Munich Cancer Registry

ICD-10 C18: Colon cancer

Survival

Year of diagnosis	1988-1997	1998-2014
Patients	6,280	29,656
Diseases	6,355	30,220
Cases evaluated	5,512	22,234
Creation date	03/02/2016	
Export date	12/23/2015	
Population	4.64 m	

BERLIN

GERMANY

BAVARIA

MUNICH

Munich Cancer Registry at Munich Cancer Center
Marchioninistr. 15
Munich, 81377
Germany

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

ICD-10 C18: Malignant neoplasm of colon
Period of diagnosis
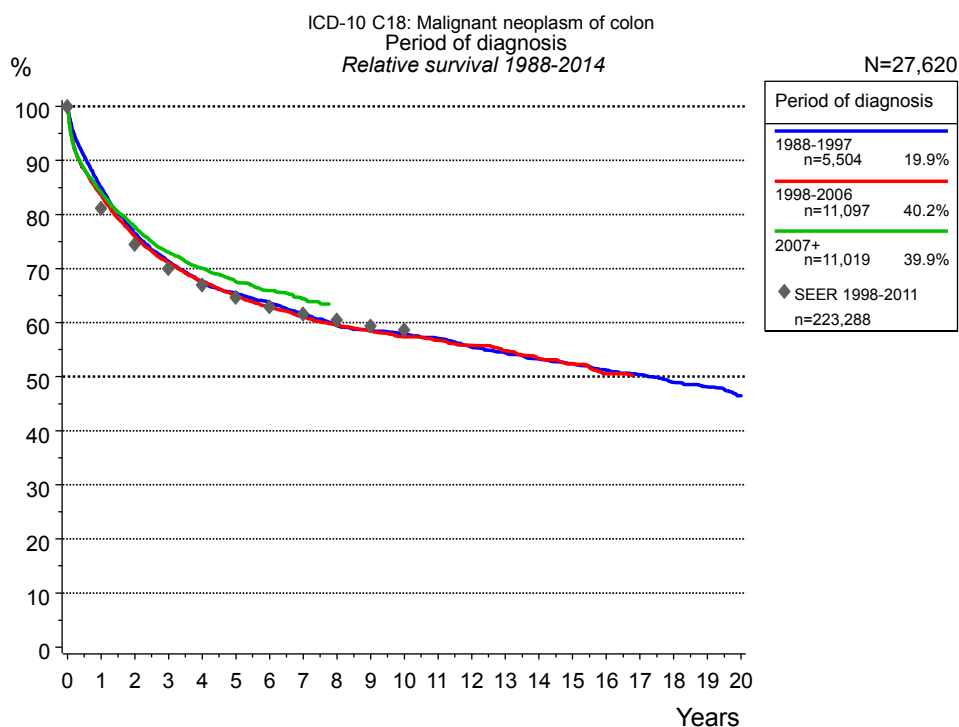*Relative survival 1988-2014*

Figure 1a. Relative survival of patients with colon cancer by period of diagnosis. Included in the evaluation are 27,620 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.

| | Period of diagnosis | | | | | |
| | 1988-1997 n=5,504 | | 1998-2006 n=11,097 | | 2007+ n=11,019 | |
Years	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0
1	81.7	85.0	80.2	83.6	80.8	84.1
2	70.8	76.5	70.3	75.9	72.1	77.7
3	63.7	71.3	63.4	71.0	65.4	73.0
4	58.0	67.5	58.3	67.7	60.5	70.1
5	54.3	65.5	54.0	65.1	56.2	67.6
6	50.8	63.6	50.3	62.9	52.9	65.9
7	47.4	61.7	47.0	61.1	49.7	64.4
8	44.0	59.5	44.2	59.5		
9	41.8	58.6	41.7	58.5		
10	39.7	57.9	39.4	57.3		
11	37.7	57.1	37.5	56.7		
12	35.2	55.5	35.4	55.8		
13	33.3	54.5	33.4	54.8		
14	31.3	53.3	31.2	53.3		
15	29.6	52.4	29.4	52.4		
16	27.7	51.2	27.1	50.5		
17	26.2	50.4				
18	24.4	49.0				
19	23.0	48.1				
20	21.3	46.5				

Table 1b. Observed (obs.) and relative (rel.) survival of patients with colon cancer by period of diagnosis for period 1988-2014 (N=27,620).

ICD-10 C18: Malignant neoplasm of colon
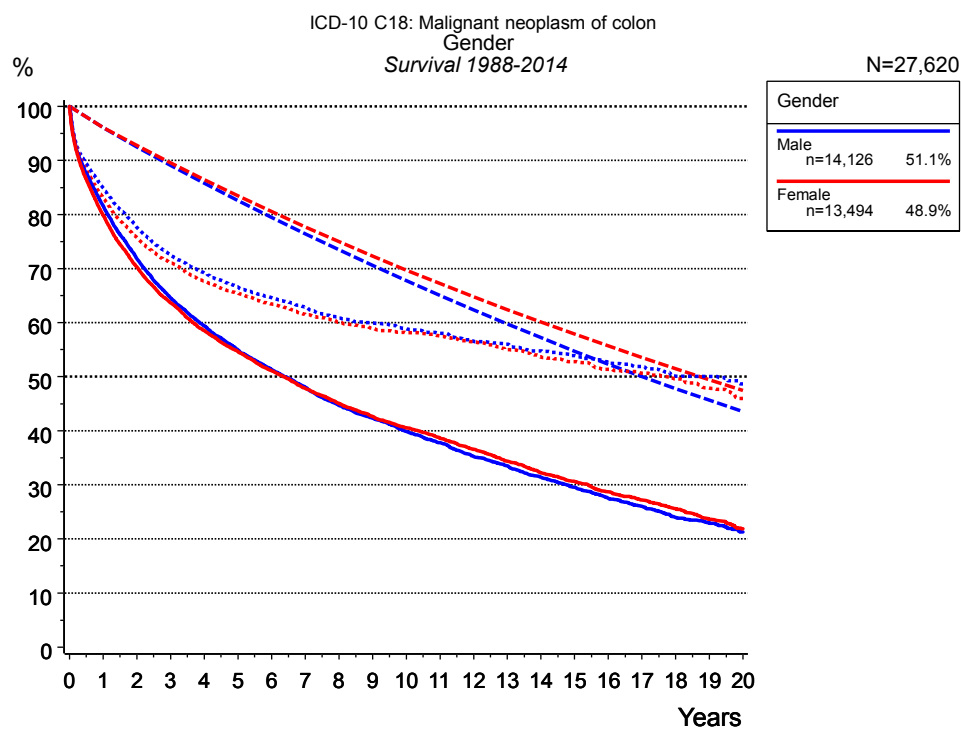Gender
Survival 1988-2014

Figure 2a. Survival of patients with colon cancer by gender. Included in the evaluation are 27,620 cases diagnosed between 1988 and 2014.

	Gender			
	Male n=14,126		Female n=13,494	
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	81.6	85.0	79.8	83.1
2	71.8	77.6	70.3	75.8
3	64.6	72.5	63.7	71.1
4	59.4	69.2	58.6	67.7
5	55.0	66.6	54.7	65.5
6	51.3	64.6	51.1	63.5
7	48.0	62.9	47.8	61.5
8	44.7	60.9	45.1	60.1
9	42.4	60.0	42.6	59.0
10	39.9	58.9	40.6	58.1
11	37.8	58.0	38.7	57.5
12	35.3	56.5	36.6	56.4
13	33.5	56.0	34.3	55.0
14	31.4	54.8	32.2	53.6
15	29.5	53.9	30.6	52.8
16	27.5	52.6	28.7	51.4
17	26.0	51.9	27.2	50.7
18	24.0	50.1	25.6	49.6
19	22.9	50.0	23.7	47.9
20	21.3	48.7	21.9	46.0

Table 2b. Observed (obs.) and relative (rel.) survival of patients with colon cancer by gender for period 1988-2014 (N=27,620).

ICD-10 C18: Malignant neoplasm of colon
Age category
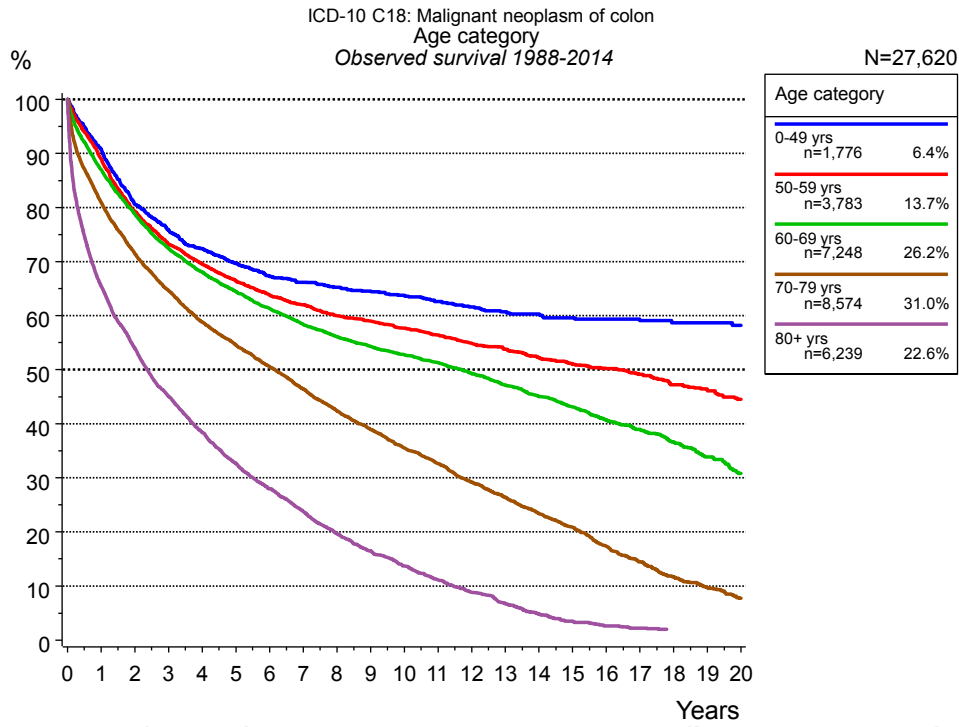*Observed survival 1988-2014*

Figure 3a. Observed survival of patients with colon cancer by age category. Included in the evaluation are 27,620 cases diagnosed between 1988 and 2014.

ICD-10 C18: Malignant neoplasm of colon
Age category
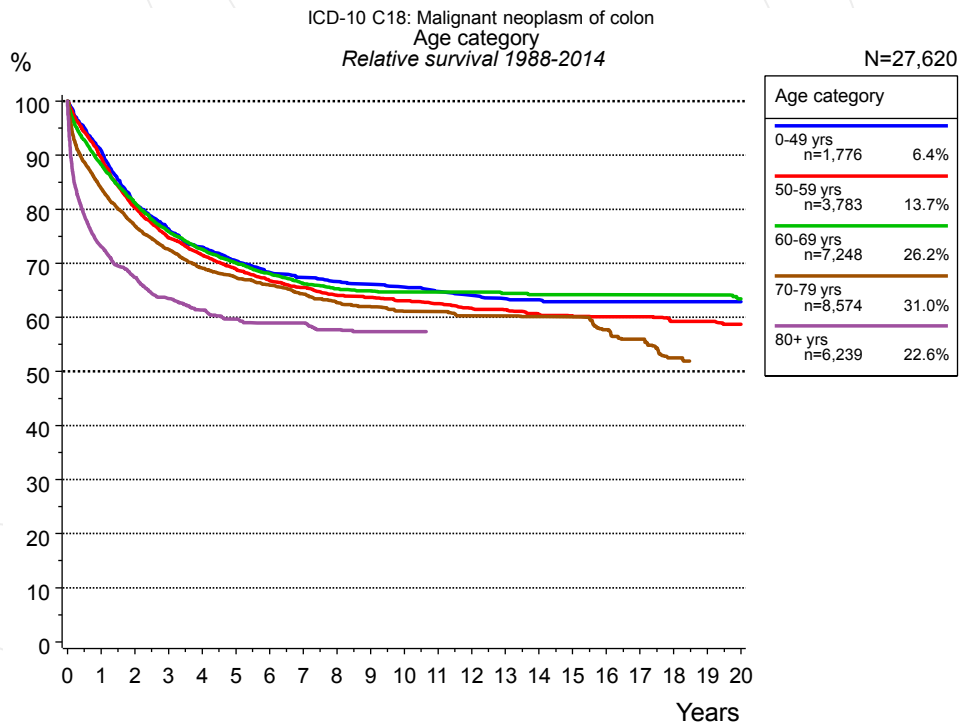*Relative survival 1988-2014*

Figure 3b. Relative survival of patients with colon cancer by age category. Included in the evaluation are 27,620 cases diagnosed between 1988 and 2014.

	Age category									
	0-49 yrs n=1,776		50-59 yrs n=3,783		60-69 yrs n=7,248		70-79 yrs n=8,574		80+ yrs n=6,239	
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	90.7	90.8	89.0	89.6	87.0	88.3	80.9	83.8	65.4	73.1
2	80.6	80.9	79.3	80.3	78.8	81.2	71.4	76.9	54.0	67.4
3	75.8	76.3	73.2	74.7	72.5	75.9	64.6	72.6	45.1	63.4
4	72.4	73.0	69.5	71.5	68.0	72.6	58.8	69.1	38.4	61.4
5	69.7	70.5	66.4	68.9	64.5	70.1	54.5	67.4	32.7	59.7
6	67.3	68.3	63.8	66.8	61.4	68.1	50.5	65.9	28.0	59.0
7	66.2	67.4	62.0	65.5	58.3	66.2	46.4	64.3	23.8	59.0
8	65.2	66.6	60.0	64.1	56.1	65.3	42.4	62.7	19.7	57.8
9	64.5	66.1	58.9	63.7	54.3	64.9	38.9	62.0	16.5	57.3
10	63.8	65.6	57.7	63.0	52.8	64.7	35.5	61.1	13.7	57.3
11	62.6	64.8	56.4	62.5	51.3	64.7	32.6	61.1		
12	61.6	64.1	54.8	61.7	49.3	64.7	29.2	60.3		
13	60.7	63.4	53.8	61.4	47.2	64.4	26.4	60.3		
14	60.3	63.2	52.3	60.6	45.1	64.2	23.4	60.1		
15	59.6	62.9	51.0	60.2	43.1	64.2	20.9	60.1		
16	59.4	62.9	50.2	60.1	40.7	64.1	17.3	57.7		
17	59.1	62.9	49.1	60.1	39.0	64.1	14.4	55.9		
18	58.7	62.9	47.2	59.3	36.6	64.1	11.7	52.5		
19	58.7	62.9	46.3	59.3	33.9	64.1				
20	58.2	62.9	44.5	58.7	30.8	63.4				

Table 3c. Observed (obs.) and relative (rel.) survival of patients with colon cancer by age category for period 1988-2014 (N=27,620).

ICD-10 C18: Malignant neoplasm of colon
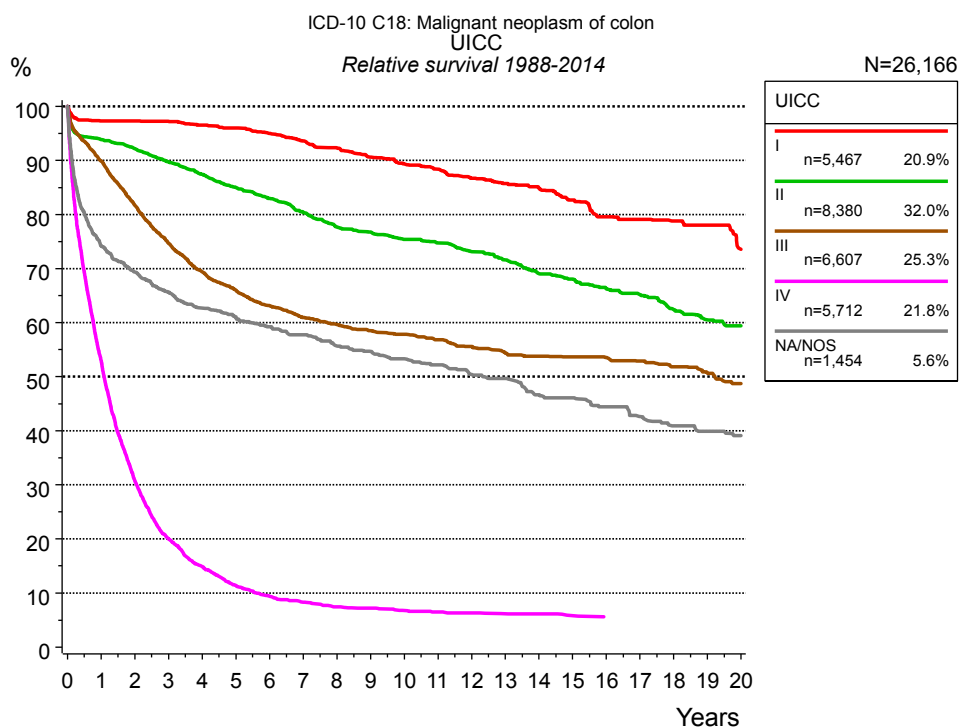UICC
Relative survival 1988-2014

Figure 4a. Relative survival of patients with colon cancer by UICC. For 26,283 of 27,620 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 26,166 cases an evaluable classification was established. The grey line represents the subgroup of 1,454 patients with missing values regarding UICC (5.3% of 27,620 patients, the percent values of all other categories are related to n=26,166).

	UICC									
	I		II		III		IV		NA/NOS	
	n=5,467		n=8,380		n=6,607		n=5,712		n=1,454	
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	94.1	97.3	89.8	93.9	86.4	89.9	50.9	52.8	70.4	74.2
2	91.1	97.3	84.6	92.2	75.7	81.7	28.9	30.8	63.2	69.4
3	87.9	97.2	79.1	89.7	66.8	74.7	18.3	20.0	57.6	65.6
4	84.3	96.5	73.9	87.4	59.9	69.4	13.3	14.9	53.2	62.7
5	81.0	96.0	69.1	85.0	55.0	66.0	9.9	11.4	49.9	61.0
6	77.2	95.0	64.7	83.0	50.8	63.2	8.0	9.4	46.8	59.2
7	73.3	93.6	60.1	80.4	47.4	61.0	6.9	8.3	44.5	57.8
8	69.7	92.3	55.8	77.7	44.8	59.7	6.0	7.4	41.0	55.7
9	65.8	90.6	52.9	76.7	42.5	58.5	5.6	7.2	38.9	54.7
10	62.6	89.4	49.9	75.4	40.5	57.8	5.1	6.8	36.6	53.3
11	59.6	88.4	47.5	74.7	38.3	56.8	4.8	6.5	34.7	52.2
12	56.1	86.7	44.6	73.1	36.2	55.6	4.5	6.4	32.2	50.4
13	53.3	85.8	41.9	71.6	34.1	54.4	4.3	6.2	30.5	49.7
14	50.6	84.8	38.8	69.1	32.7	53.8	4.2	6.1	27.6	46.7
15	47.3	82.7	36.7	68.1	31.3	53.7	3.7	5.8	26.2	46.1
16	43.8	79.6	34.2	66.2	29.8	53.5	3.4	5.7	24.4	44.4
17	41.9	79.1	32.3	65.1	28.4	52.9	3.4	5.6	22.3	42.7
18	39.9	78.8	29.6	62.4	26.6	51.8			20.6	40.9
19	38.5	78.0	27.5	60.5	24.9	50.7			19.3	39.9
20	34.3	73.6	26.0	59.4	23.1	48.8			18.2	39.1

Table 4b. Observed (obs.) and relative (rel.) survival of patients with colon cancer by UICC for period 1988-2014 (N=26,166).

ICD-10 C18: Malignant neoplasm of colon
UICC
Relative survival 1998-2014 N=21,085

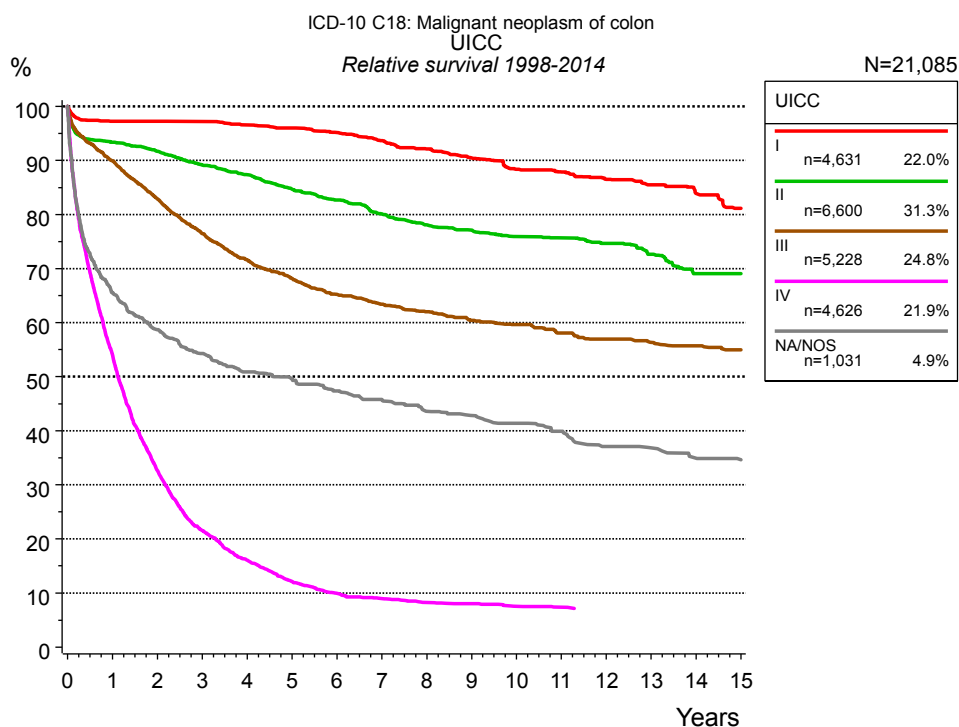| UICC		
I	n=4,631	22.0%
II	n=6,600	31.3%
III	n=5,228	24.8%
IV	n=4,626	21.9%
NA/NOS	n=1,031	4.9%

Figure 4c. Relative survival of patients with colon cancer by UICC. For 21,183 of 22,116 cases diagnosed between 1998 and 2014 valid data could be obtained for this item. For a total of 21,085 cases an evaluable classification was established. The grey line represents the subgroup of 1,031 patients with missing values regarding UICC (4.7% of 22,116 patients, the percent values of all other categories are related to n=21,085).

	UICC									
	I		II		III		IV		NA/NOS	
	n=4,631		n=6,600		n=5,228		n=4,626		n=1,031	
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	94.1	97.3	89.3	93.4	86.4	89.9	52.1	54.0	61.9	65.6
2	91.1	97.3	84.2	91.7	76.8	82.9	30.7	32.6	53.0	58.7
3	88.0	97.2	78.6	89.2	68.4	76.5	19.7	21.5	47.2	54.3
4	84.5	96.6	73.9	87.3	61.8	71.6	14.4	16.1	42.7	50.9
5	81.1	96.0	68.8	84.7	56.8	68.2	10.6	12.1	40.2	49.6
6	77.4	95.2	64.5	82.7	52.5	65.2	8.5	9.9	37.3	47.4
7	73.5	93.6	59.9	80.1	49.3	63.4	7.5	9.0	35.0	45.8
8	69.6	92.2	56.1	78.1	46.6	62.0	6.7	8.2	32.2	43.6
9	65.8	90.4	53.1	77.1	43.9	60.4	6.3	8.0	30.7	42.8
10	61.9	88.4	50.1	75.9	41.8	59.7	5.8	7.5	29.0	41.4
11	59.2	87.9	48.0	75.6	39.2	58.1	5.5	7.3	27.0	39.9
12	55.9	86.5	45.4	74.6	37.3	57.0	5.2	7.2	24.2	37.1
13	53.1	85.5	42.3	72.6	35.2	56.4	5.2	7.2	23.3	36.9
14	49.7	83.9	38.5	69.0	34.0	55.7	5.2	7.2	21.6	34.9
15	46.1	81.2	36.8	69.0	32.2	54.9			20.8	34.7

Table 4d. Observed (obs.) and relative (rel.) survival of patients with colon cancer by UICC for period 1998-2014 (N=21,085).

ICD-10 C18: Malignant neoplasm of colon
UICC
Conditional relative 5 year survival 1988-2014   N=26,166
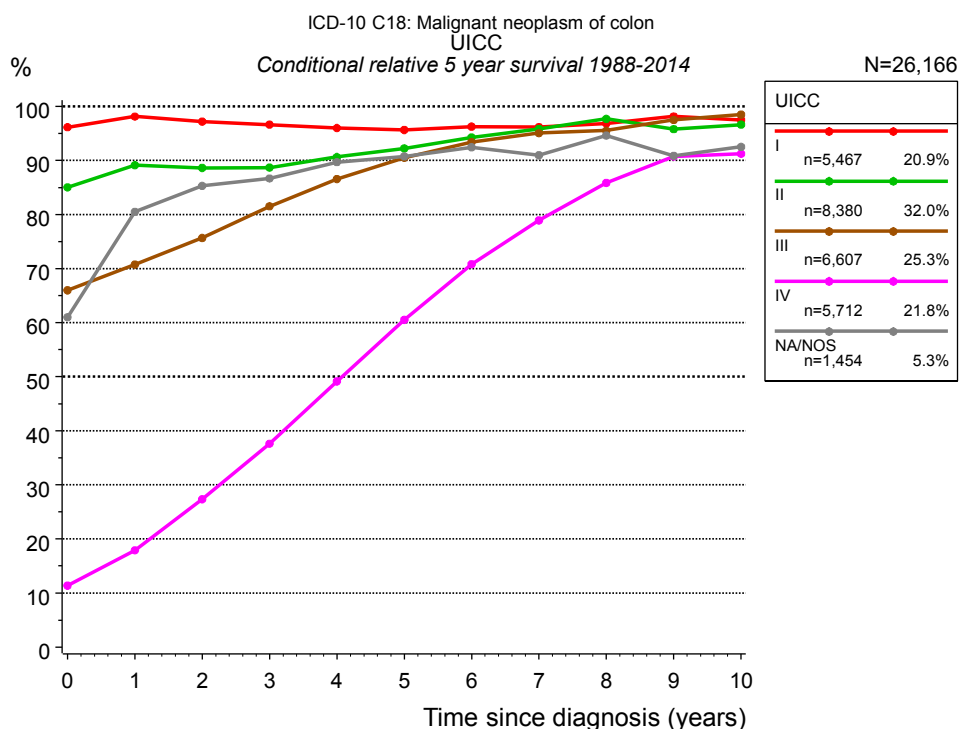

Figure 4e. Conditional relative 5-year survival of patients with colon cancer by UICC. For 26,283 of 27,620 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 26,166 cases an evaluable classification was established. The grey line represents the subgroup of 1,454 patients with missing values regarding UICC (5.3% of 27,620 patients, the percent values of all other categories are related to n=26,166).

		UICC								
	I		II		III		IV		NA/NOS	
		Cond. surv. %		Cond. surv. %		Cond. surv. %		Cond. surv. %		Cond. surv. %
Years	n	5 yrs	n	5 yrs	n	5 yrs	n	5 yrs	n	5 yrs
0	5,467	96.2	8,380	85.0	6,607	66.0	5,712	11.4	1,454	61.0
1	4,876	98.1	7,127	89.1	5,468	70.8	2,775	17.9	988	80.5
2	4,465	97.2	6,387	88.6	4,544	75.7	1,479	27.4	867	85.3
3	4,033	96.6	5,638	88.7	3,750	81.5	868	37.6	767	86.7
4	3,619	96.0	4,956	90.6	3,157	86.6	574	49.1	685	89.7
5	3,217	95.7	4,304	92.2	2,681	90.5	381	60.5	622	90.8
6	2,801	96.3	3,710	94.3	2,264	93.4	273	70.8	558	92.5
7	2,381	96.2	3,187	95.8	1,878	95.1	205	78.9	508	91.0
8	2,020	96.9	2,690	97.7	1,593	95.5	158	85.9	446	94.6
9	1,695	98.1	2,322	95.8	1,352	97.5	131	90.7	406	90.9
10	1,467	97.5	2,002	96.6	1,165	98.5	103	91.3	371	92.5

Table 4f. Conditional relative 5-year survival of patients with colon cancer by UICC for period 1988-2014 (N=26,166).

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 96.6% (n=4,033).
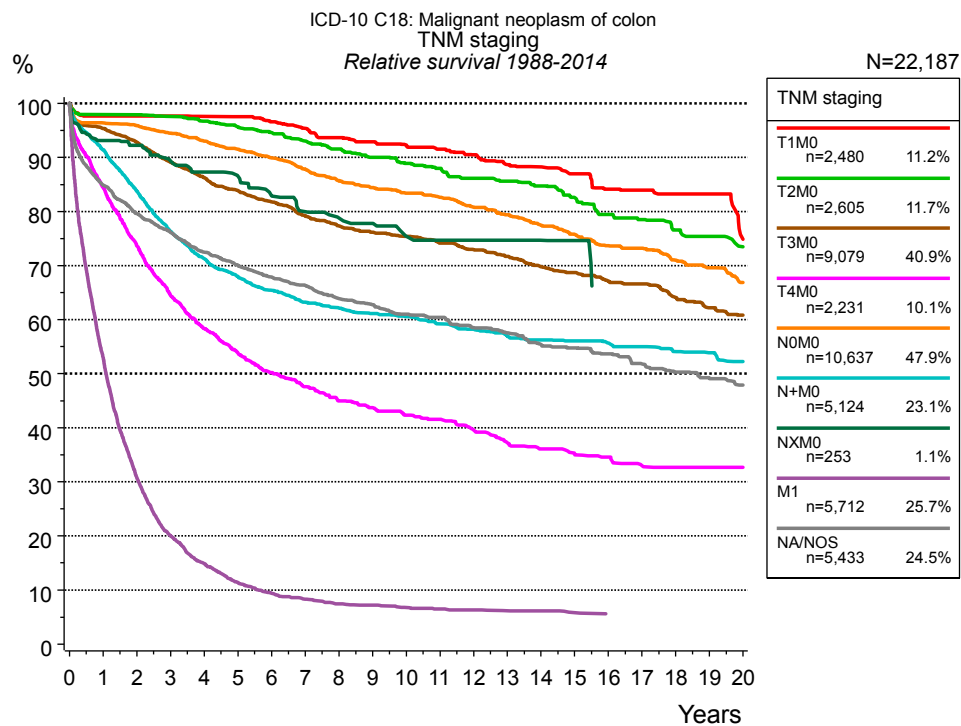
ICD-10 C18: Malignant neoplasm of colon
TNM staging
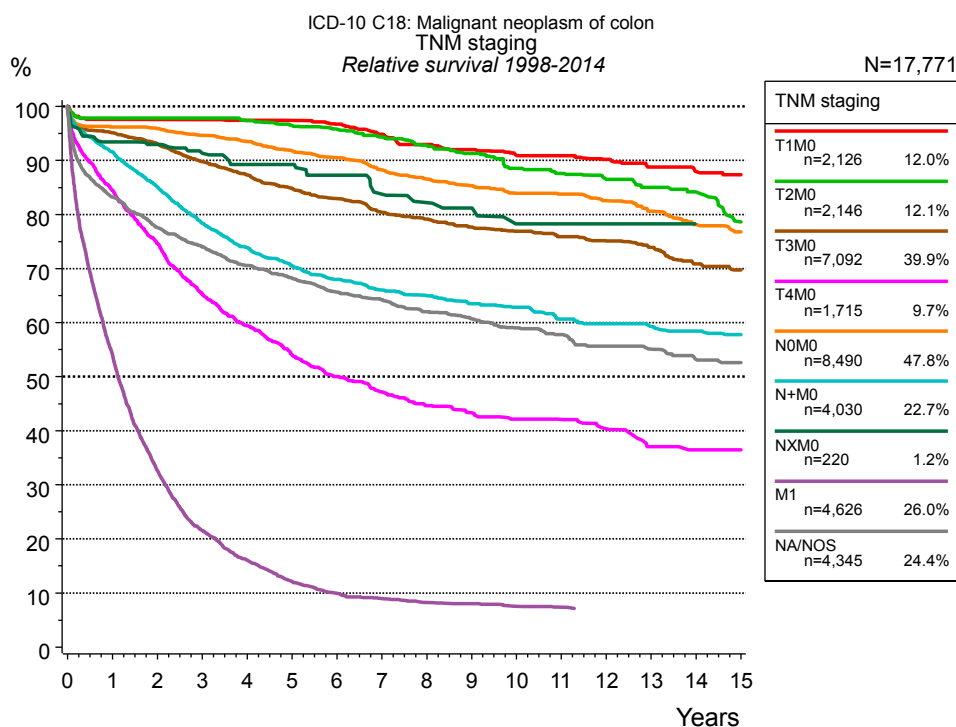*Relative survival 1988-2014*

Figure 4g. Relative survival of patients with colon cancer by TNM staging. For 26,283 of 27,620 cases diagnosed between 1988 and 2014 valid data could be obtained for this item. For a total of 22,187 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potientially considered in more than one subgroup. The grey line represents the subgroup of 5,433 patients with missing values regarding TNM staging (19.7 % of 27,620 patients, the percent values of all other categories are related to n=22,187).

	TNM staging												
	T1M0 n=2,480		T2M0 n=2,605		T3M0 n=9,079		T4M0 n=2,231		N0M0 n=10,637		N+M0 n=5,124		NXM0 n=253	
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	94.9	97.7	94.6	97.9	91.6	95.4	80.7	84.5	92.7	96.3	88.0	91.5	90.2	93.1
2	92.4	97.7	91.4	97.9	85.8	92.8	67.5	73.7	88.9	95.9	77.8	83.8	87.0	92.2
3	89.6	97.7	88.0	97.6	79.3	89.2	56.9	64.5	84.4	94.5	68.5	76.3	81.5	89.3
4	86.7	97.6	84.1	96.7	73.9	86.3	49.5	58.4	80.0	93.0	61.9	71.3	77.5	87.3
5	84.1	97.5	80.2	95.7	69.1	83.9	44.0	53.8	75.9	91.5	57.0	68.0	73.4	86.5
6	80.3	96.6	76.5	94.6	64.8	81.8	39.7	50.2	71.7	89.9	53.1	65.4	67.5	82.8
7	76.8	95.4	72.6	93.0	60.3	79.1	36.2	47.6	67.4	87.8	49.6	63.2	63.5	80.0
8	73.2	93.6	68.9	91.6	56.7	77.3	32.9	45.0	63.3	85.7	47.1	62.2	60.1	78.8
9	69.9	92.9	65.2	90.0	53.7	76.2	30.9	43.8	60.0	84.5	44.8	61.1	58.3	77.8
10	66.9	92.3	62.1	88.9	51.2	75.4	28.8	42.3	57.0	83.4	42.9	60.6	53.2	75.4
11	64.0	91.5	59.2	88.0	48.4	74.2	27.5	41.6	54.3	82.6	40.4	59.2	52.2	74.7
12	60.9	90.5	55.7	86.1	45.8	72.9	25.1	39.6	51.1	80.8	38.4	58.2	52.2	74.7
13	57.5	88.7	53.2	85.6	43.2	71.7	22.8	37.2	48.3	79.4	36.1	57.0	50.8	74.7
14	54.9	88.3	50.5	84.8	40.4	69.8	21.3	36.1	45.2	77.4	34.7	56.3	45.7	74.7
15	51.9	87.0	47.2	82.6	38.3	68.7	20.0	35.2	42.5	75.8	33.1	56.1	43.9	74.6
16	48.3	84.1	43.5	79.5	35.9	67.1	19.0	34.6	39.7	73.7	31.4	55.7	36.6	63.7
17	46.7	84.0	41.4	78.5	34.2	66.6	17.4	33.0	37.9	73.2	29.9	55.0		
18	44.8	83.3	38.6	76.6	31.6	64.1	16.9	32.7	35.2	71.0	28.2	54.1		
19	43.1	83.3	37.0	75.4	29.4	62.2	16.5	32.7	33.1	69.6	26.8	53.9		
20	36.7	74.9	34.1	73.5	27.7	60.8	15.7	32.7	30.5	66.9	25.1	52.3		

| cont'd | TNM staging | | | |
| | M1 n=5,712 | | NA/NOS n=5,433 | |
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	50.9	52.8	80.9	84.9
2	28.9	30.8	72.8	79.6
3	18.3	20.0	66.9	76.1
4	13.3	14.9	61.2	72.5
5	9.9	11.4	56.9	70.1
6	8.0	9.4	52.9	67.9
7	6.9	8.3	49.7	66.3
8	6.0	7.4	46.0	63.9
9	5.6	7.2	43.4	62.8
10	5.1	6.8	40.5	61.0
11	4.8	6.5	38.6	60.4
12	4.5	6.4	35.8	58.5
13	4.3	6.2	33.8	57.6
14	4.2	6.1	31.2	55.4
15	3.7	5.8	29.7	54.8
16	3.4	5.7	27.7	53.7
17	3.4	5.6	25.6	51.8
18			23.7	50.3
19			22.2	49.2
20			20.7	47.9

Table 4h. Observed (obs.) and relative (rel.) survival of patients with colon cancer by TNM staging for period 1988-2014 (N=38,121).

ICD-10 C18: Malignant neoplasm of colon
TNM staging
Relative survival 1998-2014

N=17,771

TNM staging

T1M0 n=2,126 12.0%
T2M0 n=2,146 12.1%
T3M0 n=7,092 39.9%
T4M0 n=1,715 9.7%
N0M0 n=8,490 47.8%
N+M0 n=4,030 22.7%
NXM0 n=220 1.2%
M1 n=4,626 26.0%
NA/NOS n=4,345 24.4%

Figure 4i. Relative survival of patients with colon cancer by TNM staging. For 21,183 of 22,116 cases diagnosed between 1998 and 2014 valid data could be obtained for this item. For a total of 17,771 cases an evaluable classification was established. The accumulated percentage exceeds the 100% value because patients are potientially considered in more than one subgroup. The grey line represents the subgroup of 4,345 patients with missing values regarding TNM staging (19.6 % of 22,116 patients, the percent values of all other categories are related to n=17,771).

	TNM staging												
	T1M0 n=2,126		T2M0 n=2,146		T3M0 n=7,092		T4M0 n=1,715		N0M0 n=8,490		N+M0 n=4,030		NXM0 n=220	
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	94.8	97.6	94.6	97.8	91.4	95.1	80.8	84.5	92.6	96.2	88.2	91.6	90.5	93.4
2	92.3	97.6	91.8	97.8	86.0	93.1	68.5	74.6	89.0	95.9	79.1	85.1	87.9	93.0
3	89.7	97.6	88.7	97.8	79.9	89.8	57.7	65.3	84.7	94.6	70.4	78.4	83.7	91.3
4	87.0	97.4	84.7	97.4	74.7	87.3	50.7	59.5	80.5	93.5	64.0	73.9	79.5	89.3
5	84.2	97.4	80.9	96.5	69.8	84.9	44.4	54.0	76.1	91.8	59.1	70.6	76.8	89.3
6	80.6	96.7	77.5	95.8	65.6	82.9	39.8	50.0	72.3	90.5	55.1	68.0	72.2	87.3
7	76.6	94.8	73.6	94.4	61.1	80.4	36.2	47.2	67.8	88.3	51.7	66.0	66.8	83.8
8	72.8	92.9	69.7	92.8	57.9	79.2	33.0	44.7	64.0	86.6	49.2	65.0	63.4	82.2
9	69.7	92.0	66.1	91.3	54.5	77.7	30.9	43.3	60.7	85.3	46.4	63.5	61.0	81.2
10	66.2	90.9	61.9	88.6	51.9	76.9	29.2	42.2	57.4	83.9	44.4	62.9	55.3	78.3
11	64.1	90.9	58.8	87.6	49.2	76.0	28.2	42.1	55.1	83.8	41.3	60.7	55.3	78.3
12	61.0	90.2	55.6	86.5	46.7	75.1	26.2	40.4	52.1	82.5	39.5	59.8	55.3	78.3
13	57.6	88.8	52.9	85.0	44.0	74.0	23.2	37.1	48.9	80.6	37.4	59.3	53.1	78.3
14	54.5	88.0	49.7	84.2	40.5	70.9	22.2	36.5	45.3	78.2	36.1	58.4	47.3	77.8
15	52.5	87.4	44.8	78.6	38.3	69.7			42.7	76.8	34.2	57.8		

| cont'd | TNM staging | | | |
| | M1 n=4,626 | | NA/NOS n=4,345 | |
Years	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	52.1	54.0	79.2	83.2
2	30.7	32.6	70.9	77.6
3	19.7	21.5	64.9	74.0
4	14.4	16.1	59.5	70.6
5	10.6	12.1	55.3	68.2
6	8.5	9.9	51.2	65.7
7	7.5	9.0	48.2	64.2
8	6.7	8.2	44.7	62.0
9	6.3	8.0	42.0	60.7
10	5.8	7.5	39.3	59.0
11	5.5	7.3	37.0	57.8
12	5.2	7.2	34.4	55.7
13	5.2	7.2	32.6	55.1
14	5.2	7.2	30.2	53.2
15			28.8	52.6

Table 4j. Observed (obs.) and relative (rel.) survival of patients with colon cancer by TNM staging for period 1998-2014 (N=30,445).

ICD-10 C18: Malignant neoplasm of colon
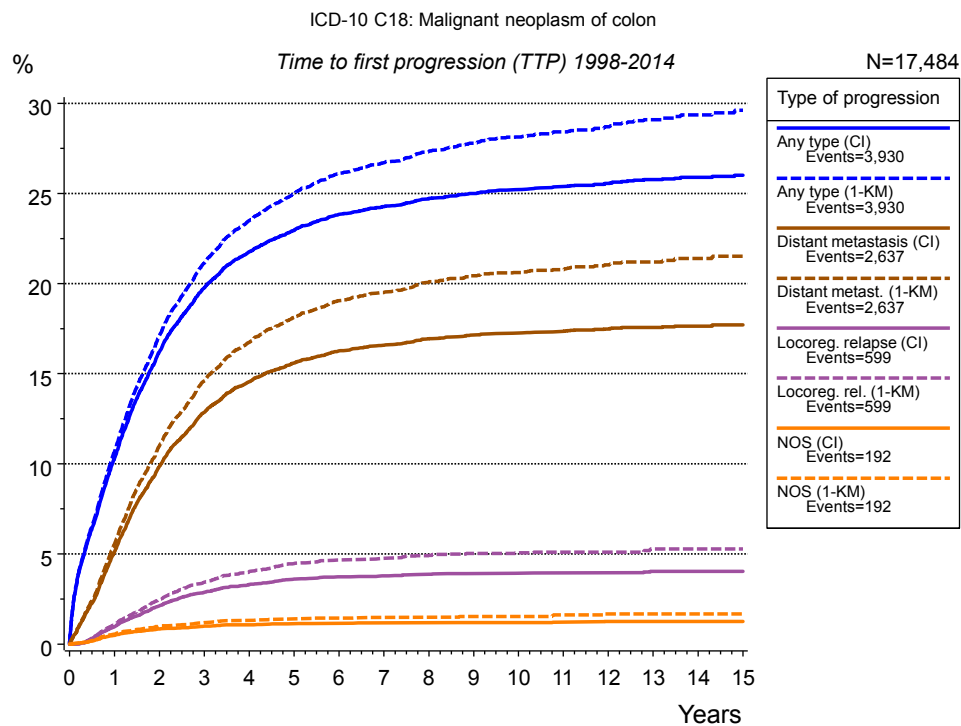
Figure 5a. Time to first progression of 17,484 patients with colon cancer diagnosed between 1998 and 2014 (M0 only in solid cancers) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

	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=17,484	n=17,484	n=17,484	n=17,484	n=17,484	n=17,484	n=17,484
Years	%	%	%	%	%	%	%
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	10.3	10.7	5.1	5.5	1.0	1.1	0.5
2	16.2	17.1	9.9	11.0	2.1	2.5	0.8
3	19.8	21.1	12.8	14.6	2.9	3.4	1.0
4	21.8	23.5	14.6	16.7	3.3	4.0	1.1
5	23.0	25.0	15.6	18.1	3.6	4.5	1.1
6	23.9	26.1	16.3	19.1	3.7	4.7	1.2
7	24.3	26.7	16.6	19.5	3.8	4.8	1.2
8	24.7	27.3	16.9	20.1	3.9	4.9	1.2
9	25.0	27.8	17.2	20.4	3.9	5.0	1.2
10	25.2	28.1	17.3	20.6	3.9	5.1	1.2
11	25.4	28.4	17.3	20.8	4.0	5.1	1.2
12	25.6	28.7	17.5	21.0	4.0	5.1	1.3
13	25.8	29.1	17.6	21.2	4.0	5.3	1.3
14	25.9	29.4	17.6	21.4	4.0	5.3	1.3
15	26.0	29.6	17.7	21.5	4.0	5.3	1.3

	Type of progression
cont'd	NOS (1-KM) n=17,484
Years	%
0	0.0
1	0.6
2	1.0
3	1.2
4	1.3
5	1.4
6	1.4
7	1.5
8	1.5
9	1.5
10	1.5
11	1.6
12	1.7
13	1.7
14	1.7
15	1.7

Table 5b. Time to first progression of patients with colon cancer for period 1998-2014 (N=17,484).

ICD-10 C18: Malignant neoplasm of colon
Progression type
Observed post-progression survival 1998-2014   N=6,543
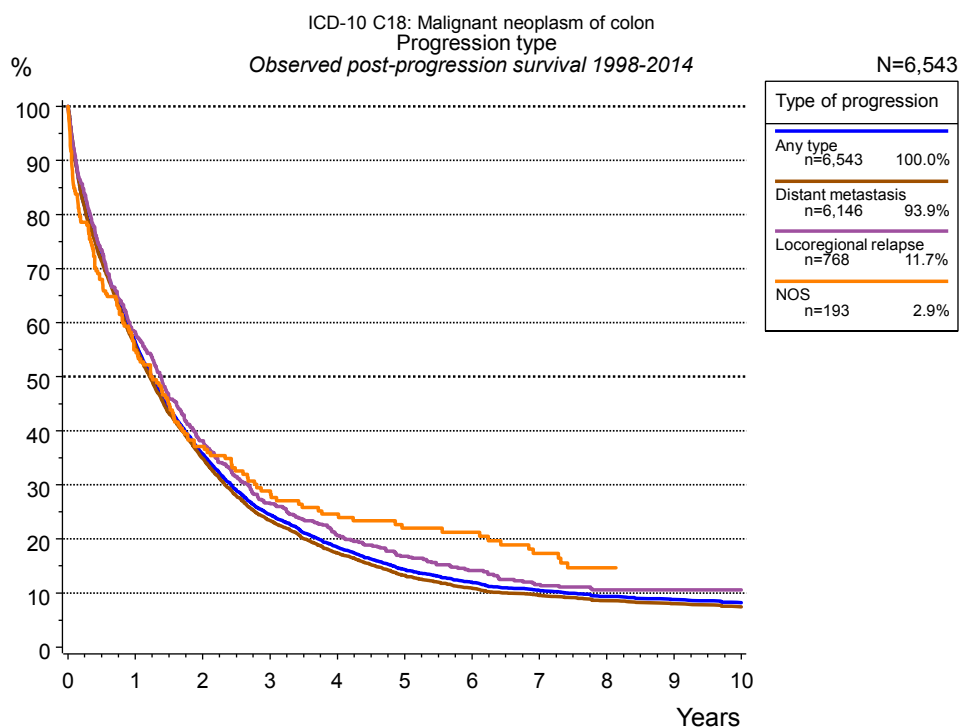
Figure 5c. Observed post-progression survival of 6,543 patients with colon cancer diagnosed between 1998 and 2014. These 6,543 patients with documented progression events during their course of disease represent 29.7 % of the totally 22,027 evaluated cases (incl. M1, n=4,543, 20.6 %). Patients with cancer relapse documented via death certificates only were excluded (n=1,930, 8.8 %). Multiple progression types on different sites are included in the evaluation even when not occuring 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 potientially considered in more than one subgroup.

	Type of progression			
	Any type n=6,543	Distant metastasis n=6,146	Locoregional relapse n=768	NOS n=193
Years	%	%	%	%
0	100.0	100.0	100.0	100.0
1	56.4	55.8	58.0	55.0
2	35.7	34.9	38.2	37.1
3	24.5	23.4	26.6	28.9
4	18.5	17.4	20.6	24.6
5	14.3	13.2	16.8	22.0
6	12.0	10.9	14.1	21.3
7	10.5	9.6	11.6	17.3
8	9.4	8.6	10.5	14.7
9	8.8	8.0	10.5	
10	8.2	7.5	10.5	

Table 5d. Observed post-progression survival of patients with colon cancer for period 1998-2014 (N=6,543).

ICD-10 C18: Malignant neoplasm of colon
Type of Progression: Distant metastasis
Observed post-progression survival by period of progression date 1988-2014   N=7,807
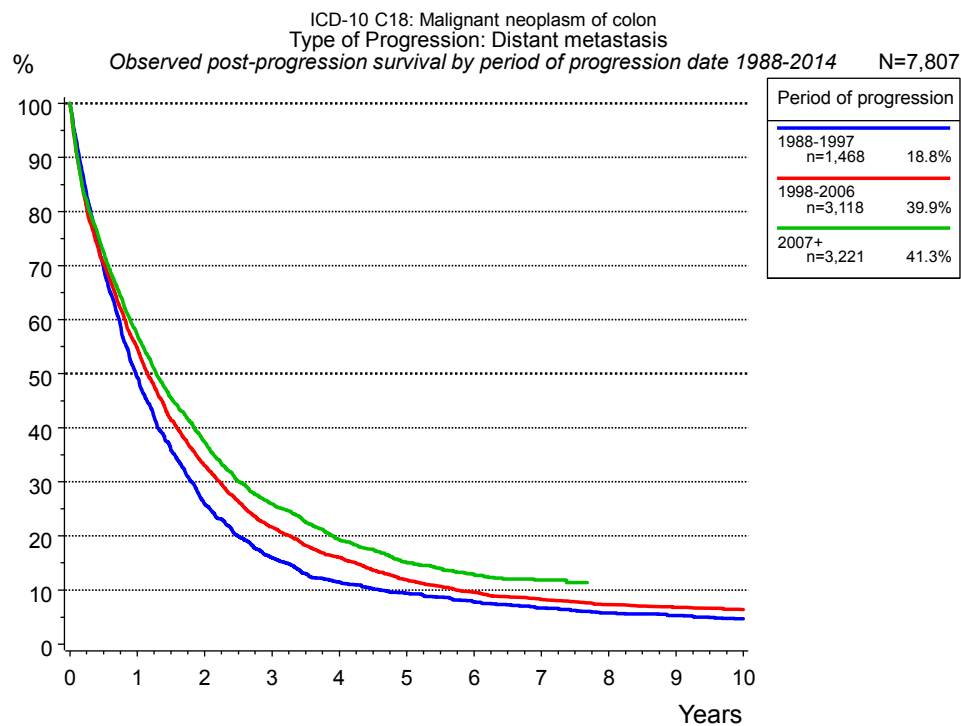
Figure 5e. Observed post-progression (distant metastasis) survival of 7,807 patients with colon cancer diagnosed between 1988 and 2014 by period of progression.

	Period of progression		
	1988-1997 n=1,468	1998-2006 n=3,118	2007+ n=3,221
Years	%	%	%
0	100.0	100.0	100.0
1	49.3	54.8	57.2
2	25.9	33.1	37.3
3	16.0	21.6	25.9
4	11.4	16.0	19.3
5	9.4	11.9	15.1
6	7.8	9.6	12.8
7	6.7	8.2	11.8
8	5.7	7.3	11.4
9	5.3	6.8	
10	4.7	6.4	

Table 5f. Observed post-progression (distant metastasis) survival of patients with colon cancer for period 1988-2014 by period of progression (N=7,807).

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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