Accuracy of Race Coding on American Indian Death Certificates, Montana 1996–1998

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SYNOPSIS

Objectives. The purpose of this study was to describe the consistency of coding of American Indians on Montana death certificates and to identify the characteristics of American Indians in Montana associated with consistent classification on death certificates.

Methods. The Billings Area Indian Health Service (IHS) patient registration file was linked with Montana Department of Health and Human Services death certificate files for 1996–1998.

Results. A total of 769 Montana residents who had died in 1996–1998 were matched to the IHS registration file. Of these decedents, 696 (91%) were consistently classified as American Indian on the death certificate. Seventy-two (99%) of the 73 decedents not classified as Indian were classified as white. American Indians living in counties on or near the seven Montana reservations were more likely to be consistently classified than Indians living in other counties (95% vs. 70%); those with less than 12 years of education (93% vs. 88%) were more likely to be consistently classified than those with 12 or more years of education. Decedents whose cause of death was suicide were less likely than those with other causes of death to be consistently classified (72% vs. 95%). In contrast, a higher percentage of those with an alcohol-related cause of death than of those with other causes of death were consistently classified, although this difference was not statistically significant.

Conclusions. The mortality rates for Montana American Indians are underestimated overall, and are differentially under- and overestimated for selected conditions.

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INTRODUCTION

Mortality rates are important indicators of the health status of a population. Death records and other vital status information are important for surveillance but are not always accurate.[1] This information is often used to identify priority areas for funding disease control and prevention programs, as well as research to improve prevention efforts. To estimate mortality rates by race, accurate and consistent race classification is crucial for both numerator and denominator data. Relatively few national[1–3] or regional[4–10] studies have been conducted to assess the accuracy and consistency of American Indian/Alaska Native classification on death certificates in the U.S.

In 2000, the Montana Department of Public Health and Human Services collaborated with the Billings Area office of the Indian Health Service (IHS) to assess the consistency of American Indian classification on Montana death certificates by linking IHS registration data with Montana death certificate files. The objectives of this study were to describe the extent to which American Indians were correctly identified as such on death certificates and to identify the characteristics of Montana American Indians associated with accurate race classification on death certificates.

METHODS

The Billings Area IHS provides health care to federally recognized American Indian tribes in Montana and Wyoming. Each of the 10 tribes in Montana and Wyoming establishes criteria for tribal membership. Information on users of IHS services is maintained and monitored through an electronic patient registration system, which records demographic information, tribal affiliation, and community of residence. The Billings Area IHS has maintained an active registration file since the early 1980s, which in 2000 included 59,255 individuals living in the state of Montana.

In November 2000, the Billings Area IHS patient registration file was linked with Montana Department of Health and Human Services death certificate files for 1996 through 1998. The linkage was conducted by matching Social Security numbers. A merged data file was then created with death record information (age at death, sex, race, county of residence, year of death, marital status, years of education, and underlying cause of death) and a field with the corrected American Indian classification based on IHS registration data.

Using methods similar to those described by Frost and Shy,[8] dummy variables were created for specific underlying causes of death based on the International Classification of Diseases, 9th Revision. These included cancer (140–239), diabetes (250), ischemic heart disease (410–414), cerebrovascular disease (430–438), motor vehicle accident (810–825), other accident (830–912), suicide (950–959, except 950.9), homicide and undetermined accident, poisoning-related suicide or homicide (960–988, except 980.9), alcohol-related conditions (291, 303, 571.0–571.3, 860, 950.9, 980.9), and pneumonia and influenza (480–487).

Data were analyzed using SPSS Version 8.0 software.[11] Comparisons were made to assess the proportion of American Indian decedents consistently coded as American Indian on death records for each of the three study years. Pearson chi-square tests were used to assess associations between consistent classification of American Indians and selected demographic variables and selected underlying causes of death. To compare the geographic distributions of people consistently and inconsistently classified as American Indian race, those whose county of residence at death was a site of or contiguous with one of Montana's seven reservations were classified as residing on or near a reservation.

RESULTS

The death records of 769 Montana residents who had died from 1996 to 1998 had matches in the Billings Area IHS registration file (see Table 1). Of these deaths, 696 (91%) were consistently classified as American Indian on the death certificate. Of the 73 decedents classified as non-Indian, 72 (99%) were classified as white and 1 (1%) as unknown. The percent of deaths consistently classified with regard to American Indian race increased slightly from 1996 (89%) to 1998 (92%), but this difference was not statistically significant.

Sex, age, and marital status were not associated with consistent classification of American Indians (Table 2). American Indians living in counties on or near the seven Montana reservations (95% vs. 78%) were more likely to be classified consistently than Indians living in other counties, and those with fewer than twelve years of education (93% vs. 88%) were more likely to be classified correctly than those with 12 or more years of education.

Individuals for whom the cause of death was listed as suicide were less likely to be consistently coded as American Indian than individuals with other underlying causes of death (72% vs. 91%, $p<0.05$) (see Table 3). Conversely, a higher percentage of those for whom an alcohol-related cause of death was listed than of those with other underlying causes of death (98% vs. 90%, $p<0.08$) were consistently classified as American Indian. No statistically significant differences were

Table 1. Racial classification of American Indian decedents identified through linkage of Montana death certificates with Billings Area Indian Health Service (IHS) enrollment registry, by year, 1996–1998

	Deaths matched to IHS enrollment registry	Race listed on death certificate					
		American Indian		White		Unknown	
Year of death	Number	Number	Percent	Number	Percent	Number	Percent
1996	249	222	89	26	10	1	<1
1997	261	237	91	24	9		
1998	259	237	92	22	8		
Total	769	696	91	72	9	1	<1

found for cancer, diabetes, or other causes of death in terms of likelihood of consistent classification as American Indian.

DISCUSSION

Inconsistent and inaccurate race coding for American Indians has been documented for birth records,[7–10] cancer registry records,[12–14] Medicare billing files,[15,16] end-stage renal disease dialysis records,[17] and injury,[18] as well as death records.[1–10] This collaborative project between the Billings Area IHS and the Montana Department of Public Health and Human Services identified a number of issues regarding the accuracy of Montana death records in terms of consistent classification of American Indians. Approximately 9% of American Indians who died in 1996–1998 were inconsistently classified on death records. This is somewhat higher than the 6% misclassification rate found previously for the Billings Area for 1986–1988.[4] In addition, the findings differ in some ways from those found in a comparison of IHS registration files with death records in Washington State. Frost et al. reported a rate of inconsistent classification of 13% for 1985–1990.[8] The rate of inconsistent classification increased from 10% in 1985 to 16% in 1990. The authors found that younger age at death (<40 years), underlying cause of death being alcohol-related, and underlying cause of death not being cancer were associated with consistent classification of American Indian race on the death

Table 2. Consistent classification of American Indian decedents identified through linkage of Montana death certificates with Billings Area Indian Health Service (IHS) enrollment registry, by demographic characteristics, 1996–1998

Characteristic recorded on death certificate	Number	Consistently classified	
		Number	Percent
Sex			
Female	326	296	91
Male	443	400	90
Age at death			
<40 years	168	152	91
≥40 years	601	544	91
County of residence			
On or near reservation	564	537	95[a]
Not on or near reservation	205	159	78
Marital status			
Married	183	168	92
Other	586	528	90
Years of education			
<12	379	352	93[a]
≥12	385	340	88

[a] $p<0.05$

Table 3. Consistent classification of American Indian decedents identified through linkage of Montana death certificates with Billings Area Indian Health Service (IHS) enrollment registry, by underlying cause of death, 1996–1998

Characteristic recorded on death certificate	*Number*	*Consistently classified*	
		Number	*Percent*
Cancer			
Yes	150	135	90
No	619	561	91
Ischemic heart disease			
Yes	55	50	91
No	714	646	91
Motor vehicle accident			
Yes	87	82	94
No	682	614	90
Other accidents			
Yes	30	26	87
No	739	670	91
Suicide			
Yes	25	18	72[a]
No	744	678	91
Homicide			
Yes	17	17	100
No	752	679	90
Alcohol-related cause			
Yes	42	41	98[b]
No	727	655	90
Cerebrovascular disease			
Yes	38	33	87
No	731	663	91
Diabetes			
Yes	48	46	96
No	721	650	90
Pneumonia and influenza			
Yes	23	22	96
No	746	674	90

NOTE: $p>0.10$ except as indicated

[a] $p\leq 0.006$

[b] $p=0.08$

record. They found no association between consistent classification and suicide or other underlying causes of death.

The findings suggest that the death rates for American Indians in Montana are underestimated overall, particularly the rate of suicide-related deaths, but that alcohol-related deaths may be less likely to be incorrectly coded for race. The findings also suggest that Montana American Indians who do not reside on or near reservations are more likely than those who live on or near reservations to be misclassified by race at the time of death. This suggests that currently available mortality estimates for American Indians who do not reside on or near reservations may be systematically lower than the actual death rate for this group.

At least three limitations may have affected our study. First, if we had used additional linking variables, we might have linked more cases between the two datasets. For example, we might have attempted a probabilistic linkage strategy that included name, gender, and date of birth as variables in addition to Social Security number. We intend to employ this expanded linkage strategy in the future. When we do, we may be able to determine if cases linked only by Social Secu-

rity number differ from cases linked by the expanded strategy. Because 97% of the names in the IHS registration file and 97% of the names in the death record file had accompanying Social Security numbers, we do not feel that this limitation had a substantial effect on the results reported here.

Second, the Montana results are not generalizable to other states or regions of the country. The proportion of Indians living on or near reservations in Montana (72%) is greater than that in many states. States in which a lower proportion of the Indian population lives on or near reservations are likely to have higher rates of inconsistent classification on death records for Indians. In addition, previous studies have documented wide variations in consistency of race coding from one region of the country to another.[4] Thus, it is important to keep these limitations in mind when evaluating comparisons of mortality rates of Indians vs. non-Indians regionally or between Indian populations in the U.S.

Third, the method reported here did not identify all Indian deaths in Montana because not all Indians were registered with the IHS. However, in the 2000 Census, 55,936 Montana residents reported their primary race as "American Indian or Alaska Native."[19] At the time of the Census, there were 59,255 Indians registered with the Billings Area IHS (according to data provided by present author DH), which is somewhat larger than the Census-estimated Indian population. Therefore, we are likely to have captured almost all, if not all, Indian residents of Montana.

How might the consistency of race coding on death records for American Indians be improved? Both state and IHS officials could encourage coroners and medical examiners to ask next-of-kin whenever possible to verify the deceased's racial identification on death records. While this strategy has been suggested previously,[5] we are unaware of evidence that it has affected the consistency of race coding for Indian deaths. The challenge to achieve consistency between numerator event data and denominator population data is likely to grow as an increasing number of people describe their ancestry by specifying more than one race. In 1990 there were more than three times as many individuals reporting some American Indian ancestry as there were individuals who identified American Indian as their primary race.[20,21] To the extent that discrepancies between numerator and denominator datasets persist, mortality rates reported for Indians need to be interpreted with caution. Our findings add to the evidence that mortality rates for Indians in the U.S. underestimate the actual mortality experience of Indian people.

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