

# Munich Cancer Registry



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## ICD-10 C18-C20: Colorectal cancer

### Survival

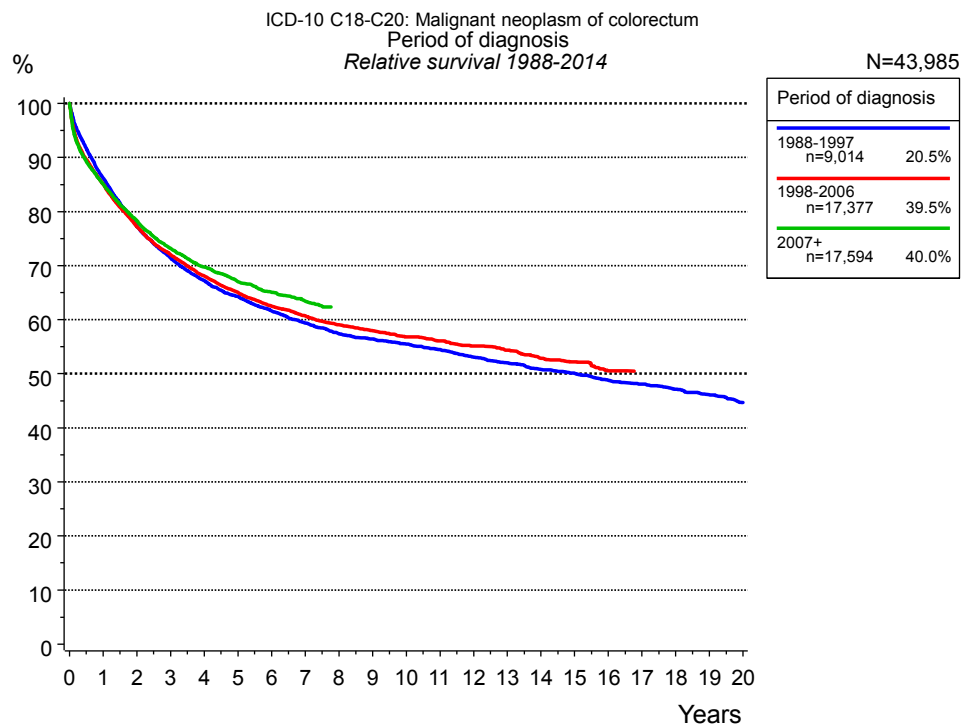
Year of diagnosis	1988-1997	1998-2014
Patients	10,090	45,104
Diseases	10,260	46,277
Cases evaluated	9,024	35,169
Creation date	03/02/2016	
Export date	12/23/2015	
Population	4.64 m	



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

<http://www.tumorregister-muenchen.de/en/facts/surv/sC1820E-ICD-10-C18-C20-Colorectal-cancer-survival.pdf>

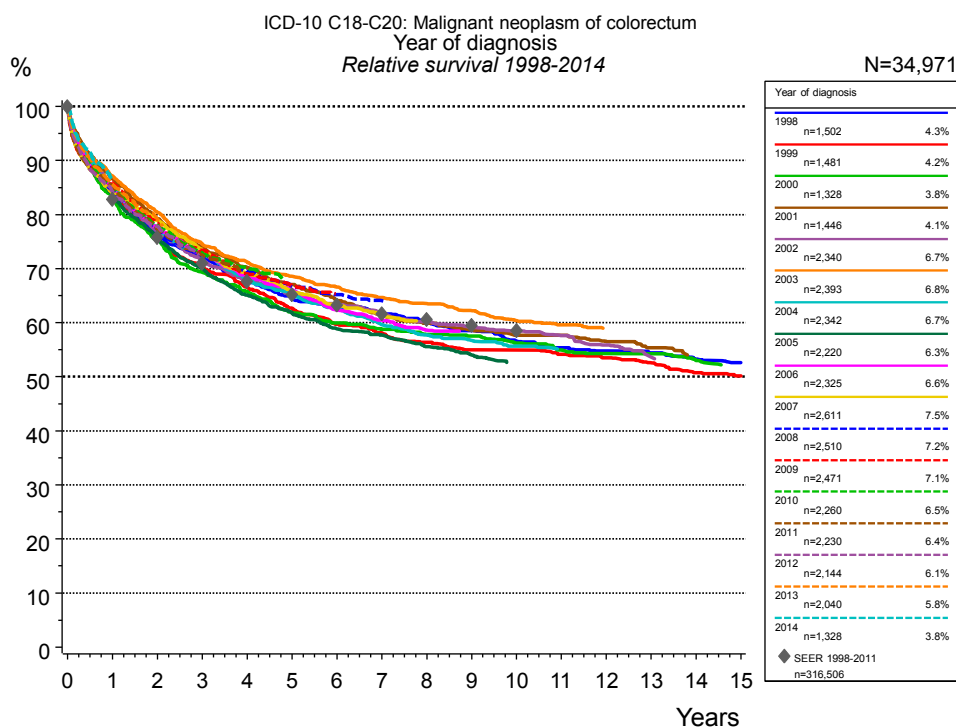


**Figure 1a.** Relative survival of patients with colorectal cancer by period of diagnosis. Included in the evaluation are 43,985 cases diagnosed between 1988 and 2014.

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=9,014		1998-2006 n=17,377		2007+ n=17,594	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	83.0	86.2	81.9	85.1	82.1	85.1
2	71.9	77.3	71.9	77.2	73.1	78.3
3	64.3	71.5	64.9	72.0	66.1	73.2
4	58.4	67.2	59.3	68.1	61.0	69.8
5	54.0	64.3	54.9	65.1	56.6	67.0
6	50.0	61.6	51.0	62.5	53.1	65.1
7	46.5	59.4	47.9	60.7	50.0	63.4
8	43.4	57.4	45.0	59.0		
9	41.1	56.4	42.6	58.0		
10	39.0	55.5	40.4	56.9		
11	37.0	54.5	38.4	56.1		
12	34.8	53.1	36.4	55.1		
13	32.9	52.0	34.5	54.4		
14	30.9	50.8	32.3	52.9		
15	29.4	50.1	30.6	52.2		
16	27.6	48.8	28.5	50.6		
17	26.1	48.1				
18	24.6	47.2				
19	23.1	46.2				
20	21.5	44.7				

**Table 1b.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by period of diagnosis for period 1988-2014 (N=43,985).



**Figure 1c.** Relative survival of patients with colorectal cancer by year of diagnosis. Included in the evaluation are 34,971 cases diagnosed between 1998 and 2014.

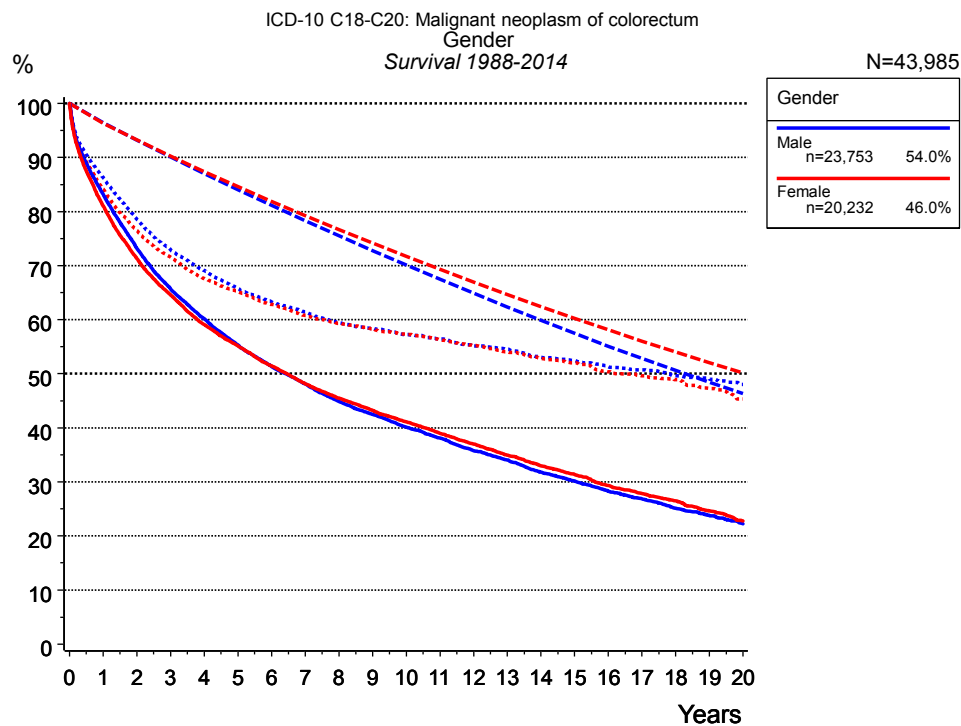
The survival results of the SEER program (Surveillance, Epidemiology, and End Results) of the American National Cancer Institute (NCI) are summarized as the period of diagnosis from 1998 to 2011, and are represented by gray diamonds in order to facilitate comparisons between MCR and SEER.

Years	Year of diagnosis													
	1998		1999		2000		2001		2002		2003		2004	
	n=1,502		n=1,481		n=1,328		n=1,446		n=2,340		n=2,393		n=2,342	
	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	81.7	85.0	80.7	84.0	79.9	83.2	83.4	86.7	81.8	85.0	84.1	87.2	81.8	84.9
2	70.6	76.2	70.0	75.4	69.9	75.3	73.8	79.2	71.4	76.9	75.1	80.4	72.0	77.3
3	64.4	71.9	62.9	70.1	62.2	69.3	66.5	73.8	64.2	71.6	67.4	74.6	65.4	72.6
4	58.7	67.7	57.6	66.5	57.1	65.8	61.3	70.2	59.1	68.1	62.3	71.2	59.4	68.1
5	54.3	64.9	52.3	62.6	51.9	61.9	56.7	67.0	54.9	65.4	58.0	68.5	55.1	65.3
6	50.9	62.9	48.2	59.7	48.8	59.9	52.6	64.2	51.4	63.4	54.4	66.6	51.2	62.8
7	48.2	61.7	45.4	58.1	46.2	58.8	49.0	61.6	48.5	61.9	51.2	64.7	46.9	59.6
8	45.4	60.2	42.6	56.4	44.0	57.9	46.1	59.9	45.5	60.2	48.6	63.5	43.9	57.7
9	42.8	58.5	40.1	54.9	42.3	57.5	43.6	58.7	43.1	59.1	45.9	62.2	41.6	56.7
10	39.8	56.6	39.0	54.9	39.9	56.3	41.5	57.6	41.0	58.4	42.9	60.4	39.6	55.7
11	37.7	55.4	36.8	54.1	37.6	55.0	40.3	57.6	38.8	57.6	40.9	59.6		
12	35.9	54.8	35.1	53.5	35.9	54.3	38.0	56.5	36.2	55.8				
13	34.4	54.5	33.1	52.6	34.8	54.3	36.0	55.4	33.9	53.6				
14	32.3	53.2	30.7	50.7	32.3	53.0								
15	30.6	52.6	29.3	50.2										

<i>cont'd</i>	Year of diagnosis													
	2005		2006		2007		2008		2009		2010		2011	
	n=2,220		n=2,325		n=2,611		n=2,510		n=2,471		n=2,260		n=2,230	
Years	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	80.8	83.8	82.1	84.9	81.1	84.0	81.5	84.6	82.8	85.8	82.2	85.3	81.9	84.9
2	70.5	75.6	72.5	77.3	73.9	79.0	72.1	77.3	73.2	78.4	72.7	78.0	72.1	77.3
3	63.3	70.0	66.1	72.7	66.4	73.3	65.4	72.5	66.3	73.4	65.7	72.9	65.4	72.5
4	57.0	65.1	60.5	68.7	60.8	69.2	60.6	69.5	60.3	69.1	61.1	70.2		
5	52.4	61.9	56.4	66.1	56.0	65.8	56.2	66.7	56.4	66.9				
6	48.3	58.9	51.5	62.3	52.0	63.3	53.1	65.2						
7	45.7	57.7	48.3	60.5	48.8	61.4	50.7	64.1						
8	42.6	55.6	45.3	58.6										
9	40.0	54.0												

<i>cont'd</i>	Year of diagnosis					
	2012		2013		2014	
	n=2,144		n=2,040		n=1,328	
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	81.3	84.2	82.6	85.6		
2	72.8	77.8	74.8	79.2		

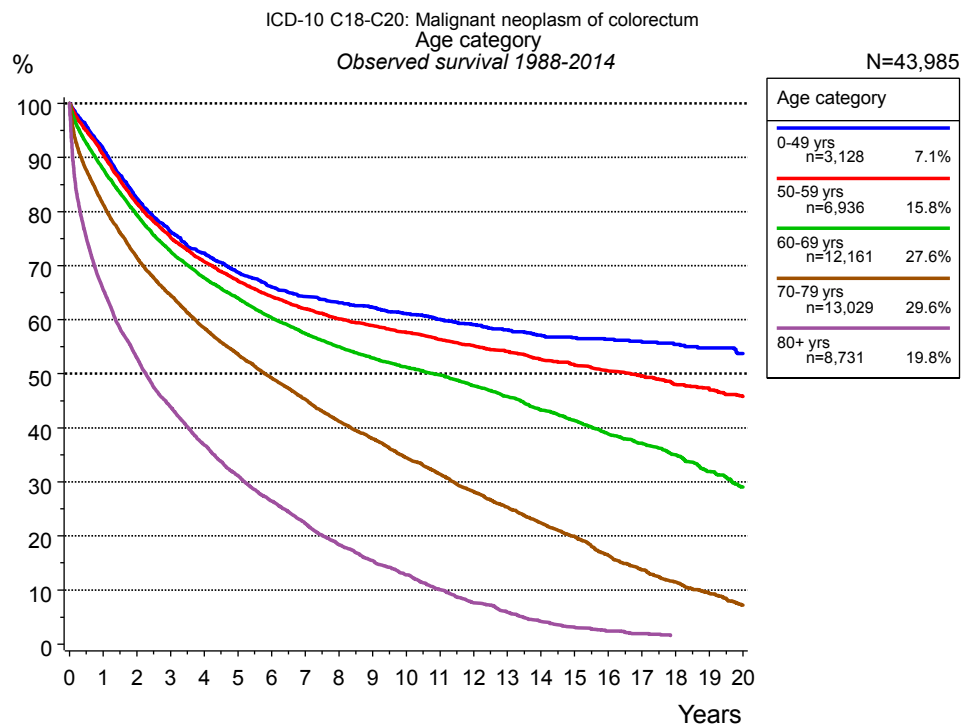
**Table 1d.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by year of diagnosis for period 1998-2014 (N=34,971).



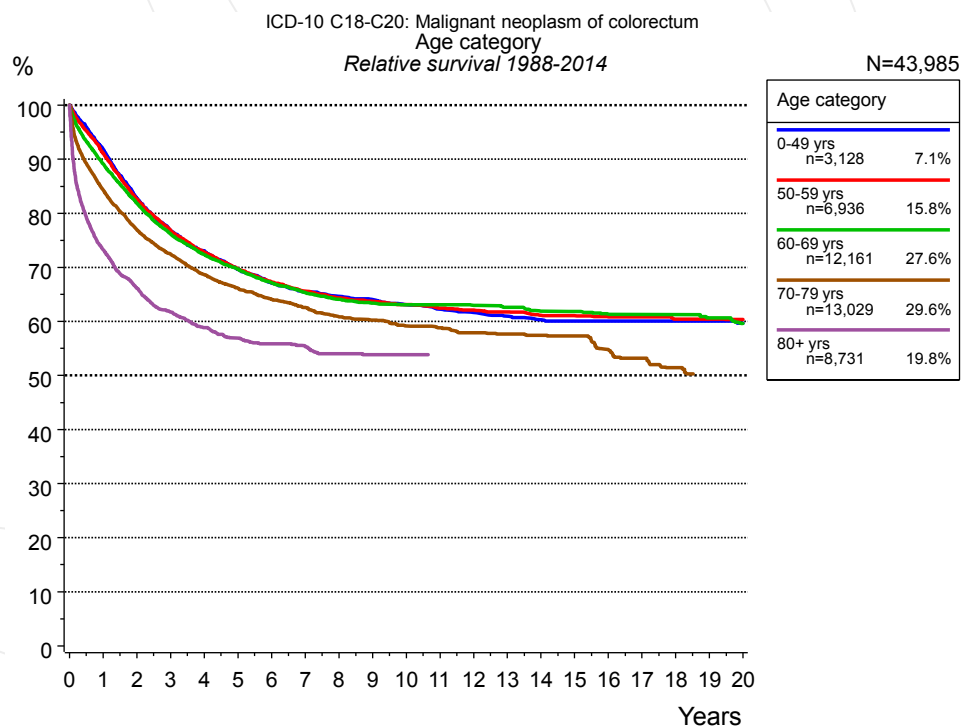
**Figure 2a.** Survival of patients with colorectal cancer by gender. Included in the evaluation are 43,985 cases diagnosed between 1988 and 2014.

Years	Gender			
	Male n=23,753		Female n=20,232	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	83.2	86.3	81.0	84.1
2	73.2	78.6	71.3	76.5
3	65.7	72.9	64.6	71.5
4	60.2	69.1	59.1	67.6
5	55.3	65.8	55.2	65.2
6	51.3	63.3	51.4	62.8
7	48.1	61.4	48.2	60.8
8	44.9	59.4	45.5	59.3
9	42.5	58.3	43.2	58.3
10	40.1	57.2	41.1	57.3
11	38.1	56.4	39.0	56.3
12	35.8	55.2	37.0	55.2
13	34.1	54.5	34.9	54.0
14	31.8	53.0	33.0	52.8
15	30.1	52.4	31.4	52.0
16	28.3	51.3	29.3	50.4
17	26.9	50.7	27.8	49.6
18	25.1	49.6	26.5	48.9
19	23.8	49.1	24.6	47.3
20	22.3	48.0	22.8	45.3

**Table 2b.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by gender for period 1988-2014 (N=43,985).



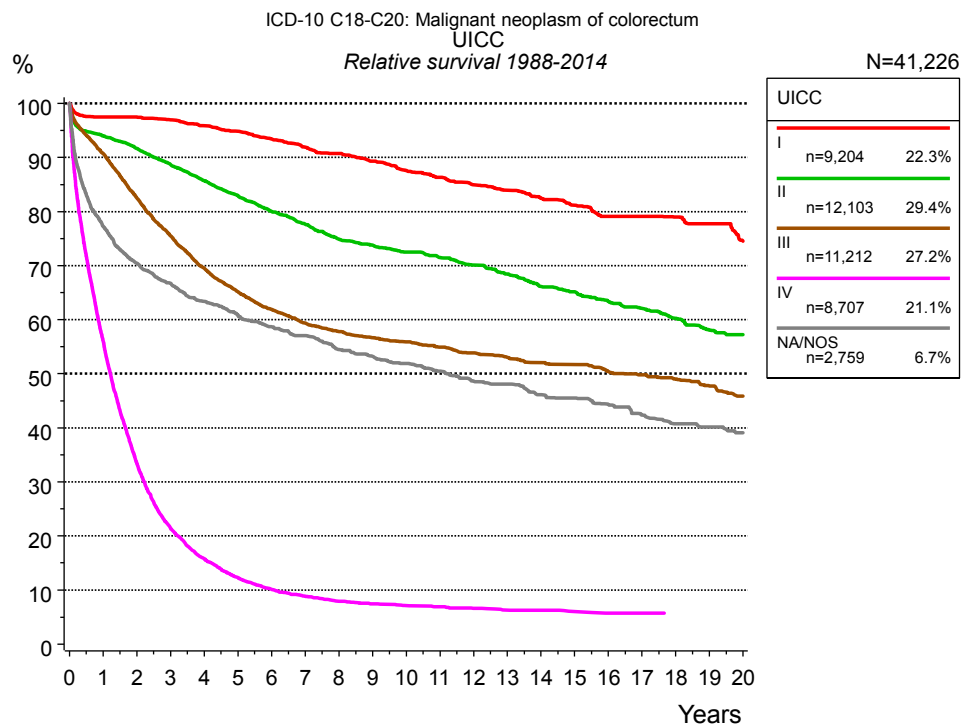
**Figure 3a.** Observed survival of patients with colorectal cancer by age category. Included in the evaluation are 43,985 cases diagnosed between 1988 and 2014.



**Figure 3b.** Relative survival of patients with colorectal cancer by age category. Included in the evaluation are 43,985 cases diagnosed between 1988 and 2014.

Years	Age category									
	0-49 yrs n=3,128		50-59 yrs n=6,936		60-69 yrs n=12,161		70-79 yrs n=13,029		80+ yrs n=8,731	
	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	91.6	91.8	90.6	91.1	87.8	89.1	81.3	84.3	65.6	73.2
2	82.4	82.8	81.5	82.6	79.4	81.9	71.5	77.0	53.0	66.2
3	76.3	76.8	75.3	76.8	72.6	76.1	64.5	72.4	43.9	61.7
4	72.4	73.0	70.8	72.8	67.8	72.3	58.5	68.7	36.9	58.9
5	68.7	69.6	67.2	69.7	64.0	69.7	53.6	66.1	31.2	56.9
6	66.0	67.1	64.2	67.3	60.4	67.2	49.2	64.1	26.5	55.8
7	64.2	65.5	62.0	65.6	57.4	65.3	45.3	62.6	22.3	55.4
8	63.1	64.6	60.1	64.3	55.0	64.1	41.2	60.9	18.5	54.0
9	62.3	64.0	58.9	63.7	52.9	63.4	38.0	60.2	15.4	53.9
10	61.1	63.1	57.6	63.1	51.2	63.1	34.5	59.2	12.8	53.9
11	60.1	62.3	56.3	62.5	49.8	63.1	31.4	58.9		
12	59.0	61.6	55.2	62.1	47.8	62.9	28.2	57.9		
13	58.1	61.0	54.1	61.8	45.8	62.6	25.3	57.7		
14	57.2	60.3	52.6	61.1	43.3	61.9	22.4	57.4		
15	56.6	60.1	51.6	61.0	41.3	61.9	19.9	57.3		
16	56.3	60.1	50.5	60.9	38.9	61.3	16.4	54.8		
17	55.8	60.1	49.5	60.9	37.2	61.3	13.8	53.2		
18	55.5	60.1	48.1	60.4	35.0	61.3	11.4	51.5		
19	54.8	60.1	47.2	60.4	31.9	60.7				
20	53.7	59.7	45.8	60.4	29.1	59.6				

**Table 3c.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by age category for period 1988-2014 (N=43,985).

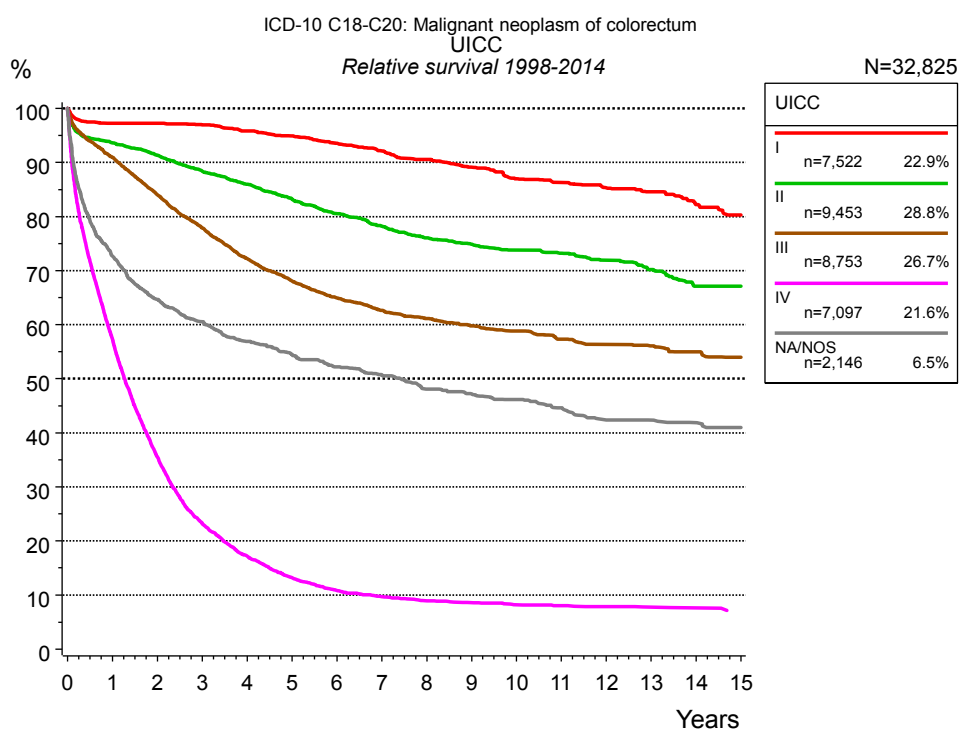


**Figure 4a.** Relative survival of patients with colorectal cancer by UICC. For 41,553 of 43,985 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 41,226 cases an evaluable classification was established. The grey line represents the subgroup of 2,759 patients with missing values regarding UICC (6.3% of 43,985 patients, the percent values of all other categories are related to n=41,226).

Years	UICC									
	I n=9,204		II n=12,103		III n=11,212		IV n=8,707		NA/NOS n=2,759	
	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	97.5	90.2	94.0	87.6	90.7	54.1	56.0	73.5	77.3
2	91.4	97.5	84.7	91.7	77.1	82.5	31.5	33.4	64.5	70.4
3	88.0	97.0	79.0	88.7	68.4	75.5	19.7	21.4	59.2	66.7
4	84.2	95.9	73.5	85.7	61.0	69.5	14.2	15.8	54.5	63.4
5	80.5	94.8	68.5	83.0	55.4	65.2	10.8	12.3	50.8	60.9
6	76.6	93.4	63.6	80.0	51.0	61.9	8.7	10.1	47.5	58.7
7	72.8	91.9	59.4	77.6	47.4	59.4	7.4	8.8	44.9	57.1
8	69.5	90.7	55.2	74.9	44.7	57.8	6.5	7.9	41.5	54.5
9	65.9	89.3	52.3	73.8	42.5	56.7	6.0	7.5	39.3	53.2
10	62.4	87.6	49.5	72.5	40.5	55.9	5.5	7.1	37.3	51.9
11	59.4	86.3	47.0	71.5	38.5	54.9	5.2	6.9	35.0	50.5
12	56.2	84.9	44.3	70.1	36.5	53.8	4.8	6.6	32.6	48.7
13	53.5	83.9	41.7	68.5	34.7	53.0	4.5	6.3	31.2	48.1
14	50.5	82.4	38.7	66.1	33.0	52.1	4.3	6.3	28.9	46.2
15	47.9	81.2	36.6	65.2	31.5	51.7	4.0	6.0	27.4	45.5
16	44.9	79.1	34.2	63.4	29.6	50.4	3.7	5.7	25.8	44.4
17	43.3	79.1	32.1	62.1	28.2	49.8	3.7	5.7	23.7	42.4
18	41.4	79.0	29.9	60.3	26.7	49.1	3.5	5.7	21.9	40.8
19	39.5	77.7	27.7	58.1	25.0	47.7	3.5	5.7	20.8	40.2
20	36.1	74.5	26.2	57.2	23.2	45.9			19.6	39.1

**Table 4b.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by UICC for period 1988-2014 (N=41,226).

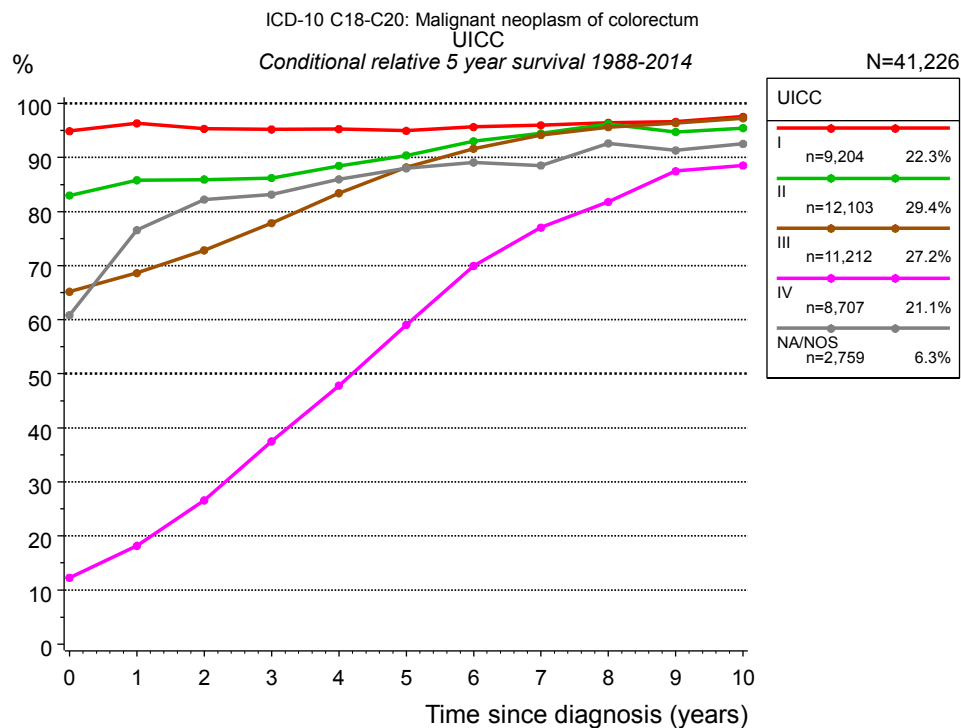




**Figure 4c.** Relative survival of patients with colorectal cancer by UICC. For 33,102 of 34,971 cases diagnosed between 1998 and 2014 valid data could be obtained for this item. For a total of 32,825 cases an evaluable classification was established. The grey line represents the subgroup of 2,146 patients with missing values regarding UICC (6.1% of 34,971 patients, the percent values of all other categories are related to n=32,825).

Years	UICC									
	I n=7,522		II n=9,453		III n=8,753		IV n=7,097		NA/NOS n=2,146	
	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	89.9	93.6	87.9	91.0	55.4	57.3	69.1	72.8
2	91.3	97.2	84.4	91.3	78.6	84.0	33.5	35.5	59.1	64.6
3	88.1	97.0	78.7	88.4	70.6	77.9	21.3	23.2	53.6	60.6
4	84.2	95.8	73.7	85.9	63.5	72.2	15.5	17.2	48.9	56.9
5	80.6	94.9	68.7	83.2	58.0	68.1	11.6	13.2	45.5	54.5
6	76.8	93.5	64.0	80.5	53.6	64.9	9.4	10.9	42.5	52.2
7	73.0	92.1	59.9	78.2	50.1	62.7	8.1	9.7	40.2	50.7
8	69.3	90.6	56.1	76.1	47.4	61.1	7.4	8.9	37.0	48.1
9	65.8	89.1	53.1	74.9	44.9	59.8	6.9	8.6	35.4	47.2
10	61.9	87.0	50.4	73.8	42.7	58.8	6.4	8.2	33.9	46.1
11	59.2	86.3	48.1	73.2	40.2	57.3	6.1	8.0	31.7	44.6
12	56.2	85.3	45.5	71.9	38.4	56.3	5.8	7.9	29.2	42.4
13	53.7	84.5	42.6	70.2	36.7	56.1	5.5	7.8	28.4	42.4
14	50.0	82.2	39.1	67.1	34.8	55.0	5.4	7.6	27.3	41.8
15	47.0	80.3	37.6	67.1	33.0	54.0	4.8	6.9	26.0	41.0

**Table 4d.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by UICC for period 1998-2014 (N=32,825).

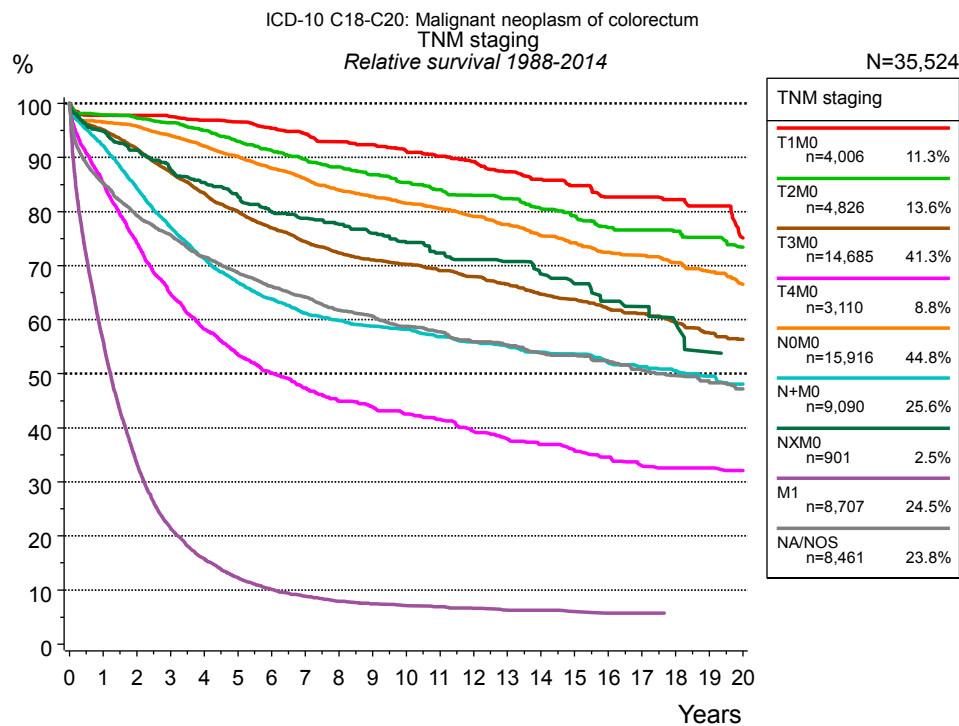


**Figure 4e.** Conditional relative 5-year survival of patients with colorectal cancer by UICC. For 41,553 of 43,985 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 41,226 cases an evaluable classification was established. The grey line represents the subgroup of 2,759 patients with missing values regarding UICC (6.3% of 43,985 patients, the percent values of all other categories are related to n=41,226).

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	9,204	94.9	12,103	83.0	11,212	65.2	8,707	12.3	2,759	60.9
1	8,257	96.3	10,392	85.8	9,388	68.6	4,497	18.2	1,954	76.5
2	7,594	95.3	9,280	85.9	7,798	72.8	2,457	26.6	1,658	82.2
3	6,899	95.2	8,179	86.2	6,446	77.9	1,408	37.5	1,470	83.2
4	6,199	95.2	7,163	88.5	5,341	83.4	921	47.8	1,298	86.0
5	5,512	94.9	6,229	90.4	4,469	88.2	614	59.0	1,153	88.0
6	4,826	95.6	5,338	93.0	3,733	91.6	437	69.9	1,029	89.1
7	4,173	95.9	4,597	94.5	3,072	94.2	325	77.0	927	88.5
8	3,591	96.4	3,878	96.2	2,562	95.6	239	81.8	806	92.6
9	3,068	96.6	3,333	94.7	2,181	96.4	191	87.5	707	91.3
10	2,641	97.5	2,867	95.4	1,879	97.3	150	88.5	634	92.5

**Table 4f.** Conditional relative 5-year survival of patients with colorectal cancer by UICC for period 1988-2014 (N=41,226).

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 95.2% (n=6,899).

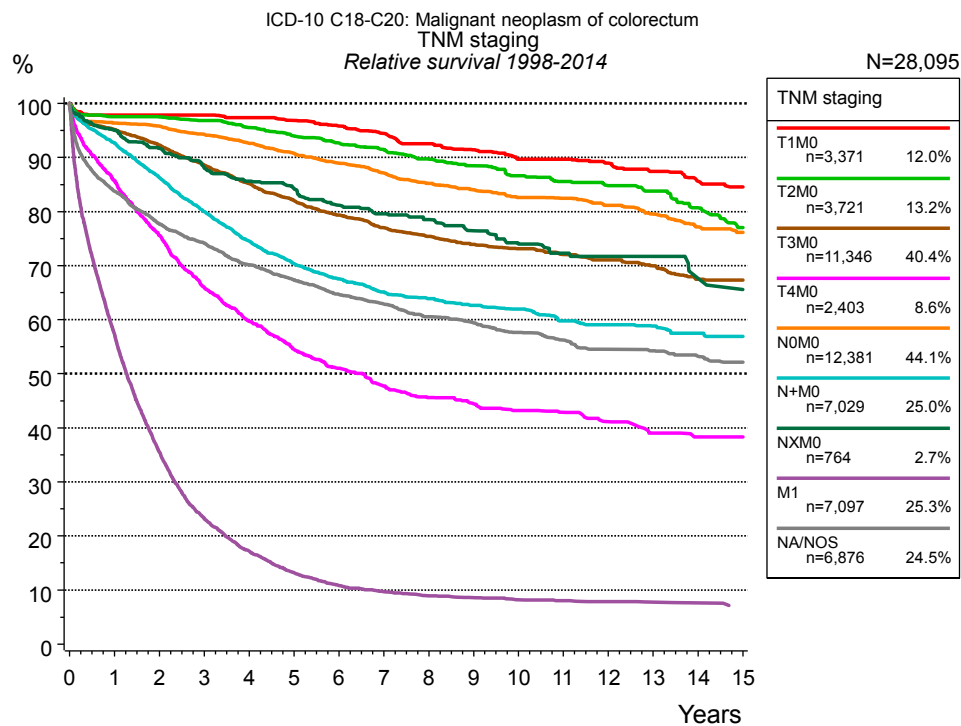


**Figure 4g.** Relative survival of patients with colorectal cancer by TNM staging. For 41,553 of 43,985 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 35,524 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 8,461 patients with missing values regarding TNM staging (19.2 % of 43,985 patients, the percent values of all other categories are related to n=35,524).

TNM staging														
Years	T1M0 n=4,006		T2M0 n=4,826		T3M0 n=14,685		T4M0 n=3,110		N0M0 n=15,916		N+M0 n=9,090		NXM0 n=901	
	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	95.2	97.8	94.7	97.9	91.7	95.1	81.8	85.3	93.2	96.6	89.1	92.2	91.9	94.9
2	92.7	97.8	91.2	97.3	85.4	91.6	68.5	74.2	89.3	95.8	79.0	84.3	85.9	91.4
3	89.7	97.6	87.5	96.4	78.6	87.3	57.7	64.8	84.7	94.1	70.1	77.1	80.2	87.8
4	86.5	96.9	83.4	95.0	72.5	83.4	50.1	58.3	80.1	92.1	62.9	71.3	75.9	85.4
5	83.7	96.5	78.9	93.0	67.2	80.1	44.6	53.6	75.7	90.2	57.2	66.9	71.2	82.7
6	80.0	95.4	74.9	91.3	62.5	77.0	40.4	50.2	71.3	88.0	53.0	63.8	66.9	80.0
7	76.7	94.4	71.1	89.7	58.3	74.4	36.9	47.4	67.2	86.0	49.3	61.2	64.2	78.8
8	73.5	92.9	67.6	88.3	54.7	72.3	33.8	44.9	63.3	84.0	46.7	59.9	61.3	77.7
9	70.3	92.3	64.2	86.8	51.8	71.0	31.8	43.8	60.2	82.8	44.5	58.8	58.1	76.0
10	67.1	91.2	61.1	85.4	49.4	70.2	29.9	42.6	57.1	81.5	42.7	58.2	54.8	74.3
11	64.1	90.2	58.2	84.1	46.9	69.1	28.3	41.6	54.4	80.6	40.3	56.8	51.9	72.3
12	61.1	89.2	55.1	83.0	44.4	68.0	25.9	39.3	51.4	79.1	38.4	55.9	49.7	71.1
13	57.7	87.4	52.9	82.4	41.9	66.6	24.2	37.9	48.6	77.6	36.5	55.1	47.2	70.8
14	54.7	85.9	49.7	80.5	39.2	64.7	22.7	36.9	45.5	75.5	34.7	54.0	43.9	68.4
15	52.0	84.8	47.1	79.2	37.1	63.7	21.4	35.9	43.0	74.2	33.1	53.6	41.2	66.6
16	48.9	82.7	44.0	77.0	34.8	62.1	20.0	34.6	40.4	72.4	31.0	52.1	38.1	63.4
17	47.4	82.7	42.4	76.6	33.0	61.1	18.4	33.0	38.6	71.9	29.6	51.3	36.6	62.4
18	45.3	82.2	40.4	76.3	30.9	59.6	17.8	32.6	36.4	70.5	28.0	50.5	33.4	59.4
19	42.9	81.0	38.6	75.2	28.6	57.5	17.3	32.6	34.1	68.9	26.4	49.6	29.7	54.0
20	38.2	75.1	35.8	73.4	26.9	56.4	16.3	32.1	31.6	66.5	24.8	48.1	28.0	52.3

<i>cont'd</i> Years	TNM staging			
	M1 n=8,707		NA/NOS n=8,461	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	54.1	56.0	81.4	85.2
2	31.5	33.4	72.9	79.3
3	19.7	21.4	67.0	75.7
4	14.2	15.8	61.1	71.6
5	10.8	12.3	56.5	68.7
6	8.7	10.1	52.5	66.1
7	7.4	8.8	49.1	64.2
8	6.5	7.9	45.5	61.8
9	6.0	7.5	43.1	60.6
10	5.5	7.1	40.3	58.8
11	5.2	6.9	38.1	57.8
12	4.8	6.6	35.5	55.9
13	4.5	6.3	33.8	55.3
14	4.3	6.3	31.7	53.9
15	4.0	6.0	30.3	53.4
16	3.7	5.7	28.3	52.3
17	3.7	5.7	26.3	50.7
18	3.5	5.7	24.7	49.6
19	3.5	5.7	23.2	48.6
20			21.7	47.2

**Table 4h.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by TNM staging for period 1988-2014 (N=61,241).

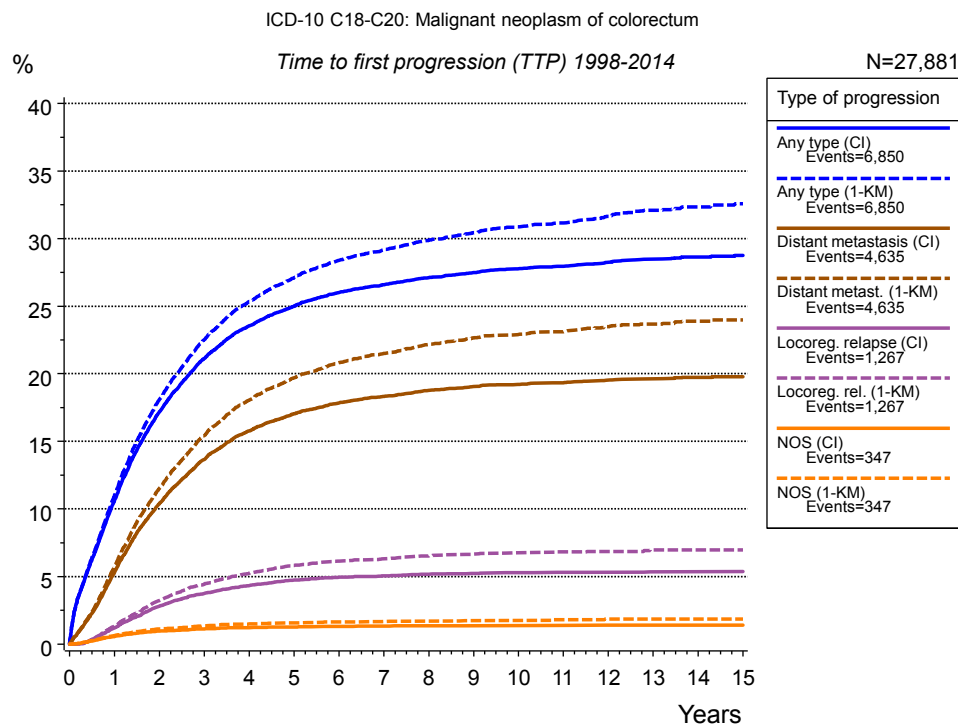


**Figure 4i.** Relative survival of patients with colorectal cancer by TNM staging. For 33,102 of 34,971 cases diagnosed between 1998 and 2014 valid data could be obtained for this item. For a total of 28,095 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 6,876 patients with missing values regarding TNM staging (19.7 % of 34,971 patients, the percent values of all other categories are related to n=28,095).

TNM staging														
Years	T1M0 n=3,371		T2M0 n=3,721		T3M0 n=11,346		T4M0 n=2,403		N0M0 n=12,381		N+M0 n=7,029		NXM0 n=764	
	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	95.2	97.8	94.5	97.5	91.8	95.2	82.3	85.7	93.0	96.4	89.7	92.7	92.3	95.1
2	92.9	97.8	91.3	97.5	86.0	92.3	69.9	75.6	89.3	95.8	81.0	86.3	86.5	91.7
3	90.1	97.8	87.9	96.8	79.8	88.6	59.0	66.0	84.9	94.3	72.8	80.0	80.8	88.1
4	87.0	97.3	83.8	95.5	74.1	85.2	51.6	59.7	80.5	92.6	65.8	74.5	76.5	85.6
5	84.0	96.8	79.7	94.0	68.9	82.1	45.6	54.5	76.2	90.8	60.3	70.4	72.9	84.2
6	80.4	95.8	76.0	92.7	64.4	79.3	41.4	51.0	72.1	89.0	56.2	67.5	68.5	81.2
7	76.8	94.4	72.6	91.5	60.3	77.0	37.5	47.7	68.1	87.1	52.5	65.1	65.5	79.6
8	73.1	92.5	68.7	89.7	57.0	75.4	34.7	45.6	64.3	85.2	50.0	63.9	62.6	78.5
9	69.7	91.4	65.4	88.5	53.9	73.9	32.7	44.4	61.1	84.0	47.5	62.6	59.3	76.5
10	66.0	89.7	62.0	86.6	51.4	73.1	31.0	43.2	57.9	82.6	45.5	61.9	55.3	74.0
11	63.8	89.7	59.0	85.5	48.7	72.0	29.7	42.9	55.6	82.4	42.4	59.8	52.8	72.3
12	60.9	89.0	56.2	84.8	46.3	71.0	27.7	41.2	52.6	81.2	40.7	59.1	51.2	71.7
13	57.5	87.5	53.8	83.8	43.8	69.9	25.3	39.1	49.6	79.5	39.0	58.8	49.4	71.7
14	54.0	85.6	49.5	80.7	40.6	67.5	24.1	38.3	46.1	77.2	36.9	57.5	44.3	67.6
15	51.8	84.6	45.5	77.1	38.9	67.3	23.5	38.3	43.8	76.2	35.3	56.9	41.5	65.5

<i>cont'd</i>	TNM staging			
	M1		NA/NOS	
	n=7,097		n=6,876	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	55.4	57.3	80.0	83.8
2	33.5	35.5	71.4	77.7
3	21.3	23.2	65.6	74.1
4	15.5	17.2	59.9	70.2
5	11.6	13.2	55.5	67.4
6	9.4	10.9	51.3	64.6
7	8.1	9.7	48.2	62.9
8	7.4	8.9	44.8	60.5
9	6.9	8.6	42.4	59.4
10	6.4	8.2	39.7	57.6
11	6.1	8.0	37.4	56.3
12	5.8	7.9	34.9	54.5
13	5.5	7.8	33.6	54.2
14	5.4	7.6	31.7	53.3
15	4.8	6.9	30.1	52.1

**Table 4j.** Observed (obs.) and relative (rel.) survival of patients with colorectal cancer by TNM staging for period 1998-2014 (N=48,112).



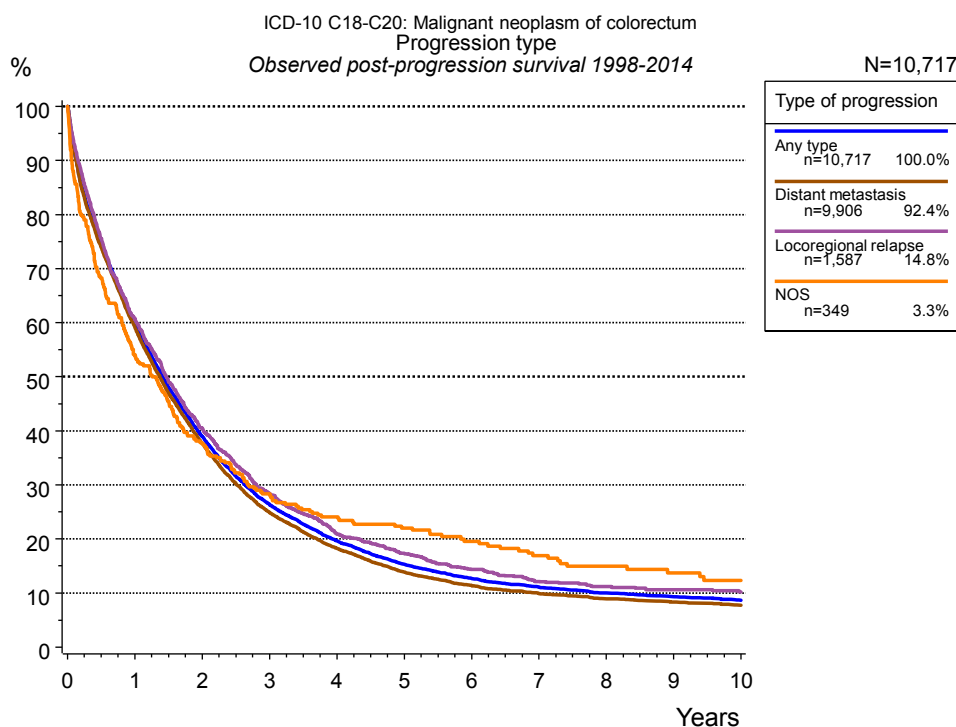
**Figure 5a.** Time to first progression of 27,881 patients with colorectal cancer diagnosed between 1998 and 2014 (M0 only in solid cancers) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The 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=27,881 %	n=27,881 %	n=27,881 %	n=27,881 %	n=27,881 %	n=27,881 %	n=27,881 %
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	10.6	11.0	5.3	5.7	1.2	1.3	0.6
2	17.2	18.1	10.4	11.5	2.8	3.2	1.0
3	21.1	22.5	13.7	15.4	3.7	4.4	1.1
4	23.6	25.3	15.8	18.1	4.3	5.3	1.2
5	25.0	27.1	17.0	19.7	4.7	5.8	1.3
6	26.0	28.4	17.9	20.8	4.9	6.2	1.3
7	26.6	29.2	18.3	21.5	5.0	6.3	1.3
8	27.1	29.9	18.8	22.2	5.2	6.5	1.4
9	27.5	30.4	19.1	22.6	5.2	6.7	1.4
10	27.8	30.9	19.2	22.9	5.3	6.8	1.4
11	28.0	31.2	19.3	23.1	5.3	6.8	1.4
12	28.2	31.7	19.5	23.5	5.3	6.9	1.4
13	28.5	32.1	19.6	23.7	5.4	7.0	1.4
14	28.6	32.3	19.7	23.9	5.4	7.0	1.4
15	28.8	32.6	19.8	24.0	5.4	7.0	1.4

Type of progression	
<i>cont'd</i>	NOS (1-KM) n=27,881
Years	%
0	0.0
1	0.6
2	1.1
3	1.4
4	1.5
5	1.6
6	1.6
7	1.7
8	1.7
9	1.7
10	1.7
11	1.8
12	1.8
13	1.8
14	1.8
15	1.8

**Table 5b.** Time to first progression of patients with colorectal cancer for period 1998-2014 (N=27,881).



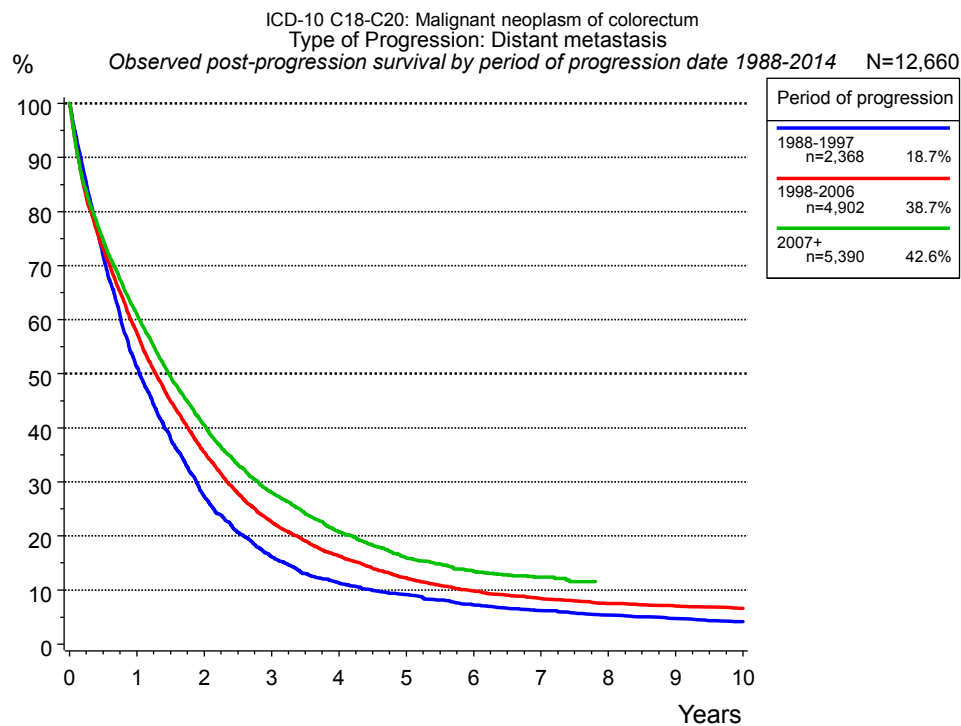


**Figure 5c.** Observed post-progression survival of 10,717 patients with colorectal cancer diagnosed between 1998 and 2014. These 10,717 patients with documented progression events during their course of disease represent 30.8 % of the totally 34,844 evaluated cases (incl. M1, n=6,963, 20.0 %). Patients with cancer relapse documented via death certificates only were excluded (n=3,096, 8.9 %). 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=10,717 %	Distant metastasis n=9,906 %	Locoregional relapse n=1,587 %	NOS n=349 %
0	100.0	100.0	100.0	100.0
1	60.0	59.2	60.6	54.2
2	39.0	37.7	40.4	37.5
3	26.4	24.9	28.5	28.4
4	19.6	18.3	20.9	24.1
5	15.3	13.9	17.4	22.0
6	12.7	11.4	14.4	19.6
7	11.1	9.9	12.2	16.9
8	10.0	8.9	11.2	14.9
9	9.4	8.4	10.6	13.7
10	8.7	7.7	10.2	12.3

**Table 5d.** Observed post-progression survival of patients with colorectal cancer for period 1998-2014 (N=10,717).



**Figure 5e.** Observed post-progression (distant metastasis) survival of 12,660 patients with colorectal cancer diagnosed between 1988 and 2014 by period of progression.

Years	Period of progression		
	1988-1997 n=2,368	1998-2006 n=4,902	2007+ n=5,390
	%	%	%
0	100.0	100.0	100.0
1	51.2	57.6	61.0
2	27.4	35.5	40.5
3	16.1	22.6	28.0
4	11.3	16.3	20.8
5	9.1	12.2	16.0
6	7.2	9.8	13.5
7	6.2	8.4	12.4
8	5.3	7.5	11.6
9	4.7	7.1	
10	4.1	6.6	

**Table 5f.** Observed post-progression (distant metastasis) survival of patients with colorectal cancer for period 1988-2014 by period of progression (N=12,660).

## 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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