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The Reliability of Racial Classifications in Hospital Discharge Abstract Data

Jan Blustein, MD, PhD

Introduction

Numerous studies have shown that Black Americans receive fewer medical services than their White counterparts.[1-8] Much of that research has been based on data abstracted from hospital medical records and reported to administrative agencies. However, there have been no published investigations of the reliability or validity of patient racial classifications in hospital discharge data sets. This is remarkable for two reasons. First, several studies have cast doubt on the reliability of the clinical information in those data sources, raising broader questions about the overall quality of the measures therein.[9-11] Second, critics have increasingly questioned the validity of the racial classifications in secondary data sources.[12]

This report of the reliability of racial classifications in a hospital discharge data source examines the concordance between assigned classifications during successive admissions for patients admitted twice. It describes the likely implications of misclassification for bias in previous reports of interracial differences in service

use. Finally, it describes some difficulties that arise in validating measures of race.

Methods

Source of the Data

The data source for the study was the Statewide Planning and Research Cooperative System (SPARCS), a hospital discharge abstract database maintained by the New York State Department of Health. It includes demographic, clinical, and billing information and is based on reports from individual hospitals. For each patient who is discharged, hospitals cull information from various sources. For example, clinical information is ab-

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ABSTRACT

Many studies demonstrating an association between race and the use of medical services have used hospital discharge abstract data. The quality of the measures of race in such data sources has heretofore been unexplored. Hospital discharge abstract data from New York State were used to identify 767 cardiac patients who had been admitted to a hospital twice. Racial classifications during the two admissions were concordant 93.7% of the time. Kappa was .89 for Blacks, .72 for Whites, and .43 for all other racial groups. Evidence suggests that the misclassification of race in hospital discharge abstract data is nondifferential; racial discrepancies in access to medical services are thus probably even greater than those previously reported. (*Am J Public Health.* 1994;84: 1018–1021)

stracted from patient medical records by trained record abstractors.

Interestingly, demographic classifications such as gender and race are not based on information abstracted from medical records. Rather, according to various knowledgeable sources, they are based on entries recorded by admitting clerks at the time that patients enter the hospital (oral communication, R. Davis, New York State Department of Health, September 1992; oral communication, B. Pavelcheck, Hospital Association of New York State, February 1994). According to those sources, race is generally assigned on the basis of encounters with patients or their proxies. There are no formal rules for assigning race to a patient. Because of the sensitive nature of racial identity, however, classification is often made by clerks' observations rather than by direct questioning.

Such procedures are apparently common in other states in which hospital discharge data are collected. For example, according to a document released by the California State Department of Health, racial classifications recorded by clerical staff at the time of admission are also generally the source of the race variable in that state's hospital discharge abstract system.[13] However, "classification of race/ethnicity is a difficult task. Hospital personnel [are] often unsure how to classify patients ... [but are] reluctant to ask the patient directly."[13] In those cases, admitting clerks assign race as best they can.

In New York State, demographic, clinical, and billing data from each admission are merged to create the electronic database. For individuals admitted to a hospital more than once, records of those admissions can be linked by matching patient insurance billing numbers.[14] In this study, discharges were linked (i.e., ascribed to the same individual) if they had the identical billing number and reflected the same gender and date of birth.

Subjects

The 9576 subjects were part of a prior study of patients admitted to the hospital with a principal diagnosis of myocardial infarction in 1986.[15,16] During that index admission, there were substantial racial differences in cardiac service use (J. Blustein, unpublished data, June 1993). Specifically, patients classified as White were more than 60% more likely to receive a high-technology cardiac service (cardiac catheterization, angioplasty, or

bypass surgery) than were patients classified as Black (odds ratio [OR] = 1.69, 95% confidence interval [CI] = 1.14, 2.50).

For various reasons, some of the patients were readmitted to a hospital during the subsequent 6-month period (hereinafter termed a "subsequent admission"). Subjects were selected for further analysis if they had been readmitted to a hospital other than the index hospital during a subsequent admission. Of the 9576 patients, 2487 were subsequently admitted; of those individuals, 767 were readmitted to a different hospital. None were admitted to three different hospitals.

Classification of Race

Race is classified as Asian, Black, American Indian/Eskimo/Aleut, "other," and White in the Statewide Planning and Research Cooperative System data set, consistent with federal guidelines.[17] A small number of patients are listed as "unknown." Because researchers using hospital discharge data have typically combined Asian, American Indian/Eskimo/Aleut, other, and unknown into the category "all other," the classifications Black, White, and all other were used for some portions of the analyses reported here.

Analytic Approach

Standard measures of crude concordance and kappa, the interrater reliability coefficient,[18] were used to calculate the extent of agreement between racial classifications during the index and subsequent admissions.

Results

In Table 1, racial classifications of the 767 subjects who were admitted to two different hospitals are compared with those of patients who were not admitted to two different hospitals. The two groups did not differ with respect to racial classification during the index admission (χ^2 = 6.2, 5 df, P = .28).

As shown in Table 2, racial classifications during the index and subsequent admissions were concordant in 719 of the 767 subjects (93.7%). The resultant percentage agreement and kappa for each racial classification are presented in Table 3. The reliability coefficients were .89 (95% CI = .82, .96) for Black race and .72 (95% CI = .64, .80) for White race. For other categories, reliability was even less consistent. When the other categories

TABLE 1—Racial Classification of Patients during Their Index Admissions, by Whether They were Admitted to Two Different Hospitals (n = 9576)

| | Admitted to Two Different Hospitals | |
	Yes (n = 767), % (No.)	No (n = 8809), % (No.)
Black	6.4 (49)	6.3 (556)
White	89.0 (683)	88.6 (7806)
Other	3.9 (30)	4.1 (364)
Asian	0.3 (2)	0.5 (47)
American Indian	0.3 (2)	0.1 (5)
Unknown	0.1 (1)	0.4 (41)

(other, Asian, American Indian, unknown) were combined, the interrater reliability coefficient was .43 (95% CI = .28, .58). Assessment of the reliability of the individual non-Black, non-White categories was limited by small sample sizes.

Finally, as shown in Table 4, the use of cardiac services during the index admission was not associated with concordance between racial classifications during the index and subsequent admissions (χ^2 = 1.48, 1 df, P = .22).

Discussion

This study of hospital discharge abstract data revealed a substantial lack of reliability for racial classifications, particularly for non-Black, non-White categories. This pattern of results is consistent with previous reports comparing birth and death records[19] and with studies of discrepancies between self- and observer-classified race.[20]

As described above, the data analyzed here emanate from a study in which White cardiac patients were estimated to be 69% more likely than their Black counterparts to receive a high-technology cardiac service. The present findings suggest that this estimate of the effect of race may have been biased by measurement error. Is it possible to assess the extent of that bias? More generally, are estimates of the impact of race based on hospital discharge data sets likely to overstate or understate true racial disparities in access to services?

If misclassification of patient race is nondifferential (i.e., if the tendency to

TABLE 2—Racial Classification during Index and Subsequent Admissions for Patients Admitted to Two Different Hospitals (n = 767)

Classification during Index Admission	Classification during Subsequent Admission						
	Black	White	Other	Asian	American Indian	Unknown	Total
Black	41	5	3	0	0	0	49
White	0	665	17	1	0	0	683
Other	1	15	11	2	0	1	30
Asian	0	1	0	1	0	0	2
American Indian	0	1	0	0	1	0	2
Unknown	0	0	1	0	0	0	1
Total	42	687	32	4	1	1	767

TABLE 3—Percentage of Concordance and Interrater Reliability (Kappa) of Reported Racial Classifications during Index and Subsequent Admissions (n = 767)

Racial Classification	Concordance, %	Kappa	95% Confidence Interval
Black (n = 49)	99	.89	.82, .96
White (n = 683)	95	.72	.64, .80
All other (n = 35)	95	.43	.28, .58
Other (n = 30)	95	.32	.17, .47
Asian (n = 2)	99	.33	−.16, .82
American Indian (n = 2)	99	.66	0.4, 1.00
Unknown (n = 1)	99	−.00	.00, .00

Note. Percentage of concordance refers to the proportion of the 767 cases in which the two successive classifications were concordant for the dichotomy in question. For example, in 99% of the cases, patients were concordantly classified according to the dichotomy Black/non-Black. "All other" is an aggregated classification, including patients classified as other, Asian, American Indian, and unknown (see text).

TABLE 4—Concordance in Racial Classification and Rate of Use of Cardiac Services for Patients Admitted to Two Different Hospitals (n = 767)

	Race Classified Concordantly	
	Yes (n=719), % (No.)	No (n=48), % (No.)
Received cardiac services	12.1 (87)	6.3 (3)
Did not receive cardiac services	87.9 (632)	93.8 (45)

misclassify a patient as White or Black is independent of the likelihood that that patient will receive services), then the estimated racial discrepancy will be biased toward the null value.[21] Real discrep-ancies in service use will be greater than those reported.

There are several reasons to believe that misclassification of patient race is non-differential with respect to service use. First, racial classifications are as-signed by hospital clerks at the time of admission, and, in most cases, decisions about providing services are made after admission. In those cases, misclassifica-tion is necessarily nondifferential. It is noteworthy that patients admitted emer-gently—including most patients admitted with myocardial infarction—will meet this description. In other cases, patients are electively admitted in order to receive services. Although those patients (or their proxies) may announce the intended treatment to the admitting clerk, it seems rather unlikely that clerks would classify patient race on that basis. Finally, the results reported in Table 4 are consistent with misclassification being nondifferen-tial.

Recently, several investigators have used validation studies to "correct" effect estimates based on risk factors measured with known error.[22–24] However, it is not clear how these methods could be useful in correcting reported effects of race. Determining the sensitivity and specificity of racial classifications would require that there be some "gold standard" for race. As has been emphasized by many com-mentators, however, no such standard exists. Race is not a biological construct; rather, racial classifications are "based on socially defined phenotypic traits as seen through the filter of individual and social perspective."[25]

In explaining racial differences in cardiac service use, commentators have proposed two competing theories. One theory is that White patients may "prefer" more services than do Black patients.[1,2,4,8] The other is that physicians' treatment decisions are influenced—either con-sciously or unconsciously—by patient race.[1,2,4,8] These competing theories sug-gest two different validation sources. If the first theory is correct, then patients' self-categorization of race would probably be the logical gold standard. On the other hand, if the second theory is true, then physicians' perceptions of patients' race would be more appropriate.

In spring 1993, the working group from a conference convened by the Centers for Disease Control and Preven-tion recommended that, in all public health surveillance data sources, "race and ethnicity status should be self-identified using a multiple-choice option."[12] Implementation of this recom-mendation might well enhance the unifor-mity of the data collected by various agencies. However, if the second of the above-cited theories is true, access to services may depend less on self-catego-rized race than on the racial classifications and perceptions of others.

In conclusion, categorization of race in hospital discharge data exhibits a pattern of measurement error similar to that previously reported in other data sources used for public health surveil-lance. This misclassification is probably nondifferential; thus prior reports of the impact of race on service use are probably biased downward. However, because race is subjectively determined, it is not clear how to correct these misestimates of the impact of race on the use of medical services. ☐

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