

Sub-site Specific Colorectal Cancer Survival in Puerto Rican Population



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ABSTRACT

Background: Colorectal cancer (CRC) is the second most common type of cancer in Puerto Rico. Both incidence and mortality of CRC are increasing among Puerto Ricans. Colorectal cancer survival varies by stage at diagnosis, however, studies on the prognostic value of anatomic sub-site have generated variable results. **Purpose:** To examine the survival of CRC by sub-site location using data from the Puerto Rico Central Cancer Registry. **Methods:** An analysis of CRC cases (greater than 50 years of age at diagnosis and with a surgery) from 2001-2003 was conducted by sub-site (proximal, distal, rectum, and other). Five-year maximum relative survival ratio by CRC sub-site was calculated and a Poisson regression model used to calculate the relative excess risk of death. **Results:** The sub-site distribution of the 2,624 CRC cases analyzed was as follows: proximal (38.8%), distal (30.3%), rectum (25.1%), and other (5.7%). A larger proportion of proximal cancers presented in regional stage (61.3%) or distant stage (9.6%). In addition, proximal cancers had the greater proportion of mucinous adenocarcinoma histology (52.2%). The five-year relative survival was 66.4% for proximal cancer, 70.8% for distal and 67.2% for rectum. After adjustment (age, sex, socioeconomic position index (SEP), histology, grade, surgery type, chemotherapy, radiotherapy), the excess of risk of death for distal cancer (RER=0.84; CI 95%: 0.68-1.03) and for rectum cancer (RER=0.83; CI 95%: 0.64-1.06) was lower, although marginally significant compared with proximal tumors. **Conclusions:** In this analysis, distal colon cancers presented in an earlier stage, and had a lower excess of risk death compared with proximal tumors. These differences could be associated to several factors among which are prognostic factors, current early detection strategies, or treatment methods.

INTRODUCTION

- Colorectal cancer (CRC) is the second most common type of cancer in Puerto Rico.
- Both incidence and mortality of CRC are increasing among Puerto Ricans.
- Colorectal cancer survival varies by stage at diagnosis, however, studies on the prognostic value of anatomic sub-site have generated variable results (Wray, CM, 2009; Feng-ying LI, 2009)

OBJECTIVE

- To determine the stage-specific five-year relative survival by subsite location of Puerto Rican colorectal cancer patients.
- Estimate the overall relative excess mortality rate by stage and subsite location.

METHODS

Source of Data: Data from Puerto Rico Central Cancer Registry: population based cancer registry.

Patients: Aged 50 years and older, diagnosed in Puerto Rico, with a first malignancy of invasive Colorectal cancer with a surgery in the first course of treatment (n=2,624) and those specifically diagnosed from 2001-2003 with a follow up until December 2008.

Statistical Analysis
Descriptive analysis

We used χ^2 test (p-value <0.05) to assess the differences in the variables of interest.

Survival analysis
Relative Survival

Maximize Five-year relative survival were calculated using the incidence case file database of PR and estimated using the Actuarial method.

Modeled using **stms** in **Stata 11.1**, decennial life tables of PR, and age-standardized.

Overall relative excess mortality rate

Poisson regression model used to calculate the relative excess risk of death.

RESULTS

Demographic and Tumor Features of Colorectal Cancer (Overall) for Incidence and Mortality, PR 2001-2003

Demographic Features p<0.05 for comparison of each listed variable by site of CRC

	Proximal n (%)	Distal n (%)	Rectum n (%)	Other n (%)	Total n (%)
All	1,019 (38.8)	795 (30.3)	658 (25.1)	152 (5.7)	2,624 (100.0)
Sex					
Male	494 (48.5)	456 (57.4)	381 (57.9)	64 (42.1)	1,395 (53.2)
Female	525 (51.5)	339 (42.6)	277 (42.1)	88 (57.9)	1,229 (46.8)
Age					
50-64	273 (26.8)	332 (41.8)	261 (39.7)	48 (31.6)	914 (34.8)
65-79	524 (51.4)	339 (42.6)	308 (46.8)	74 (48.7)	1,245 (47.4)
80+	222 (21.8)	124 (15.6)	89 (13.5)	30 (19.7)	465 (17.7)
SEP*					
SEP 1	51 (5.0)	49 (6.2)	34 (5.2)	7 (4.6)	141 (5.4)
SEP 2	86 (8.4)	78 (9.8)	86 (13.1)	12 (7.9)	262 (10.0)
SEP 3	140 (13.7)	99 (12.5)	95 (14.4)	26 (17.1)	360 (13.7)
SEP 4	222 (21.8)	192 (24.2)	171 (26.0)	36 (23.7)	621 (23.7)
SEP 5	483 (47.4)	332 (41.8)	249 (37.8)	52 (34.2)	1,116 (42.5)

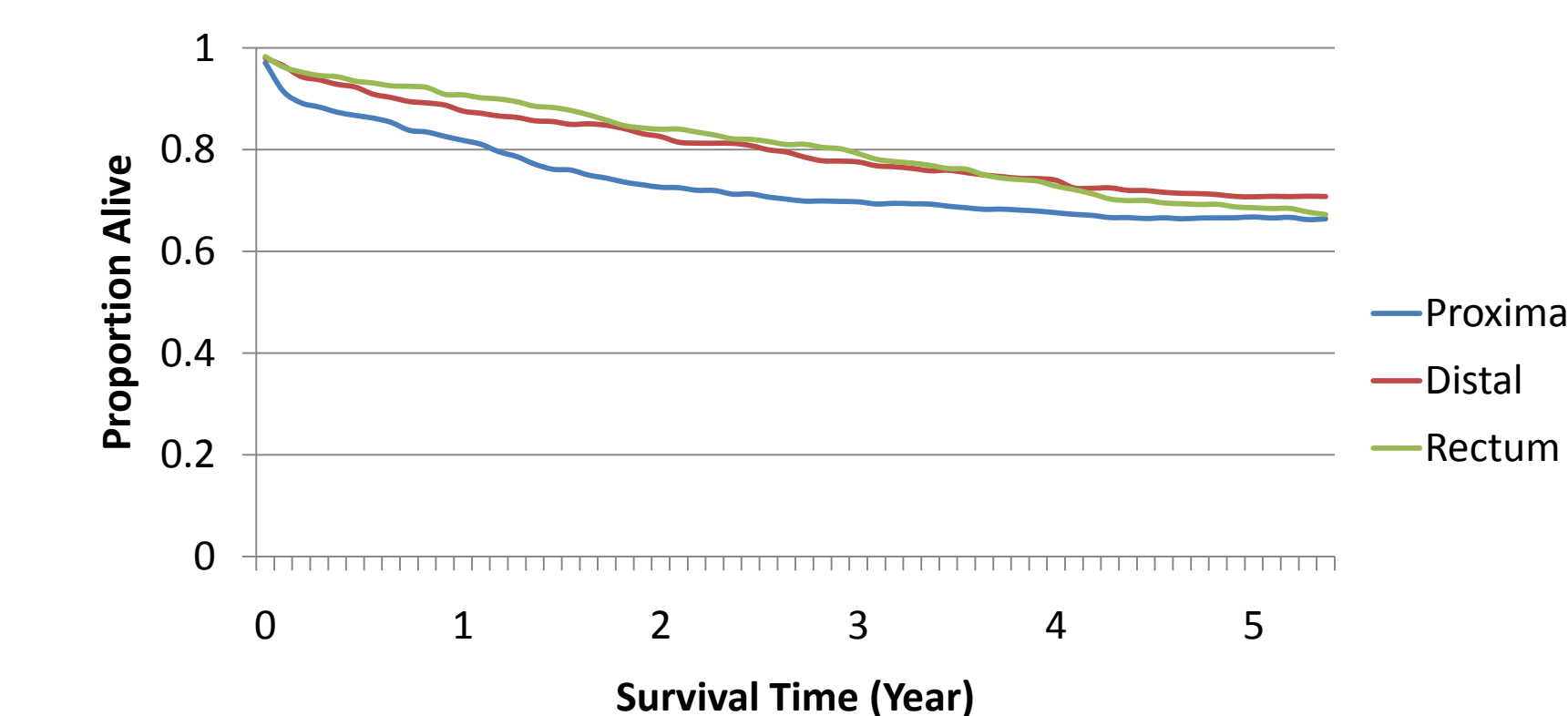
Tumor Features p<0.05 for comparison of each listed variable by site of CRC

	Proximal n (%)	Distal n (%)	Rectum n (%)	Other n (%)	Total n (%)
Stage					
Localized	260 (25.5)	292 (36.7)	265 (40.3)	53 (34.9)	870 (33.2)
Regional	625 (61.3)	397 (49.9)	296 (45.0)	53 (34.9)	1,371 (52.2)
Distant	98 (9.6)	66 (8.3)	54 (8.2)	24 (15.8)	242 (9.2)
Unstage	36 (3.5)	40 (5.0)	43 (6.5)	22 (14.5)	141 (5.4)
Histology					
Adenocarcinoma	809 (79.4)	714 (89.8)	563 (85.6)	116 (76.3)	2,202 (83.9)
Mucinous Adenocarcinoma	176 (17.3)	69 (8.7)	66 (10.0)	26 (17.1)	337 (12.8)
Other	34 (3.3)	12 (1.5)	29 (4.4)	10 (6.6)	85 (3.2)
Grade					
Well diff	242 (23.7)	221 (27.8)	150 (22.8)	36 (23.7)	649 (24.7)
Moderately diff	584 (57.3)	465 (58.5)	384 (58.4)	61 (40.1)	1,494 (56.9)
Poorly diff	100 (9.8)	24 (3.0)	26 (4.0)	13 (8.6)	163 (6.2)
Unknown	88 (8.6)	82 (10.3)	96 (14.6)	42 (27.6)	308 (11.7)

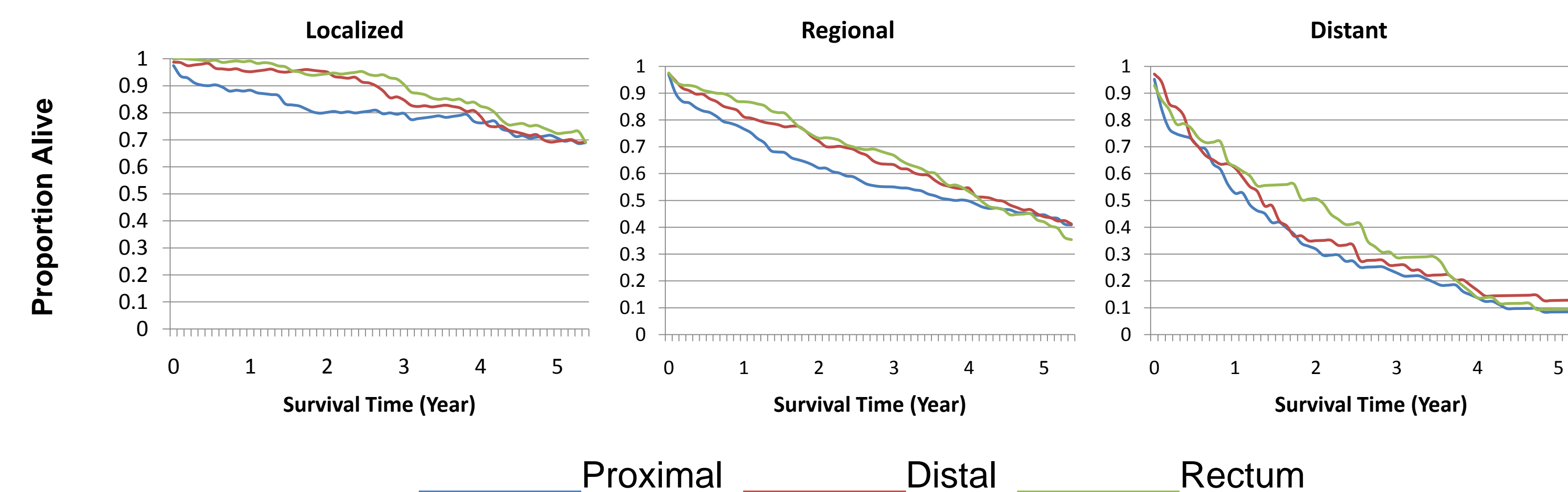
Treatment Features p<0.05 for comparison of each listed variable by site of CRC

	Proximal n (%)	Distal n (%)	Rectum n (%)	Other n (%)	Total n (%)
Type of Surgery					
Local Excision	23 (2.3)	86 (10.8)	102 (15.5)	31 (20.4)	242 (9.2)
Partial Colectomy	294 (28.9)	440 (55.3)	361 (54.9)	62 (40.8)	1,157 (44.1)
Hemicolectomy	611 (60.0)	170 (21.4)	25 (3.8)	28 (18.4)	834 (31.8)
Total Colectomy	75 (7.4)	69 (8.7)	129 (19.6)	15 (9.9)	288 (11.0)
Other/Unknown	16 (1.6)	30 (3.8)	41 (6.2)	16 (10.5)	103 (3.9)
Radiotherapy					
No	992 (97.4)	751 (94.5)	418 (63.5)	148 (97.4)	2,309 (88.0)
Yes	27 (2.6)	44 (5.5)	240 (36.5)	4 (2.6)	315 (12.0)
Chemotherapy					
No	890 (87.3)	684 (86.0)	457 (69.5)	133 (87.5)	2,164 (82.5)
Yes	129 (12.7)	111 (14.0)	201 (30.5)	19 (12.5)	460 (17.5)

Age-Standardized Relative Survival for Colorectal Cancer by Sub-site, 2001-2003



Age-Standardized Relative Survival for Colorectal Cancer by Sub-site and Stage, 2001-2003



CRC Subsite Relative Excess Risk of Death (RER) of Colorectal Cancer with use of Poisson Models (2001-2003) by Stage, with follow up through 2008

RER Crude Model

Colorectal Site	Overall	Localized	Regional	Distant
Proximal*	1.00	1.00	1.00	1.00
Distal	0.79 (0.65-0.96)	0.85 (0.44-1.61)	0.91 (0.71-1.16)	0.85 (0.58-1.23)
Rectum	0.74 (0.61-0.92)	0.59 (0.27-1.28)	0.94 (0.72-1.22)	0.93 (0.64-1.36)

*Reference Group

RER Adjusted Model (age, sex, SEP, histology, grade, surgery type, chemotherapy, radiotherapy)

Colorectal Site	Overall	Localized	Regional	Distant
Proximal*	1.00	1.00	1.00	1.00
Distal	0.84 (0.68-1.03)	0.63 (0.28-1.41)	0.93 (0.71-1.20)	0.90 (0.60-1.36)
Rectum	0.83 (0.64-1.06)	0.28 (0.10-0.79)	1.14 (0.82-1.58)	1.26 (0.75-2.13)

*Reference Group

DISCUSSION

- Proximal colon cancer:
 - presented with advanced stage than distal and rectal cancer
 - have a greater proportion of mucinous adenocarcinoma
 - have a greater proportion of higher tumor grade
- The relative survival is approximately 10% lower in the proximal than in the distal colon or rectum.
- Localized and regional tumors have a lower relative survival in proximal cancer, while in the distant no difference by subsite were noted.
- Distal and rectal cancers had a lower excess risk of death compared with proximal tumors. This difference is observed in the localized disease.
- These differences could be associated to several factors among which are prognostic factors, current early detection strategies, or treatment methods.

CONCLUSIONS

- Regional and Distant stage tumors located in distal and rectal site have a decreased risk of death as compared to proximal cancers, but these differences were not statistically significant, except for localize tumors in the rectum (RER= 0.28; 0.10-0.79) after adjusted for age, sex, SEP, histology, grade, surgery type, chemotherapy, radiotherapy.
- This information could be useful for stratifying patients in clinical trials, and to tailor therapy according to risk.
- Relative survival, the survival analogue of excess mortality, is the method of choice for estimating patient survival using data collected by population-based cancer registries.

REFERENCES

- Wray CM, Ziogas A, Hinojosa MW, Le H, Stamos MJ, Zell JA. Tumor subsite location within the colon is prognostic for survival after colon cancer diagnosis. *Dis Colon Rectum*. 2009 Aug;52(8):1359-66.
- Rosenberg R, Maak M, Schuster T, Becker K, Frie. Does a rectal cancer of the upper third behave more like a colon or a rectal cancer? *Dis Colon Rectum*. 2010 May;53(5):761-70.
- Feng-ying LI, Mao-de LAI. Colorectal cancer, one entity or three? *J Zhejiang Univ Sci B* 2009 10(3):219-229ss H, Gentler R.
- Dickman PW, Coviello e, Hills M. Estimating and modelling relative survival. *The Stata Journal* (in press)
- Dickman PW, Sloggett A, Hills M, Hakulinen T. Regression models for relative survival. *Statistics in Medicine* 2004;23:51-64.