

CEBP Focus: Cancer Disparities

Recent Trends in Black-White Disparities in Cancer Mortality

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Abstract

Despite decreases in overall cancer death rates across all racial and ethnic groups since the early 1990s, racial disparities in cancer mortality persist. We examined temporal trends in Black-White disparities in cancer mortality from all sites combined, smoking-related cancers (lung and a group including oral cavity, pharynx, larynx, esophagus, pancreas, bladder, and kidney), and sites affected, or potentially affected by screening and treatment (breast, prostate, colon/rectum). Death rates, rate differences, and rate ratios comparing Blacks to Whites from 1975 through 2004 were based on mortality data from the National Center for Health

Statistics. The Black-White disparity in overall cancer death rates narrowed from the early 1990s through 2004, especially in men. This reduction was driven predominantly by more rapid decreases in mortality from tobacco-related cancers in Black men than White men. In contrast, racial disparities in mortality from cancers potentially affected by screening and treatment increased over most of the interval since 1975. Coordinated efforts to improve early detection and treatment for all segments of the population are essential to eliminate racial disparities in cancer mortality. (Cancer Epidemiol Biomarkers Prev 2008;17(11):2908–12)

Introduction

Eliminating racial disparities in cancer mortality is a stated goal of the Federal Healthy People 2010 initiative (1) and the American Cancer Society's 2015 challenge goals (2). How this objective is to be achieved remains elusive, however. African Americans still experience the highest death rates for many cancers, despite decreases in death rates for all racial and ethnic groups since the early 1990s (3). Moreover, racial differences in cancer mortality are closely related to underlying socioeconomic inequalities that present major challenges across the entire spectrum of cancer prevention, early detection, and access to high quality care.

Two important components of cancer control involve reductions in tobacco use and, for certain cancers, systematic screening coupled with timely and appropriate treatment. Tobacco smoking is known to cause at least 15 different types of cancer (4). Smoking cessation by men over the last half century has been estimated to account for at least 40% of the decrease in male all-cancer death rates between 1991 and 2003. In contrast to tobacco control, effective screening programs require a coordinated sequence of early detection and timely, appropriate treatment. Several screening modalities have been proven to be effective in reducing death rates from cancers of the breast, colon/rectum, and cervix. The early detection of prostate cancer has not been shown to

reduce prostate cancer mortality in randomized trials, several of which are ongoing. However, a recent study suggests that 45% to 70% of the observed decrease in prostate cancer mortality through the year 2000 could be attributed to earlier stage of diagnosis as a result of screening.

We examined temporal trends in cancer mortality among African Americans and Whites separately for tobacco-related cancers and for the three most common cancers affected, or potentially affected by screening (breast, colon/rectum, prostate). National mortality data from 1975 to 2004 were used to examine changes in the death rates, rate ratios, and rate differences in African Americans compared with Whites. To our knowledge, this is the first analysis to separate these two broad categories of disease in examining trends in racial disparities.

Materials and Methods

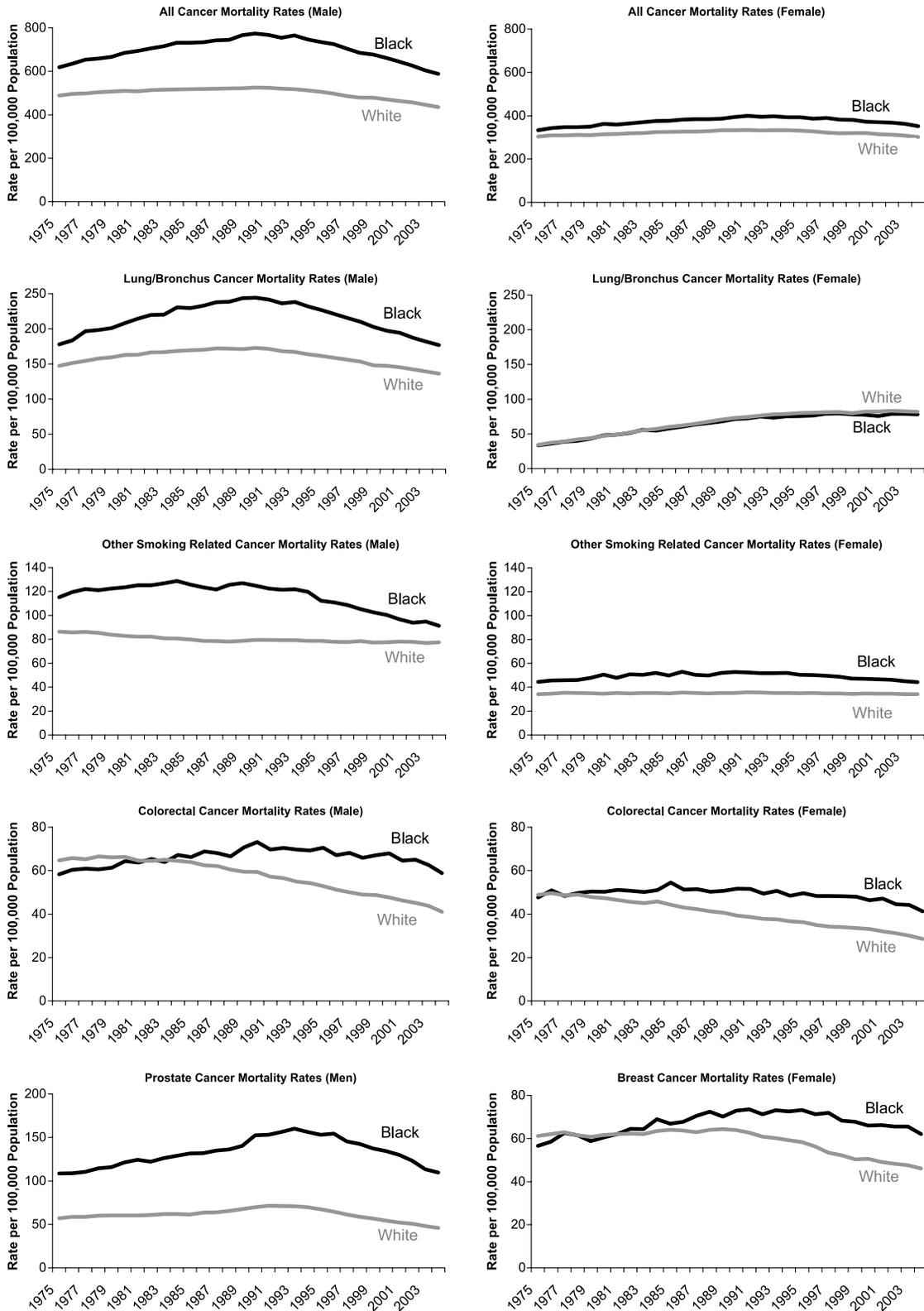
We calculated age-standardized mortality rates for African American and White adults age 35 y and older using SEER*Stat software and mortality data from the National Center for Health Statistics from 1975 through 2004 (11). Black-White disparities in cancer mortality were assessed by comparing both the annual death rates and the rate ratios of the age-standardized death rates between African Americans and Whites. Analyses considered all cancers combined, lung cancer, a combination of seven other tobacco-related cancers (oral cavity, pharynx, larynx, esophagus, pancreas, bladder, and kidney), and cancers of the breast, prostate, and colon/rectum. We did not include cervical cancer because

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*Mortality rates are age-standardized to the year 2000 U.S. age standard

Figure 1. Cancer mortality rates for African American and Whites for all cancers combined, lung cancer, other smoking-related cancers, colorectal, breast, and prostate cancers, National Center for Health Statistics, 1975 to 2004.

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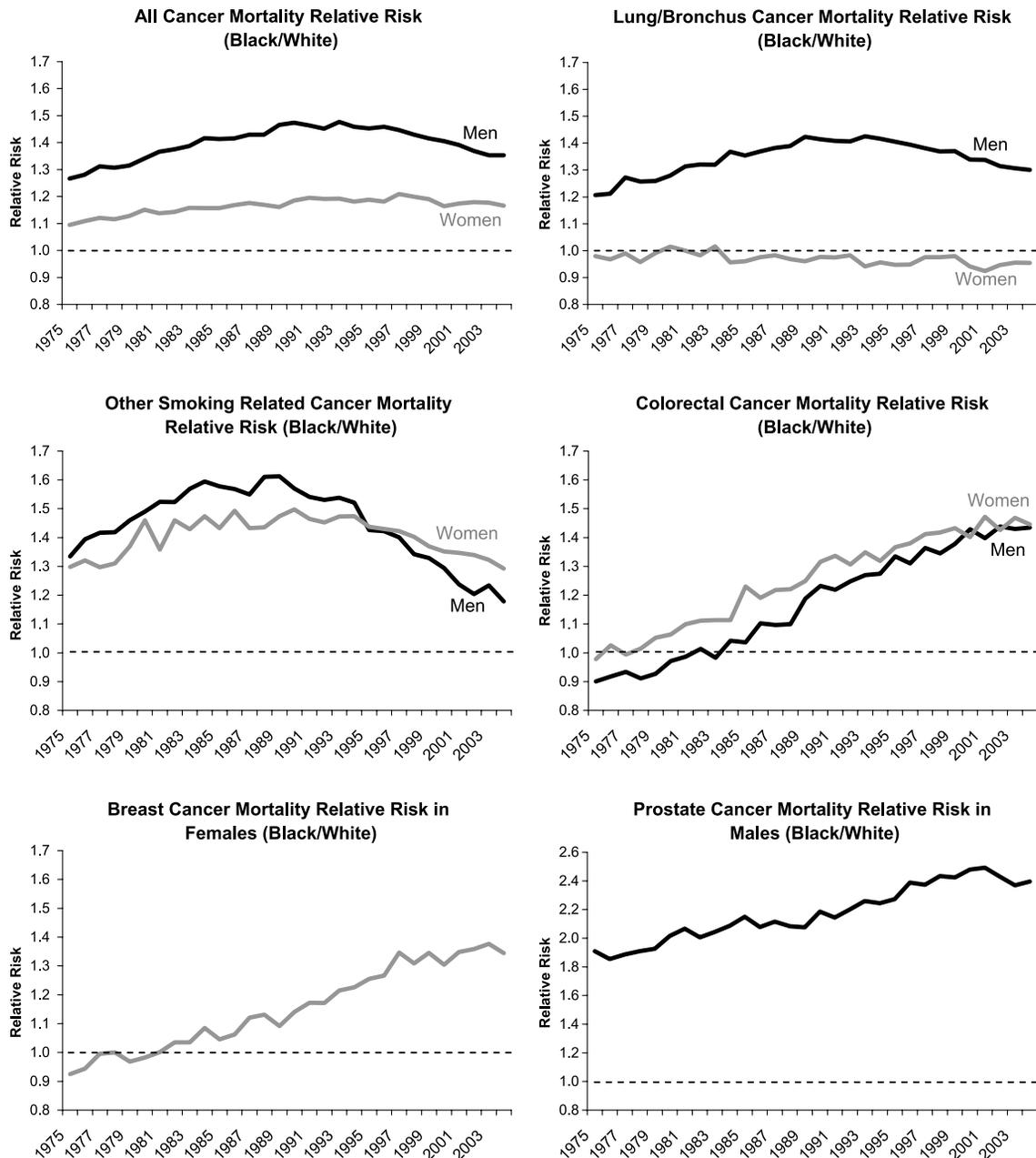


Figure 2. Cancer mortality relative risks (Black/White) by gender for all cancers combined, lung and bronchus cancer, other smoking-related cancers, colorectal, breast, and prostate cancers, National Center for Health Statistics, 1975 to 2004.

although it is related to screening, death from cervical cancer is rare in the United States. Death rates per 100,000 population were standardized to the year 2000 U.S. age standard.

Results

Figure 1 plots the age-standardized sex- and race-specific death rates between 1975 and 2004 for each of the cancers or grouping of cancers examined. The death rates from all cancers combined and for each of these sites and

groupings have decreased since the early 1990s with the exception of lung cancer in women (data available online). The absolute rates and the magnitude of the temporal decline were consistently greater in men than in women. The disparity in death rates between African Americans and Whites has decreased for all sites combined since 1993 in men and 1997 in women (data available online). Most of the convergence of the all cancer death rates between African American and White men was due to a more rapid decrease in death rates from lung and other tobacco-related cancers in Black than White men.

Rate ratios comparing the annual death rates in African American men and women to those in Whites are plotted for all cancers combined and for each of the individual cancers or groups of cancers in Fig. 2. The Black/White rate ratios decreased since the early 1990s for all cancers combined and for lung and other smoking-related cancers, especially in men. For all cancers combined, the rate ratio (95% confidence interval) comparing African Americans to Whites decreased from 1.48 (1.46-1.50) in 1993 to 1.35 (1.34-1.37) in 2004 among men and from 1.21 (1.19-1.22) in 1997 to 1.17 (1.15-1.18) in 2004 among women. In contrast, the Black-White rate ratios increased over most of this 30-year interval for the 3 most common cancers affected, or potentially affected by screening and treatment.

Because the decline in the Black-White rate ratio for the category of other smoking-related cancers was much larger and began earlier than that observed for lung cancer, we further examined which cancer(s) contributed most to this decline. The trend in mortality from esophageal cancer accounted for 45% of the decrease in death rate from other smoking-related cancers among Black men from 1989 to 2004. In White men, an increase in esophageal cancer death rates offset a decrease in the death rate from the group of other smoking-related cancers. In analyses that excluded esophageal cancer, the trend in absolute rates for the other smoking-related cancers closely paralleled the pattern for lung cancer (data not shown). The implications of this are discussed below.

Discussion

Our principal findings were that the disparity in overall cancer death rates between African Americans and Whites narrowed from 1993 through 2004, especially in men, and that this reduction was driven predominantly by decreases in tobacco-related cancer mortality. Previous reports have noted that lung cancer incidence and death rates have decreased more rapidly in Black than White men (3, 12), but the implications of this and of temporal trends in other smoking-related cancers have received little attention. Death rates from lung and other smoking-related cancers in Black and White men began to converge in the early 1990s, approximately 15 years after the prevalence of current cigarette smoking began to decrease more rapidly in Black than White men. Adult smoking prevalence in 1974, 1995, and 2004, respectively, was 53%, 32%, and 24% among Black men and 42%, 26%, and 22% in White men (13). The convergence of death rates from other smoking-related cancers began somewhat earlier and was larger in proportionate terms than the pattern seen for lung cancer. This unexpected finding was entirely due to esophageal cancer, for which the death rates reflect two different histologic subtypes, the trends of which vary by race. Among White men and women, the decrease in squamous cell cancers of the esophagus has been offset by an increase in adenocarcinoma of the esophagus (14). In contrast, among Black men and women, there has been less of an increase in adenocarcinoma of the esophagus, and so the overall death rate from esophageal cancer has continued to decrease, accentuating the temporal trends due to reduced smoking. Although

obesity is thought to contribute to the increasing incidence of esophageal adenocarcinoma (15), the reason for the racial difference is unclear.

The temporal patterns are notably different with respect to racial disparities for the cancers related to screening and treatment. For these, the decreases in death rates began earlier and have been larger in proportionate terms for Whites than for African Americans, despite screening and follow-up services for breast and cervical cancer provided through the CDC Breast and Cervical Cancer Control Program to a small fraction of low socioeconomic women. African Americans have historically been less likely than Whites to be screened for breast and colorectal cancers (16-18), but population-based data on colorectal cancer screening only became available in 2000. Small racial differences persist in the percentage of adults over 50 years who report a fecal occult blood test within the last year or endoscopy within the past 5 years (44.2% in Whites and 38.9% in Blacks in 2003; ref. 19). For breast cancer screening however, the historical difference in use of mammography between Black and White women has almost disappeared. In 2003, 70.6% of White and 70.3% of Black women over 40 years and older reported having a mammogram in the past 2 years (19). White women are also more likely to receive appropriate treatment than Black women for breast, prostate, lung, or colorectal cancer (20-28). The disparities in mortality for these screening-related cancers are even greater with respect to socioeconomic status than race (29). However, they affect African Americans disproportionately because of poverty.

In summary, racial disparities in cancer mortality have decreased for tobacco-related cancers but continue to increase in relative terms for those cancer sites related to screening and treatment. The goal of eliminating racial disparities in cancer mortality cannot be achieved without coordinated and sustained efforts to provide high quality prevention, screening, and treatment to all segments of the population.

Disclosure of Potential Conflicts of Interest

No potential conflicts of interest were disclosed.

References

1. US Department of Health and Human Services. Tracking Healthy People 2010. Washington, DC: US Government Printing Office; 2000.
2. Byers T, Mouchawar J, Marks J, et al. The American Cancer Society challenge goals: How far can cancer rates decline in the US by the year 2015? *Cancer* 1999;86:715-27.
3. Howe HL, Wu X, Ries LA, et al. Annual report to the nation on the status of cancer, 1975-2003, featuring cancer among U S. Hispanic/Latino populations. *Cancer* 2006;107:1711-42.
4. IARC. Tobacco Smoke and Involuntary Smoking. Lyon: International Agency for Research on Cancer; 2004.
5. U.S. Department of Health and Human Services. The Health Consequences of Smoking: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2004.
6. Thun MJ, Jemal A. How much of the decrease in cancer death rates in the United States is attributable to reductions in tobacco smoking? *Tob Control* 2006;15:345-7.
7. Berry DA, Cronin KA, Plevritis SK, et al. Effect of screening and adjuvant therapy on mortality from breast cancer. *N Engl J Med* 2005; 353:1784-92.

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8. Pignone M, Rich M, Teutsch SM, Berg AO, Lohr KN. Screening for colorectal cancer in adults at average risk: a summary of the evidence for the U.S. Preventive Services Task Force. *Ann Intern Med* 2002;132-41.
9. Freeman HP, Wingrove BK. Excess Cervical Cancer Mortality: A Marker for Low Access to Health Care in Poor Communities, 05-5282. Rockville, MD: National Cancer Institute, Center to Reduce Cancer Health Disparities, 2005. Report No.:05-5282.
10. Etzioni R, Tsodikov A, Mariotto A, et al. Quantifying the role of PSA screening in the US prostate cancer mortality decline. *Cancer Causes Control* 2007;19:175-81.
11. National Cancer Institute. Surveillance, Epidemiology, and End Results (SEER) Program (<http://www.seer.cancer.gov>) SEER*Stat Database: Mortality - All COD, Public-Use With State, Total U S. (1969-2004), released April 2007. Underlying mortality data provided by NCHS (<http://www.cdc.gov/nchs>). In: National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch; 2007.
12. Espy DK, Wu XC, Swan J, et al. Annual report to the nation on the status of cancer, 1975-2004, featuring cancer in American Indians and Alaska Natives. *Cancer* 2007;110:2119-52.
13. National Center for Health Statistics. Health, United States, 2006 with Chartbook on Trends in the Health of Americans. Hyattsville, MD: National Center for Health Statistics; 2006.
14. Brown LM, Devesa SS. Epidemiologic trends in esophageal and gastric cancer in the United States. *Surg Oncol Clin N Am* 2002;11:235-56.
15. Schottenfeld D, Fraumeni JF. *Cancer Epidemiology and Prevention*. Third ed. New York: Oxford University Press; 2006.
16. McMahon LF, Jr., Wolfe RA, Huang S, Tedeschi P, Manning W, Jr., Edlund MJ. Racial and gender variation in use of diagnostic colonic procedures in the Michigan Medicare population. *Med Care* 1999;37:712-7.
17. James TM, Greiner KA, Ellerbeck EF, Feng C, Ahluwalia JS. Disparities in colorectal cancer screening: a guideline-based analysis of adherence. *Ethn Dis* 2006;16:228-33.
18. Smith-Bindman R, Miglioretti DL, Lurie N, et al. Does utilization of screening mammography explain racial and ethnic differences in breast cancer? *Ann Intern Med* 2006;144:541-53.
19. National Center for Health Statistics. National Health Interview Survey. Centers for Disease Control and Prevention, 2006. Available at: <http://www.cdc.gov/nchs/nhis.htm>. Accessed April 8, 2008.
20. Imperato PJ, Nenner RP, Will TO. Radical prostatectomy: lower rates among African-American men. *J Natl Med Assoc* 1996;88:589-94.
21. Harlan L, Brawley O, Pommerenke F, Wali P, Kramer B. Geographic, age, and racial variation in the treatment of local/regional carcinoma of the prostate. *J Clin Oncol* 1995;13:93-100.
22. Dunmore C, Plummer P, Regan G, Mattingly D, Jackson S, Millikan R. Re: race and differences in breast cancer survival in a managed care population. *J Natl Cancer Inst* 2000;92:1690-1.
23. Michalski TA, Nattlinger AB. The influence of black race and socioeconomic status on the use of breast-conserving surgery for Medicare beneficiaries. *Cancer* 1997;79:314-9.
24. Muss HB, Hunter CP, Wesley M, et al. Treatment plans for black and white women with stage II node-positive breast cancer. The National Cancer Institute Black/White Cancer Survival Study experience. *Cancer* 1992;70:2460-7.
25. Mandelblatt JS, Hadley J, Kerner JF, et al. Patterns of breast carcinoma treatment in older women: patient preference and clinical and physical influences. *Cancer* 2000;89:561-73.
26. Riley GF, Potosky AL, Klabunde CN, Warren JL, Ballard-Barbash R. Stage at diagnosis and treatment patterns among older women with breast cancer: an HMO and fee-for-service comparison. *JAMA* 1999;281:720-6.
27. Bach PB, Cramer LD, Warren JL, Begg CB. Racial differences in the treatment of early-stage lung cancer. *N Engl J Med* 1999;341:1198-205.
28. Ball JK, Elixhauser A. Treatment differences between blacks and whites with colorectal cancer. *Med Care* 1996;34:970-84.
29. Albano JD, Ward E, Jemal A, et al. Cancer mortality in the United States by education level and race. *J Natl Cancer Inst* 2007;99:1384-94.

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