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# Economic hardship of minority and non-minority cancer survivors one year after diagnosis: another long term effect of cancer?

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## Abstract

**Background**—Current literature suggests that racial/ethnic minority survivors may be more likely than whites to experience economic hardship after a cancer diagnosis; however, little is known about such hardship.

**Methods**—Lung (LC) and colorectal (CRC) cancer participants of the Cancer Care Outcomes Research and Surveillance consortium (CanCORS) were surveyed approximately 4 (baseline) and 12 months (follow-up) after diagnosis. Economic hardship at follow-up was present if participants 1) indicated difficulty living on household income; and/or 2) for the following two months, anticipated experiencing hardships (inadequate housing, food, or medical attention), or reducing living standards to bare life necessities. We tested whether African Americans (AAs) and Hispanics were more likely than whites to experience economic hardship controlling for gender, age, education, marital status, cancer stage, treatment, and economic status at baseline (income, prescription drug coverage).

**Results**—Of 3,432 survivors (39.7% LC, 60.3% CRC) 14.0% were AA, 7% Hispanic and 79% white. AAs and Hispanics had lower education and income than whites. About 68% AAs, 58% Hispanics, and 44.5% whites reported economic hardship. In LC participants, the Hispanic-white disparity was not significant in unadjusted or adjusted analyses, the AA-white disparity was explained by baseline economic status. In CRC participants, the Hispanic-white disparity was explained by baseline economic status, the AA-white disparity was not explained by variables included in the model,

**Conclusions**—Economic hardship was evident in almost 1 in 2 cancer survivors one year after diagnosis, especially AAs. Research should evaluate and address risk factors and impact on survival and survivorship outcomes.

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## Introduction

Among the side effects of cancer, "financial toxicity" is now recognized as an important sequela that cannot be overlooked in a comprehensive approach to cancer care.[1, 2] Within a few months from diagnosis, as many as 40% of cancer patients worry about the cost of their care.[3, 4] Cancer patients have higher out of pocket expenses for medical care compared to demographic counterparts who are not diagnosed with cancer.[5-7] Such medical expenses are higher among survivors even when they are no longer receiving acute cancer care.[5-7] Further, about one in three survivors report "cancer-related financial problems" for them or their family at some point since the cancer diagnosis.[8] This financial toxicity may translate in longer term economic hardship that leads survivors to lower their standards of living, experience hardships such as inadequate housing, food, or medical attention, or in general experience difficulty living on their income. A greater understanding of economic hardship is imperative given its potential effects on delayed or forgone medical care,[8] and consequently on disease and survivorship outcomes.

While potentially affecting many cancer survivors, cancer economic hardship may not affect all survivors equally. Those with lower incomes[5, 7, 9, 10] and of racial/ethnic minority background may be disproportionally burdened.[10] In one study, racial/ethnic minority breast cancer survivors with low income spent a significantly higher proportion of that income on cancer-related out of pocket expenses than their counterparts.[10] Further, minority survivors identified financial assistance for medical bills as one of their most pressing needs,[11] and were concerned about the long term impact of this financial toxicity, for example on savings, on the ability to provide for other family needs, and on work.[12] Moreover, minority survivors were more likely to report cancer-related financial problems compared to their counterparts.[8] Thus, they may suffer the consequences of their disease in terms of economic hardship more than non-minority survivors, even further away from diagnosis.

The objective of this paper was to examine the economic hardship experienced by racial/ethnic minority cancer survivors compared to their majority counterparts one-year post diagnosis. We used the Cancer Care Outcomes Research and Surveillance (CanCORS) Consortium data, a multisite population- based study that combined data from surveys and from medical records about disease and treatment, and that oversampled racial/ethnic minorities. These data provided an excellent opportunity to preliminarily examine economic hardship in a multiethnic sample. In particular, we examined whether African American and Hispanic survivors were more likely than white survivors to report economic hardship accounting for factors that may affect this hardship and differ across race/ethnicity, e.g., disease and treatment, and economic status.

## Methods

The Cancer Care Outcomes Research and Surveillance (CanCORS) Consortium, established by the National Cancer Institute, aimed at better understanding the reasons that underlie variations in cancer treatment and cancer outcomes.[13] Beginning in 2003, lung and colorectal cancer patients were identified through state cancer registries or from health care systems in five large geographic areas, five Cancer Research Network integrated health

systems, and 15 Veteran Administration hospitals. Participants were surveyed approximately 4 months (baseline), and one year (follow-up) after diagnosis. On average, there were 265 days between the baseline and the follow-up survey for lung cancer participants, and 297 days for colorectal cancer participants. Surveys were conducted by trained telephone interviewers using a questionnaire that included previously validated items and scales in addition to items developed specifically for the study.[14] The study was approved by each institution's Institutional Review Board. Informed consent was obtained from all participants. This analysis includes CanCORS participants who completed the full versions of both surveys, and excludes those who completed short surveys or those whose surveys were completed by surrogates. Clinical data were collected from medical records.

The main outcome was self-reported economic hardship defined based on three questions asked only at follow-up. Namely, it was a dichotomous variable equal to one if participants reported at least some difficulty on the question: "How difficult is it for you to live on your total household income right now?" (Response options: not at all difficult, somewhat difficult, difficult or barely get by, very difficult and extremely difficult or impossible); or at least just a little on the question "In the next two months, how much do you anticipate that you and your family will experience hardships such as inadequate housing, food, or medical attention?" (Response options: not at all, just a little, moderately, a great deal); or at least just a little on the question "In the next two months, how much do you anticipate having to reduce your standard of living to the bare necessities of life?" (Response options: not at all, just a little, moderately, a great deal).

Race/ethnicity was assessed by first asking respondents if they were Hispanic or Latino, then if they were White, Black or African American, or of other race (Asian, American Indian or Alaska Native, Native Hawaiian, Other Pacific Islander or Other). In this analysis, we classified and included Hispanic, White (Non-Hispanic) and African American (Non-Hispanic Black).

### Statistical Analysis

For each cancer type, we reported differences in economic hardship by race/ethnicity and tested the association between race/ethnicity, economic hardship, and other variables that may affect economic hardship and act as confounders of the association of economic hardship and race/ethnicity. These were factors that affect access to medical or other care, and consequently health care costs,[15] or factors that affect survivors' ability to maintain economic well-being. Specifically, we considered: i) socio-demographic variables, i.e., gender, age, education, marital status; ii) stage of disease, treatment obtained before follow-up (chemotherapy, radiation), and quality of life (measured at baseline with the Euro-QOL (EQ-5D)[16]); and ii) economic status at baseline, i.e., household income and number of people supported by that income, insurance coverage and coverage for prescription drugs (partly or fully), and paid job and job changes since baseline, i.e., having a paid job at baseline and not at follow-up. We used Chi Square (or Fisher Exact when needed) two-tailed tests using a significance level of 5%.

We conducted multivariable logistic regression analyses[17] adjusting for factors significantly associated with race/ethnic group. We did not include factors that may themselves be

considered indicators of economic hardship, such as job changes. Moreover, due to multicollinearity considerations, insurance coverage and paid job at baseline were also not included. Variables were included sequentially in blocks starting with sociodemographic variables. Given the relationships between race/ethnicity and socioeconomic variables, we tested for, but did not find, statistically significant interactions between race/ethnicity and income and education. We estimated full models with all variables included, and reduced models that include race/ethnicity and variables found statistically significant in the full model. Model goodness of fit was assessed with the Hosmer-Lemeshow (HL) test.[17] Odds ratios and 95% confidence intervals (CI) are presented. Statistical significance was declared where the CI did not include the value one. Statistical analyses were performed using SAS, version 9.3 (SAS Institute, Inc., Cary, NC).

## Results

Among 1,364 lung cancer participants 83.1% were white, 12.2% African American, and 4.8% Hispanic; among 2,068 colorectal cancer participants 76.3% were white, 15.2% African American and 8.4% Hispanic (Table 1). There were significant differences across race/ethnicity in demographics, for example age and marital status. There were no racial/ethnic differences in stage of disease, but some differences in treatment, with African Americans being more likely to receive radiation for lung cancer, and African Americans and Hispanics chemotherapy for colorectal cancer, than white survivors. Further, quality of life scores were similar across race/ethnic groups, although lower for lung cancer than for colorectal cancer participants. Only a few survivors were uninsured, but a larger proportion did not have coverage for prescription drugs, with African Americans and Hispanics being less likely to have coverage. Similarly, African Americans and Hispanics had lower incomes with more people supported on that income at baseline, and were more likely to have job changes since baseline.

Economic hardship was reported by 52.7% of lung cancer and 46.1% of colorectal cancer participants with a higher proportion of African Americans and Hispanics reporting economic hardship than whites (Table 2). About 68% of African Americans and 58% of Hispanics reported economic hardship across the two cancer types, while 50% of white lung cancer and 40.5% of white colorectal cancer participants reported such hardship. Between 14.7% and 19.2% of African Americans and 13.4%-16.9% of Hispanics reported that it was very difficult or extremely difficult to live on their income compared to 4.8%-7.6% of whites. Similarly, African American and Hispanic survivors more frequently reported at least some level of anticipated hardship or reduction of living standards.

In adjusted analyses for lung cancer participants, the full and reduced models showed good model fit (HL test, p=0.71 and p=0.34, respectively) (Table 3). The association between economic hardship and race/ethnicity was not significant: the adjusted odds ratio for African Americans was 1.21 (CI 0.79-1.84), and for Hispanics it was 1.48 (CI 0.73-2.54). The association with African American race became non-significant when adjusting for baseline economic status, while the association with Hispanic ethnicity was not significant in unadjusted analyses. In adjusted analyses for colorectal cancer participants, the full and reduced models showed good model fit (HL test, p=0.49 and p=0.92, respectively).

Economic hardship remained significantly associated with African American race when adjusting for all factors, with African American having higher odds of economic hardship than whites (adjusted OR: 1.69, CI 1.24-2.30). Economic hardship was not significantly associated with Hispanic ethnicity after adjusting for economic status (adjusted OR in full model: 1.35, CI 0.90-2.03). Overall, education, marital status, and disease characteristics as well as having received chemotherapy or radiation therapy, were not significantly associated with economic hardship. Lack of prescription drug coverage, and lower income were associated with higher odds of economic hardship (Table 3).

## Discussion

Among lung and colorectal cancer survivors surveyed about one-year post diagnosis in the CanCORS study, almost one in two reported economic hardship, i.e., having difficulty living on total household income, or anticipating hardships such as inadequate housing, food, or medical attention, and/or reductions in living standards to the bare necessities of life. Hardship was more frequently reported by African Americans and Hispanics. Some of the observed disparities were explained by differences in economic status but not all. Moreover, type of treatment or disease stage were not associated with economic hardship. These results suggest that economic hardship may not only be due to cancer care costs.

The burden of the cost of care is now considered an additional side effect of cancer and its treatment.[1] In a sample of stage III colon cancer patients, 38% reported accruing debt, selling or refinancing a home, borrowing money from friends or family, or experiencing a 20% or greater decline in annual income as a result of treatment-related expenses.[18] Among patients from academic and community hospitals, 30% reported concerns about paying for cancer care, 22% reported their families had to make sacrifices, and 17% were concerned about coverage of costs past the initial cancer care treatment period.[4] This concern about long-term finances is legitimate: our findings indicate that almost 50% of survivors experienced economic hardship about one-year post diagnosis. Similarly, among respondents to the National Health Interview Survey mostly one year or more past the cancer diagnosis, about a third reported having experienced cancer-related financial problems.[8] The consequences of these hardships are tangible. Survivors reporting cancer-related financial problems were more likely to report forgoing or delaying medical care including medications.[8] Among patients who applied for copayment assistance, more than 20% had cut down on or not filled drug prescriptions, almost 50% used savings, and the same proportion reduced spending on food or clothing.[19] Among cancer survivors responding to an Internet survey, about 9%, but 25% of those with lower incomes, reported deciding not to have recommended care because of costs, and about 20% reported a large amount of distress related to medical care costs.[20] The consequences of economic hardships on emotional well-being, and in general the quality of life of survivors, are also starting to be examined.[21-24]

Our results are generally consistent with current literature pointing to racial/ethnic minority survivors, who represent about 20% of US survivors,[25] being more likely to experience some economic hardship.[8, 26] We find that two thirds of African Americans and more than half of the Hispanics reported economic hardship regardless of the cancer they had,

compared to 50% or less of white survivors. The disparity among lung cancer survivors was not significant once participants' economic status was considered, and it was less than that observed among colorectal cancer survivors. This may be explained by white lung cancer participants having lower incomes compared to white colorectal cancer survivors, a factor significantly associated with a higher likelihood of economic hardship. The observed disparity between African American and white colorectal cancer survivors was not explained by economic status or the factors included in our analysis. We note, however, that while African American colorectal cancer survivors were more likely than whites to have a paid job at diagnosis, they were also more likely to have job changes since diagnosis, possibly indicating challenges related to returning to work after the diagnosis. This is in line with others who have found disparities in work-related outcomes after breast cancer.[27-29] Furthermore, it is reported that African American and Hispanic workers have lower levels of net worth, and are less likely to be in white-collar jobs that would offer benefits such as sick leave and work schedule flexibility, all of which are very helpful during cancer recovery.[30] Therefore, events related to differences in jobs and earnings post diagnosis, may be contributing to the observed racial/ethnic disparity in economic hardship and should be further examined.

Others have found that a history of chemotherapy or radiation was associated with cancer-related financial problems or with a greater perceived impact of medical costs, especially chemotherapy.[8, 31] We found that treatment was not significantly associated with economic hardship one year post-diagnosis. This may suggest that other expenses to maintain or improve quality of life, rather than expenses for the treatment itself, may be making a difference for survivors in the months post-treatment. Not having prescription drug coverage was significantly associated with economic hardship, reinforcing the fact that not being able to pay for drugs other than chemotherapy, may also have an important impact on economic hardship. This is in line with previous studies reporting that survivors' expenses in the years post diagnosis remain higher than those of individuals who never had cancer.[5-7] Moreover, as expected, having a lower income was associated with economic hardship, in line with other reports on the low income association with a greater perceived impact of medical costs and a large amount of distress related to medical care expenses.[20, 31]

This secondary data analysis has limitations. First, economic hardship questions were not asked at baseline, therefore while we control for survivors' economic status at baseline, we cannot exclude that the economic hardship existed at baseline as well. Moreover, baseline corresponds to a mean of 4 months from cancer diagnosis: it is, thus, not a true baseline reflecting the participants' status at the time of diagnosis. Second, while CanCORS participants were representative of the SEER cancer patient population in age, gender, and stage of disease,[32] we do not know whether the participants included in this analysis are representative of the general lung and colorectal cancer survivor population one year post diagnosis. Moreover, survivors with worst economic hardship may have been those in poorer health,[33] and more likely to have dropped out or died before the follow-up survey. In this case, the reported prevalence of economic hardship may be underestimated. Third, we only examined a population of cancer survivors; therefore, we cannot be certain that economic hardship is due to cancer or whether the same hardship is experienced by people with other severe conditions. However, other studies have shown that the risk of having high

out-of-pocket expenses burdens, for example, is higher for people who had cancer compared to those with or without other chronic diseases.[26] Fourth, we strived for a much larger representation of ethnic minorities; however, our minority representation reached a respectable 17%.

Despite some limitations, our study represents one of few investigations on economic hardship in a large population-based multi-ethnic sample that includes not only African Americans, but also Hispanics, Asians and other groups (although we did not include other minorities due to small numbers). This analysis makes a significant contribution to our understanding of the challenges faced by diverse survivors along the survivorship continuum, and provides a picture of some of the trade-offs survivors face, regardless of disease severity or cancer treatment received. In particular, survivors are not only at risk of foregoing medical care,[8] but may be also at risk of forgoing basic necessities like food and housing.

In conclusion, our findings suggest that economic hardship in cancer survivors is frequently reported one-year post diagnosis, especially for African Americans and Hispanics. Thus, the economic consequences of cancer may not be limited to the intense treatment phase, but may lead to a longer term economic hardship that needs to be recognized and addressed in the growing survivor population.[34] Considering that those with lower incomes at diagnosis are more likely to report such hardship later in the survivorship phase, long term economic hardship should be addressed early after diagnosis and appropriate support offered to reduce its prevalence. Such support may include interventions to provide drug coverage, financial counseling, or to facilitate the return to a stable working status. Failure to address economic hardship is no longer an option as this may put survivors at a higher risk of distress, forgoing or delaying medical care, and in general poorer outcomes and quality of life. It is also important to continue investigating disparities in work-related outcomes, and what may facilitate return to work especially among African American survivors.

## Acknowledgement

## References

1. Ubel P, Abernethy AP, Zafar YS. Full Disclosure - Out-of-Pocket Costs as Side Effects. New England Journal of Medicine. 2013; 369:1484–1486. [PubMed: 24131175]

2. National Research Council. Cancer Care for the Whole Patient: Meeting Psychosocial Health Needs. The National Academies Press; Washington, DC.: 2008.

3. Martin MY, Fouad MN, Oster RA, et al. What do cancer patients worry about when making decisions about treatment? Variation across racial/ethnic groups. Support Care Cancer. 2013

4. Stump TK, Eghan N, Egleston BL, et al. Cost concerns of patients with cancer. J Oncol Pract. 2013; 9:251–257. [PubMed: 23943901]

5. Finkelstein EA, Tangka FK, Trogdon JG, Sabatino SA, Richardson LC. The personal financial burden of cancer for the working-aged population. Am J Manag Care. 2009; 15:801–806. [PubMed: 19895184]

6. Guy GP Jr. Ekwueme DU, Yabroff KR, et al. Economic burden of cancer survivorship among adults in the United States. J Clin Oncol. 2013; 31:3749–3757. [PubMed: 24043731]

7. Langa KM, Fendrick AM, Chernew ME, Kabeto MU, Paisley KL, Hayman JA. Out-of-pocket health-care expenditures among older Americans with cancer. Value Health. 2004; 7:186–194. [PubMed: 15164808]

8. Kent EE, Forsythe LP, Yabroff KR, et al. Are survivors who report cancer-related financial problems more likely to forgo or delay medical care? Cancer. 2013; 119:3710–3717. [PubMed: 23907958]

9. Arozullah AM, Calhoun EA, Wolf M, et al. The financial burden of cancer: estimates from a study of insured women with breast cancer. J Support Oncol. 2004; 2:271–278. [PubMed: 15328826]

10. Pisu M, Azuero A, Meneses K, Burkhardt J, McNees P. Out of Pocket Cost Comparison Between Caucasian and Minority Breast Cancer Survivors in the Breast Cancer Education Intervention (BCEI). Breast Cancer Research and Treatment. 2010 In press.

11. Mosavel M, Sanders K. Needs of low-income african american cancer survivors: multifaceted and practical. J Cancer Educ. 2011; 26:717–723. [PubMed: 21706193]

12. Darby K, Davis C, Likes W, Bell J. Exploring the financial impact of breast cancer for African American medically underserved women: a qualitative study. J Health Care Poor Underserved. 2009; 20:721–728. [PubMed: 19648700]

13. Ayanian JZ, Chrischilles EA, Fletcher RH, et al. Understanding cancer treatment and outcomes: the Cancer Care Outcomes Research and Surveillance Consortium. J Clin Oncol. 2004; 22:2992–2996. [PubMed: 15284250]

14. Malin JL, Ko C, Ayanian JZ, et al. Understanding cancer patients' experience and outcomes: development and pilot study of the Cancer Care Outcomes Research and Surveillance patient survey. Support Care Cancer. 2006; 14:837–848. [PubMed: 16482448]

15. Aday, LA.; Andersen, RM. Health Care Utilization and Behavior, Models of. John Wiley & Sons, Ltd; 2005.

16. Rabin R, de Charro F. EQ-5D: a measure of health status from the EuroQol Group. Ann Med. 2001; 33:337–343. [PubMed: 11491192]

17. Hosmer, DW.; Lemeshow, S. Applied Logistic Regression. 2nd ed.. John Wiley & Sons, Inc; New York, NY: 2000.

18. Shankaran V, Jolly S, Blough D, Ramsey SD. Risk factors for financial hardship in patients receiving adjuvant chemotherapy for colon cancer: a population-based exploratory analysis. J Clin Oncol. 2012; 30:1608–1614. [PubMed: 22412136]

19. Zafar SY, Peppercorn JM, Schrag D, et al. The Financial Toxicity of Cancer Treatment: A Pilot Study Assessing Out-of-Pocket Expenses and the Insured Cancer Patient's Experience. Oncologist. 2013; 18:381–390. [PubMed: 23442307]

20. Markman M, Luce R. Impact of the cost of cancer treatment: an internet-based survey. J Oncol Pract. 2010; 6:69–73. [PubMed: 20592778]

21. Ell K, Xie B, Wells A, Nedjat-Haiem F, Lee PJ, Vourlekis B. Economic stress among low-income women with cancer: effects on quality of life. Cancer. 2008; 112:616–625. [PubMed: 18085642]

22. Meneses K, Azuero A, Hassey L, McNees P, Pisu M. Does economic burden influence quality of life in breast cancer survivors? Gynecol Oncol. 2012; 124:437–443. [PubMed: 22138013]

23. Coons SJ, Chongpison Y, Wendel CS, Grant M, Krouse RS. Overall quality of life and difficulty paying for ostomy supplies in the Veterans Affairs ostomy health-related quality of life study: an exploratory analysis. Med Care. 2007; 45:891–895. [PubMed: 17712260]

24. Fenn KM, Evans SB, McCorkle R, et al. Impact of Financial Burden of Cancer on Survivors' Quality of Life. J Oncol Pract. 2014

25. Underwood JM, Townsend JS, Stewart SL, et al. Surveillance of demographic characteristics and health behaviors among adult cancer survivors--Behavioral Risk Factor Surveillance System, United States, 2009. MMWR Surveill Summ. 2012; 61:1–23. [PubMed: 22258477]

26. Bernard DS, Farr SL, Fang Z. National estimates of out-of-pocket health care expenditure burdens among nonelderly adults with cancer: 2001 to 2008. J Clin Oncol. 2011; 29:2821–2826. [PubMed: 21632508]

27. Bradley CJ, Neumark D, Bednarek HL, Schenk M. Short-term effects of breast cancer on labor market attachment: results from a longitudinal study. J Health Econ. 2005; 24:137–160. [PubMed: 15617792]

28. Bradley CJ, Wilk A. Racial differences in quality of life and employment outcomes in insured women with breast cancer. J Cancer Surviv. 2013

29. Mujahid MS, Janz NK, Hawley ST, et al. Racial/ethnic differences in job loss for women with breast cancer. J Cancer Surviv. 2011; 5:102–111. [PubMed: 20936435]

30. LaVeist TA. Disentangling race and socioeconomic status: a key to understanding health inequalities. J Urban Health. 2005; 82:iii26–34. [PubMed: 15933328]

31. Brooks J, Wilson K, Amir Z. Additional financial costs borne by cancer patients: a narrative review. Eur J Oncol Nurs. 2011; 15:302–310. [PubMed: 21093369]

32. Catalano PJ, Ayanian JZ, Weeks JC, et al. Representativeness of participants in the cancer care outcomes research and surveillance consortium relative to the surveillance, epidemiology, and end results program. Med Care. 2013; 51:e9–15. [PubMed: 22406968]

33. Lynch JW, Kaplan GA, Shema SJ. Cumulative impact of sustained economic hardship on physical, cognitive, psychological, and social functioning. N Engl J Med. 1997; 337:1889–1895. [PubMed: 9407157]

34. de Moor JS, Mariotto AB, Parry C, et al. Cancer survivors in the United States: prevalence across the survivorship trajectory and implications for care. Cancer Epidemiol Biomarkers Prev. 2013; 22:561–570. [PubMed: 23535024]

**Precis**

One-year post-diagnosis about one in two lung and colorectal cancer survivors reported economic hardship, especially African Americans. This disparity among lung cancer survivors was explained by differences in economic status, but among colorectal cancer survivors differences in economic status, cancer stage and treatment did not account for observed disparities.

**Table 1**

Participants' characteristics at baseline by cancer type and minority group, CanCORS 2003-2005

| | Lung Cancer | | | | Colorectal Cancer | | | |
|---|---|---|---|---|---|---|---|---|
| | All | W | AA | H | All | W | AA | H |
| | N= 1,364 100% | N= 1,133 83.1% | N= 166 12.2% | N=65 4.8% | N=2,068 100% | N=1,579 76.3% | N=315 15.2% | N=174 8.4% |
| **Personal characteristics (%)** | | | | | | | | |
| Female[C] | 49.0 | 49.0 | 44.6 | 60.0 | 45.7 | 43.9 | 50.5 | 52.9 |
| Age <54[LC] | 12.8 | 11.2 | 21.7 | 18.5 | 24.2 | 20.5 | 33.3 | 40.8 |
| Age >80[LC] | 9.1 | 9.4 | 9.6 | 1.5 | 10.9 | 12.6 | 5.1 | 5.7 |
| With college[LC] | 19.4 | 21.2 | 10.4 | 11.1 | 29.3 | 32.9 | 17.2 | 18.3 |
| Married[LC] | 61.0 | 62.2 | 53.3 | 58.5 | 63.7 | 66.0 | 48.2 | 70.7 |
| **Disease and treatment (%)** | | | | | | | | |
| Stage I | 42.3 | 44.0 | 34.6 | 32.3 | 25.8 | 26.7 | 23.3 | 22.5 |
| Chemotherapy[C] | 52.9 | 52.1 | 58.8 | 53.1 | 52.1 | 50.2 | 57.1 | 60.3 |
| Radiation[L] | 31.0 | 29.9 | 42.2 | 20.3 | 13.4 | 13.1 | 14.1 | 15.0 |
| **Quality of life (mean score)[A]** | | | | | | | | |
| Baseline | 0.80 | 0.80 | 0.77 | 0.79 | 0.84 | 0.85 | 0.83 | 0.82 |
| **Economic status (%)** | | | | | | | | |
| Uninsured[LC] | 1.2 | 0.8 | 2.4 | 4.8 | 2.6 | 1.8 | 5.7 | 3.4 |
| No prescription drug coverage[LC] | 14.1 | 14.6 | 11.1 | 11.7 | 10.0 | 11.3 | 5.4 | 5.7 |
| Income[LC] | | | | | | | | |
| < $20,000 | 29.2 | 26.4 | 49.4 | 26.1 | 22.9 | 19.2 | 37.5 | 29.3 |
| $20,000 - $39,999 | 28.6 | 30.1 | 20.5 | 23.1 | 26.0 | 26.0 | 29.8 | 18.4 |
| $40,000 - $59,999 | 16.3 | 17.0 | 11.4 | 15.4 | 16.4 | 17.8 | 13.0 | 10.3 |
| > $60,000 | 19.1 | 20.8 | 9.0 | 15.4 | 27.1 | 30.2 | 13.0 | 24.1 |
| Number of people supported by income[LC] | | | | | | | | |
| 1 | 35.1 | 34.2 | 44.0 | 28.1 | 33.0 | 32.3 | 41.7 | 22.8 |

| | Lung Cancer | | | | Colorectal Cancer | | | |
|---|---|---|---|---|---|---|---|---|
| | **All** | **W** | **AA** | **H** | **All** | **W** | **AA** | **H** |
| | N=1,364 100% | N=1,133 83.1% | N=166 12.2% | N=65 4.8% | N=2,068 100% | N=1,579 76.3% | N=315 15.2% | N=174 8.4% |
| 2 | 52.5 | 54.7 | 41.0 | 43.7 | 49.5 | 53.0 | 38.2 | 37.4 |
| 3+ | 12.4 | 11.1 | 15.1 | 28.1 | 17.6 | 14.6 | 20.1 | 39.8 |
| Paid job[C] | 35.5 | 34.8 | 37.9 | 41.5 | 43.0 | 40.2 | 51.7 | 52.3 |
| Job change since baseline[LC] | 16.9 | 15.4 | 23.5 | 26.6 | 13.0 | 10.1 | 24.4 | 19.1 |

W = White, H = Hispanic, AA = African American

[L]Significant difference across minority status for lung cancer cases (p<0.05)

[C]Significant difference across minority status for colorectal cancer cases (p<0.05)

[A]EQ-5D scores range from 0 for a health state equivalent to death, to 1 for a health state equivalent to perfect health. The instrument measures three levels of severity (extreme, some or no problems) for mobility, self-care, usual activities, pain/discomfort, and anxiety and depression.

**Table 2**

Economic hardship at follow-up by cancer type and minority group, CanCORS 2003-2005

|  | Lung Cancer | | | | Colorectal Cancer | | | |
|---|---|---|---|---|---|---|---|---|
|  | **All** | **W** | **AA** | **H** | **All** | **W** | **AA** | **H** |
| **Economic hardship**[LC] | 52.7 | 50.0 | 68.7 | 58.5 | 46.1 | 40.5 | 67.0 | 58.6 |
| **Difficulty living on current income**[LC] |  |  |  |  |  |  |  |  |
| Not at all difficult | 50.7 | 53.1 | 34.3 | 52.3 | 57.4 | 62.3 | 37.6 | 48.3 |
| Somewhat difficult | 29.4 | 29.3 | 27.7 | 27.7 | 27.4 | 26.1 | 33.8 | 27.6 |
| Difficult or can barely get by | 10.7 | 10.0 | 18.7 | 3.1 | 8.1 | 6.7 | 14.0 | 9.8 |
| Very difficult | 6.0 | 4.7 | 12.0 | 12.3 | 4.8 | 3.0 | 11.5 | 9.2 |
| Extremely difficult or impossible | 3.5 | 2.9 | 7.2 | 4.6 | 2.3 | 1.8 | 3.2 | 5.2 |
| **Anticipate hardship**[LC] |  |  |  |  |  |  |  |  |
| Not at all | 79.1 | 82.4 | 56.9 | 76.2 | 82.5 | 87.4 | 64.0 | 70.3 |
| Just a little | 10.0 | 8.3 | 20.6 | 14.3 | 8.4 | 6.5 | 15.9 | 12.8 |
| Moderately | 7.3 | 6.7 | 12.5 | 6.3 | 5.5 | 4.1 | 11.0 | 8.7 |
| A great deal | 3.6 | 2.7 | 10.0 | 3.2 | 3.6 | 2.0 | 9.1 | 8.1 |
| **Anticipate reductions in living standards to bare necessities**[LC] |  |  |  |  |  |  |  |  |
| Not at all | 70.4 | 73.6 | 50.6 | 62.3 | 74.8 | 80.3 | 56.1 | 58.5 |
| Just a little | 14.2 | 12.4 | 22.5 | 24.6 | 12.4 | 10.5 | 18.7 | 18.7 |
| Moderately | 9.5 | 9.1 | 13.7 | 6.6 | 7.8 | 5.9 | 15.8 | 10.5 |
| A great deal | 5.9 | 4.8 | 13.1 | 6.6 | 5.0 | 3.3 | 9.3 | 12.3 |

W = White, H = Hispanic, AA = African American

[L] Significant difference across minority status for lung cancer cases (p<0.05)

[C] Significant difference across minority status for colorectal cancer cases (p<0.05)

**Table 3**

Odds Ratios and Confidence Intervals of Reporting Economic Hardship, CanCORS participants, 2003-2005

| | Lung Cancer Models | | | | Colorectal Cancer Models | | | |
|---|---|---|---|---|---|---|---|---|
| | Full | | Reduced | | Full | | Reduced | |
| | OR | CI | OR | CI | OR | CI | OR | CI |
| **Race/ethnicity (vs. White)** | | | | | | | | |
| African American | 1.21 | 0.79-1.84 | 1.24 | 0.82-1.88 | **1.69** | **1.24-2.30** | **1.69** | **1.25-2.29** |
| Hispanic | 1.36 | 0.73-2.54 | 1.32 | 0.71-2.43 | 1.35 | 0.90-2.03 | 1.37 | 0.92-2.04 |
| *Personal characteristics* | | | | | | | | |
| **Female** | 0.88 | 0.68-1.15 | – | – | 0.86 | 0.69-1.08 | – | – |
| **Age (vs. 54)** | | | | | | | | |
| 55-59 | 0.92 | 0.53-1.58 | 0.98 | 0.58-1.67 | **0.67** | **0.45-0.99** | **0.66** | **0.45-0.97** |
| 60-64 | 0.69 | 0.42-1.14 | 0.72 | 0.44-1.18 | **0.62** | **0.42-0.92** | **0.61** | **0.41-0.90** |
| 65-69 | **0.43** | **0.26-0.70** | **0.45** | **0.27-0.73** | **0.44** | **0.30-0.66** | **0.42** | **0.29-0.61** |
| 70-74 | **0.41** | **0.24-0.69** | **0.40** | **0.24-0.67** | **0.43** | **0.29-0.66** | **0.40** | **0.27-0.59** |
| 75-79 | **0.25** | **0.14-0.43** | **0.25** | **0.15-0.42** | **0.35** | **0.23-0.54** | **0.30** | **0.20-0.45** |
| >80 | **0.36** | **0.20-0.66** | **0.36** | **0.20-0.64** | **0.27** | **0.17-0.43** | **0.21** | **0.13-0.32** |
| **Education** (*vs.* < high school) | | | | | | | | |
| High school graduate or GED | 0.95 | 0.64-1.40 | -- | -- | 0.87 | 0.61-1.24 | | |
| 1-3 year of college | 0.79 | 0.53-1.18 | -- | -- | 0.97 | 0.68-1.40 | | |
| With college degree or more | 0.95 | 0.59-1.52 | -- | -- | 0.90 | 0.62-1.31 | | |
| **Marital status** (vs. married) | | | | | | | | |
| Divorced or separated | 1.65 | 0.98-2.79 | -- | -- | 1.40 | 0.91-2.17 | | |
| Never married | 0.93 | 0.39-2.19 | -- | -- | 1.48 | 0.80-2.72 | | |
| Widowed | 1.22 | 0.71-2.08 | -- | -- | 0.87 | 0.55-1.39 | | |
| *Disease and treatment* | | | | | | | | |
| **Stage** (vs. Stage I) | | | | | | | | |
| II | 0.95 | 0.62-1.46 | -- | -- | 1.05 | 0.78-1.41 | | |
| III | 0.85 | 0.58-1.23 | -- | -- | 0.79 | 0.55-1.13 | | |
| IV | 0.84 | 0.56-1.27 | -- | -- | 1.00 | 0.65-1.55 | | |
| **Chemotherapy** | 1.00 | 0.73-1.39 | -- | -- | 1.27 | 0.92-1.73 | | |
| **Radiation** | 1.18 | 0.87-1.60 | -- | -- | 1.14 | 0.83-1.56 | | |
| *Economic status* | | | | | | | | |
| **No drug coverage** | 1.45 | 1.00-2.11 | **1.47** | **1.01-2.14** | **1.49** | **1.03-2.15** | **1.48** | **1.02-2.13** |
| **Income (vs. <$20,000)** | | | | | | | | |
| $20,000-<$40,000 | **0.33** | **0.23-0.48** | 0.31 | 0.22-0.45 | 0.30 | 0.22-0.41 | 0.31 | 0.22-0.42 |
| $40,000-<$60,000 | **0.17** | **0.10-0.26** | 0.16 | 0.10-0.24 | 0.12 | 0.08-0.18 | 0.13 | 0.09-0.18 |
| $60,000 | **0.07** | **0.04-0.11** | 0.06 | 0.04-0.10 | 0.06 | 0.04-0.08 | 0.06 | 0.04-0.08 |
| **Persons supported by income (vs. 1)** | | | | | | | | |
| 2 | 1.18 | 0.72-1.92 | 0.94 | 0.70-1.26 | 1.16 | 0.78-1.74 | 1.04 | 0.81-1.34 |
| 3 or more | **2.19** | **1.22-3.95** | **1.80** | **1.13-2.85** | **1.82** | **1.13-2.93** | **1.59** | **1.11-2.26** |

| | Lung Cancer Models | | | | Colorectal Cancer Models | | | |
|---|---|---|---|---|---|---|---|---|
| | Full | | Reduced | | Full | | Reduced | |
| | OR | CI | OR | CI | OR | CI | OR | CI |
| Observations used | | 1239 | | 1239 | | 1841 | | 1841 |
| Hosmer-Lemeshow Goodness of Fit Test | | 0.71 | | 0.34 | | 0.49 | | 0.92 |