

# Chapter 4

## Cancers of the Colon and Rectum

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### INTRODUCTION

Cancers of the colon and rectum are the third most common cancer among both men and women in the United States and the second leading cause of cancer death (1). Fifty-three percent of colorectal cancers occur in either the lower (sigmoid) colon or the rectum and should be easy to detect at an early stage.

### MATERIALS AND METHODS

The NCI contracts with medically-oriented, nonprofit institutions located in specific geographic areas to obtain data on all cancers diagnosed in residents of the SEER geographic areas. SEER collects data on all invasive and in situ cancers except basal cell and squamous cell carcinomas of the skin (of non-genital anatomic sites) and in situ carcinomas of the uterine cervix. SEER actively follows all previously diagnosed patients on an annual basis to obtain vital status allowing the calculation of observed and relative survival rates.

This analysis is based on data from 12 SEER geographic areas which collectively cover about 14% of the total US population. The areas are the States of Connecticut, Iowa, New Mexico, Utah, and Hawaii; the metropolitan areas of Detroit, Michigan; Atlanta, Georgia; San Francisco, San

Jose, and Los Angeles, California; Seattle, Washington; and 10 counties in rural Georgia. Los Angeles contributed data for diagnosis years 1992 to 2001, all other areas for 1988-2001.

In situ diagnoses have been excluded, except as noted in the staging section. Cases diagnosed in children and adolescents aged 0-19 have also been excluded. Some patients have more than one diagnosis of cancer, but only the first diagnosis of cancer has been included. Death certificate only cases, autopsy only cases, and all other cases with no survival time have been excluded. Further, cases with no microscopic confirmation have been excluded. Finally, sarcomas arising in the colon and rectum have also been excluded from this analysis as they have been included in Chapter 11 of this monograph. Table 4.1 shows the numbers of cases excluded by category.

Survival analysis is based on relative survival rates calculated by the life-table (actuarial) method. Relative survival, defined as observed survival in the cohort divided by expected survival in the cohort, adjusts for the expected mortality that the cohort would experience from other causes of death. Expected survival is based on decennial life tables for the United States in 1990.

**Table 4.1: Cancers of the Colon and Rectum: Number of Cases and Exclusions by Reason, 12 SEER Areas, 1988-2001**

Number Selected/Remaining	Number Excluded	Reason for Exclusion/Selection
247,671	0	Select 1988-2001 diagnosis (Los Angeles for 1992-2001 only)
201,637	46,034	Select first primary only
199,425	2,212	Exclude death certificate only or at autopsy
198,521	904	Exclude unknown race
198,331	190	Exclude alive with no survival time
198,242	89	Exclude children (Ages 0-19)
187,201	11,041	Exclude in situ cancers
182,752	4,449	Exclude no or unknown microscopic confirmation
182,589	163	Exclude sarcomas

Table 4.2: Cancers of the Colon and Rectum: Distribution by Subsite, Sex, Race and 5th Edition AJCC Stage Group, Ages 20+, 12 SEER Areas, 1988-2001

Primary Site/Subsite	Total	Sex		Race			AJCC Stage (%)				
		Male	Female	White	Black	Other	0/I	II	III	IV	Unknown
Colon and rectum	182,589	92,880	89,709	150,522	16,830	15,237	26.3	28.5	23.3	17.4	4.4
Colon	129,445	62,825	66,620	106,695	12,732	10,018	22.8	31.1	23.9	18.5	3.6
Cecum	30,203	13,186	17,017	25,528	3,166	1,509	17.3	31.9	27.9	20.4	2.5
Appendix	1,455	726	729	1,210	146	99	18.4	36.7	11.3	31.1	2.5
Ascending	19,236	8,682	10,554	15,966	1,961	1,309	19.9	35.0	26.0	16.0	3.0
Hepatic flexure	6,998	3,361	3,637	5,782	655	561	17.0	37.9	24.9	16.7	3.5
Transverse	11,142	5,012	6,130	9,231	1,073	838	16.1	38.3	24.9	18.1	2.5
Splenic flexure	5,045	2,725	2,320	4,012	689	344	14.5	36.8	26.4	19.7	2.5
Descending	8,194	4,248	3,946	6,380	994	820	25.4	33.4	21.8	16.4	3.0
Sigmoid	43,016	22,767	20,249	35,220	3,520	4,276	32.8	26.3	21.6	16.4	2.9
Overlapping	1,129	584	545	911	135	83	11.5	32.7	26.4	25.6	3.8
Colon, NOS	3,027	1,534	1,493	2,455	393	179	6.5	6.9	4.8	45.2	36.7
Rectum and rectosigmoid	53,144	30,055	23,089	43,827	4,098	5,219	34.8	22.0	21.9	14.8	6.5
Rectosigmoid	17,984	9,967	8,017	14,897	1,403	1,684	27.1	26.1	25.7	17.5	3.6
Rectum	35,160	20,088	15,072	28,930	2,695	3,535	38.7	20.0	19.9	13.4	7.9

## RESULTS

Table 4.2 shows the case distribution by subsite and by sex, race, and 5th edition American Joint Committee on Cancer (AJCC) Stage (2) for the 182,589 cases included in this analysis. There were slightly more females included in the colon category while males predominated the rectum and rectosigmoid category. Blacks comprised 9.2% of the cases while races other than white or black accounted for 8.3% of the cases. With the exceptions of cases arising in the colon “not otherwise specified” or cases overlapping two colon subsites, more than 50% of the cases were diagnosed at an early stage (I or II). For the unknown colon subsite, the percentage of cases with unknown stage was large which contributed to the percentage of early stage being low. The percentage of stage I cases was greatest for the sigmoid colon, the rectum, and the rectosigmoid junction.

Table 4.3 shows the 1-, 3-, 5-, and 10-year relative survival rates by subsite of the colon and rectum and by sex. With the exception of a cancer which overlapped two subsites or a lesion which arose in an unidentified subsite of the colon, 5-year survival rates differed little by subsite or between the colon (64%) and the rectum (63%). The other two subsites (overlapping and NOS) had much poorer survival. There was essentially no difference by subsite or overall in survival of men and women, both 64%.

Table 4.4 shows the relative survival by subsite for whites and blacks. As has been noted, with the exception of overlapping or unspecified subsites, there was little variation by subsite within race. However, whites had a clear

survival advantage (65% overall after 5 years) over blacks (55%).

Relative survival rates for the four age groups 20-49, 50-64, 65-74, and 75+ are shown in Table 4.5. Interestingly, roughly one-third of the cases occurred in each of the age groups 20-64, 65-74, and 75+. Overall, there was a slight increase in the 5-year relative rate with increasing age before age 75, however, these differences are small (63%-65%). Again, with the exception of the overlapping and unspecified subsites, there was very little difference in survival rates across subsites for cases within the same age group.

Table 4.6 shows relative survival rates by subsite for the three time periods 1988-1991, 1992-1996 and 1997-2001. It should be noted that there was a higher percentage of cases included in the later two time periods due to the inclusion of the Los Angeles County data beginning in 1992. Surprisingly, there was no change in the survival rates for first two time periods, 63% vs. 63% overall at 5 years with a slight increase to 65% in the last time period.

The distribution by stage categories as defined in the 5th Edition of the AJCC Staging Handbook (2) and subsite is shown in Table 4.7. While in situ lesions were excluded from this analysis, the AJCC considers invasion of the lamina propria to be equivalent to in situ or non-invasive disease. Thus while cancers which meet these criteria are

Table 4.3: Cancers of the Colon and Rectum: 1-, 3-, 5- and 10-Year (Yr) Relative Survival Rates (%) by Subsite and Sex, Ages 20+, 12 SEER Areas, 1988-2001

Primary Site/Subsite	Relative Survival Rate (%)											
	Total				Male				Female			
	1-Yr	3-Yr	5-Yr	10-Yr	1-Yr	3-Yr	5-Yr	10-Yr	1-Yr	3-Yr	5-Yr	10-Yr
Colon and rectum	83.3	69.9	63.6	57.7	84.2	70.6	63.7	57.8	82.4	69.1	63.5	57.5
Colon	82.0	69.3	64.0	58.9	83.0	70.4	64.7	60.0	81.1	68.3	63.4	57.9
Cecum	79.8	65.7	61.2	56.7	80.9	66.2	60.7	56.6	78.9	65.4	61.6	56.7
Appendix	85.0	68.2	59.3	50.4	84.3	68.4	59.1	49.2	85.6	68.1	59.2	51.3
Ascending	81.7	70.3	66.0	60.7	82.8	70.6	66.0	60.6	80.8	70.0	66.0	60.8
Hepatic flexure	78.6	66.6	62.1	55.0	78.7	66.1	61.1	55.0	78.4	67.0	62.9	54.8
Transverse	79.7	67.2	62.4	56.6	80.9	69.2	63.6	58.6	78.7	65.6	61.4	54.9
Splenic flexure	80.1	64.9	59.6	53.3	81.0	66.3	60.3	54.6	79.1	63.3	58.7	51.4
Descending	84.8	72.4	65.5	58.3	85.9	74.0	66.8	60.1	83.6	70.8	64.1	56.5
Sigmoid	86.9	74.8	68.7	64.0	87.4	75.8	69.7	65.5	86.4	73.6	67.7	62.5
Overlapping	74.3	60.1	54.7	50.9	74.6	58.2	52.9	43.9	73.9	62.2	55.9	55.9
Colon, NOS	50.1	34.6	29.2	23.4	52.5	38.3	33.7	28.4	47.7	30.9	24.5	17.9
Rectum and rectosigmoid	86.5	71.3	62.7	55.0	86.7	71.1	61.9	53.8	86.1	71.5	63.7	56.5
Rectosigmoid	86.3	71.4	62.8	55.6	86.4	71.0	61.6	53.2	86.2	72.0	64.3	58.1
Rectum	86.5	71.2	62.6	54.7	86.9	71.2	62.1	54.1	86.1	71.3	63.3	55.5

Table 4.4: Cancers of the Colon and Rectum: 1-, 3-, 5- and 10-Year Relative Survival Rates (%) by Subsite and Race, Ages 20+, 12 SEER Areas, 1988-2001

Primary Site/Subsite	Relative Survival Rate (%)							
	White				Black			
	1-Year	3-Year	5-Year	10-Year	1-Year	3-Year	5-Year	10-Year
Colon and rectum	83.5	70.5	64.5	58.7	78.9	62.5	55.1	48.7
Colon	82.2	70.0	65.0	60.1	77.7	61.7	55.2	49.3
Cecum	80.1	66.5	62.2	57.6	76.6	59.1	52.7	49.0
Appendix	84.2	67.9	59.9	52.0	89.9	69.7	55.5	43.9
Ascending	82.0	71.0	67.0	62.5	76.7	63.1	56.4	47.6
Hepatic flexure	78.3	67.3	63.2	56.0	79.5	62.1	55.1	49.5
Transverse	79.4	67.6	62.7	57.0	76.9	58.9	52.9	46.7
Splenic flexure	80.6	66.1	61.2	55.9	75.5	57.5	51.2	39.6
Descending	85.1	73.1	66.5	58.9	80.0	67.1	59.1	52.8
Sigmoid	87.2	75.6	69.8	65.3	82.1	66.7	60.5	54.4
Overlapping	75.2	61.7	56.6	52.7	64.7	50.7	43.1	38.8
Colon, NOS	49.8	34.6	29.3	23.5	48.5	31.1	25.5	17.4
Rectum and rectosigmoid	86.5	71.7	63.2	55.7	82.6	64.7	54.7	47.0
Rectosigmoid	86.6	72.1	63.5	56.5	80.2	62.7	52.8	42.8
Rectum	86.5	71.5	63.1	55.2	83.9	65.8	55.7	49.2

considered to be malignant neoplasms, with respect to AJCC stage they are classified as Stage 0. Thus, in the tables containing information by AJCC stage category, Stage 0 is limited only to those patients whose tumor had extended to the lamina propria. For stage 0/I with the exception of patients whose cancer overlapped two subsites and rectal cancers, all other colorectal subsites had 5-year relative survival rates of 90% or higher. For stage II cancers, with the exception of colon not otherwise

specified, there was a distinct survival advantage (83% overall) for colon versus rectum and rectosigmoid (70% overall). Among persons with Stage III disease there were no notable differences among the colon or rectal subsites with the exception of the appendix and the unspecified colon, both of which had much poorer relative survival rates at five years. For stage IV cancers, 5-year survival rates were less than 8% for all subsites with the

Table 4.5: Cancers of the Colon and Rectum: 1-, 3-, 5- and 10-Year Relative Survival Rates (%) by Subsite and Age Group (Ages 20+), 12 SEER Areas, 1988-2001

Subsite/Age Group (Years)	Total	Percent	Relative Survival Rate (%)			
			1-Year	3 -Year	5-Year	10-Year
<b>Colon and rectum</b>	<b>182,589</b>	<b>100.0</b>				
20-49	15,670	8.6	87.6	70.0	62.8	56.7
50-64	44,949	24.6	87.4	72.2	64.9	59.0
65-74	54,379	29.8	85.0	71.7	65.0	59.3
75+	67,591	37.0	77.9	66.2	61.3	55.1
<b>Colon</b>	<b>129,445</b>	<b>100.0</b>				
20-49	9,834	7.6	85.9	68.4	61.7	56.4
50-64	29,344	22.7	85.7	70.5	64.3	59.4
65-74	38,563	29.8	84.0	71.2	65.4	60.6
75+	51,704	39.9	77.5	66.9	63.1	57.5
<b>Cecum</b>	<b>30,203</b>	<b>100.0</b>				
20-49	1,808	6.0	84.8	66.0	60.3	55.0
50-64	5,722	18.9	81.5	63.3	57.7	53.4
65-74	8,654	28.7	81.0	66.5	61.4	58.2
75+	14,019	46.4	77.5	66.4	63.4	59.3
<b>Appendix</b>	<b>1,455</b>	<b>100.0</b>				
20-49	487	33.5	93.2	74.6	68.1	61.1
50-64	442	30.4	85.0	67.5	56.4	46.5
65-74	284	19.5	82.6	65.6	56.1	40.1
75+	242	16.6	69.9	57.0	44.7	37.4
<b>Ascending</b>	<b>19,236</b>	<b>100.0</b>				
20-49	1,125	5.8	83.1	66.6	61.7	56.5
50-64	3,744	19.5	83.7	67.3	61.8	57.8
65-74	5,662	29.4	84.2	72.3	67.4	61.7
75+	8,705	45.3	78.8	70.9	68.1	64.1
<b>Hepatic flexure</b>	<b>6,998</b>	<b>100.0</b>				
20-49	476	6.8	80.1	65.8	62.6	58.4
50-64	1,317	18.8	80.9	66.9	62.9	57.8
65-74	2,029	29.0	81.1	67.7	61.4	53.9
75+	3,176	45.4	75.5	65.6	61.8	51.0
<b>Transverse</b>	<b>11,142</b>	<b>100.0</b>				
20-49	838	7.5	82.5	65.0	58.4	53.5
50-64	2,319	20.8	82.4	66.7	61.6	56.2
65-74	3,243	29.1	83.0	69.9	64.1	58.7
75+	4,742	42.6	75.3	65.8	62.3	54.0
<b>Splenic flexure</b>	<b>5,045</b>	<b>100.0</b>				
20-49	482	9.6	87.8	67.6	60.2	55.0
50-64	1,176	23.3	84.7	66.4	59.6	53.9
65-74	1,518	30.1	82.1	68.4	62.8	56.5
75+	1,869	37.0	73.2	59.4	55.8	45.3

Table 4.5 (continued): Cancers of the Colon and Rectum: 1-, 3-, 5- and 10-Year Relative Survival Rates (%) by Subsite and Age Group (Ages 20+), 12 SEER Areas, 1988-2001

Subsite/Age Group (Years)	Total	Percent	Relative Survival Rate (%)			
			1-Year	3 -Year	5-Year	10-Year
<b>Descending</b>	<b>8,194</b>	<b>100.0</b>				
20-49	742	9.1	87.3	71.4	62.3	57.0
50-64	2,139	26.1	88.7	74.5	67.4	60.2
65-74	2,506	30.6	87.1	75.1	67.8	61.1
75+	2,807	34.3	78.6	68.1	62.1	52.2
<b>Sigmoid</b>	<b>43,016</b>	<b>100.0</b>				
20-49	3,463	8.1	89.4	72.0	64.2	58.9
50-64	11,577	26.9	90.9	78.2	71.5	66.7
65-74	13,558	31.5	90.9	78.2	71.5	66.7
75+	14,418	33.5	81.5	70.1	65.1	60.3
<b>Overlapping</b>	<b>1,129</b>	<b>100.0</b>				
20-49	122	10.8	74.7	53.5	47.9	47.9
50-64	263	23.3	75.7	58.8	49.8	40.4
65-74	285	25.2	76.6	62.0	58.0	55.4
75+	459	40.7	71.7	61.8	57.5	55.1
<b>Colon, NOS</b>	<b>3,027</b>	<b>100.0</b>				
20-49	291	9.6	67.5	48.5	42.2	33.4
50-64	645	21.3	56.0	36.7	31.8	26.6
65-74	824	27.2	52.8	36.4	28.1	22.0
75+	1,267	41.9	40.6	27.9	23.7	16.2
<b>Rectum &amp; rectosigmoid</b>	<b>53,144</b>	<b>100.0</b>				
20-49	5,836	11.0	90.3	72.9	64.7	57.0
50-64	15,605	29.4	90.7	75.3	65.9	58.2
65-74	15,816	29.8	87.5	72.8	64.2	56.2
75+	15,887	29.9	79.4	64.0	55.6	47.7
<b>Rectosigmoid</b>	<b>17,984</b>	<b>100.0</b>				
20-49	1,663	9.2	89.6	70.1	61.5	52.8
50-64	5,211	29.0	89.9	74.5	65.0	57.9
65-74	5,654	31.4	87.6	72.7	64.5	57.5
75+	5,456	30.3	80.1	66.9	58.4	50.2
<b>Rectum</b>	<b>35,160</b>	<b>100.0</b>				
20-49	4,173	11.9	90.6	74.0	66.0	58.7
50-64	10,394	29.6	91.1	75.7	66.3	58.3
65-74	10,162	28.9	87.4	72.9	63.9	55.2
75+	10,431	29.7	79.1	62.5	54.1	46.1

Table 4.6: Cancers of the Colon and Rectum: 1-, 3-, and 5-Year Relative Survival Rates (%) by Subsite and Sex, Ages 20+, 12 SEER Areas, 1988-2001

Primary Site/Subsite	Relative Survival Rate (%)								
	Diagnosis Year 1988-1991			Diagnosis Year 1992-1996			Diagnosis Year 1997-2001		
	1-Year	3 -Year	5-Year	1-Year	3 -Year	5-Year	1-Year	3 -Year	5-Year
Colon and rectum	83.0	69.0	62.6	82.9	69.1	62.9	83.9	71.3	65.2
Colon	81.8	68.8	63.6	81.8	68.6	63.3	82.4	70.2	65.0
Cecum	79.2	64.9	60.6	78.9	64.4	60.0	81.0	67.7	62.3
Appendix	82.0	67.7	61.0	86.5	67.4	57.8	85.0	68.9	59.2
Ascending	80.3	69.5	65.1	81.9	69.8	65.4	82.3	70.9	66.8
Hepatic flexure	78.2	66.4	60.0	78.2	66.4	62.6	79.1	66.6	62.9
Transverse	79.3	65.2	61.2	79.0	66.6	61.6	80.6	69.1	63.2
Splenic flexure	78.8	63.7	58.6	79.6	63.6	58.6	81.5	67.0	60.9
Descending	85.4	73.9	66.6	84.6	72.3	64.6	84.6	71.2	66.9
Sigmoid	86.5	73.8	67.9	86.9	74.3	68.0	87.2	76.1	70.7
Overlapping	72.8	60.4	56.1	75.0	60.1	53.9	74.2	60.0	54.8
Colon, NOS	56.1	40.2	35.4	50.9	36.2	31.2	45.7	29.4	20.2
Rectum & rectosigmoid	86.0	69.3	60.2	85.8	70.1	62.0	87.4	73.9	65.5
Rectosigmoid	86.0	69.8	60.8	85.6	70.6	62.3	87.3	73.8	65.3
Rectum	85.9	69.1	59.9	85.8	69.9	61.8	87.5	74.0	65.6

Table 4.7: Cancers of the Colon and Rectum: 1-, 5-, and 10-Year Relative Survival Rates (%) by Subsite and AJCC Stage (5th Edition), Ages 20+, 12 SEER Areas, 1988-2001

Primary Site/Subsite	AJCC Stage											
	Stage 0,I			Stage II			Stage III			Stage IV		
	1-Yr	5-Yr	10-Yr	1-Yr	5-Yr	10-Yr	1-Yr	5-Yr	10-Yr	1-Yr	5-Yr	10-Yr
Colon and rectum	96.9	92.7	89.0	93.0	79.7	71.8	88.6	58.3	50.5	43.6	6.9	4.8
Colon	96.7	94.8	92.6	93.2	82.7	75.9	87.2	59.1	52.7	41.8	7.0	5.0
Cecum	95.5	94.4	91.4	94.0	85.8	81.0	85.4	56.9	51.7	39.1	6.8	5.1
Appendix	97.4	89.9	83.2	92.6	73.9	63.9	89.2	48.3	37.0	65.9	25.4	16.2
Ascending	95.4	93.0	89.0	94.3	87.5	80.8	84.6	58.8	54.2	36.6	5.9	3.4
Hepatic flexure	94.6	93.2	89.7	91.3	81.0	72.4	83.5	54.8	46.0	31.5	5.5	4.0
Transverse	95.0	89.9	86.3	92.0	83.3	76.4	83.8	56.3	49.2	37.6	7.4	6.2
Splenic flexure	94.2	89.9	87.4	91.3	78.6	70.7	86.9	59.7	49.7	42.7	6.6	5.9
Descending	96.5	92.4	84.9	93.0	81.5	72.8	89.1	58.4	50.2	48.7	7.1	5.3
Sigmoid	98.0	96.8	95.1	93.4	79.4	72.1	91.9	63.3	55.8	51.0	7.5	4.9
Overlapping	93.2	81.6	80.0	94.0	84.9	79.2	85.5	57.0	49.0	31.1	4.9	4.4
Colon, NOS	94.9	90.2	82.5	78.1	57.9	49.7	67.0	40.7	28.9	19.8	2.1	0.8
Rectum and rectosigmoid	97.3	89.5	84.0	92.5	69.7	59.2	92.2	56.4	44.9	49.0	6.9	4.2
Rectosigmoid	97.8	93.4	89.9	93.4	74.3	64.7	92.4	59.4	47.8	52.0	7.6	4.8
Rectum	97.1	88.1	81.6	91.9	66.7	55.2	92.0	54.4	43.0	47.0	6.4	3.7

Table 4.8: Cancers of the Colon and Rectum: 1-, 3-, 5- and 10-Year Relative Survival Rates (%) for AJCC (5th Edition) Stage 0/I Cancers by Extension, Ages 20+, 12 SEER Areas, 1988-2001

Extension- Invasive tumor confined to:	Relative Survival Rate (%)							
	Colon				Rectum and rectosigmoid			
	1-Year	3-Year	5-Year	10-Year	1-Year	3-Year	5-Year	10-Year
Mucosa, NOS	96.6	94.5	93.6	92.9	97.4	92.4	90.0	88.6
Lamina propria*	96.5	95.6	94.2	91.9	98.3	95.3	93.0	89.5
Muscularis mucosae	96.6	95.0	94.1	93.9	98.1	94.9	92.6	85.7
Head of polyp	98.4	98.4	98.2	96.3	99.3	99.3	99.2	86.0
Stalk of polyp	98.8	98.4	96.5	93.8	98.3	95.8	92.6	90.9
Polyp, NOS	96.5	94.9	93.5	91.7	98.5	95.8	92.7	85.8
Submucosa	97.5	97.4	96.2	94.3	98.6	96.7	93.4	89.3
Muscularis propria invaded	97.0	97.0	96.2	92.1	97.9	95.0	89.4	81.3

\* Considered Stage 0

Table 4.9: Cancers of the Colon and Rectum: 1-, 3-, 5- and 10-Year Relative Survival Rates (%) for AJCC Stage II (5th Edition) Cancers by Extension, Ages 20+, 12 SEER Areas, 1988-2001

Extension	Relative Survival Rate (%)			
	Stage II Colon Cancers			
	1-Year	3-Year	5-Year	10-Year
Invasion through muscularis propria or muscularis, NOS	95.5	92.5	89.3	81.6
Fat, NOS	93.3	90.8	~	~
Extension to adjacent (connective) tissue	95.0	89.0	84.2	77.5
Invasion of/through serosa	93.4	87.8	82.8	76.6
Invasion of/through serosa with extension to fat, NOS or adjacent tissue	88.5	78.4	71.4	66.7
Greater omentum, spleen, pelvic wall, small intestine	74.9	60.0	55.9	49.8
Abdominal wall, retroperitoneum	72.4	52.1	44.9	39.0
Ureter, kidney	67.1	37.0	26.2	18.0
Uterus, ovary, fallopian tube	75.2	52.8	44.2	38.6
Urinary bladder, adrenal gland, diaphragm, other segments of colon via serosa	76.7	59.6	49.3	43.2
Further contiguous direct extension	60.9	38.5	29.7	26.3
	Stage II - Rectum/Rectosigmoid Cancers			
	1-Year	3-Year	5-Year	10-Year
Invasion through muscularis propria or muscularis, NOS	96.1	89.2	79.4	67.6
Fat, NOS	98.5	90.3	~	~
Extension to adjacent (connective) tissue	94.1	82.5	71.6	61.5
Invasion of/through serosa	92.5	81.5	69.2	60.2
Invasion of/through serosa with extension to fat, NOS or adjacent tissue	92.9	78.2	61.1	48.9
Greater omentum, spleen, pelvic wall, small intestine	77.0	49.3	38.3	28.4
Uterus, ovary, fallopian tube	71.9	41.1	30.7	18.4
Further contiguous direct extension	71.2	35.6	29.4	21.4

~ Statistic not displayed due to less than 25 cases.

Table 4.10: Cancers of the Colon and Rectum: 1-, 3-, 5- and 10-Year Relative Survival Rates (%) by Subsite and Histology, Ages 20+, 12 SEER Areas, 1988-2001

Histology (ICD-O code)	Relative Survival Rate (%)							
	Colon				Rectum and Rectosigmoid			
	1-Year	3-Year	5-Year	10-Year	1-Year	3-Year	5-Year	10-Year
Unspecified (8000-8004)	56.2	35.1	31.2	25.6	65.5	52.3	43.6	32.9
Carcinoma, NOS (8010)	57.1	42.8	38.6	30.5	60.6	43.0	32.7	24.8
Undifferentiated carcinoma (8012-8032,8230-8231,8510)	46.7	35.9	33.2	28.4	26.9	10.7	10.7	10.7
Small cell carcinoma (8041-8044)	29.3	18.6	18.6	15.6	49.2	19.1	16.6	~
Other and unspecified carcinoma (8050-8130,8141-8201,8310-8460,8550,8570)	70.5	57.9	48.7	39.2	81.8	62.4	56.3	45.7
Adenocarcinoma, NOS (8140)	80.5	66.2	60.3	54.8	84.9	67.6	57.8	49.2
Adenocarcinoma in adenomatous polyp (8210-8211)	95.9	93.5	91.8	91.0	96.7	90.9	86.6	79.8
Adenocarcinoma in adenomatous polyposis coli (8220-8221)	91.4	81.1	74.0	55.5	78.5	71.1	63.3	63.3
Carcinoid (8240-8246)	80.9	72.8	69.6	65.1	97.0	95.9	94.1	91.8
Papillary adenocarcinoma, NOS (8260)	84.4	76.2	70.0	65.3	89.2	79.2	67.8	59.6
Adenocarcinoma in villous adenoma (8261)	91.1	84.3	80.1	75.0	91.6	82.7	76.0	70.0
Villous adenocarcinoma (8262)	89.5	83.0	81.8	71.2	90.7	78.5	70.6	60.2
Adenocarcinoma in tubulovillous adenoma (8263)	93.7	89.3	86.8	84.1	95.3	89.2	84.8	82.3
Mucinous adenocarcinoma (8470-8480)	81.9	67.3	61.5	54.4	84.1	63.0	52.8	41.6
Mucin producing adenocarcinoma (8481)	78.0	63.0	58.3	51.9	81.1	57.8	47.4	40.9
Signet ring cell carcinoma (8490)	61.5	37.3	28.2	21.3	60.1	33.0	23.9	18.0
Adenosquamous carcinoma (8560)	42.5	27.7	26.7	24.2	66.0	36.5	33.4	30.0
Melanoma (8720-8772)	~	~	~	~	79.9	30.0	22.8	22.8
Other (8930-9100)	66.8	42.5	25.9	~	88.6	78.6	78.6	~

~ Statistic not displayed due to less than 25 cases.

Figure 4.1: Cancer of the Colon: Relative Survival Rates (%) for the Five Most Common Histologic Types by Months Since Diagnosis, Age 20+, 12 SEER Areas, 1988-2001

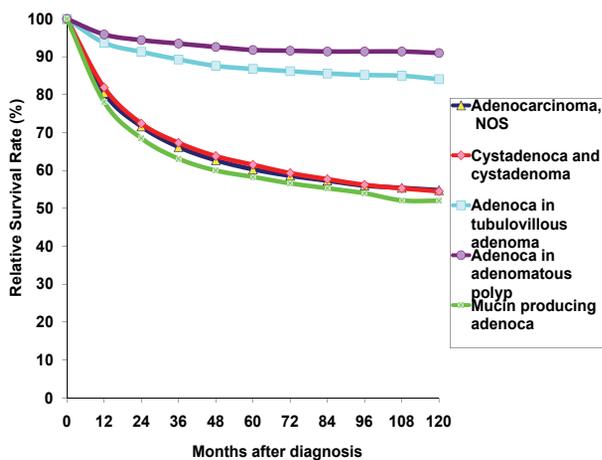
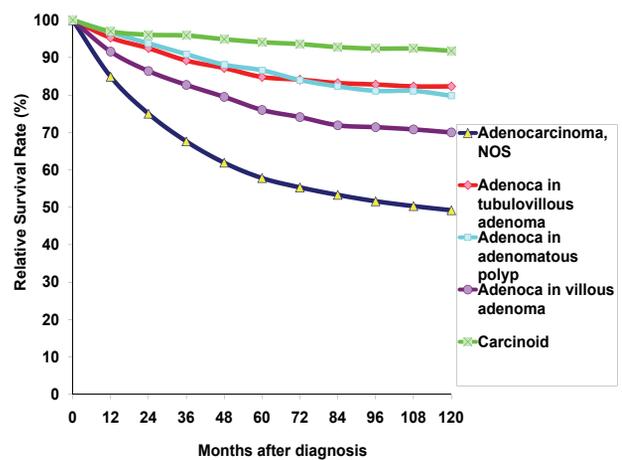


Figure 4.2: Cancer of the Rectum: Relative Survival Rates (%) for the Five Most Common Histologic Types by Months Since Diagnosis, Age 20+, 12 SEER Areas, 1988-2001



exception of cases with appendix cancer whose 5-year relative rate was 25%.

Stage 0/I cancers are those cancers which are clearly confined to the colon, i.e. cancers which have not extended through the wall of the colon or of the rectum. These cancers can be further subdivided into the depth of penetration into the wall based on SEER Extent of Disease (EOD) extension codes. Table 4.8 shows survival rates for Stage 0/I cancers by depth of extension for colon and for rectal cancers separately. For cancers arising in the colon, all categories experienced five-year survival rates of 94% or better, and for cancers of the rectum and rectosigmoid junction, all had survival of 89% or better after five-years. The highest relative survival occurred among those patients whose disease was limited to the head of a polyp, 98% for colon and 99% for rectum. Interestingly, patients whose tumor had extended to the lamina propria (AJCC Stage 0) had no better survival than patients included in Stage 1.

Stage II tumors are tumors which have extended deeper into the wall of the colon or directly extended through the colon wall into adjacent structures but are node negative and have no discontinuous metastases. Table 4.9 shows survival rates by SEER extension codes. Clearly, once the tumor has penetrated the serosa, survival becomes much poorer, with the poorest survival occurring among patients whose tumor has extended to the ureter or kidney.

Table 4.10 shows survival rates for colon and rectal cancers separately by histology. As might be expected, cancers of the rectum arising in a polyp or an adenoma and carcinoma tumors had the best 5-year relative survival 85-90%. The poorest survival rates, i.e. less than 30% survival at 5-years, were experienced by patients with small cell carcinoma, signet ring carcinoma, and adenosquamous carcinoma of the colon. Among patients with rectal cancer, undifferentiated carcinoma, small cell carcinoma, signet ring cell carcinoma, and melanoma histologic groups all had survival rates under 30% at 5-years. Persons with adenocarcinoma not otherwise specified which represented the majority of the cases (69%) had a five-year relative rate of 58-60%.

Ten-year survival curves for the five most common histologies for colon cancers are shown in Figure 4.1 and for rectal cancers in Figure 4.2. For colon cancer patients the best survival was experienced by patients whose cancer arose in either an adenomatous polyp or in a tubulovillous adenoma while the poorest survival was experienced by those with mucin-producing adenocarcinomas. By contrast, for rectal cancers persons with malignant carcinoid tumors had the highest survival while those with

non-specific adenocarcinomas had the lowest relative survival.

## DISCUSSION

The lack of substantial variation in survival rates by subsites of the colon and rectum is interesting. This is best explained by the fact that each subsite had a similar stage distribution at diagnosis with 50-60% in each group being diagnosed early, Stage 0/I or II. The poorer survival among patients whose subsite could not be determined is probably explained by the fact that many of these patients had multifocal colon cancer, i.e. simultaneous lesions arising in multiple polyposis; or else occurred in patients whose disease was so extensive within the colon at the time of diagnosis that the point of origin could not be determined.

There was no difference in survival between males and females, but the disparity among race groups was once again noted with whites having higher survival rates than blacks for each subsite.

Since most analyses based on stage 0 would include both in situ and confined to the lamina propria, it is interesting that when only the confined to the lamina propria group are shown, the patients had no better survival than those whose cancer arose in a polyp or extended to the submucosa. Further, one component of stage II had poor survival, node negative patients whose tumors had extended from the colon to the kidney and/or ureter.

## REFERENCES

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2. Fleming ID, Cooper JS, Henson DE, Hutter RVP, Kennedy BJ, Murphy, GP, O'Sullivan, B, Sobin LH and Yarbrow, JW (eds) AJCC Cancer Staging Manual, Fifth Edition, Lippincott-Raven, Philadelphia, 1998.

