

Munich Cancer Registry



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ICD-10 C19, C20: Rectal cancer

Survival

Year of diagnosis	1988-1997	1998-2014
Patients	3,903	16,038
Diseases	3,905	16,057
Cases evaluated	3,512	12,935
Creation date	03/02/2016	
Export date	12/23/2015	
Population	4.64 m	



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Munich, 81377
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<http://www.tumorregister-muenchen.de/en>

<http://www.tumorregister-muenchen.de/en/facts/surv/sC1920E-ICD-10-C19-C20-Rectal-cancer-survival.pdf>

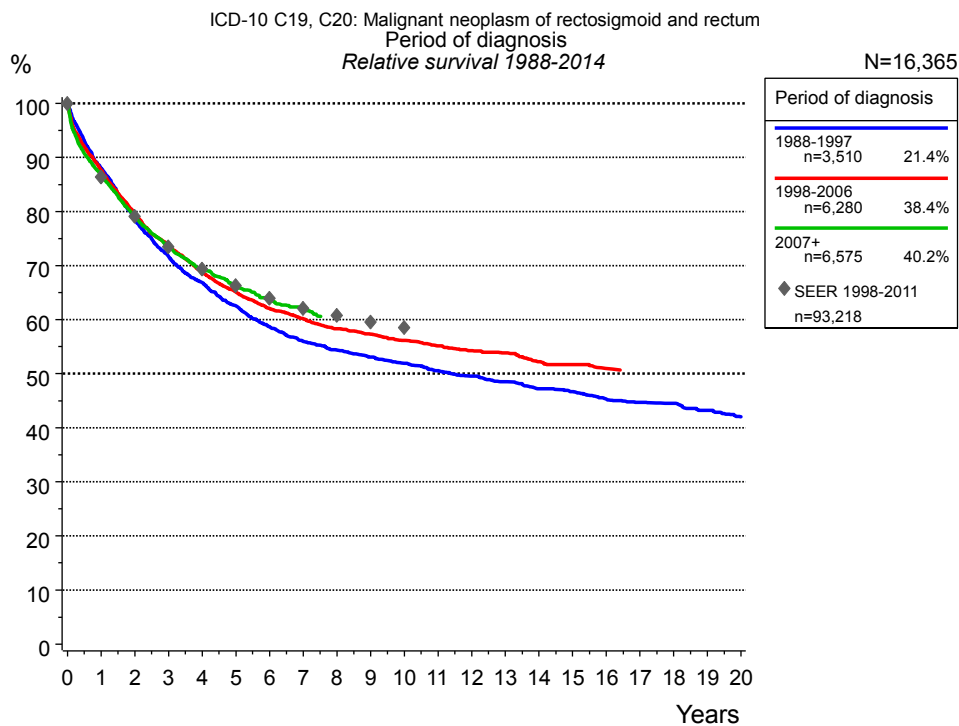


Figure 1a. Relative survival of patients with rectal cancer by period of diagnosis. Included in the evaluation are 16,365 cases diagnosed between 1988 and 2014.

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.

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=3,510		1998-2006 n=6,280		2007+ n=6,575	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	85.2	88.0	84.9	87.6	84.1	86.7
2	73.7	78.5	74.8	79.5	74.8	79.2
3	65.3	71.7	67.5	73.8	67.5	73.4
4	59.1	66.9	61.2	68.7	61.8	69.3
5	53.5	62.5	56.4	65.1	57.4	66.2
6	48.7	58.6	52.2	62.0	53.6	63.6
7	45.1	56.0	49.3	60.2	50.5	61.7
8	42.4	54.4	46.4	58.3		
9	40.1	53.1	44.2	57.3		
10	38.0	51.9	42.0	56.1		
11	35.9	50.6	40.0	55.1		
12	34.0	49.6	38.0	54.3		
13	32.2	48.5	36.6	53.9		
14	30.3	47.2	34.2	52.2		
15	29.0	46.7	32.9	51.7		
16	27.3	45.3	31.0	50.9		
17	26.0	44.7				
18	25.0	44.5				
19	23.4	43.2				
20	21.9	42.0				

Table 1b. Observed (obs.) and relative (rel.) survival of patients with rectal cancer by period of diagnosis for period 1988-2014 (N=16,365).

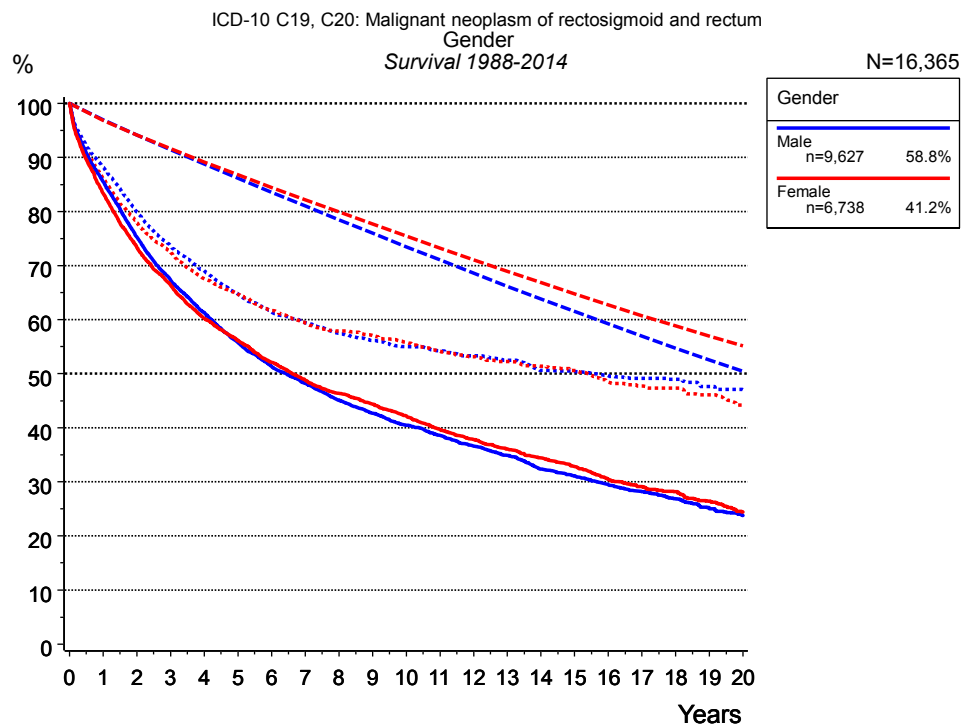


Figure 2a. Survival of patients with rectal cancer by gender. Included in the evaluation are 16,365 cases diagnosed between 1988 and 2014.

Years	Gender			
	Male n=9,627		Female n=6,738	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	85.5	88.2	83.3	86.1
2	75.3	79.9	73.4	78.0
3	67.3	73.6	66.4	72.4
4	61.3	69.0	60.2	67.6
5	55.8	64.8	56.1	64.7
6	51.4	61.5	52.1	61.7
7	48.2	59.5	48.8	59.4
8	45.1	57.5	46.3	57.9
9	42.7	56.1	44.4	57.1
10	40.5	55.0	42.1	55.8
11	38.6	54.2	39.7	54.1
12	36.6	53.3	37.8	53.2
13	34.9	52.5	36.1	52.2
14	32.3	50.6	34.4	51.4
15	31.0	50.4	32.8	50.6
16	29.5	49.7	30.5	48.6
17	28.2	49.1	29.1	47.7
18	26.9	49.0	28.2	47.3
19	25.1	47.6	26.4	46.1
20	23.8	47.0	24.4	44.2

Table 2b. Observed (obs.) and relative (rel.) survival of patients with rectal cancer by gender for period 1988-2014 (N=16,365).

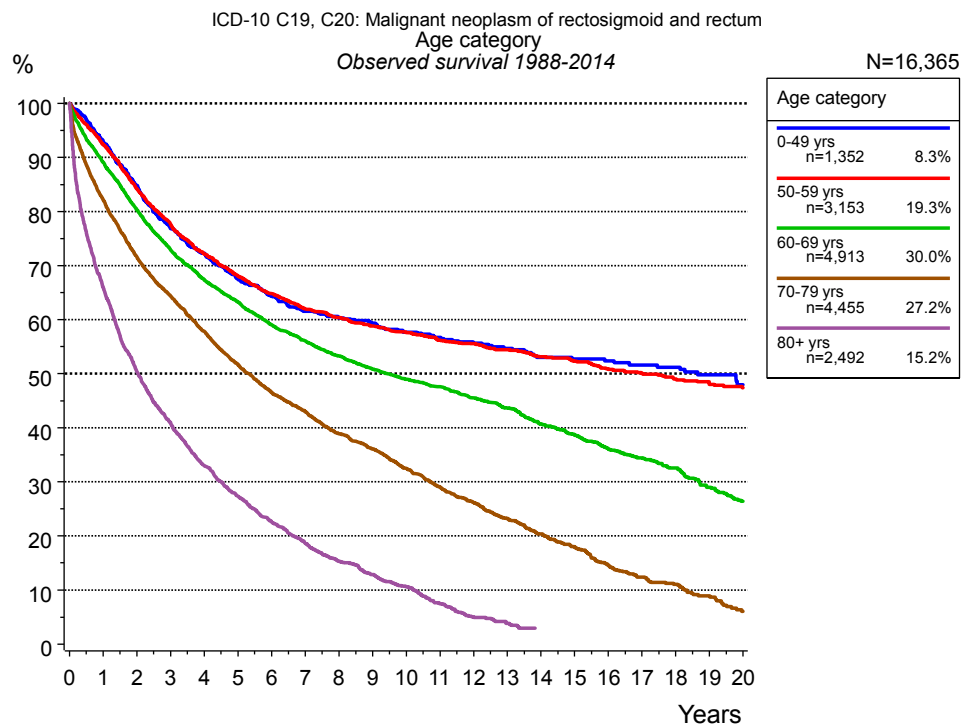


Figure 3a. Observed survival of patients with rectal cancer by age category. Included in the evaluation are 16,365 cases diagnosed between 1988 and 2014.

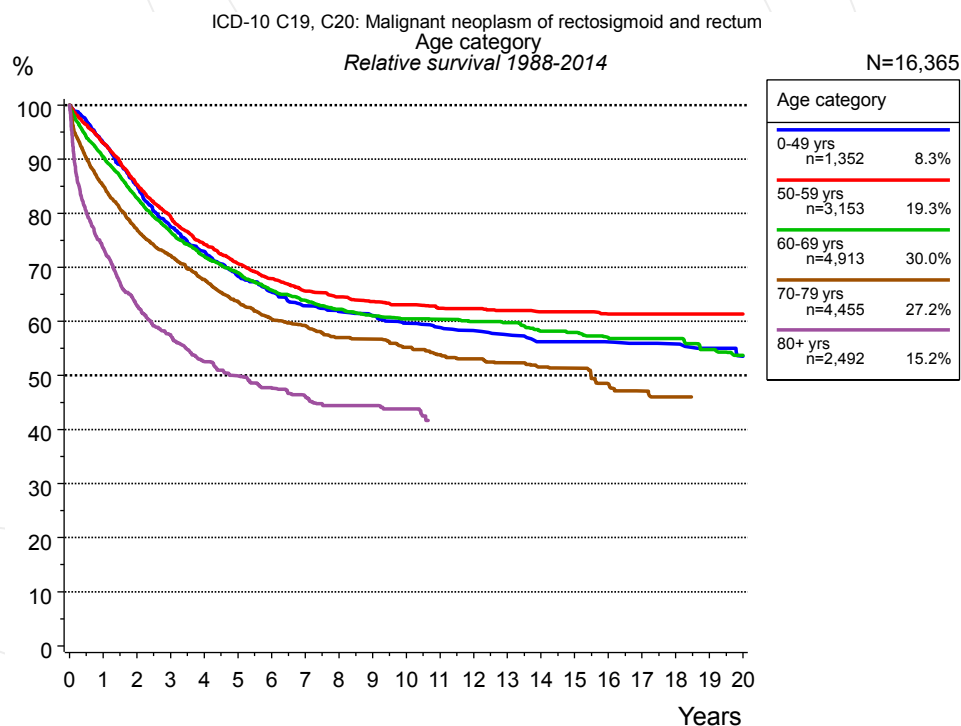


Figure 3b. Relative survival of patients with rectal cancer by age category. Included in the evaluation are 16,365 cases diagnosed between 1988 and 2014.

Years	Age category									
	0-49 yrs n=1,352		50-59 yrs n=3,153		60-69 yrs n=4,913		70-79 yrs n=4,455		80+ yrs n=2,492	
	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	92.9	93.0	92.4	93.0	89.1	90.5	82.1	85.1	65.9	73.6
2	84.8	85.2	84.2	85.3	80.3	82.8	71.6	77.0	50.4	63.0
3	76.9	77.4	77.7	79.3	72.9	76.5	64.4	72.1	40.9	57.4
4	72.3	73.0	72.2	74.3	67.4	72.0	57.8	67.8	33.0	52.6
5	67.5	68.4	68.0	70.7	63.3	69.0	51.7	63.7	27.4	49.9
6	64.3	65.4	64.8	67.9	59.0	65.8	46.5	60.4	22.6	47.7
7	61.6	62.9	62.0	65.6	56.1	63.9	43.0	59.2	18.7	46.1
8	60.3	61.8	60.3	64.6	53.3	62.3	38.9	57.0	15.4	44.4
9	59.3	61.1	58.8	63.7	50.9	61.0	36.1	56.7	12.8	44.4
10	57.7	59.7	57.5	63.1	49.0	60.5	32.5	55.2	10.6	43.8
11	56.7	58.9	56.2	62.4	47.6	60.4	29.0	53.9		
12	55.7	58.3	55.5	62.4	45.5	60.0	26.2	53.1		
13	54.7	57.5	54.4	62.0	43.7	59.8	23.2	52.3		
14	53.0	56.3	53.1	61.8	40.7	58.2	20.4	51.6		
15	52.7	56.3	52.3	61.8	38.6	57.9	17.9	51.3		
16	52.4	56.2	50.9	61.4	36.2	57.0	14.6	48.5		
17	51.6	56.0	50.0	61.4	34.5	56.8	12.4	47.1		
18	51.2	55.8	49.0	61.4	32.6	56.8	11.0	46.0		
19	49.8	55.0	48.3	61.4	29.0	54.8				
20	48.0	53.5	47.4	61.4	26.4	53.7				

Table 3c. Observed (obs.) and relative (rel.) survival of patients with rectal cancer by age category for period 1988-2014 (N=16,365).

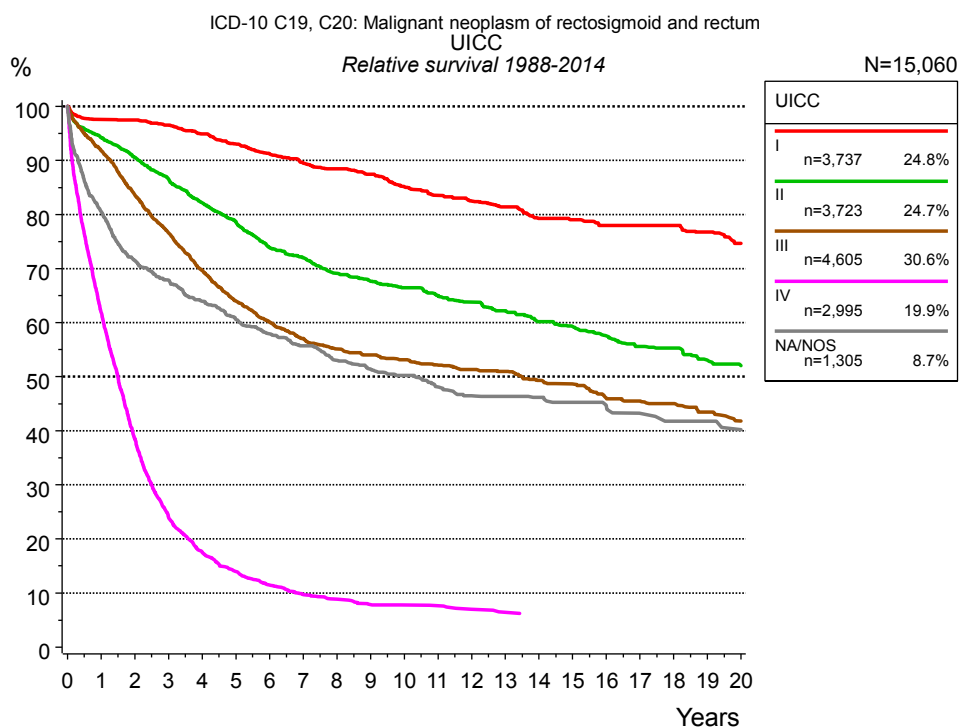


Figure 4a. Relative survival of patients with rectal cancer by UICC. For 15,270 of 16,365 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 15,060 cases an evaluable classification was established. The grey line represents the subgroup of 1,305 patients with missing values regarding UICC (8.0% of 16,365 patients, the percent values of all other categories are related to n=15,060).

Years	UICC									
	I n=3,737		II n=3,723		III n=4,605		IV n=2,995		NA/NOS n=1,305	
	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	94.8	97.6	91.1	94.2	89.3	91.8	60.1	61.8	77.0	80.5
2	91.9	97.5	84.8	90.5	79.1	83.6	36.6	38.5	66.0	71.5
3	88.3	96.6	78.6	86.5	70.6	76.6	22.3	23.9	60.9	67.9
4	84.1	94.9	72.4	82.1	62.5	69.7	16.0	17.6	55.9	63.9
5	79.9	93.0	67.2	78.7	55.9	64.0	12.4	13.9	51.6	60.6
6	75.9	91.2	61.3	73.9	51.2	60.1	10.0	11.5	48.1	58.0
7	72.1	89.5	57.9	72.0	47.3	57.1	8.4	9.7	45.2	55.7
8	69.1	88.4	53.9	69.1	44.4	55.1	7.5	8.8	41.9	53.1
9	66.0	87.4	51.1	67.7	42.4	54.0	6.5	7.8	39.7	51.4
10	62.1	85.2	48.7	66.5	40.6	53.1	6.3	7.8	37.9	50.3
11	59.0	83.5	46.0	65.0	38.7	52.2	6.1	7.6	35.2	48.1
12	56.1	82.5	43.8	63.8	37.0	51.3	5.4	7.0	33.0	46.5
13	53.6	81.4	41.1	62.2	35.6	51.0	4.9	6.4	32.2	46.4
14	50.3	79.3	38.4	60.2	33.3	49.3	4.6	6.1	31.0	46.2
15	48.5	79.1	36.5	59.3	31.8	48.7	4.6	5.8	29.5	45.3
16	46.3	78.0	34.2	57.6	29.2	46.1			28.6	44.8
17	44.9	78.0	31.9	55.6	28.0	45.5			26.4	43.3
18	43.2	78.0	30.7	55.3	26.9	45.0			24.9	41.8
19	40.8	76.7	28.1	53.1	25.1	43.5			24.9	41.8
20	37.9	74.6	26.6	52.0	23.3	41.8			23.0	40.2

Table 4b. Observed (obs.) and relative (rel.) survival of patients with rectal cancer by UICC for period 1988-2014 (N=15,060).

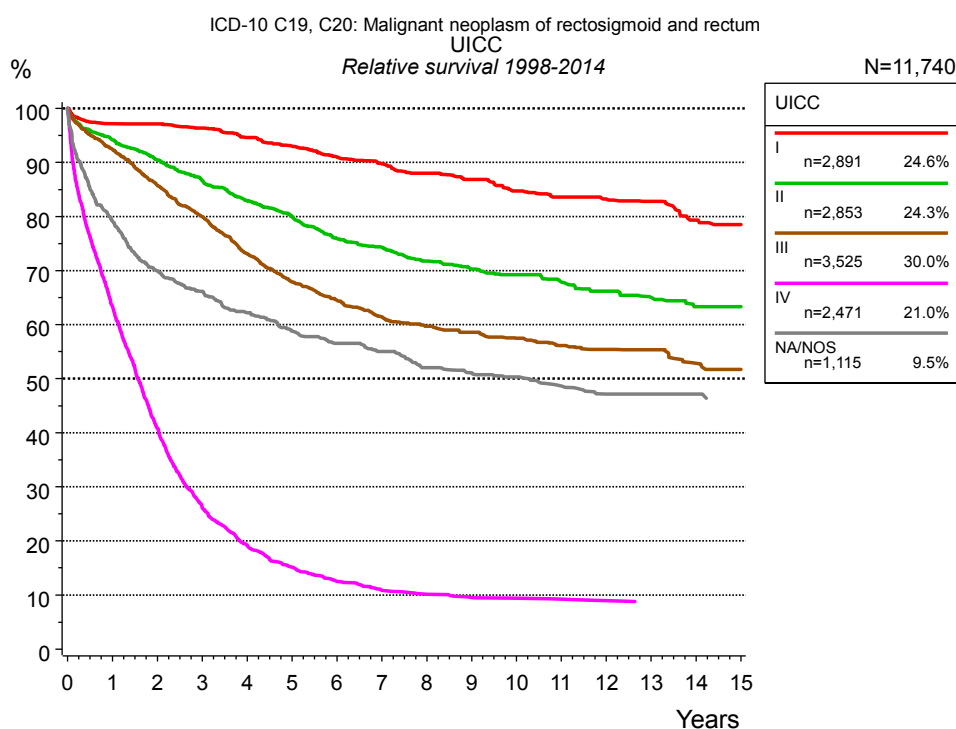


Figure 4c. Relative survival of patients with rectal cancer by UICC. For 11,919 of 12,855 cases diagnosed between 1998 and 2014 valid data could be obtained for this item. For a total of 11,740 cases an evaluable classification was established. The grey line represents the subgroup of 1,115 patients with missing values regarding UICC (8.7% of 12,855 patients, the percent values of all other categories are related to n=11,740).

Years	UICC									
	I n=2,891		II n=2,853		III n=3,525		IV n=2,471		NA/NOS n=1,115	
	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	97.1	91.1	94.2	90.0	92.4	61.6	63.3	75.7	79.1
2	91.7	97.1	84.8	90.4	81.3	85.7	38.8	40.8	64.7	69.9
3	88.1	96.3	78.8	86.6	73.9	80.0	24.4	26.1	59.5	66.2
4	83.9	94.6	73.2	82.9	65.9	73.1	17.6	19.2	54.5	62.2
5	79.9	93.0	68.5	80.0	59.6	67.9	13.5	15.1	50.3	58.8
6	75.8	91.0	63.1	75.9	55.2	64.5	11.0	12.6	47.3	56.6
7	72.4	89.8	59.9	74.3	51.3	61.4	9.4	10.9	44.9	55.0
8	68.9	88.0	56.2	71.8	48.5	59.7	8.7	10.2	41.5	52.0
9	65.7	86.9	53.3	70.3	46.5	58.6	8.0	9.5	39.8	51.1
10	61.9	84.7	51.0	69.2	44.1	57.5	7.6	9.4	38.4	50.3
11	59.3	83.6	48.4	67.9	41.9	56.1	7.3	9.3	36.1	48.7
12	56.7	83.3	45.7	66.2	40.2	55.4	7.0	9.0	33.8	47.1
13	54.5	82.8	43.3	65.0	39.1	55.4			33.2	47.1
14	50.3	79.3	40.5	63.3	36.0	52.9			32.8	47.1
15	48.4	78.5	39.5	63.3	34.3	51.7				

Table 4d. Observed (obs.) and relative (rel.) survival of patients with rectal cancer by UICC for period 1998-2014 (N=11,740).

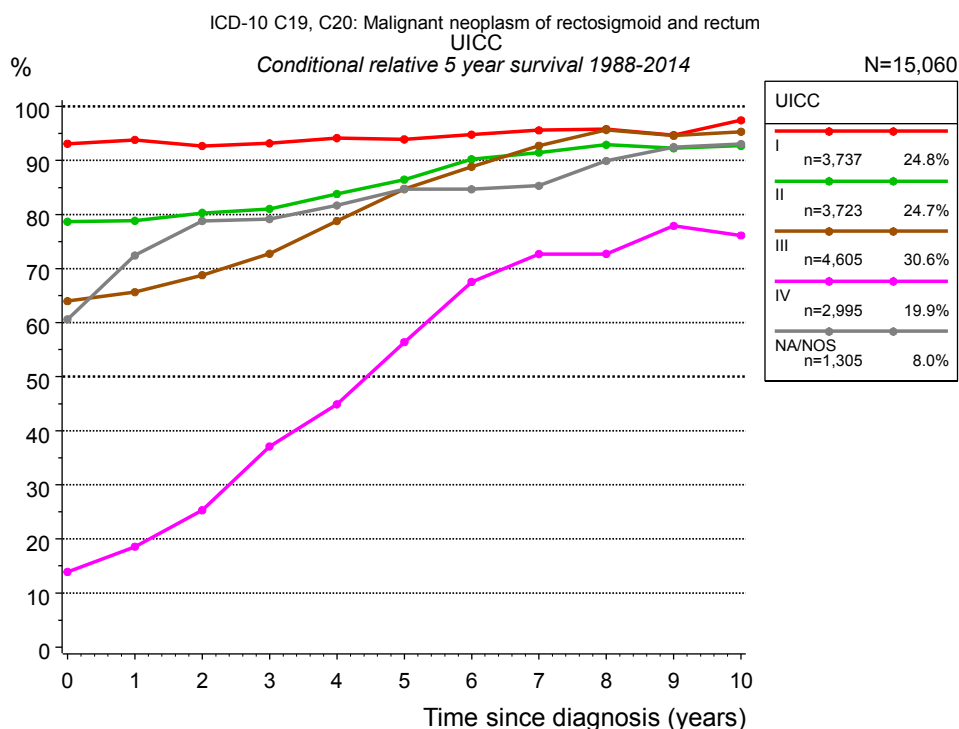


Figure 4e. Conditional relative 5-year survival of patients with rectal cancer by UICC. For 15,270 of 16,365 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 15,060 cases an evaluable classification was established. The grey line represents the subgroup of 1,305 patients with missing values regarding UICC (8.0% of 16,365 patients, the percent values of all other categories are related to n=15,060).

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	3,737	93.1	3,723	78.7	4,605	64.0	2,995	13.9	1,305	60.6
1	3,381	93.8	3,265	78.8	3,920	65.7	1,722	18.6	966	72.4
2	3,129	92.7	2,893	80.3	3,254	68.8	978	25.3	791	78.8
3	2,866	93.2	2,541	81.0	2,696	72.7	540	37.1	703	79.2
4	2,580	94.1	2,207	83.8	2,184	78.8	347	44.9	613	81.7
5	2,295	93.9	1,925	86.5	1,788	84.8	233	56.4	531	84.7
6	2,025	94.8	1,628	90.2	1,469	88.9	164	67.5	471	84.7
7	1,792	95.6	1,410	91.5	1,194	92.7	120	72.7	419	85.3
8	1,571	95.8	1,188	92.9	969	95.7	81	72.7	360	89.9
9	1,373	94.7	1,011	92.2	829	94.6	60	77.9	301	92.5
10	1,174	97.4	865	92.7	714	95.3	47	76.1	263	93.0

Table 4f. Conditional relative 5-year survival of patients with rectal cancer by UICC for period 1988-2014 (N=15,060).

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 93.2% (n=2,866).

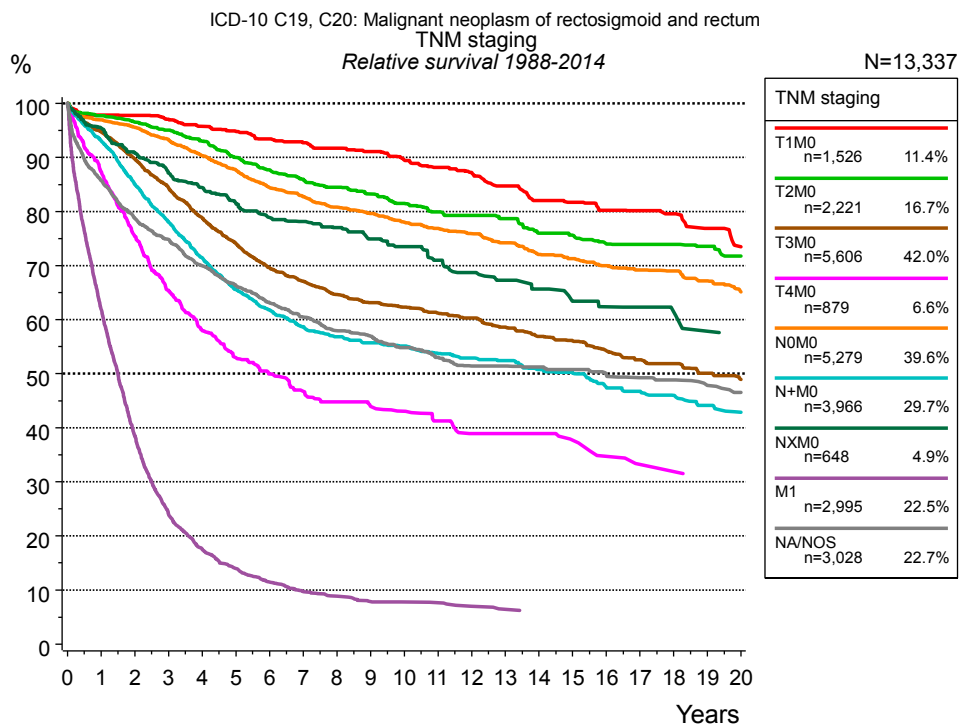


Figure 4g. Relative survival of patients with rectal cancer by TNM staging. For 15,270 of 16,365 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 13,337 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 3,028 patients with missing values regarding TNM staging (18.5 % of 16,365 patients, the percent values of all other categories are related to n=13,337).

TNM staging															
	T1M0 n=1,526		T2M0 n=2,221		T3M0 n=5,606		T4M0 n=879		N0M0 n=5,279		N+M0 n=3,966		NXM0 n=648		
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	95.5	97.8	94.9	97.7	91.9	94.7	84.5	87.3	94.0	97.0	90.6	93.0	92.6	95.5	
2	93.2	97.8	90.9	96.5	84.6	89.7	70.8	75.4	90.0	95.6	80.6	85.0	85.5	90.8	
3	89.9	97.1	86.9	95.1	77.4	84.3	59.8	65.4	85.3	93.3	72.1	78.0	79.7	87.1	
4	86.3	95.7	82.5	93.0	70.3	78.9	51.5	57.9	80.1	90.3	64.3	71.4	75.3	84.5	
5	83.0	94.8	77.4	90.0	64.2	74.1	46.0	53.0	75.5	87.7	57.5	65.6	70.5	81.4	
6	79.5	93.4	73.2	87.7	58.6	69.6	42.2	50.0	70.5	84.5	52.9	61.8	66.6	78.9	
7	76.6	92.7	69.5	86.0	55.0	67.1	38.5	46.8	67.0	82.8	49.0	58.7	64.3	78.2	
8	73.9	91.8	66.2	84.5	51.4	64.7	36.1	44.8	63.4	80.8	46.1	56.8	61.5	77.0	
9	71.0	91.1	63.1	83.2	48.8	63.1	34.3	44.0	60.5	79.6	44.1	55.7	58.0	75.0	
10	67.3	89.5	59.9	81.5	46.6	62.3	32.9	43.0	57.3	78.0	42.3	55.1	55.2	73.5	
11	64.3	88.1	57.0	79.9	44.4	61.2	30.6	41.3	54.6	76.9	40.2	53.7	51.6	71.0	
12	61.4	87.2	54.4	79.3	42.4	60.3	28.0	38.9	52.1	75.9	38.4	52.9	48.8	68.7	
13	58.0	84.7	52.4	78.7	39.7	58.6	28.0	38.9	49.3	74.2	37.0	52.4	46.0	67.3	
14	54.2	82.1	48.7	76.0	37.2	56.9	27.0	38.9	46.1	72.1	34.6	50.8	43.4	65.6	
15	52.3	81.7	46.8	75.6	35.4	56.0	25.2	37.7	44.0	71.3	33.1	50.1	40.3	63.4	
16	49.8	80.2	44.2	74.0	33.1	54.3	22.7	34.7	41.7	70.0	30.5	47.6	38.7	62.4	
17	48.4	80.2	43.1	73.9	31.0	52.6	21.2	33.2	39.8	69.2	29.1	46.7	37.7	62.3	
18	46.2	79.6	41.6	73.9	29.8	51.9	20.4	31.9	38.2	69.0	27.8	46.0	36.2	61.4	
19	42.8	76.9	39.6	73.6	27.4	50.1	19.4	29.8	35.8	67.2	25.9	44.2	33.0	57.8	
20	39.8	73.5	36.9	71.8	25.8	48.9			33.3	65.1	24.3	42.9	31.1	55.9	

<i>cont'd</i> Years	TNM staging			
	M1 n=2,995		NA/NOS n=3,028	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	60.1	61.8	82.3	85.7
2	36.6	38.5	73.0	78.7
3	22.3	23.9	67.2	74.8
4	16.0	17.6	60.9	70.0
5	12.4	13.9	55.9	66.3
6	10.0	11.5	51.6	63.0
7	8.4	9.7	47.9	60.5
8	7.5	8.8	44.6	58.0
9	6.5	7.8	42.5	56.9
10	6.3	7.8	39.8	54.8
11	6.1	7.6	37.2	53.0
12	5.4	7.0	34.9	51.5
13	4.9	6.4	34.0	51.5
14	4.6	6.1	32.7	51.2
15	4.6	5.8	31.5	50.8
16			29.7	49.8
17			28.2	49.3
18			27.1	48.8
19			25.7	47.9
20			24.0	46.6

Table 4h. Observed (obs.) and relative (rel.) survival of patients with rectal cancer by TNM staging for period 1988-2014 (N=23,120).

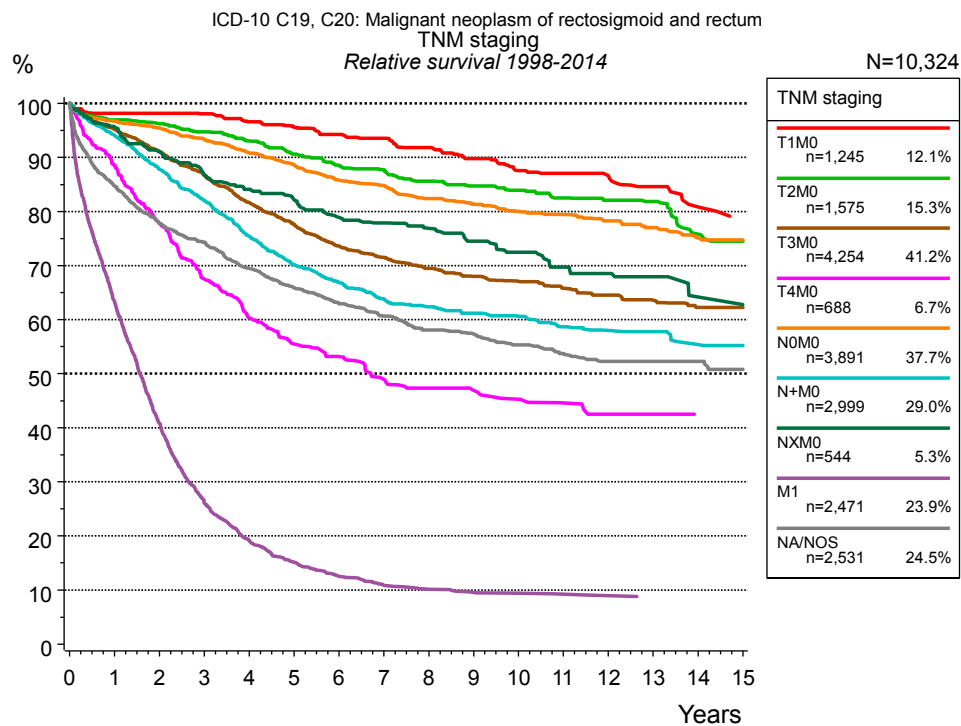


Figure 4i. Relative survival of patients with rectal cancer by TNM staging. For 11,919 of 12,855 cases diagnosed between 1998 and 2014 valid data could be obtained for this item. For a total of 10,324 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potentially considered in more than one subgroup. The grey line represents the subgroup of 2,531 patients with missing values regarding TNM staging (19.7 % of 12,855 patients, the percent values of all other categories are related to n=10,324).

TNM staging															
Years	T1M0 n=1,245		T2M0 n=1,575		T3M0 n=4,254		T4M0 n=688		N0M0 n=3,891		N+M0 n=2,999		NXM0 n=544		
	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	95.9	98.2	94.2	96.9	92.5	95.2	86.0	88.6	93.8	96.7	91.7	94.1	93.1	95.7	
2	94.0	98.2	90.6	96.3	86.0	91.1	73.4	77.8	89.9	95.5	83.4	87.8	85.9	91.0	
3	90.8	98.0	86.8	94.7	79.7	86.6	62.2	67.5	85.3	93.3	76.1	82.1	79.7	86.8	
4	87.1	96.6	82.6	93.0	73.0	81.7	54.0	60.3	80.6	90.8	68.3	75.5	75.5	84.1	
5	83.7	95.6	78.1	90.6	67.4	77.6	48.6	55.5	76.3	88.7	61.9	70.1	71.6	82.1	
6	80.2	94.3	74.1	88.5	62.3	73.6	45.4	53.2	71.7	85.8	57.6	66.9	67.3	78.9	
7	77.3	93.6	71.1	87.8	58.9	71.5	40.8	48.9	68.7	84.8	53.6	63.8	64.9	77.9	
8	73.6	91.8	67.3	85.6	55.6	69.5	38.8	47.3	64.8	82.4	51.0	62.3	62.2	76.9	
9	69.8	89.8	64.5	84.7	52.9	68.0	37.1	46.9	61.9	81.3	49.0	61.2	58.6	74.5	
10	65.6	87.5	62.1	83.9	50.5	67.0	35.2	45.3	59.0	80.1	46.9	60.6	55.1	72.4	
11	63.5	87.1	59.1	82.5	48.1	65.8	33.4	44.6	56.7	79.5	44.1	58.6	51.8	69.7	
12	60.7	86.6	56.7	82.1	45.7	64.6	31.2	42.5	53.8	78.3	42.4	58.0	49.7	68.6	
13	57.6	84.6	54.7	81.9	43.5	63.6	31.2	42.5	51.1	77.1	41.4	57.8	48.2	67.9	
14	53.2	80.9	49.0	75.8	41.0	62.2	29.3	42.4	47.9	75.1	38.2	55.4	43.6	64.2	
15			46.5	74.5	40.3	62.2	29.3	41.0	46.3	74.7	37.1	55.2			

<i>cont'd</i>	TNM staging			
	M1		NA/NOS	
	n=2,471		n=2,531	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	61.6	63.3	81.4	84.7
2	38.8	40.8	72.2	77.9
3	24.4	26.1	66.8	74.3
4	17.6	19.2	60.6	69.5
5	13.5	15.1	55.7	65.9
6	11.0	12.6	51.7	63.0
7	9.4	10.9	48.3	60.6
8	8.7	10.2	44.9	58.1
9	8.0	9.5	43.0	57.4
10	7.6	9.4	40.4	55.3
11	7.3	9.3	38.0	53.7
12	7.0	9.0	35.7	52.2
13			35.1	52.2
14			34.1	52.2
15			32.2	50.8

Table 4j. Observed (obs.) and relative (rel.) survival of patients with rectal cancer by TNM staging for period 1998-2014 (N=17,667).

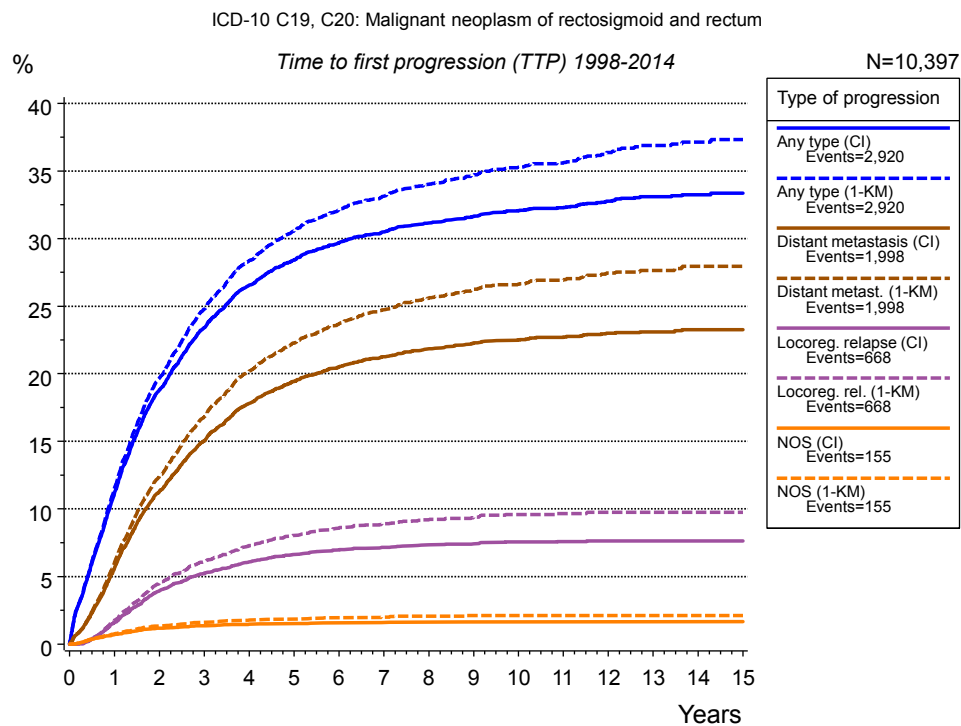


Figure 5a. Time to first progression of 10,397 patients with rectal cancer diagnosed between 1998 and 2014 (M0 only in solid cancers) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency 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=10,397 %	n=10,397 %	n=10,397 %	n=10,397 %	n=10,397 %	n=10,397 %	n=10,397 %
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	11.2	11.5	5.6	6.0	1.6	1.8	0.7
2	18.8	19.7	11.3	12.4	4.0	4.5	1.2
3	23.4	24.8	15.0	16.8	5.2	6.1	1.4
4	26.6	28.4	17.8	20.2	6.1	7.3	1.5
5	28.4	30.6	19.4	22.3	6.6	8.1	1.5
6	29.7	32.1	20.5	23.7	7.0	8.6	1.6
7	30.5	33.1	21.3	24.8	7.2	8.9	1.6
8	31.2	34.0	21.8	25.6	7.3	9.2	1.6
9	31.6	34.7	22.3	26.2	7.4	9.3	1.7
10	32.1	35.3	22.5	26.6	7.6	9.6	1.7
11	32.3	35.6	22.7	26.9	7.6	9.7	1.7
12	32.8	36.4	23.0	27.4	7.6	9.7	1.7
13	33.1	36.9	23.1	27.6	7.6	9.7	1.7
14	33.2	37.1	23.3	27.9	7.6	9.7	1.7
15	33.4	37.3	23.3	27.9	7.6	9.7	1.7

Type of progression	
<i>cont'd</i>	NOS (1-KM) n=10,397
Years	%
0	0.0
1	0.8
2	1.4
3	1.6
4	1.8
5	1.8
6	2.0
7	2.0
8	2.1
9	2.1
10	2.1
11	2.1
12	2.1
13	2.1
14	2.1
15	2.1

Table 5b. Time to first progression of patients with rectal cancer for period 1998-2014 (N=10,397).

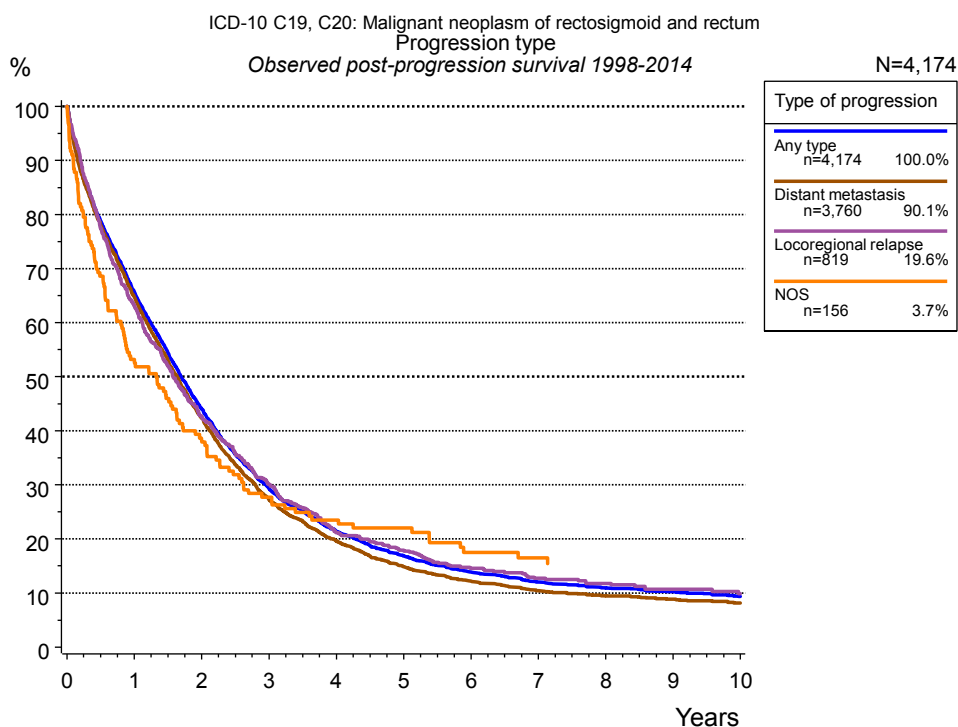


Figure 5c. Observed post-progression survival of 4,174 patients with rectal cancer diagnosed between 1998 and 2014. These 4,174 patients with documented progression events during their course of disease represent 32.6 % of the totally 12,817 evaluated cases (incl. M1, n=2,420, 18.9 %). Patients with cancer relapse documented via death certificates only were excluded (n=1,166, 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=4,174 %	Distant metastasis n=3,760 %	Locoregional relapse n=819 %	NOS n=156 %
0	100.0	100.0	100.0	100.0
1	65.7	64.7	63.0	53.2
2	44.0	42.4	42.5	38.0
3	29.4	27.3	30.1	27.7
4	21.5	19.7	21.1	23.5
5	16.9	14.9	17.9	22.0
6	13.8	12.1	14.6	17.5
7	12.0	10.4	12.7	16.5
8	11.0	9.5	11.8	15.4
9	10.2	8.9	10.7	15.4
10	9.4	8.2	9.8	

Table 5d. Observed post-progression survival of patients with rectal cancer for period 1998-2014 (N=4,174).

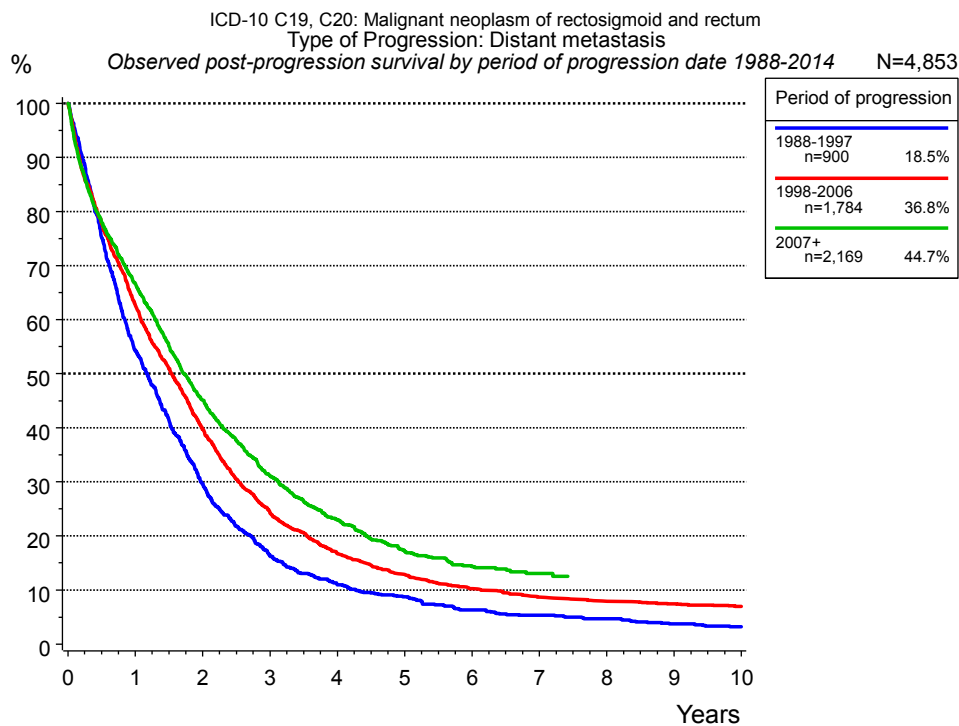


Figure 5e. Observed post-progression (distant metastasis) survival of 4,853 patients with rectal cancer diagnosed between 1988 and 2014 by period of progression.

Years	Period of progression		
	1988-1997 n=900	1998-2006 n=1,784	2007+ n=2,169
	%	%	%
0	100.0	100.0	100.0
1	54.3	62.6	66.6
2	29.7	39.7	45.1
3	16.3	24.3	31.1
4	11.0	16.8	23.0
5	8.7	12.9	17.2
6	6.3	10.2	14.3
7	5.3	8.7	13.1
8	4.7	7.9	
9	3.7	7.5	
10	3.2	7.0	

Table 5f. Observed post-progression (distant metastasis) survival of patients with rectal cancer for period 1988-2014 by period of progression (N=4,853).

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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