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# Trends in Melanoma Mortality Among Non-Hispanic Whites by Educational Attainment, 1993-2007

*Vilma E. Cokkinides, PhD; Alan C. Geller, MPH, RN; Ahmedin Jemal, PhD, DVM*

**Objective:** To evaluate overall trends in melanoma mortality rates among non-Hispanic whites by educational level.

**Design:** Descriptive study.

**Setting:** Death certificate records from 26 states, representing approximately 45% of the US population as reported by the National Center for Health Statistics, with recorded educational level information and population data from the US Bureau of Census Current Population Survey.

**Patients:** Recorded deaths from malignant melanoma in non-Hispanic whites reported from 1993 through 2007.

**Main Outcome Measures:** Age-standardized mortality rates for melanoma were evaluated by educational attainment (a marker of socioeconomic status) among non-Hispanic whites (aged 25-64 years) from 1993 through 2007. Rate ratios assessed the time trend in age-adjusted death rates by sex and educational level. Mortality differentials in educational level were measured using the regression-based Relative Index of Inequality. All statistical tests were 2-sided.

**Results:** Melanoma mortality declined significantly between 1993-1997 and 2003-2007 in men (RR [rate ratio], 0.916; 95% CI, 0.878-0.954; $P<.001$) and women (RR, 0.907; 95% CI, 0.857-0.957; $P<.001$). However, these declines occurred only among the most educated persons (≥13 years of education irrespective of sex), and nonsignificant increases were found among the least-educated individuals, specifically men ($P=.17$). As a result, the Relative Index of Inequality by education in melanoma mortality in 2003-2007 relative to 1993-1997 (baseline) widened by 51.7% in men and by 35.7% in women.

**Conclusions:** Recent declines in melanoma mortality rates among non-Hispanic whites in the United States mainly reflect declines among the most-educated individuals. The widening disparities in melanoma mortality rates by education calls for early detection strategies to effectively target high-risk, less-educated, non-Hispanic white individuals.

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**Author Affiliations:**
Surveillance Research Program, American Cancer Society, Atlanta, Georgia (Drs Cokkinides and Jemal); and Division of Society, Human Development, and Health, Harvard School of Public Health, Boston, Massachusetts (Mr Geller).

MELANOMA, WHICH IS the most commonly fatal type of skin cancer, is a growing component of the cancer burden in light-skinned populations in the United States and worldwide.[1,2] Approximately 70 230 cases of melanoma and 8790 deaths were expected to occur in the United States in 2011.[3] Since the early 1990s, melanoma mortality rates in the United States have been declining in non-Hispanic white adults younger than 65 years, despite the persistent increase in incidence.[2]

Although previous studies have documented widening disparities in mortality rates for cancers of the lung, colon and rectum, breast, and prostate by educational status in the past 20 years, similar information for melanoma mortality is largely unknown.[4] Studies have suggested that socioeconomic status (SES) factors may influence melanoma survival and related prognostic factors, including advanced stage, tumor thickness, and case-fatality rates.[1,5-10] Early recognition of melanoma is the cornerstone of melanoma control,[11-13] and, most recently, a large population-based case-control study in Queensland, Australia, found that an individual's educational status is significantly associated with the performance of the clinical skin examination ($P<.01$), which, in turn, contributes to improved prognosis.[14] In this study, we examined melanoma mortality trends from 1993 through 2007 among young and middle-aged non-Hispanic white adults using individual-level educational attainment data from death certificates in 26 states that consistently collected educational-level information on death certificates.



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## METHODS

Mortality data from 1993 through 2007 were obtained from the National Vital Statistics Systems, administered by the Centers for Disease Control and Prevention's National Center for Health Statistics. Underlying causes of death were classified according to the selection and coding rules of the *International Classification of Diseases, Ninth Revision (ICD-9)*,[15] for deaths recorded between 1993 and 1998 and according to the *International Statistical Classification of Diseases, 10th Revision (ICD-10)*,[16] for deaths recorded between 1999 and 2007. The corresponding codes for melanoma of the skin as underlying causes of death were as follows: *ICD-9*, 172; and *ICD-10*, C43. An evaluation study from the National Center for Health Statistics reported that this change in disease-coding classification for cancers, including melanoma of the skin, would not substantially affect the analysis of trends.[17]

The level of education is recorded on death certificates as the number of years of formal schooling completed. In accordance with the National Center for Health Statistics, educational attainment was categorized into 3 levels: less than 12 years (did not finish high school), 12 years (high school graduate), and 13 or more years (had some college education or higher).[18] Since 1989, information on educational attainment has been included on the standard death certificates in the United States. However, most states did not collect this information systematically until 1993. Therefore, for this analysis, data were restricted to the 26 states (Alabama, Alaska, Arizona, Arkansas, Colorado, Hawaii, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, Nevada, North Carolina, North Dakota, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin) that continuously reported educational attainment on the 1989 version of death certificates from 1993 through 2007. In these 26 states, a total of 21 230 deaths in persons aged 25 to 64 years occurred between 1993 and 2007, which represented 44.8% of the total melanoma deaths in the entire United States for persons in this age group during that period. Since melanoma death counts in non-Hispanic whites vastly outnumber (>97%) those in minority subgroups, we restricted the analysis to non-Hispanic white men and women aged 25 to 64 years, an age range during which an individual's education has generally been completed and which provides a better index of SES position for this group than for older adults.[19-21] Also, the complete reporting of education data on death certificates is high, as the proportions of missing or unknown persons are less than 5%.[18]

Population estimates (as the denominator for rate calculations) for the corresponding age, sex, education, state, and time intervals were obtained in a custom-designed tabulation from the US Bureau of Census (Victor Valdisera, BA, Housing and Household Economic Statistics Division, US Bureau of Census, written communication, January 2010). These data were based on the Annual Social and Economic Supplement to the Current Population Survey, an ongoing monthly survey of nationally representative samples of US households. The population data were restricted to the same 26 states as represented by the numerator counts for these analyses. Mortality and population data were categorized to create corresponding numerator and denominator data for strata based on the following combined years: 1993-1997, 1998-2002, and 2003-2007. This study was waived from institutional review board approval, as all data used were deidentified.

Age-standardized mortality rates (expressed per 100 000 population and standardized to the 2000 US population) were computed for 25- to 64-year-olds by sex and education for the combined years 1993-1997, 1998-2002, and 2003-2007 and were used for trend analyses instead of annual rates, which had considerable year-to-year fluctuations. Standard errors and 95% confidence intervals for the rates were computed using methods that are designed to account for both random variability of death counts[22,23] and sampling variability of the Current Population Survey–based population estimates by educational attainment.[22] Computations of rates and standard errors were performed using SAS version 9.1 software (SAS Institute). Sex-specific temporal changes in melanoma death rates from 1993-1997 through 2003-2007 by educational attainment levels were evaluated using rate ratios (ie, comparing the age-adjusted rate in 2003-2007 with that in 1993-1997) and computing the 95% confidence intervals using the delta method.[24] All statistical tests were 2-sided, and 95% confidence intervals different from 0 that were statistically significantly were interpreted as evidence of a temporal change in death rate in the observed direction.

To assess the SES disparity (as measured by educational attainment) in melanoma mortality, we used the Relative Index of Inequality (RII) and its 95% confidence intervals.[25] The RII is a regression-based measure that assesses the linear association between mortality rates and the relative position of each education level separately. The relative position is measured as the cumulative proportion of each educational level within the educational hierarchy. Therefore, this measure of inequality takes into account the size and relative position of each group and is well adapted to compare populations with different educational distribution that may vary by sex and time.[25] The resulting measure (the RII) can be interpreted as the risk in mortality at the highest as compared with the lowest end of the educational hierarchy. An RII greater than 1.0 indicates a negative relationship between educational level and mortality.[25,26] The relative percentage change in the respective RIIs between the most recent period (2003-2007) and the beginning period (1993-1997) was calculated to assess the net changes (ie, relative increase or decrease) in SES disparity over the entire study period.

## RESULTS

The **Table** summarizes the results of the analysis of melanoma mortality rates for men and women by educational attainment, while the **Figure** provides a graphic display of the sex-specific data over time. As shown in the Table, the overall mortality rates declined significantly from 1993-1997 through 2003-2007 in men (RR, 0.916; 95% CI, 0.878-0.954) and women (RR, 0.907; 95% CI, 0.857-0.957), respectively. However, the declines in sex-specific declining trends in melanoma mortality were mainly observed for persons with 13 years or more of education (some college or greater) and were statistically significant (Table and Figure). Melanoma mortality rates among the least-educated groups showed a nonsignificant increase ($P = .17$ among men and $P = .33$ among women), while other subgroups remained unchanged during the 1993-2007 period (no statistically significant change in the rate ratio for trend, Table).

The magnitude of the educational-level inequality in death rates for each respective 5-year period and sex was computed using the RII. As shown in the Table, the RII values indicate an inverse relationship between education and mortality, and the magnitude of the values expresses the size of the inequality within the whole educational hierarchy in the respective year and sex group. As also shown in the Table, the RIIs for both men and



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**Table. Trends in Age-Adjusted Melanoma Mortality Rates by Sex and Educational Attainment in Non-Hispanic Whites, Aged 25 to 64 Years, From 26 States, 1993-2007**

| Variable | 1993-1997 | | 2003-2007 | | Rate Ratio (95% CI)[c] |
|---|---|---|---|---|---|
| | No.[a] | Adjusted Rate[b] (SE) | No.[a] | Adjusted Rate[b] (SE) | |
| Non-Hispanic white men | 4307 | 3.845 (0.058) | 4875 | 3.522 (0.051) | 0.916 (0.878-0.954) |
| Education, y | | | | | |
| <12 | 601 | 3.788 (0.167) | 508 | 4.135 (0.194) | 1.092 (0.954-1.229) |
| 12 | 1677 | 4.247 (0.107) | 1930 | 4.188 (0.098) | 0.986 (0.92-1.053) |
| ≥13 | 1897 | 3.414 (0.081) | 2323 | 2.903 (0.062) | 0.850 (0.797-0.903) |
| RII (95% CI) | | 1.37 (1.20-1.54) | | 2.08 (1.80-2.36) | 51.7%[d] |
| Non-Hispanic white women | 2459 | 2.096 (0.042) | 2630 | 1.901 (0.037) | 0.907 (0.857-0.957) |
| Education, y | | | | | |
| <12 | 320 | 2.111 (0.131) | 228 | 2.309 (0.167) | 1.094 (0.89-1.298) |
| 12 | 1124 | 2.356 (0.072) | 1034 | 2.294 (0.073) | 0.974 (0.89-1.058) |
| ≥13 | 936 | 1.725 (0.058) | 1248 | 1.562 (0.045) | 0.906 (0.827-0.984) |
| RII (95% CI) | | 1.66 (1.37-1.94) | | 2.25 (1.81-2.69) | 35.7%[d] |

Abbreviation: RII, Relative Index of Inequality.
[a] Totals reflect all levels of education, including unknowns.
[b] Five-year rates per 100 000 were age-adjusted to the 2000 US standard population for persons aged 25 to 64 years.
[c] Comparing age-adjusted rate in 2003-2007 with rate in 1993-1997.
[d] Percentage change comparing RII value in 2003-2007 with RII value in 1993-1997.

women during the most recent period (2003-2007) were greater than those seen in 1993-1997; therefore, the relative percentage change of the educational inequality (or disparity) in melanoma mortality rates widened over the period by 51.7% in men and by 35.7% in women.

## COMMENT

To our knowledge, this is the first study to document SES disparities in melanoma mortality trends among non-Hispanic whites in the United States. The SES disparity in melanoma mortality in 2003-2007 relative to 1993-1997 increased by 51.7% in men and by 35.7% in women primarily because of substantial declines in the rates among the most-educated groups coupled with nonsignificant rate increases among men with the least education. This increase in the disparity score mirrors contemporaneously collected data (1988-1992 and 1998-2002) from the California Cancer Registry, in which persons living in low SES areas had the sharpest increases in melanoma incidence rates, especially for thicker tumors (2.01-4.00 mm).[27]

Reyes-Ortiz et al[6] speculated that low SES influenced melanoma survival in 3 separate but interconnected ways: biologic features of the tumor, stage or thickness at diagnosis, and host factors. For example, at the biologic level, nodular tumors, which are normally aggressive, have been found to be more frequent in persons who have the least education.[28] Lower SES is also associated with suboptimal knowledge and awareness of melanoma, inadequate health insurance, fewer primary providers, and lower rates of skin self-examination or physician screening.[29-31] In fact, one study found that only 16% of Americans with less than a high school diploma could identify melanoma as a type of skin cancer.[29] Areas with more dermatologists were associated with decreased overall melanoma mortality rates in 67 counties in Florida.[32] Other host factors correlated with SES, such as occupational status, may underlie differences in socioenvironmental or behavioral exposures that influence the risk of melanoma.[6]

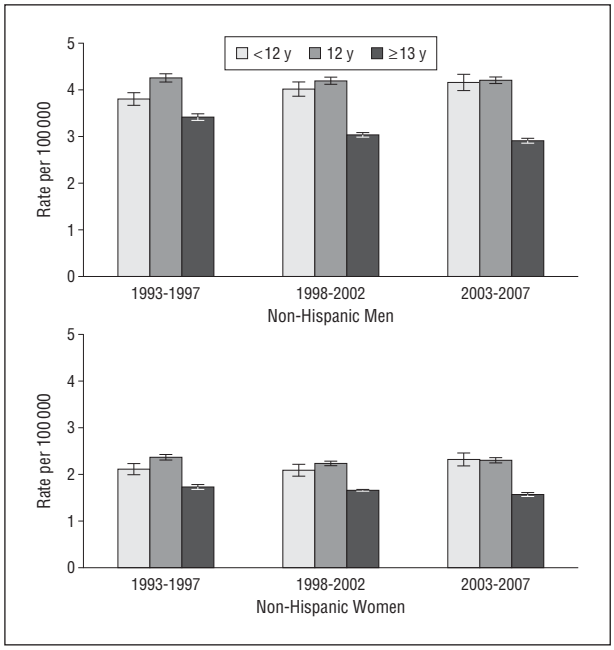


**Figure.** Changes in educational-level disparities in melanoma mortality rates over time by sex in non-Hispanic whites, aged 25 to 64 years, from 26 states, 1993-2007.

Our findings of higher melanoma mortality rates in populations with the least education using individual-level educational attainment are largely consistent with previous findings based on area-level SES that have ascertained tumor thickness and stage data alone.[4,10,33,34] Melanoma mortality is affected by prognostic factors, and improved prognostic characteristics associated with higher area-level SES likely underlie better melanoma mortality outcomes.[1,6,7,9] A recent population-based study using area-level SES status reported that patients with mela-



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noma residing in areas with higher education were less likely to have a poor prognosis (ie, a lower proportion of advanced stage and thicker tumors).[8] Similar evidence from population-based studies that measured individual-level social class is lacking; however, one clinic-based study showed an inverse association between individual-level SES and melanoma thickness.[35]

The strengths of our study include the use of mortality data from 26 states (and all US geographic areas) that encompass 45% of the total melanoma deaths in non-Hispanic whites from 1993 through 2007, with a sufficient number of deaths for more precise statistical estimates of death rates by sex and the use of individual-level SES instead of ecological measures of SES.[5] Also, although educational status information on death certificates was less complete for the remaining 24 states during this period, the age-adjusted rates for melanoma mortality in 2007 in these states demonstrated a similar inverse gradient by education among non-Hispanic whites (data not shown), thereby adding some support to the generalizability of the findings. A limitation of this analysis is that stage of disease and tumor thickness are not available on death certificates, and these factors are undoubtedly important in further study of SES and melanoma mortality. Another limitation is that death certificates capture only 1 indicator of socioeconomic position—educational attainment—and reliance on this indicator hinders the ability to examine the independent or mediating confounding effects of other SES indicators, such as occupation. Socioeconomic position is a multifactorial construct that reflects a combination of individual- and geographic area–level influences. Although it is optimal to consider multiple indexes of socioeconomic position in examining relationships with health outcomes,[36] educational attainment alone is frequently used as an indicator because of its availability, stability, and close association with other indicators of socioeconomic position for which data are not routinely available.[21]

In conclusion, the recent declines in melanoma mortality are largely confined to the more educated groups. An increasingly disproportionate burden of fatal melanoma among low SES populations calls for more vigilant primary and secondary prevention education campaigns directed to high-risk, low SES individuals and the physicians who care for them. For the control of melanoma, early recognition is the best means to ensure a favorable prognosis. Given the persistent inverse SES gradient and the widening melanoma mortality by educational attainment, current melanoma control programs need to develop and implement targeted strategies to high-risk subgroups of low SES.

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**Correspondence:** Vilma Cokkinides, PhD, Surveillance Research Program, American Cancer Society, 250 Williams St NW, Suite 600, Atlanta, GA 30303-1002 (vilma.cokkinides@cancer.org).
**Author Contributions:** Drs Cokkinides and Jemal had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Cokkinides and Jemal. *Acquisition of data:* Cokkinides. *Analysis and interpretation of data:* Cokkinides, Geller, and Jemal. *Drafting of the manuscript:* Cokkinides and Geller. *Critical revision of the manuscript for important intellectual content:* Cokkinides, Geller, and Jemal. *Statistical analysis:* Cokkinides, Geller, and Jemal. *Obtained funding:* Cokkinides. *Administrative, technical, and material support:* Cokkinides. *Study supervision:* Cokkinides and Jemal.
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## REFERENCES

1. Geller AC, Swetter SM, Brooks K, Demierre MF, Yaroch AL. Screening, early detection, and trends for melanoma: current status (2000-2006) and future directions. *J Am Acad Dermatol*. 2007;57(4):555-576.
2. Jemal A, Saraiya M, Patel P, et al. Recent trends in cutaneous melanoma incidence and death rates in the United States, 1992-2006. *J Am Acad Dermatol*. 2011;65(5)(suppl 1):S17-S25, e3.
3. Siegel R, Ward E, Brawley O, Jemal A. Cancer statistics, 2011: the impact of eliminating socioeconomic and racial disparities on premature cancer deaths. *CA Cancer J Clin*. 2011;61(4):212-236.
4. Kinsey T, Jemal A, Liff J, Ward E, Thun M. Secular trends in mortality from common cancers in the United States by educational attainment, 1993-2001. *J Natl Cancer Inst*. 2008;100(14):1003-1012.
5. Singh GK, Miller BA, Hankey BF, Edwards BK. *Area Socioeconomic Variations in U.S. Cancer Incidence, Mortality, Stage, Treatment, and Survival, 1975-1999*. Bethesda, MD: National Cancer Institute; 2003. NCI Cancer Surveillance Monograph Series, No 4; NIH publication 03-0000.
6. Reyes-Ortiz CA, Goodwin JS, Freeman JL, Kuo YF. Socioeconomic status and survival in older patients with melanoma. *J Am Geriatr Soc*. 2006;54(11):1758-1764.
7. Geller AC, Miller DR, Lew RA, Clapp RW, Wenneker MB, Koh HK. Cutaneous melanoma mortality among the socioeconomically disadvantaged in Massachusetts. *Am J Public Health*. 1996;86(4):538-543.
8. Eide MJ, Weinstock MA, Clark MA. Demographic and socioeconomic predictors of melanoma prognosis in the United States. *J Health Care Poor Underserved*. 2009;20(1):227-245.
9. Chang AE, Karnell LH, Menck HR; The American College of Surgeons Commission on Cancer and the American Cancer Society. The National Cancer Data Base report on cutaneous and noncutaneous melanoma: a summary of 84,836 cases from the past decade. *Cancer*. 1998;83(8):1664-1678.
10. Clegg LX, Reichman ME, Miller BA, et al. Impact of socioeconomic status on cancer incidence and stage at diagnosis: selected findings from the surveillance, epidemiology, and end results: National Longitudinal Mortality Study. *Cancer Causes Control*. 2009;20(4):417-435.
11. Koh HK. Cutaneous melanoma. *N Engl J Med*. 1991;325(3):171-182.
12. Schneider JS, Moore DH II, Mendelsohn ML. Screening program reduced melanoma mortality at the Lawrence Livermore National Laboratory, 1984 to 1996. *J Am Acad Dermatol*. 2008;58(5):741-749.
13. Berwick M, Begg CB, Fine JA, Roush GC, Barnhill RL. Screening for cutaneous melanoma by skin self-examination. *J Natl Cancer Inst*. 1996;88(1):17-23.
14. Youl PH, Baade PD, Parekh S, English D, Elwood M, Aitken JF. Association between melanoma thickness, clinical skin examination and socioeconomic status: results of a large population-based study. *Int J Cancer*. 2011;128(9):2158-2165.
15. World Health Organization. *International Statistical Classification of Disease and*



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*Related Health Problems: 9th Revision.* Geneva, Switzerland: World Health Organization; 1977.
16. World Health Organization. *International Statistical Classification of Disease and Related Health Problems: 10th Revision.* Geneva, Switzerland: World Health Organization; 1992.
17. Anderson RN, Miniño AM, Hoyert DL, Rosenberg HM. *Comparability of Cause of Death Between ICD–9 and ICD–10: Preliminary Estimates.* Vol 49. Hyattsville, MD: National Center for Health Statistics; 2001. National Vital Statistics Reports, No. 2.
18. Kung HC, Hoyert DL, Xu JQ, Murphy SL. *Deaths: Final Data for 2005.* Vol 56. Hyattsville, MD: National Center for Health Statistics; 2008. National Vital Statistics Reports, No. 10.
19. Shai D, Rosenwaike I. Errors in reporting education on the death certificate: some findings for older male decedents from New York State and Utah. *Am J Epidemiol.* 1989;130(1):188-192.
20. Sorlie PD, Johnson NJ. Validity of education information on the death certificate. *Epidemiology.* 1996;7(4):437-439.
21. Krieger N, Williams DR, Moss NE. Measuring social class in US public health research: concepts, methodologies, and guidelines. *Annu Rev Public Health.* 1997; 18:341-378.
22. US Department of Health and Human Services. *Technical Appendix from Vital Statistics of the United States: 1999 Mortality.* Hyattsville, MD: Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics; 2004.
23. Chiang C. *Standard Error of the Age-Adjusted Death Rate: Vital Statistics—Special Reports.* Washington, DC: National Center for Health Statistics, Public Health Service; 1961.
24. Benichou J, Gail MH. A delta-method for implicitly defined random variables. *Am Stat.* 1989;43(1):41-44.
25. Harper S, Lynch J. *Methods for Measuring Cancer Disparities: Using Data Relevant to Healthy People 2010 Cancer-Related Objectives.* Washington, DC: National Cancer Institute; 2006.
26. Mackenbach JP, Kunst AE. Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe. *Soc Sci Med.* 1997;44(6):757-771.
27. Linos E, Swetter SM, Cockburn MG, Colditz GA, Clarke CA. Increasing burden of melanoma in the United States. *J Invest Dermatol.* 2009;129(7):1666-1674.
28. Geller AC, Elwood M, Swetter SM, et al. Factors related to the presentation of thin and thick nodular melanoma from a population-based cancer registry in Queensland Australia. *Cancer.* 2009;115(6):1318-1327.
29. Miller DR, Geller AC, Wyatt SW, et al. Melanoma awareness and self-examination practices: results of a United States survey. *J Am Acad Dermatol.* 1996;34(6):962-970.
30. Saraiya M, Hall HI, Thompson T, et al. Skin cancer screening among U.S. adults from 1992, 1998, and 2000 National Health Interview Surveys. *Prev Med.* 2004; 39(2):308-314.
31. Pollitt RA, Clarke CA, Shema SJ, Swetter SM. California Medicaid enrollment and melanoma stage at diagnosis: a population-based study. *Am J Prev Med.* 2008; 35(1):7-13.
32. Van Durme DJ, Ullman R, Campbell RJ, Roetzheim R. Effects of physician supply on melanoma incidence and mortality in Florida. *South Med J.* 2003;96 (7):656-660.
33. Sauaia A, Dellavalle RP. Health care inequities: an introduction for dermatology providers. *Dermatol Clin.* 2009;27(2):103-107, v.
34. Kogevinas M, Porta M. Socioeconomic differences in cancer survival: a review of the evidence. *IARC Sci Publ.* 1997;138(138):177-206.
35. Baumert J, Plewig G, Volkenandt M, Schmid-Wendtner MH. Factors associated with a high tumour thickness in patients with melanoma. *Br J Dermatol.* 2007; 156(5):938-944.
36. Winkleby MA, Cubbin C. Influence of individual and neighbourhood socioeconomic status on mortality among black, Mexican-American, and white women and men in the United States. *J Epidemiol Community Health.* 2003;57(6): 444-452.

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1. Bhatia AC. The clinical image: archiving clinical processes and an entire specialty. *Arch Dermatol.* 2006;142(1):96-98.
2. Iverson C, Flanagin A, Fontanarosa PB, et al. *American Medical Association Manual of Style.* 9th ed. Baltimore, Md: Williams & Wilkins; 1998:141-142.



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