



Disparities in Colon Cancer Treatment

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Race and Overall Survival

Race and Overall Survival in CRC

A cohort study of primary patient data merged with the National Cancer Database as part of a Commission on Cancer Special Study was performed.

The study population was a random sample of patients undergoing surgery for stage I to III CRC between years 2006 and 2007 with 5 years of follow-up.

Propensity-weighted multivariable Cox regression was performed with pooled results to yield statistical inferences.

Race and Overall Survival in CRC

- The study population included 8176 patients, 9.9% (n=811) Black and 90.1% (n=7365) White.
- Black patients were more likely to be uninsured or underinsured, have lower household income, and lower educational status (all $P < .001$).
- Rates of guideline concordant care were higher among Black vs White patients with colon cancer (76.9% vs 72.6%, $P=0.02$), and Black and White patients with rectal cancer were treated with radiation at similar rates (69.1% vs 66.6%, $P=.64$).
- Black race was independently associated with increased risk of recurrence (hazard ratio [HR]=1.48, 95% confidence interval [CI] =1.26 to 1.73) and mortality (HR=1.37, 95% CI=1.18 to 1.59).
- In sensitivity analysis of only patients who received guideline concordant care, observed effects for recurrence (HR=1.51, 95% CI =1.27 to 1.79) and overall survival (HR=1.40, 95% CI=1.18 to 1.66) persisted.

Race and Overall Survival in CRC

- When socioeconomic factors, specifically insurance status, income, and population density of residence, were added to the model, Black race remained associated with risk of recurrence (HR = 1.48, 95% CI = 1.26 to 1.73) and worsened overall survival (HR = 1.44, 95% CI = 1.26 to 1.66)
- Among those with locoregional or distant recurrent disease, White patients were treated with surgical therapy either alone or in combination with chemotherapy or radiation more often than Black patients (24.0% [n = 288] vs 16.8% [n = 32], P = 0.04).

Race and Overall Survival in CRC

- In this study, the finding that Black patients with colon cancer were more likely to receive GCC than White patients was unexpected. Most prior studies have demonstrated persistent racial disparities in CRC treatment, including lower rates of surgery for stage I and stage IV CRC, adjuvant chemotherapy for stage III colon cancer, radiation for stage II or III rectal cancer, and targeted therapy for stage IV CRC
- The cohort of Black patients treated at CoC sites and included in this study was more often from a metro area (87.5% vs 75.1) and more likely to receive care at an academic or research facility than White patients (31.2% vs 16.0%), which could explain higher rates of GCC

Race and Overall Survival in CRC

- Conclusions: Despite higher rates of GCC for CRC, Black patients experience a higher risk of recurrence and mortality compared with White patients.
- Equality means each individual or group of people is given the same resources or opportunities. Equity recognizes that each person has different circumstances and allocates the exact resources and opportunities needed to reach an equal outcome.
- Maybe this is a question of equity, not equality...

Inequalities in Surgical Care

- A retrospective analysis of the national inpatient sample including adult patients (≥ 18 years) diagnosed with colorectal cancer, and who underwent colorectal resection while admitted between 2008 and 2015 was performed. Multivariable logistic and linear regression were used to assess the association between emergent admissions, compared to elective admissions, and postoperative outcomes.

Inequalities in Surgical Care

A total of 141,641 hospitalizations were included: 93,775 (66%) were elective admissions and 47,866 (34%) were emergent admissions.

Black patients were more likely to undergo emergent colectomy, compared to white patients (42% vs 32%, $p < 0.0001$).

Emergent procedures were less likely to be laparoscopic (19% vs 38%, $p < 0.0001$).

Medicaid and Medicare patients were also more likely to have an emergent colectomy, compared to private insurance (47% and 36% vs 25%, respectively, $p < 0.0001$), as were patients with low household income, compared to highest (38% vs 31%, $p < 0.0001$).

Inequalities in Surgical Care

- Patients undergoing emergent colectomy were significantly more likely to have postoperative venous thromboembolism, wound complications, infection, bleeding, cardiac failure, renal failure, respiratory failure, shock, and inpatient mortality.
- Screening rates are low among racial and ethnic minorities and socioeconomically disadvantaged patient populations.
- While these disparities may be due to lower rates of CrC screening among these patients, it is likely that reduced overall access to care, patient-physician miscommunication, and mistrust in the healthcare system may also play an important role.

Early Onset Colon Cancer



Racial Disparities in Early Onset Colon Cancer

CRC patients from SEER 1973-2010 database were identified, and EO-CRC was defined as CRC at <50 years. Clinical/pathological features and survival were compared between NHW, NHB, and Hispanics. Cancer-specific survival (CSS) predictors were assessed in a multivariable Cox proportional hazard model.

EO-CRC in NHB is less likely to present in locations targetable by sigmoidoscopy than NHW (54.6% vs. 67.7% OR:1.7, 95% $p < 0.001$)

100%
80%
60%
40%
20%
0%



- Cecum
- ▣ Ascending
- ▣ Hepatic Flexure
- ▣ Transverse
- Splenic Flexure
- Descending
- ▣ Sigmoid
- ▣ Rectosigmoid
- ▣ Rectum

NHW
8.9%
7.0%
2.3%
5.0%
2.5%
4.6%
25.0%
12.2%
30.5%

NHB
14.2%
11.2%
3.3%
6.1%
2.7%
6.3%
23.7%
9.2%
21.7%

Hispanic
9.0%
7.9%
2.9%
5.0%
3.2%
4.7%
26.6%
11.3%
28.0%

Racial Disparities in Early Onset Colon Cancer

- Among patients with non-metastatic EO-CRC, surgery was lower in NHB (OR: 0.52, 95% CI: 0.39-0.68, $p < 0.001$) and Hispanics (OR: 0.51, 95% CI: 0.38-0.66, $p < 0.001$) compared to NHW
- Similarly, among 5242 patients diagnosed with EO-CRC rectal cancer, the frequency of radiation was significantly lower in NHB compared to NHW (61.3% vs. 66.9%, OR: 0.78, 95% CI: 0.65-0.94) whereas no difference was seen among NHW and Hispanics

Racial Disparities in Early Onset Colon Cancer

- A multivariable Cox regression model in patients with EO-CRC demonstrated that racial/ethnic group was independently associated with an increased risk of cancer-related death, after adjusting for gender, stage, grade, sidedness, surgery, and radiation.
- The mortality risk was 53% higher in NHB (HR: 1.53, 95% CI: 1.39- 1.69, $p < 0.001$) and 19% higher in Hispanics (HR: 1.19, 95% CI: 1.08-1.33, $p = 0.001$), compared to NHW.

Racial Disparities in Early Onset Colon Cancer

Stage	1-year CSS			5-year CSS		
	NHW	NHB	Hispanic	NHW	NHB	Hispanic
I	99.5%	98.8%	99.3%	96.4%	94.8%	94.5%
II	99.2%	98.2%	98.8%	90.7%	81%	90.5%
III	98.1%	97%	97.2%	80.3%	68.4%	71.2%
IV	77%	72.2%	74.2%	22.3%	12.3%	15.5%
Sidedness						
Right-sided	89.9%	89.1%	93%	69.9%	59.2%	71.2%
Left-sided	94.9%	91.6%	92.9%	73.7%	60.2%	65.9%

Note: Early-onset Colorectal Cancer was defined as diagnosis before age 50.

Abbreviations: NHW, Non-Hispanic White; NHB, Non-Hispanic Black; CSS, Cancer-specific survival

Racial Disparities in Early Onset Colon Cancer

- Consistent with differences reported among CRC patients diagnosed at 50 years or older, significant racial disparities were demonstrated in EO-CRC and identified NHB as a group that suffers disproportionately compared to others.

Racial Disparities in Early Onset Colon Cancer

- "Unfavorable outcomes among NHBs are recognized across several cancer types including CRC. However, it remains unclear whether this is determined by tumor biological differences or delays in access to care. While molecular differences across racial/ethnic groups are well-established, it seems unlikely that it would solely explain unfavorable outcomes in NHBs as only *BRAF* mutation has shown prognostic value and it does not seem to differ between NHW and NHB."

Genetic counseling

- Young adults (age 18–49yrs) diagnosed with CRC between 2009 and 2017 in 2 health systems in Texas were identified.
- Referral to genetic counseling, attendance at genetic counseling appointments, and receipt of germline genetic testing by race/ethnicity were evaluated.
- Most patients received MMR testing and there was no difference in IHC
- A lower proportion of Black patients were referred to genetic counseling (50.0% vs White patients 54.1% vs Hispanic patients 65.9%; $P=0.02$)
- A lower proportion of Black patients attended genetic counseling appointments (61.2% vs 81.7% White patients vs 86.2% Hispanic patients; $P < .01$)

Summary

- Improve screening rates in NHB populations
- Consider the question of equity instead of equality. Is the biology more aggressive and should earlier recommendations to access to screenings and types of screening be present?
- Work on community engagement to overcome mistrust in the healthcare system, miscommunications, and overall access to care.

Rural Health



Disparities for Rural Populations

- Assessed screening rates according to the 2016 Behavioral Risk Factor Surveillance System guidelines using state and city-level data for county level estimates and correlating with county CRC mortality data from the National Cancer Institute.
- Used multivariable modeling to examine associations between rurality, screening rates, and mortality.
- Highest screening rate states had the smallest urban-rural disparities;
- **Lowest screening rate states had the largest disparities.**
- This is concerning because it implies that rural populations in states with poor screening at a state level are at an even further disadvantage.

Disparities for Rural Populations

- Some states (Oklahoma, Nebraska, North Dakota) had urban screening rates more than 10% greater than rural screening rates
- Percent screened and urban–rural classification correlated significantly with mortality. Rural counties experienced ~5 more deaths per 100,000 population even controlling for screening rates.

Disparities for Rural Populations

- Hughes et al. conducted a survey examining health care beliefs in urban and rural residents of Nebraska to identify factors associated with use of CRC screening in the population aged 50–75 years.
- They identified that perceived cost of screening was a barrier for rural residents.
- They also found that although **nearly all respondents had health insurance**, rural residents were less likely to have visited a provider in the past year and less likely to have a primary care provide (lack of routine interaction with the healthcare)
- Rural respondents were also more likely to report a belief that CRC "cannot be prevented"

Disparities for Rural Populations

- Screening rates also do not fully explain the mortality gap between urban and rural populations. Additional barriers include:
 - poorly controlled comorbidities due to less frequent contact with PCPs,
 - potential difficulty in obtaining aftercare in rural settings,
 - potential differences in access to chemotherapy,
 - acceptability of chemotherapy,
 - practice/prescribing patterns or biases around offering chemotherapy to different groups of patients.

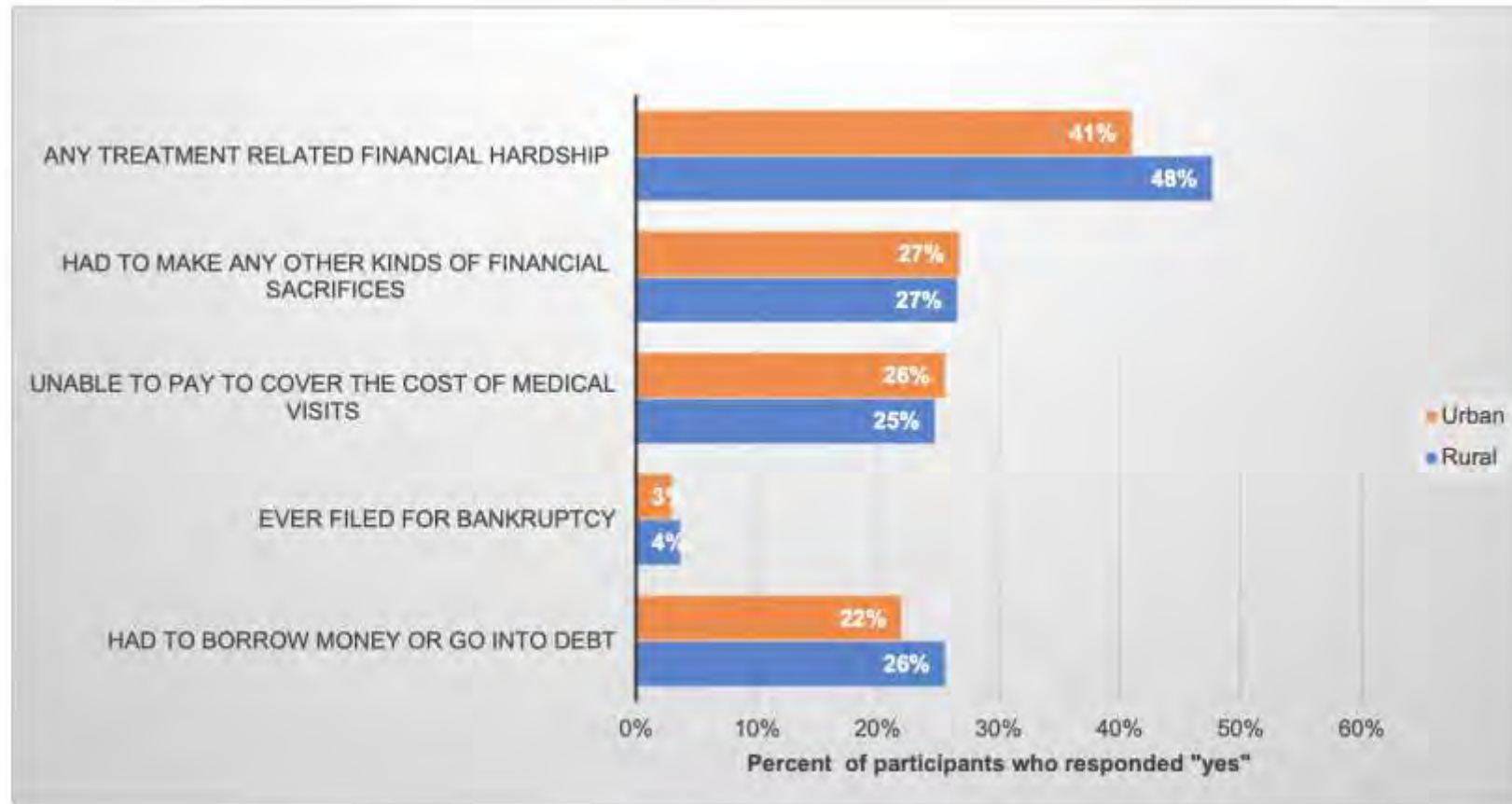
Rural Disparities and Financial Toxicity

- Individuals diagnosed with localized or regional colorectal cancer between 2004 and 2012 were ascertained by the population-based New Mexico Tumor Registry. Participants completed a mailed questionnaire or telephone survey about their colorectal cancer survivorship experience, including treatment-related financial hardship and receipt of surveillance colonoscopy. Multivariable logistic regression was used to estimate adjusted odds ratios (ORs) and 95% confidence intervals (CIs).

Rural Disparities and Financial Toxicity

- Compared with urban colorectal cancer survivors (n = 168), rural colorectal cancer survivors (n = 109) were:
 - Slightly older
 - More likely to be married (65% vs. 59%)
 - Have an annual income <\$30,000 (37% vs. 27%)
 - Less likely to be employed (35% vs. 41%),
 - Less likely to have a college degree (28% vs. 38%)
 - Less likely to have a high level of health literacy (39% vs. 51%).
 - Twice as likely as urban survivors to report treatment-related financial hardship (OR, 1.86; 95% CI, 1.06- 3.28) and nonadherence to surveillance colonoscopy guide- lines (OR, 2.28; 95% CI, 1.07-4.85)

Rural Disparities and Financial Toxicity



Financial Incentives

- Colorectal cancer screening rates are suboptimal ,particularly among socio–demographically disadvantaged groups.
- This parallel ,3–arm randomized clinical trial was conducted from March 13, 2017, through April 12, 2018, at 21 medical centers in an integrated health care system in western Washington. A total of 838 age–eligible patients overdue for colorectal cancer screening who completed a questionnaire that confirmed eligibility and included sociodemographic and psychosocial questions were enrolled

Financial Incentives

- Interventions were
 - (1) **mail only** (n = 284; up to 3 mailings that included information on the importance of colorectal cancer screening and screening test choices, a fecal immunochemical test [FIT], and a reminder letter if necessary)
 - (2) **mail and monetary** (n = 270; mailings plus guaranteed \$10 on screening completion)
 - (3) **mail and lottery** (n = 284; mailings plus a 1 in 10 chance of receiving \$50 on screening completion).

Financial Incentives

The primary outcome was completion of any colorectal cancer screening within 6 months of randomization



Secondary outcomes were FIT or colonoscopy completion within 6 months of randomization



Intervention effects were compared across sociodemographic subgroups and self-reported psychosocial measures.

Financial Incentives

- A total of 838 participants were included in the study
 - mean [SD] age, 59.7 [7.2] years
 - 546 [65.2%] female
 - 433 [52.2%] white race
 - 101 [12.1%] Hispanic ethnicity
- Completion of any colorectal screening was **not significantly** higher for the mail and monetary group (207 of 270 [76.7%]) or the mail and lottery group (212 of 284 [74.6%]) than for the mail only group (203 of 284 [71.5%]) ($P = .11$).
- For FIT (fecal Immunochemical Test) completion, interventions had **a statistically significant effect** ($P = .04$), with a net increase of 7.7% (95% CI, 0.3%–15.1%) in the mail and monetary group and 7.1% (95% CI, –0.2% to 14.3%) in the mail and lottery group compared with the mail only group.

Financial Incentives

- For patients with **Medicaid insurance**, the net increase compared with mail only in FIT completion for the mail and monetary or the mail and lottery group was 37.7% (95% CI, 11.0%–64.3%) (34.2% for the mail and monetary group and 40.4% for the mail and lottery group) compared with a net increase of only 5.6% (95% CI, –0.9% to 12.2%) among those not Medicaid insured (test for interaction $P = .03$)

Summary

- Improve access to financial counselors to address perceived costs of healthcare
- Improve access to primary care services, whether through outreach clinics or telehealth
- Improve health literacy in rural populations through community outreach campaigns

Thank you

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