
Mortality Rates and Causes Among U.S. Physicians

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Content/Objectives: No recent national studies have been published on age at death and causes of death for U.S. physicians, and previous studies have had sampling limitations. Physician morbidity and mortality are of interest for several reasons, including the fact that physicians' personal health habits may affect their patient counseling practices.

Methods: Data in this report are from the National Occupational Mortality Surveillance database and are derived from deaths occurring in 28 states between 1984 and 1995. Occupation is coded according to the U.S. Bureau of the Census classification system, and cause of death is coded according to the ninth revision of the International Classification of Diseases.

Results: Among both U.S. white and black men, physicians were, on average, older when they died, (73.0 years for white and 68.7 for black) than were lawyers (72.3 and 62.0), all examined professionals (70.9 and 65.3), and all men (70.3 and 63.6). The top ten causes of death for white male physicians were essentially the same as those of the general population, although they were more likely to die from cerebrovascular disease, accidents, and suicide, and less likely to die from chronic obstructive pulmonary disease, pneumonia/influenza, or liver disease than were other professional white men.

Conclusions: These findings should help to erase the myth of the unhealthy doctor. At least for men, mortality outcomes suggest that physicians make healthy personal choices.

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Introduction

Although anecdotal evidence and conjecture abound regarding physician mortality and some causes of death, such as suicide, have been extensively explored, little is actually known about U.S. physicians' age at death or causes of death. Most prior work¹⁻³ has used small or unrepresentative samples or databases, compared only mortality difference among medical specialties, been applicable only to white male physicians, concentrated on specific causes of death, or has not removed the confounding of socioeconomic status or the healthy worker effect. In addition, little reliable recent comprehensive information has been published.

Physician mortality is of interest for several reasons. First, physicians' personal health habits may affect their patient counseling practices, and mortality reflects personal health choices.⁴ Second, given that mortality rates

may reflect lifestyle choices, it would be valuable for patients and others to know whether physicians' average age of death suggest that they have made healthful lifestyle choices. Finally, physicians' large amount of health-related education and high socioeconomic strata (as judged by education, income, and occupational level) should lead to lower relative mortality.⁵

Methods

We took data for this study from the National Occupational Mortality Surveillance database.⁶ This database is supported through the collaborative efforts of the National Institute for Occupational Safety and Health (NIOSH), the National Cancer Institute, the National Center for Health Statistics, and state health departments; it also contains information from death certificates from selected states. The death certificate records the usual industry and occupation of the decedent as reported by an informant, usually the next of kin. The state health departments code this information. We derived the data in this report from deaths occurring in 28 states between 1984 and 1995. Occupation is coded according to the U.S. Bureau of the Census classification system,⁷ and cause of death is coded according to the ninth revision of the International Classification of Diseases (ICD).⁸ States contributing data for at least 1 year are Alaska, Colorado, Georgia, Hawaii, Idaho, Indiana, Kansas, Kentucky, Maine, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Is-

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Table 1. Mean age at death (for men dying after age 25) for deaths occurring in 1984–1995

Race/gender group	Occupation	Number of deaths	Mean age at death
White men	Physicians	13,790	73.0
	Lawyers	14,389	72.3
	All professionals	214,744	70.9
	All deaths	3,386,475	70.3
Black men	Physicians	372	68.7
	Lawyers	258	62.0
	All professionals	14,059	65.3
	All deaths	443,585	63.6

land, South Carolina, Tennessee, Utah, Vermont, Washington, West Virginia, and Wisconsin. To reduce confounding by gender or race/ethnicity, all analyses were gender-specific, and race/ethnicity-specific. Because of small numbers, we excluded from these analyses individuals of race/ethnicity other than white or black.

The proportionate mortality ratio (PMR) analysis compares physicians with all decedents who had a professional occupation⁷ reported on the death certificate. A PMR compares the proportion of deaths due to a specific cause in a specific occupation with the proportion of that cause of death in all occupations in the analysis. We limited the analysis to those who were aged 18 to 90 years at death and whose race was reported as white or black. We calculated race- and sex-specific, indirectly age-adjusted PMRs using computer software developed at NIOSH. We computed 95% confidence interval (CI) based on the Poisson distribution⁹ if the observed number of deaths was 1000 or less; otherwise we used the Mantel-Haenszel chi-square.¹⁰ Proportionate mortality ratio analyses are normally used with this data set because no comparable population information exists to calculate rates. Because PMRs are proportionate ratios rather than rate ratios, the PMR will overestimate the relative risk if the overall death rate in an occupation is lower than that in the comparison group. To avoid this, we used a comparison population with similar educational requirements, which should have a similar overall death rate because mortality rates are related to socioeconomic status.⁵

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We calculated mean age at death for selected occupations (physicians, lawyers, all professionals as defined in the U.S. Census classification system, and all decedents in the database) for deaths occurring after age 25. We did so using a Statistical Analysis System (SAS) procedure.¹¹ The number of deaths in PMR analysis for all white men was 204,365; for white male physicians, $n=13,034$; for all black men, $n=13,558$; for black male physicians, $n=347$; for all white women, $n=211,533$; for white female physicians, $n=1,017$; for all black women, $n=22,667$; and for black female physicians $n=56$.

Results

Table 1 shows mean ages at death for white and black adult men from selected states between 1984 and 1995. Among both white and black men, physicians were older when they died when compared with others in the population, with all examined professionals, and specifically when compared with lawyers. Despite the recent burgeoning of women in medicine, data for women are not presented because the relatively few older women in the physician population falsely skew downward the mean age at physician death.

Table 2 compares white male physicians' proportionate mortality with that of all white male professionals for the top ten causes of death in the general popula-

Table 2. Top ten leading causes of death in the U.S. in 1990¹² and white male physicians' proportionate mortality ratios (compared with that of all white male professionals) for each cause^a

	# of deaths	Proportionate mortality ratio	95% CIs
Heart disease (390–398, 402, 404–429)	4657	98	96–101
Cancer (140–208)	3503	99	97–102
Cerebrovascular disease (430–438)	830	109	101–116
Accidents (E800–949)	497	125	114–136
COPD (490–496)	381	80	72–89
Pneumonia/influenza (480–487)	310	79	70–88
Diabetes mellitus (250)	247	99	87–112
Suicide (E950–959)	379	170	153–188
Liver disease (571)	112	80	66–97
HIV/AIDS (*042–*044)	102	83	67–100

^aInternational Classification of Diseases, 9th revision, codes in parentheses following each cause.⁸
COPD, chronic obstructive pulmonary disease; CI, confidence interval

Table 3. Occupational mortality surveillance data, 1984–1995: selected* sources of reduced and elevated mortality among white male physicians^a

	<i>n</i>	PMR	CI
Sources of elevated mortality			
Air/space transport accidents	52	328	245–430
Drug-related causes (including suicide)	142	326	275–385
Accidental poisonings	51	232	173–306
Hepatitis (excluding chronic nonviral)	31	178	121–253
Suicide/self-inflicted injury (including from drugs)	379	170	153–188
Malignant melanoma of the skin	100	125	101–152
Alzheimer's disease	209	122	106–139
Cancer of the pancreas	226	115	100–131
Cerebrovascular disease	830	109	101–116
Other (nonacute MI) ischemic heart disease	1747	109	105–113
Sources of reduced mortality			
Alcoholism and alcohol-related deaths	53	61	46–80
Cancer of rectum, rectosigmoid junction, anus	36	63	44–88
Bacterial diseases	76	75	59–94
Respiratory diseases (specifically including pneumonia, pneumoconioses, and COPD, including emphysema and other chronic airways obstruction)	828	80	74–85
Sources of elevated mortality			
Cancers of the trachea, bronchus, and lung	752	86	80–92
Digestive system diseases (specifically including cirrhosis and other hepatic disease)	360	90	81–99
Acute myocardial infarction	1682	93	89–97
Other (nonischemic) forms of heart disease	1088	92	87–97

^aInternational Classification of Diseases, 9th revision, codes available from the authors.

* $p < 0.05$ and $n > 20$.

COPD, chronic obstructive pulmonary disease; MI, myocardial infarction; PMR, proportionate mortality ratio; CI, confidence interval

tion in 1990.¹² Physicians' top ten causes of death were essentially the same as that of the general population. These white male physicians were more likely to die from cerebrovascular disease, accidents, and suicide, and less likely to die from chronic obstructive pulmonary disease, pneumonia/influenza, or liver disease than were other professional white men.

We also examined 241 specific ICD-9 codes and groups of codes for white and black physicians of both genders. White male physicians aged ≤ 90 were significantly ($p < 0.05$ and $n > 20$, Table 3) more likely than were other white male professionals to die from external causes of injury (e.g., air and space transport accidents, accidental poisonings, suicide and self-inflicted injury, and drug-related causes), hepatitis (excluding chronic nonviral), malignant melanoma of the skin, Alzheimer's disease, pancreatic cancer, cerebrovascular disease, and non-acute myocardial infarction ischemic heart disease. They were significantly less likely to die from alcoholism and alcohol-related deaths; cancer of the rectum, rectosigmoid junction, and anus; bacterial diseases; respiratory cancers and other respiratory diseases; digestive system diseases; and acute myocardial infarction and nonischemic heart disease. Black male physicians significantly differed

from other black male professionals only in having higher rates of diabetes mellitus-related deaths ($n = 21$ deaths, PMR = 180, CI = 112 to 275).

White female physicians aged ≤ 90 were significantly (again, $p < 0.05$ and $n > 20$) more likely to die than were other female professionals from cancers of the genital (noncervical) organs ($n = 52$ deaths, PMR = 136, CI = 101 to 178); drug-related deaths ($n = 21$ deaths, PMR = 255, CI = 158 to 390); and suicide and self-inflicted injury ($n = 37$, PMR = 238, CI = 168 to 328). Other lifestyle-related deaths of interest that did not meet our reporting criteria were diabetes mellitus ($n = 7$ deaths, PMR = 32, CI = 13 to 65) and myocardial infarction ($n = 78$ deaths, PMR = 82, CI = 65 to 102), which were marginally lower than for all female professionals. Black female physicians did not significantly differ at all from other black female professionals (likely due, at least in part, to small cell sizes).

Discussion

This is the first national study to examine age at death and causes of death for U.S. physicians. For both white and black male physicians, the average age at death was older than for other same-race professionals and non-

professionals in the U.S. population. Because the number of (still primarily male) physicians has increased dramatically in recent years (nearly doubling, for example, between 1970 and 1990),¹³ this finding is especially impressive. Such a trend makes available a relatively high proportion of young physicians who could die, increases the statistical contribution of younger physicians' deaths, and lowers the average age at death. Although black male physicians die older than do other blacks, they nonetheless die younger than do white male nonprofessionals. Although this may be a function of blacks' higher general mortality rates, it may also partly be due to the relatively recent increased admission of black men to medical schools other than historically black institutions,¹⁴ again increasing the statistical impact of younger black physicians' deaths. Although a gap remains between black and white male physicians' average ages at death, this gap is smaller than for any other professional stratification.

Because the increase in numbers of female physicians has been so substantial (the number of female medical school graduates increased nearly ninefold between 1950 and 1990), analyses of their average age at death is, as previously explained, not meaningful. This limits the data, as does our lack of knowledge about correlated occupational exposures and lifestyle choices, information about morbidity, a more meaningful designation than "race," diversity beyond black vs white, and knowledge about whether physician deaths may be reported differently than are others' deaths to protect colleagues' professional standing. Although the states in the study have a wide geographic distribution, a final limitation is that several states to which large numbers of older people tend to migrate, such as Florida and Arizona, are not included. This could result in an underestimation of the mean age at death. However, persons in other professions used for comparison purposes in the study would be expected to have similar patterns of migration, so that although the national mean age at death may differ from that found in the study, the comparisons made should be valid.

Our finding that physicians die older than do others is not unexpected, given the healthy worker effect,¹⁵ physicians' high socioeconomic status (SES),⁵ and prior data showing that physicians tend to make healthy choices.¹⁶⁻¹⁸ However, because we could compare physician data with that of other professionals, we could decrease the confounding nature of the healthy-worker effect and physicians' higher SES. Two possibilities remain: that healthier individuals choose medicine, or that individuals who have received medical training make healthier choices and therefore have lower mortality rates. Considerable evidence supports the latter possibility: Physicians have been found to smoke less,^{16,17} and female physicians have been shown to eat more fruits and vegetables and less fat, and to receive more health screening than do women in the general popu-

lation.¹⁶ The few prior studies known to directly examine U.S. physician mortality also found lower cumulative rates. Williams and colleagues¹ compared mortality data from the Harvard Medical School graduating classes between 1923-1924, 1932-1934, and 1942-1944 with other age-matched U.S. white men, and found lower cumulative mortality for the physicians. A study of physician graduates of University of Southern California and Loma Linda University found that both groups had standardized mortality ratios (SMRs) lower than that of age-matched white men (and the predominantly Adventist/vegetarian Loma Linda graduates had SMRs even lower than that of the USC graduates, 56 vs 76).² A 1969-1973 study of physician mortality reported to the American Medical Association Masterfile found SMRs of 75 for men and 84 for women physicians;¹⁹ a 1980-1988 study of young U.S. physicians whose deaths were reported in the *Journal of the American Medical Association* found SMRs less than one half that of the same-age general population.³ A 1971-1980 Finnish study also echoes our findings: doctors had lower comparative mortality figures than did other workers.²⁰ A large, comprehensive British survey examining deaths between 1962 and 1992 also found the SMRs of the physicians was less than one half that expected (SMR = 48, 95% CI 46 to 49).²¹

One may conclude from these overall mortality data that U.S. male physicians' death rates are typically lower than those of the general population. However, we found that when physicians do die, they tend to die of the same causes as do others: heart and cerebrovascular disease, and cancer. Historically, much attention has been paid to physician suicide rates and drug-related deaths. Like others, we also found that these rates were elevated. Although such deaths are tragic, disconcerting, and potentially preventable, they need to be kept in perspective. Suicide and drug-related deaths, respectively, represented 2.9% and 1.1% of white male, 3.6% and 2.1% of white female, 2.3% and 1.2% of black male, and 0% and 1.8% of black female physicians' deaths. Further, these percentages are misleadingly high, as physicians are younger than the general population (because of the growth in the total numbers of medical graduates over the past few decades)^{13,22} and therefore less likely to die from chronic diseases, leaving other diseases proportionately over-represented. Also of interest are white male physicians' significantly (PMR=61, 95% CI=46 to 80) lower rates of death coded as attributable to alcoholism. Although this may be an artifact of inappropriate reporting, it is consistent with our finding of lower mortality rates from chronic liver disease and cirrhosis, and with findings that although physicians are less likely to completely abstain from alcohol than are others,^{16,23} they may drink smaller amounts when they do consume.¹⁶ Physicians' lower lung cancer PMR is also highly consistent with physicians' helping to lead the smoking cessation move-

ment for the past several decades; recent smoking rates are <4% for both male and female physicians vs >25% for the general population.¹⁷

We offer a word of caution in interpreting the tables for those less familiar with PMRs. For example, we show in Tables 2 and 3 that physicians' PMR for stroke (cerebrovascular disease) is 109, 9% higher than that of all white male professionals. This does not mean that physicians are 9% more likely to die from stroke in a given year than are all professionals. It does mean that, among physicians who die in a given time period, 9% more of them die of stroke than would be expected if their causes of death were distributed as are other professionals' causes of death.

Our findings should help to erase the myth of the unhealthy doctor; physicians seem not to be the "ideal targets" for pathology and ill health that some have claimed.²⁴ Because physicians who have healthy personal habits are more likely to talk to their patients about prevention,^{4,25-28} our results should encourage those promoting prevention and give comfort to those who hope that their physicians practice what they preach.

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