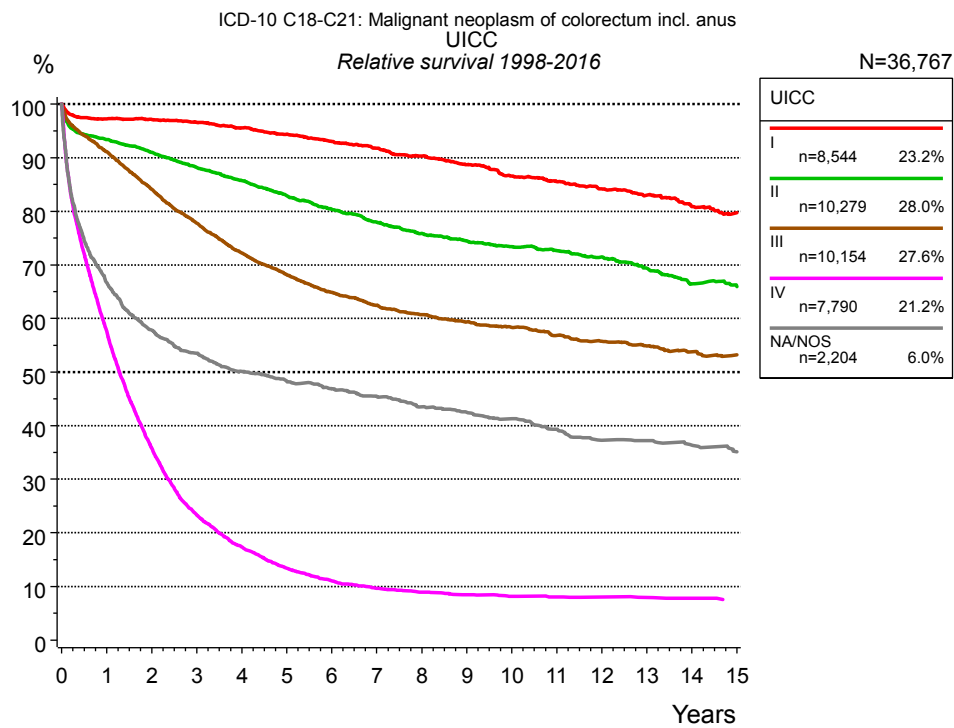




**Figure 4a.** Relative survival of patients with colorectal cancer by UICC. For 45,674 of 48,233 cases diagnosed between 1988 and 2016 valid data could be obtained for this item. For a total of 45,381 cases an evaluable classification was established. The grey line represents the subgroup of 2,852 patients with missing values regarding UICC (5.9 % of 48,233 patients, the percent values of all other categories are related to n=45,381).

Years	UICC									
	I n=10,324		II n=12,989		III n=12,651		IV n=9,417		NA/NOS n=2,852	
	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	94.4	97.4	90.0	93.7	87.8	90.9	54.4	56.3	69.0	72.8
2	91.3	97.2	84.4	91.3	77.5	82.7	31.9	33.8	59.5	65.4
3	87.8	96.5	78.8	88.4	68.7	75.6	19.9	21.6	54.0	61.5
4	84.1	95.4	73.4	85.5	61.5	69.8	14.4	16.0	49.6	58.3
5	80.3	94.2	68.4	82.7	56.0	65.5	11.0	12.5	46.5	56.3
6	76.5	92.8	63.6	79.8	51.4	62.1	8.9	10.3	43.9	54.8
7	72.8	91.4	59.4	77.4	47.8	59.5	7.4	8.9	41.5	53.3
8	69.5	90.3	55.2	74.7	45.0	57.8	6.6	8.0	38.7	51.3
9	66.0	88.8	52.2	73.5	42.8	56.6	6.0	7.5	36.6	50.0
10	62.4	87.0	49.5	72.3	40.8	55.8	5.6	7.2	34.5	48.7
11	59.3	85.6	46.9	71.2	38.7	54.7	5.3	7.0	32.2	47.1
12	56.2	84.1	44.2	69.8	36.7	53.6	5.0	6.8	29.9	45.1
13	53.5	82.9	41.5	68.0	34.8	52.6	4.7	6.6	28.7	44.8
14	50.5	81.3	38.5	65.6	33.1	51.8	4.5	6.5	26.5	42.6
15	48.0	80.2	36.4	64.5	31.6	51.3	4.3	6.4	25.1	41.8

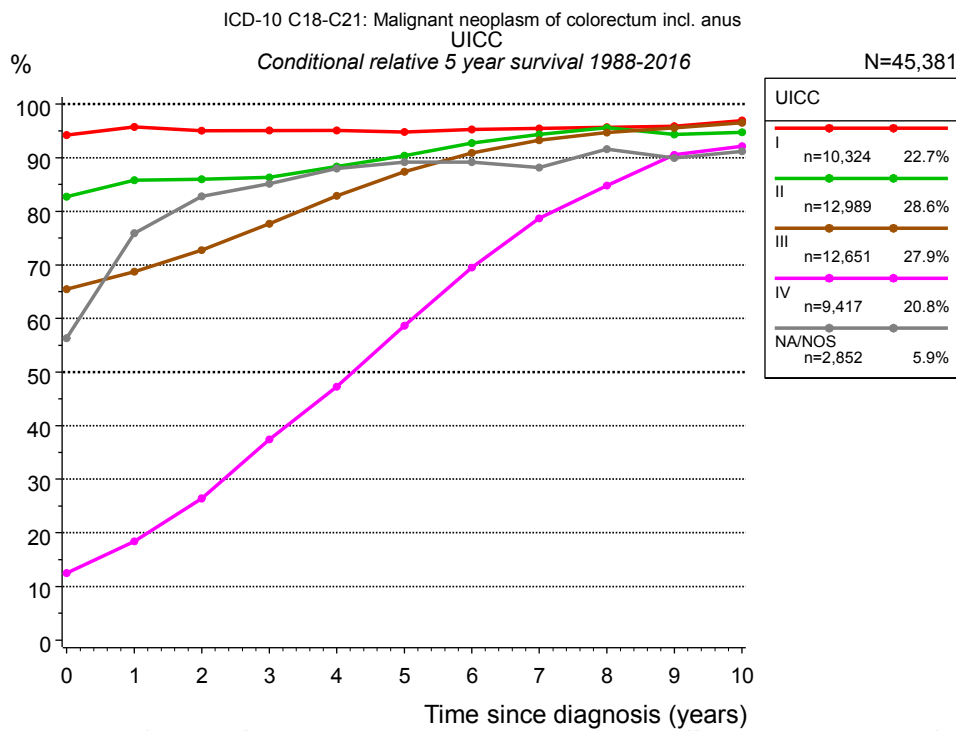
**Table 4b.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by UICC for period 1988-2016 (N=45,381).



**Figure 4c.** Relative survival of patients with colorectal cancer by UICC. For 37,009 of 38,971 cases diagnosed between 1998 and 2016 valid data could be obtained for this item. For a total of 36,767 cases an evaluable classification was established. The grey line represents the subgroup of 2,204 patients with missing values regarding UICC (5.7 % of 38,971 patients, the percent values of all other categories are related to n=36,767).

Years	UICC									
	I n=8,544		II n=10,279		III n=10,154		IV n=7,790		NA/NOS n=2,204	
	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	94.2	97.2	89.6	93.4	88.1	91.1	55.7	57.6	63.0	66.7
2	91.3	97.2	84.1	91.0	78.9	84.1	33.8	35.8	52.3	57.8
3	87.9	96.6	78.5	88.2	70.8	77.8	21.5	23.3	46.8	53.5
4	84.2	95.6	73.6	85.7	63.8	72.2	15.6	17.3	42.5	50.1
5	80.5	94.4	68.6	82.9	58.4	68.2	11.8	13.4	39.8	48.3
6	76.8	93.0	64.0	80.4	53.9	64.8	9.5	11.1	37.6	46.9
7	73.2	91.8	59.8	77.9	50.3	62.5	8.1	9.6	35.5	45.5
8	69.6	90.3	56.1	75.9	47.5	60.7	7.4	8.9	33.1	43.5
9	66.0	88.7	53.0	74.5	45.0	59.4	6.8	8.5	31.5	42.5
10	62.2	86.6	50.3	73.4	42.8	58.3	6.4	8.2	29.8	41.3
11	59.2	85.5	47.9	72.7	40.3	56.8	6.1	8.0	27.6	39.3
12	56.2	84.2	45.3	71.5	38.3	55.7	5.9	8.0	25.4	37.3
13	53.4	83.0	42.2	69.4	36.5	54.9	5.7	8.0	24.7	37.2
14	50.0	80.9	38.9	66.5	34.5	53.8	5.5	7.8	23.6	36.4
15	47.4	79.7	37.0	66.0	33.0	53.2	5.1	7.4	22.1	35.2

**Table 4d.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by UICC for period 1998-2016 (N=36,767).

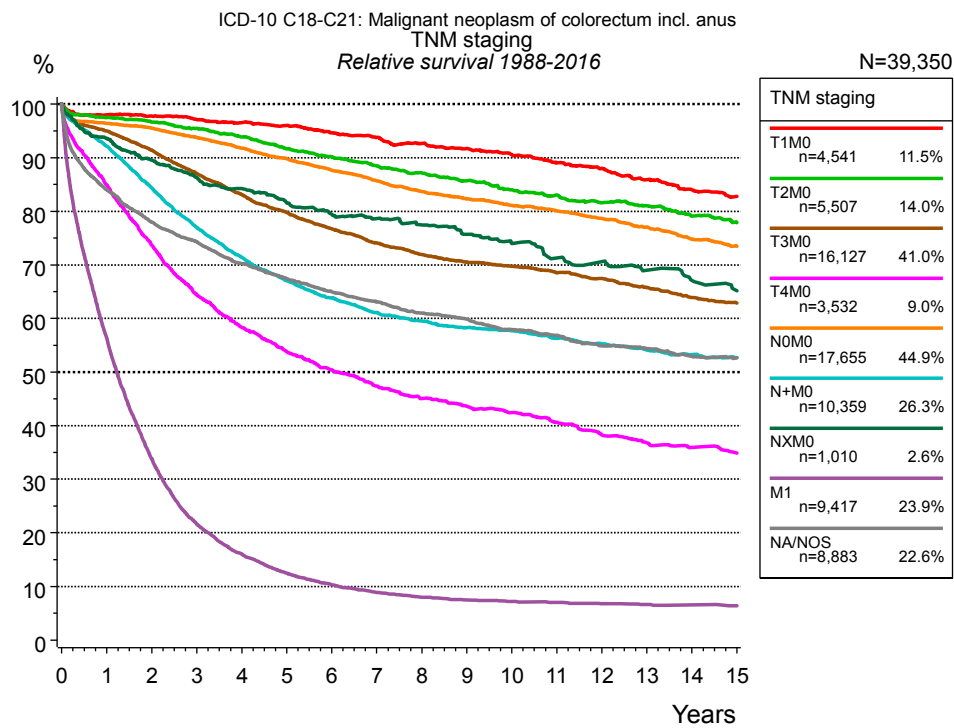


**Figure 4e.** Conditional relative 5-year survival of patients with colorectal cancer by UICC. For 45,674 of 48,233 cases diagnosed between 1988 and 2016 valid data could be obtained for this item. For a total of 45,381 cases an evaluable classification was established. The grey line represents the subgroup of 2,852 patients with missing values regarding UICC (5.9 % of 48,233 patients, the percent values of all other categories are related to n=45,381).

Years	UICC									
	I		II		III		IV		NA/NOS	
	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs
0	10,324	94.2	12,989	82.7	12,651	65.5	9,417	12.5	2,852	56.3
1	9,276	95.8	11,095	85.8	10,500	68.7	4,846	18.4	1,874	75.9
2	8,531	95.1	9,926	86.0	8,788	72.8	2,664	26.4	1,576	82.7
3	7,754	95.1	8,770	86.3	7,322	77.7	1,544	37.5	1,386	85.1
4	6,978	95.1	7,732	88.3	6,089	82.9	1,019	47.3	1,236	88.0
5	6,249	94.8	6,792	90.4	5,120	87.4	699	58.7	1,107	89.2
6	5,543	95.3	5,863	92.8	4,342	90.9	498	69.5	1,004	89.2
7	4,835	95.4	5,057	94.3	3,650	93.2	369	78.7	901	88.2
8	4,206	95.7	4,342	95.6	3,050	94.7	288	84.8	795	91.6
9	3,603	95.9	3,741	94.3	2,559	95.6	224	90.6	701	89.9
10	3,071	97.0	3,214	94.7	2,177	96.5	178	92.1	620	91.2

**Table 4f.** Conditional relative 5-year survival of patients with colorectal cancer by UICC for period 1988-2016 (N=45,381).

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 UICC="I", who are alive at least 3 years after cancer diagnosis, the conditional relative 5-year survival rate is 95.1% (n=7,754).

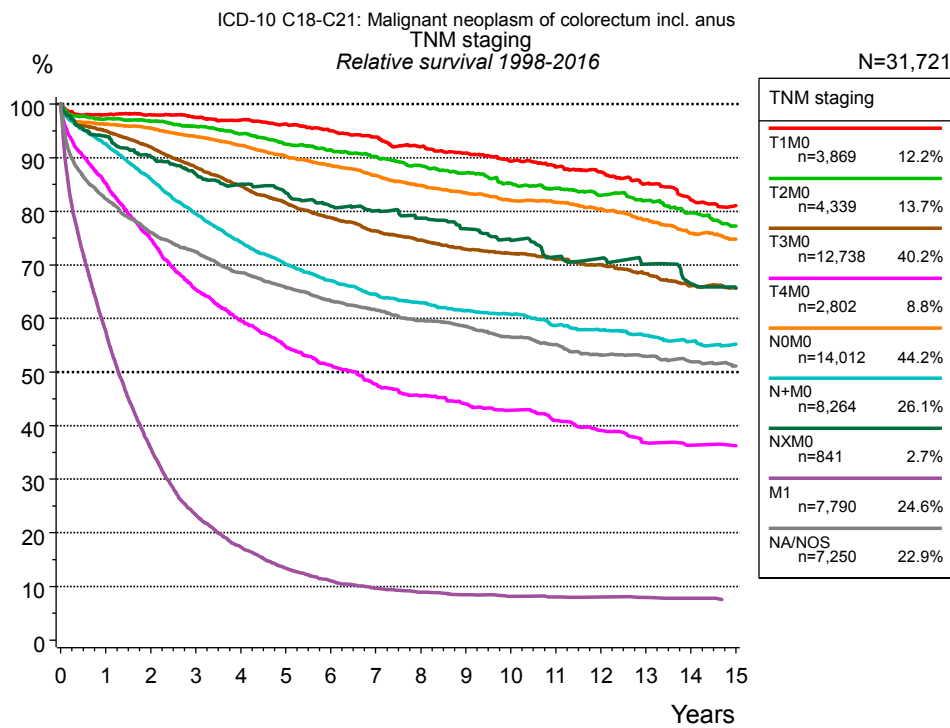


**Figure 4g.** Relative survival of patients with colorectal cancer by TNM staging. For 45,674 of 48,233 cases diagnosed between 1988 and 2016 valid data could be obtained for this item. For a total of 39,350 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 8,883 patients with missing values regarding TNM staging (18.4 % of 48,233 patients, the percent values of all other categories are related to n=39,350).

Years	TNM staging													
	T1M0 n=4,541		T2M0 n=5,507		T3M0 n=16,127		T4M0 n=3,532		N0M0 n=17,655		N+M0 n=10,359		NXM0 n=1,010	
	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	95.4	98.0	94.4	97.5	91.6	95.0	81.5	85.0	93.1	96.4	89.2	92.2	90.7	93.6
2	92.6	97.8	90.6	96.6	85.3	91.4	68.2	73.7	89.1	95.5	79.2	84.4	84.2	89.6
3	89.4	97.1	86.7	95.5	78.5	87.0	57.6	64.5	84.6	93.8	70.2	77.0	78.9	86.3
4	86.3	96.5	82.6	93.9	72.5	83.1	50.4	58.3	80.0	91.8	63.2	71.4	74.9	84.3
5	83.4	96.0	78.1	91.7	67.2	79.8	45.0	53.8	75.6	89.8	57.6	67.1	70.4	81.6
6	79.7	94.6	74.3	90.2	62.4	76.7	40.8	50.4	71.3	87.7	53.2	63.8	66.6	79.4
7	76.5	93.8	70.6	88.5	58.2	74.1	37.1	47.4	67.3	85.7	49.5	61.1	64.1	78.7
8	73.2	92.6	67.2	87.2	54.7	72.0	34.1	45.0	63.5	83.7	46.8	59.5	61.3	77.4
9	70.1	91.7	63.9	85.7	51.7	70.5	31.9	43.6	60.3	82.4	44.5	58.3	58.1	75.7
10	67.0	90.6	60.5	84.0	49.3	69.7	30.1	42.4	57.2	81.1	42.6	57.7	55.0	74.0
11	63.6	89.0	57.8	83.0	46.8	68.6	27.9	40.6	54.5	80.1	40.3	56.3	51.4	71.3
12	60.7	88.0	54.8	81.6	44.4	67.5	25.4	38.3	51.6	78.6	38.3	55.3	49.3	70.6
13	57.2	85.9	52.6	81.0	41.7	65.8	23.7	36.8	48.7	77.1	36.3	54.1	46.5	69.0
14	53.9	84.0	49.5	79.1	39.0	63.9	22.3	35.9	45.5	74.8	34.5	53.3	43.9	67.1
15	51.3	82.8	47.0	77.9	36.9	62.9	21.0	34.9	43.0	73.5	33.0	52.7	41.1	65.1

<i>cont'd</i>	TNM staging			
	M1		NA/NOS	
	n=9,417		n=8,883	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	54.4	56.3	80.2	84.0
2	31.9	33.8	71.6	78.0
3	19.9	21.6	65.7	74.3
4	14.4	16.0	59.9	70.3
5	11.0	12.5	55.5	67.5
6	8.9	10.3	51.5	65.0
7	7.4	8.9	48.3	63.1
8	6.6	8.0	45.0	61.0
9	6.0	7.5	42.6	59.9
10	5.6	7.2	39.7	57.9
11	5.3	7.0	37.5	56.9
12	5.0	6.8	34.9	54.9
13	4.7	6.6	33.3	54.4
14	4.5	6.5	31.2	53.0
15	4.3	6.4	29.9	52.7

**Table 4h.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by TNM staging for period 1988-2016 (N=39,350).

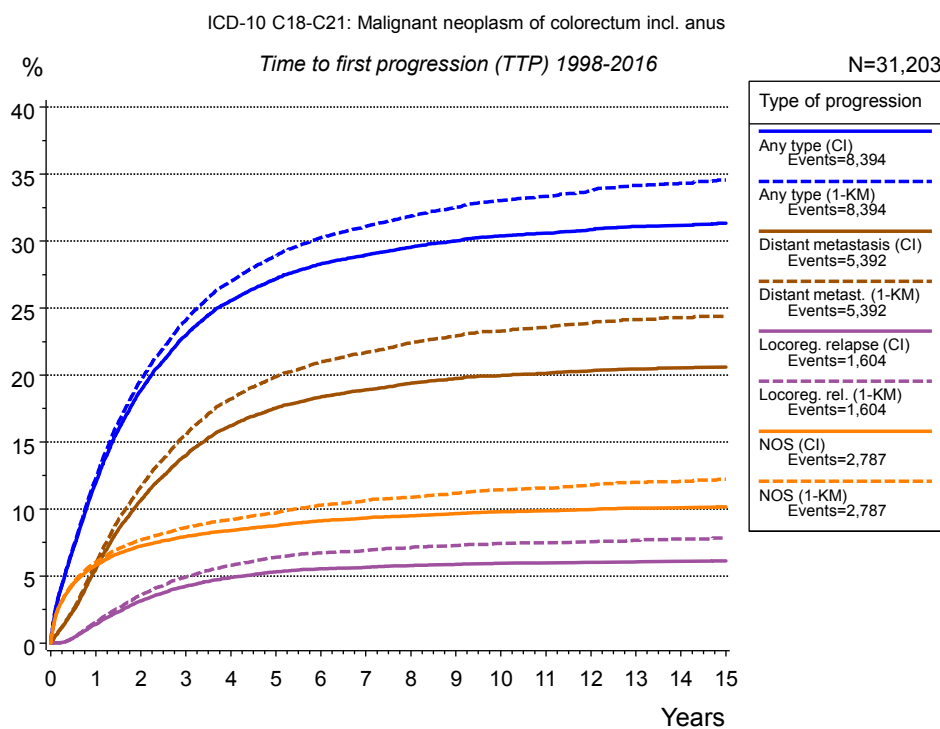


**Figure 4i.** Relative survival of patients with colorectal cancer by TNM staging. For 37,009 of 38,971 cases diagnosed between 1998 and 2016 valid data could be obtained for this item. For a total of 31,721 cases an evaluable classification was established. The accumulated percentage exceeds the 100 % value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 7,250 patients with missing values regarding TNM staging (18.6 % of 38,971 patients, the percent values of all other categories are related to n=31,721).

Years	TNM staging													
	T1M0 n=3,869		T2M0 n=4,339		T3M0 n=12,738		T4M0 n=2,802		N0M0 n=14,012		N+M0 n=8,264		NXM0 n=841	
	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	95.4	98.0	94.1	97.2	91.7	95.0	81.9	85.3	92.9	96.2	89.6	92.6	91.2	94.0
2	92.8	98.0	90.8	96.8	85.9	92.0	69.4	74.8	89.2	95.5	80.9	86.1	85.1	90.3
3	89.8	97.5	87.1	95.8	79.6	88.2	58.7	65.4	84.8	93.9	72.6	79.5	79.7	87.0
4	86.8	97.0	83.1	94.4	73.9	84.7	51.8	59.6	80.5	92.3	65.9	74.3	75.9	85.1
5	83.6	96.3	78.8	92.6	68.8	81.6	46.0	54.7	76.1	90.3	60.5	70.2	72.3	83.4
6	80.1	95.0	75.4	91.4	64.2	78.8	41.8	51.3	72.1	88.6	56.1	67.1	68.4	81.0
7	76.6	93.8	72.0	90.2	60.0	76.3	37.7	47.7	68.1	86.7	52.4	64.5	65.7	80.1
8	72.8	92.1	68.2	88.5	56.7	74.6	34.9	45.6	64.4	84.8	49.6	62.9	62.8	78.7
9	69.5	90.9	64.9	87.1	53.5	72.9	32.7	44.0	61.1	83.5	47.0	61.4	59.4	76.8
10	66.1	89.4	61.4	85.2	51.0	72.1	30.9	42.9	57.9	82.1	45.1	60.7	55.7	74.5
11	63.0	88.3	58.7	84.3	48.4	71.0	28.6	41.0	55.5	81.7	42.2	58.7	52.0	71.5
12	60.2	87.4	55.7	83.0	46.0	70.0	26.5	39.1	52.7	80.4	40.2	57.8	50.3	71.2
13	56.5	85.1	53.2	82.0	43.2	68.4	24.2	36.8	49.4	78.4	38.2	56.8	47.8	70.2
14	52.3	82.1	49.8	79.7	40.2	66.1	23.1	36.3	46.0	75.9	36.2	55.7	43.9	66.6
15	49.9	81.1	46.6	77.2	38.4	65.6	22.3	36.2	43.6	74.9	34.7	55.2	42.1	65.7

<i>cont'd</i>	TNM staging			
	M1 n=7,790		NA/NOS n=7,250	
	obs. %	rel. %	obs. %	rel. %
Years				
0	100.0	100.0	100.0	100.0
1	55.7	57.6	78.5	82.3
2	33.8	35.8	69.7	76.0
3	21.5	23.3	64.0	72.4
4	15.6	17.3	58.4	68.5
5	11.8	13.4	54.2	65.9
6	9.5	11.1	50.2	63.3
7	8.1	9.6	47.2	61.6
8	7.4	8.9	44.1	59.6
9	6.8	8.5	41.7	58.5
10	6.4	8.2	38.9	56.5
11	6.1	8.0	36.6	55.2
12	5.9	8.0	34.0	53.2
13	5.7	8.0	32.7	52.9
14	5.5	7.8	30.9	51.9
15	5.1	7.4	29.4	51.1

**Table 4j.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by TNM staging for period 1998-2016 (N=31,721).



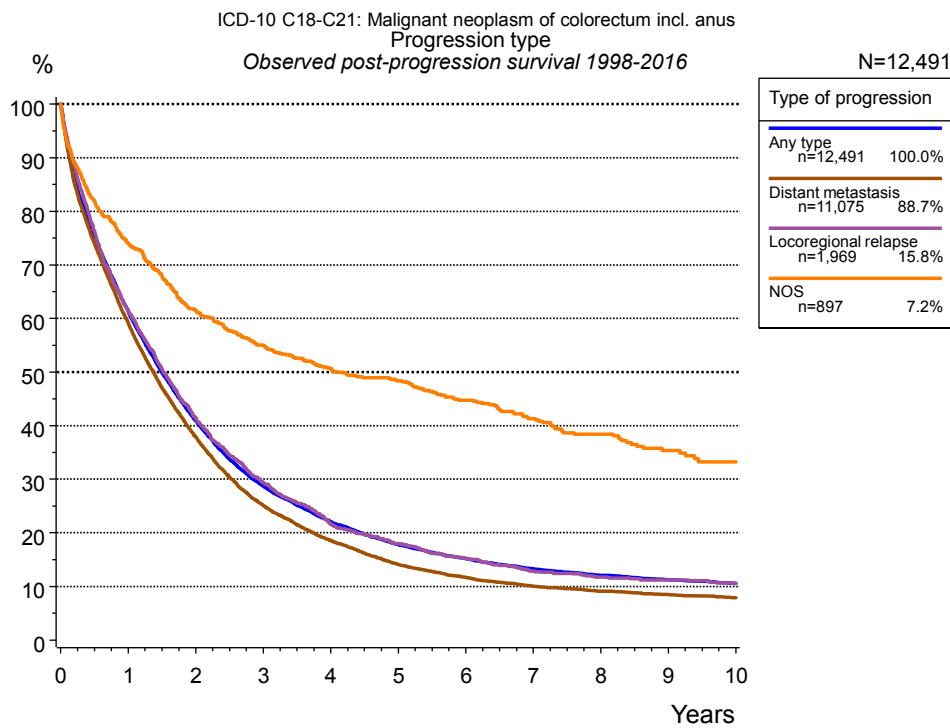
**Figure 5a.** Time to first progression of 31,203 patients with colorectal cancer diagnosed between 1998 and 2016 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The 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=31,203 %	n=31,203 %	n=31,203 %	n=31,203 %	n=31,203 %	n=31,203 %	n=31,203 %
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	12.0	12.3	5.5	5.9	1.4	1.5	5.8
2	18.8	19.6	10.6	11.6	3.1	3.6	7.2
3	23.0	24.1	14.0	15.5	4.2	4.9	8.0
4	25.5	27.0	16.2	18.2	4.9	5.8	8.4
5	27.2	28.9	17.5	19.9	5.3	6.4	8.7
6	28.3	30.3	18.4	21.0	5.5	6.7	9.1
7	29.0	31.1	18.9	21.7	5.6	6.9	9.3
8	29.5	31.9	19.4	22.4	5.8	7.1	9.5
9	30.0	32.5	19.7	22.9	5.9	7.3	9.7
10	30.4	33.0	20.0	23.3	6.0	7.5	9.8
11	30.6	33.3	20.1	23.5	6.0	7.5	9.9
12	30.9	33.8	20.3	23.9	6.0	7.6	10.0
13	31.1	34.2	20.5	24.1	6.1	7.7	10.1
14	31.2	34.3	20.5	24.3	6.1	7.8	10.1
15	31.3	34.6	20.6	24.4	6.1	7.8	10.2



Type of progression	
<i>cont'd</i>	NOS (1-KM) n=31,203
Years	%
0	0.0
1	6.0
2	7.7
3	8.6
4	9.2
5	9.7
6	10.3
7	10.6
8	10.9
9	11.2
10	11.4
11	11.6
12	11.8
13	12.0
14	12.1
15	12.2

**Table 5b.** Time to first progression of patients with colorectal cancer for period 1998-2016 (N=31,203).

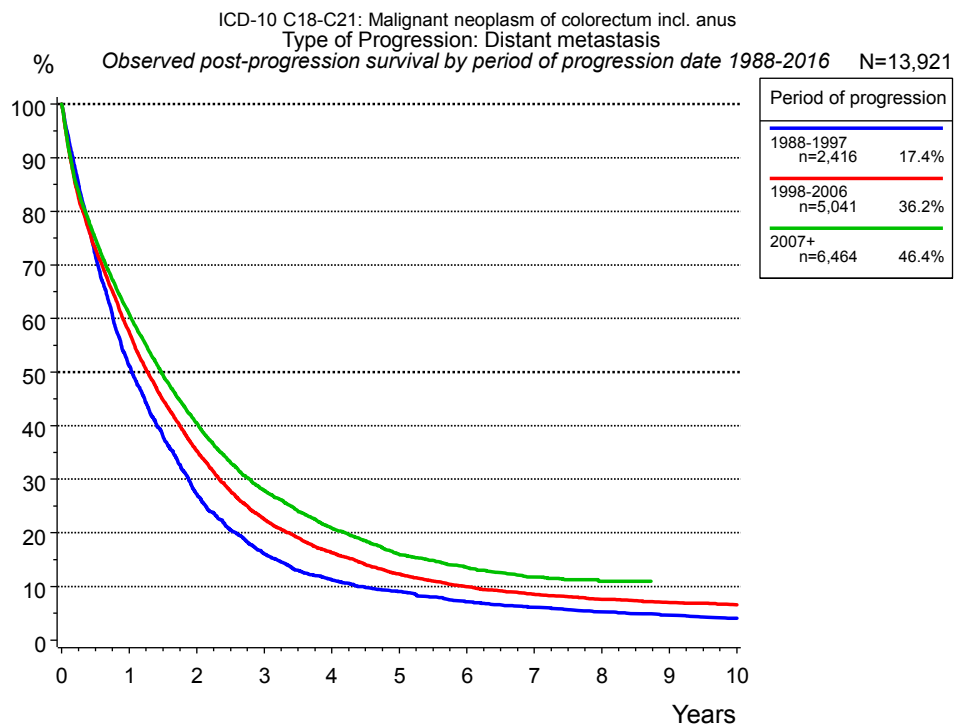


**Figure 5c.** Observed post-progression survival of 12,491 patients with colorectal cancer diagnosed between 1998 and 2016. These 12,491 patients with documented progression events during their course of disease represent 32.2 % of the totally 38,838 evaluated cases (incl. M1, n=7,635, 19.7 %). Patients with cancer relapse documented via death certificates only were excluded (n=3,538, 9.1 %). 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=12,491 %	Distant metastasis n=11,075 %	Locoregional relapse n=1,969 %	NOS n=897 %
0	100.0	100.0	100.0	100.0
1	61.4	59.2	61.4	74.1
2	40.9	37.9	41.4	61.4
3	28.7	25.1	29.4	55.0
4	22.1	18.5	21.6	50.7
5	17.8	14.1	18.0	48.3
6	15.2	11.7	15.2	44.7
7	13.2	10.0	12.8	41.3
8	12.1	9.1	11.7	38.4
9	11.3	8.4	11.2	35.4
10	10.6	7.9	10.5	33.3

**Table 5d.** Observed post-progression survival of patients with colorectal cancer for period 1998-2016 (N=12,491).



**Figure 5e.** Observed post-progression (distant metastasis) survival of 13,921 patients with colorectal cancer diagnosed between 1988 and 2016 by period of progression.

Years	Period of progression		
	1988-1997 n=2,416 %	1998-2006 n=5,041 %	2007+ n=6,464 %
0	100.0	100.0	100.0
1	51.2	57.5	60.8
2	27.2	35.3	40.5
3	16.1	22.5	27.9
4	11.2	16.3	20.8
5	9.0	12.3	16.0
6	7.1	9.9	13.5
7	6.1	8.5	11.7
8	5.3	7.6	11.0
9	4.6	7.0	
10	4.0	6.6	

**Table 5f.** Observed post-progression (distant metastasis) survival of patients with colorectal cancer for period 1988-2016 by period of progression (N=13,921).

## 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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