

THE DETERMINANTS OF COLORECTAL CANCER SURVIVAL DISPARITIES IN NEVADA



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Background

Substantial disparities in colorectal cancer (CRC) survival among racial-ethnic groups, especially those between Blacks and Whites, have been extensively documented in the Northeast, California and in the South of the United States.

Purpose

To ascertain the determinants of colorectal cancer racial-ethnic survival disparities in a state of the Mountain West region, Nevada.

Sample Population

The study population consisted of a cohort of 12,181 men and women diagnosed with a first primary invasive carcinoma in the colon and rectum from 1995 to 2007, identified through the Nevada Central Cancer Registry and followed for vital status until 31 December 2007.

Death records were obtained from the Nevada State Office of Vital Records.

Methods and Techniques

Cancer site and morphology were coded based on the International Classification of Disease for Oncology (ICD-9/or ICD-10).

Variables used for analysis included: age, gender, marital status, stage of diagnosis, economic status (ES), time period of diagnosis, and sub-location of the tumor

Statistical Analyses

Likelihood ratio chi-square statistics were used to compare the socio-demographic and clinical characteristics for race-ethnicity.

Cox proportional regression modeling and partial likelihood tests were used to estimate the hazard ratios and interaction effects for CRC death (cause-specific).

Table 1 - Patients' Sociodemographic and Clinical Characteristics by Race/Ethnicity [N = 12 181]

Characteristic	White %(n)	Black %(n)	Hispanic %(n)	Asian %(n)	P value*
Gender					0.03
Male	54.1(5494)	52.3(374)	52.7(372)	46.0(193)	
Female	45.9(4670)	47.7(341)	47.3(334)	54.0(227)	
Age Group					<.0001
<44	3.5(355)	5.2(37)	9.9(70)	7.1(30)	
45 - 54	9.3(946)	18.0(129)	15.9(112)	17.1(72)	
55 - 64	19.6(1997)	28.0(200)	24.2(171)	25.5(107)	
65 - 74	31.6(3210)	27.3(195)	26.6(188)	28.3(119)	
75+	36.0(3656)	21.5(154)	23.4(165)	21.9(92)	
Marital Status					<.0001
Single (Never Married)	12.5(1275)	22.4(160)	14.7(104)	14.3(60)	
Married	51.3(5211)	43.9(314)	53.8(380)	57.9(243)	
Separated/Divorced	8.8(899)	10.6(76)	9.5(67)	6.4(27)	
Widowed	18.7(1897)	15.1(108)	13.0(92)	13.1(55)	
Unknown	8.7(882)	8.0(57)	8.9(63)	8.3(35)	
ES					<.0001
Low	49.9(5003)	60.7(433)	61.7(432)	43.6(182)	
Medium	34.9(3493)	23.0(164)	25.9(181)	34.8(145)	
High	15.2(1525)	16.3(116)	12.4(87)	21.6(90)	
SEER Stage					<.0001
Localized	31.9(3240)	27.8(199)	29.9(211)	26.7(112)	
Regional	36.5(3710)	36.4(260)	35.6(251)	39.3(165)	
Distant	17.9(1820)	22.4(160)	21.5(152)	20.0(84)	
Unstaged	13.7(1394)	13.4(96)	13.0(92)	14.0(59)	
Tumor Sub-location					<.0001
Proximal	41.0(4165)	51.0(365)	33.3(235)	31.9(134)	
Sigmoid Colon	20.1(2042)	18.7(134)	25.9(183)	26.2(110)	
Rectosigmoid/Rectum	27.7(2813)	18.3(131)	31.0(219)	30.7(129)	
Colon NOS	11.3(1144)	11.9(85)	9.8(69)	11.2(47)	

Statistics are based off likelihood ratio chi-square
P value = Chi-square P value for chi-square test of differences between racial-ethnic groups.

Table 2 - Univariate Survival Analysis Results

Characteristic	95% CI for HR			P value*
	HR	LL	UL	
Black	1.20	1.05	1.37	0.01
Hispanic	1.05	0.91	1.20	0.51
Asian	0.98	0.82	1.18	0.86

HR=Hazard Ratio; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; P = Wald p-values

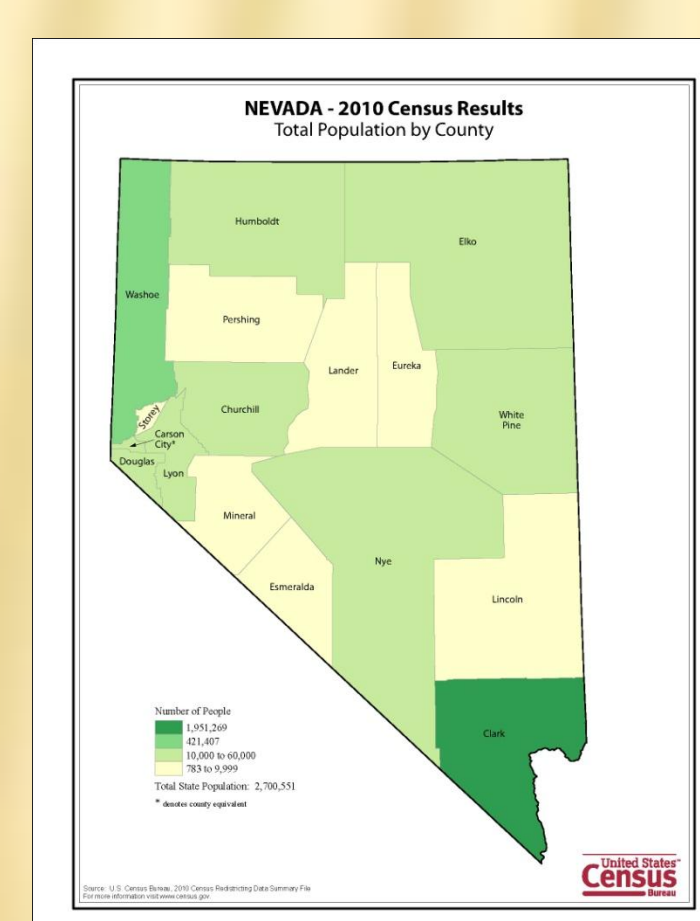


Table 3 – Multivariate Survival Analysis Results

Characteristic	95% CI of HR			Subgroup P Value	Group P Value
	HR	LL	UL		
Race-Ethnicity					0.0003
Ref = White					
Black	1.16	1.02	1.33	0.03	
Hispanic	1.09	0.95	1.26	0.20	
Asian	1.01	0.84	1.22	0.88	
SEER Stage					<.0001
Ref = Localized					
Regional	2.63	2.33	2.97	<.0001	
Distant	10.43	9.26	11.75	<.0001	
NA/Unstaged	7.74	6.79	8.82	<.0001	
Gender					0.0004
Ref = Male					
Female	0.88	0.82	0.95	0.0004	
Period of Diagnosis					0.4843
Ref = 1995 - 2000					
2001 - 2007	0.98	0.91	1.05	0.48	
Age Groups					<.0001
Ref <=44					
45 - 54	1.06	0.86	1.31	0.56	
55 - 64	1.11	0.92	1.35	0.29	
65 - 74	1.36	1.12	1.64	0.0014	
75+	1.84	1.52	2.22	<.0001	
Tumor Sub-location					<.0001
Ref = Proximal					
Colon NOS	2.00	1.81	2.20	<.0001	
Rectosigmoid and Rectum	0.97	0.89	1.06	0.57	
Sigmoid Colon	0.92	0.83	1.01	0.10	
Marital Status					<.0001
Ref = Married					
Single/never married	1.04	0.94	1.16	0.41	
Separated/Divorced	1.18	1.05	1.32	0.0049	
Widowed	1.23	1.12	1.35	<.0001	
Unknown	0.57	0.49	0.66	<.0001	
ES					0.0008
Ref = High					
Medium	1.06	0.94	1.18	0.33	
Low	1.18	1.06	1.31	0.0022	

HR = Hazard Ratio; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; ES = Economic Status at a zip code level; Colon NOS = Not Otherwise Specified; Ref = Reference

Results

Blacks, Hispanics and Asians were more likely than White to present with distant stage disease at the time of diagnosis, 22.4%, 21.5%, and 20.0% respectively compared to 17.9% for Whites (table 1).

Blacks were more likely to be diagnosed with proximal tumors than other groups with 51.1% (table 1).

Blacks (60.7%) and Hispanics (61.7%) were more likely to reside in areas with low economic status compared to Whites (49.9%) and Asians (43.7%) (table 1)

Asians, Hispanics, and Whites were more likely to be married at the time of diagnosis (57.9%, 53.8% and 51.3%) respectively than Blacks, 43.9%.

The CRC cause-specific survival unadjusted model showed that Blacks had a significantly increased risk of death (HR = 1.20, CI = 1.05 – 1.37, p=0.006) compared with Whites (table 2).

After adjustment for age group, gender, SEER stage, ES, period of diagnosis, marital status, and sub-location of the tumor, Black race was still significantly associated with increased risk of CRC death (HR=1.17) compared to Whites (table 3).

Limitations

The Nevada Central Cancer Registry does not link (yet) its cancer records with the National Death Index. However, there is no reason to believe out-of state deaths would be biased according to race.

ES is an ecological measure based on median annual household income by zip code.

Conclusion

Black Race is a particularly persistent determinant of CRC survival disparities in Nevada. The risk of death for Blacks compared to Whites hardly changed, even after adjustment for stage at diagnosis, economic status, gender, tumor sub-location, age, and marital status at diagnosis.

The determinant Period of Diagnosis shows that survival gains for CRC elsewhere in the US have not been observed in Nevada so far, which is in agreement with the low screening rates in the State (BRFSS data).

Further determinants of survival disparities, such as course of treatment, should be investigated. More public health intervention programs should tailor CRC screening awareness towards minorities as well as ensuring equal access to healthcare and quality treatment.

