Racial and Ethnic Differences in Hospitalization Rates Among Aged Medicare Beneficiaries, 1998

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Efforts to study racial variations in access to health care for minorities other than black persons have been hampered by a paucity of data. The Health Care Financing Administration (HCFA) has made efforts in the past few years to enhance the racial codes on the Medicare enrollment files to include Hispanic, Asian American, and Native American designations. This study examines hospitalization rates by these more detailed racial/ethnic groupings. The results show black, Hispanic, and Native American aged beneficiaries compared with white beneficiaries have higher hospitalization rates. Asian American beneficiaries have lower hospitalization rates. Rates of revascularization—coronary artery bypass graft (CABG) and percutaneous transluminal coronary angioplasty (PTCA)—are lower for black, Hispanic, and Native American beneficiaries compared with white beneficiaries, while rates for Asian Americans are similar to rates for white beneficiaries.

INTRODUCTION

Stimulated by President Clinton's initiative to eliminate racial and ethnic disparities in health, HCFA is involved in several efforts to strengthen the base of knowledge about health and health care of Medicare and Medicaid beneficiaries. Guiding these efforts are the national goals established to eliminate health disparities in six areas by 2010: infant mortality; cancer screening and management; cardiovascular disease; diabetes; human immunodeficiency virus/acquired immunodeficiency syndrome rates; and child and adult immunization levels. Numerous studies have examined racial and ethnic differences in the health, disability, and mortality trends of older Americans as well as the health care they receive (Mayberry et al., 1999; Elo and Preston, 1997; Manton and Stallard, 1997; Escarce and Puffer, 1997; Smith and Kington, 1997; Gornick et al., 1996). The reasons for health disparities among racial and ethnic groups are not well understood. It is unclear why certain minority groups are disproportionately affected by particular medical conditions or why they are less likely to receive diagnostic and surgical interventions for many medical conditions.

Many studies have documented that black persons are significantly less likely than white persons to receive diagnostic and surgical interventions for cardiovascular disease and stroke (Gornick, 2000a; 2000b). A recent study on medical treatment for ischemic heart disease (IHD) shows that race was an important predictor of whether Medicare patients received reperfusion treatment (Canto et al., 2000). In this study, the probability of receiving treatment was higher among white males (56 percent) and white females (56 percent) than black males (50 percent) and black females (44 percent).

Generally, the literature shows disparities in prevention, diagnosis, treatment, and outcomes of major therapeutic inter-

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ventions between white and minority groups. The literature shows that black persons have higher death rates from cardiovascular disease, cancer, and cerebrovascular disease than white or Hispanic persons, suggesting that black persons may be less likely than white persons to receive needed diagnostic tests and major therapeutical interventions (Mayberry et al., 1999). Studies have focused primarily on differences in access to medical care and differences in health outcomes between black persons and white persons. However, fewer studies have been able to examine health disparities among Hispanics, Asians, and Native-Americans.

CLASSIFICATIONS FOR RACIAL/ETHNIC GROUPS

Research efforts to monitor disparities in health and health care use among racial and ethnic groups are likely to rely on large administrative databases, including HCFA's claims and enrollment database because the sample sizes of household surveys are typically too small. Small household surveys are likely to have low representation of minority groups other than black persons, which makes it difficult to produce reliable population estimates of health care use for these groups. As a result of recent expansions in the race coding in the Medicare enrollment database (EDB), it is now possible to explore disparities in health care access, utilization, and outcomes among minority groups other than black persons.

Arday et al. (2000) provide an assessment of the efforts made to expand the information available about race and ethnicity of Medicare enrollees, following up on a previous study that examined the validity of Medicare's race coding (Lauderdale and Goldberg 1996). They note that the effort was incomplete and suggest that HCFA's racial and ethnic categorizations are still likely to misclassify many minority beneficiaries. In their study Arday et al. (2000) linked data from the Medicare Current Beneficiary Survey (MCBS) with HCFA's enrollment database before and after the 1997 effort to update the EDB. The primary focus of their study was to estimate the completeness of the effort to expand the racial and ethnic identifiers. They found that HCFA's enrollment database is likely to misclassify many minority beneficiaries as either white or other persons, thereby under-representing the number of minority beneficiaries. The study highlights problems in comparability of race reporting from the two sources. A serious limitation is that the Social Security Administration's (SSA's) racial coding (the original source of HCFA's EDB race data) treats Hispanic as a race, not an ethnicity. In contrast, the MCBS and the U.S. Census Bureau collect race and ethnicity data separately. Their study raises questions about the uses to which the expanded race codes designations can be effectively used. For example, they show that the current HCFA data cannot be used for counting the number of persons in each minority group. However, our study indicates that current HCFA data can be useful for estimates of utilization rates and studies of access to care, and finds no evidence that such studies would provide biased utilization estimates.

This article is the first attempt to explore the usefulness of the expanded racial/ethnic coding by aged persons enrolled in Medicare for calculating hospitalization rates for the various racial/ethnic groups. Our approach compares Medicare enrollment counts with U.S. Census Bureau population estimates and uses National Center for Health Statistics (NCHS) mortality rates as a base of comparison for the Medicare hospitalization rates. It is hoped that an understanding of the use of health care ser-

vices by different racial and ethnic groups will help to further determine the extent to which disparities in access to care exist.

DATA AND METHODS

Data for this study were taken from the 1990 U.S. Census, NCHS, and HCFA administrative databases for calendar years 1997 and 1998. HCFA claims and use files for 1998 were used to estimate hospitalization rates and use of medical procedures by different racial/ethnic groups. NCHS data were used as the source for all cause mortality and mortality by leading causes of death among the elderly including heart disease, cancer, stroke, and chronic obstructive pulmonary diseases (COPD). When rates of health care utilization are examined, this study excludes aged Medicare beneficiaries who were enrolled in health maintenance organizations (HMOs) because HCFA does not receive complete information on inpatient care services for HMO enrollees.

HCFA DATA ON RACE /ETHNICITY

The HCFA EDB contains current and historical Medicare enrollment and entitlement information for all beneficiaries ever enrolled in the health insurance (HI) or supplemental medical insurance (SMI) Medicare programs. It is the primary source of information on demographic characteristics and geographic distribution for the entire Medicare population. The information contained in the EDB comes from the entitlement and eligibility process performed for HCFA by SSA. The basic source of race/ethnicity of a beneficiary comes from the SSA entitlement records.

Prior to 1982, SSA used only three race categories: White, Black, and Other. Since 1982, SSA has used the following categories: White; Black, Hispanic, Asian, Asian-American or Pacific Islander, North American Indian or Alaskan Native, and Other. Due to the incompleteness of race recording in the SSA database, HCFA conducted a mail survey of beneficiaries to enhance the race coding. In May 1997, HCFA sent out mail surveys to 2.1 million beneficiaries to obtain more accurate race information. The survey was sent to all persons whose race code on the EDB was "unknown" or "other." In addition, surveys were sent to all persons with a Hispanic surname or country of birth. The overall response rate was 40 percent. Among the 858,520 beneficiaries who responded to the survey, 41 percent identified themselves as Hispanic, 30 percent white, 24 percent Asian, 2 percent black, and 2 percent as Native-American. As a result of HCFA efforts, the number of persons with a race code of "other" or "unknown" has decreased from 978,000 in 1993 to 473,000 in 1997.

U.S. Census Data

Census data are the U.S. population estimates by age, sex, race, and Hispanic origin. The census-based race distribution of the U.S. Census has been conformed to be consistent with the definition of race specified in Office of Management and Budget Directive 15. The U.S. Census Bureau uses estimation techniques to assign race to persons when data are unavailable. "In the 1990 census, a substantial number of people (roughly 9.8 million) did not specify a racial group that could be classified as any of the White, Black, American-Indian, Eskimo, Aleut, Asian, or Pacific Islander categories on the census form. A large majority of these respondents were of Hispanic origin, based on their response to a separate Hispanic origin question on the form. Most wrote in "Hispanic" or their Hispanic origin type (such as "Mexican" or "Puerto Rican") as their race. People of

unspecified race were allocated to one of the four tabulated racial groups (White; Black; American Indian, Eskimo, and Aleut; Asian and Pacific Islander) based on their response to the Hispanic origin question (U.S. Census Bureau, 1999).

Medicare race/ethnic coding does not include a separate field to capture Hispanic ethnicity. Therefore, Hispanic is considered a race designation. Consequently, U.S Census data were arrayed to be consistent with the Medicare race/ethnic designations. The data reported in this article are for non-Hispanic white persons, non-Hispanic black persons, Hispanics, non-Hispanic Asians, and non-Hispanic Native-Americans.

FINDINGS

Medicare Enrollment Compared With U.S. Census

To estimate the completeness of the Medicare race coding, Medicare enrollment counts were compared with U.S. Census estimates. A comparison of U.S. Census estimates of the United States population in 1998 for persons age 65 or over with Medicare Part A enrollment for the aged population for 1998 are shown in Table 1. For each race group, counts of persons are shown by sex and three age groups. Overall, Medicare enrollment (32.4 million) is about 95 percent of the U.S. Census estimate (34.3 million). This is to be expected because not everyone age 65 or over is entitled to Medicare and not all Medicare beneficiaries are enrolled in Part A. Medicare enrollment, as a percent of the U.S. Census, ranges from a low of 92 percent for males age 85 or over to a high of 97 percent for females age 85 or over.

For white persons, the U.S. Census estimates and Medicare enrollment counts are nearly identical. For black persons, the Medicare enrollment counts are 91 percent of the U.S. Census estimates. As expected, the completeness of the Medicare enrollment for the newer race designations is considerably lower than for either white or black groupings. For Asians, the Medicare enrollment of roughly 307,000 is only 42 percent of the 726,000 from U.S. Census (45 percent for males and 40 percent for females). This ranges from a low of 36 percent for females age 65 to 74 to a high of 57 percent for males age 75 to 84. Native-Americans have the lowest ratio of Medicare enrollment to U.S. Census estimates, 24 percent overall (26 percent for males, 23 percent for females). For both males and females, the ratio is under 0.20 for persons age 85 or over. Finally, for Hispanic persons, the ratio of Medicare enrollment to U.S. Census estimates is 0.29. As might be expected, given the use of surnames in the mailing process, the ratio is lower for females (0.27) than for males (0.30). However, sex differences in completeness for Hispanics are not much greater than those observed for Native-Americans and Asians.

In summary, the Medicare enumeration of the additional race groupings appears to have identified just under one-half of the aged Asians, about one-quarter of the aged Native-Americans, and just under one-third of aged Hispanics. In terms of age and sex, the enumeration seems to be biased toward a younger population and a heavier concentration of males. These enumeration rates are similar to, but somewhat lower than, the sensitivity figures found by Arday et al. (2000).

Mortality Rates by Race/Ethnicity

Table 2 presents 1997 data[1] from the NCHS on deaths per 100,000 for the population age 65 or over by race and ethnicity

[1] NCHS mortality data for 1998 were not available at the time this article was written.

Table 1

Total Medicare Aged Population and Total Aged Population of the United States: U.S. Census, 1998

Demographic Characteristic	Medicare	Census	Ratio Medicare: Census
Total	32,391,382	34,269,150	0.95
Males	13,249,986	14,138,348	0.94
65-74 Years	7,798,091	8,230,752	0.95
75-84 Years	4,381,869	4,742,446	0.92
85 Years or Over	1,070,026	1,165,150	0.92
Females	19,141,396	20,130,802	0.95
65-74 Years	9,523,531	10,125,922	0.94
75-84 Years	6,853,518	7,163,596	0.96
85 Years or Over	2,764,347	2,841,284	0.97
White Total	28,537,623	28,911,402	0.99
Males	11,717,052	11,965,629	0.98
65-74 Years	6,830,379	6,863,790	1.00
75-84 Years	3,931,700	4,111,275	0.96
85 Years or Over	954,973	990,564	0.96
Females	16,820,571	16,945,773	0.99
65-74 Years	8,230,753	8,299,300	0.99
75-84 Years	6,107,208	6,177,481	0.99
85 Years or Over	2,482,610	2,468,992	1.01
Black Total	2,505,835	2,756,110	0.91
Males	957,059	1,078,329	0.89
65-74 Years	592,689	673,793	0.88
75-84 Years	284,279	317,498	0.90
85 Years or Over	80,091	87,038	0.92
Females	1,548,776	1,677,781	0.92
65-74 Years	816,349	933,534	0.87
75-84 Years	511,117	534,102	0.96
85 Years or Over	221,310	210,145	1.05
Hispanic Total	494,897	1,733,060	0.29
Males	221,821	730,792	0.30
65-74 Years	142,149	467,686	0.30
75-84 Years	69,598	205,322	0.34
85 Years or Over	10,074	57,784	0.17
Females	273,058	1,002,268	0.27
65-74 years	161,606	585,016	0.28
75-84 years	91,216	303,310	0.30
85 years or Over	20,236	113,942	0.18
Native American Total	34,056	142,729	0.24
Males	15,402	60,243	0.26
65-74 Years	9,897	35,852	0.28
75-84 Years	4,448	18,214	0.24
85 Years or Over	1,057	6,177	0.17
Females	18,654	82,486	0.23
65-74 Years	10,752	44,107	0.24
75-84 Years	6,012	25,723	0.23
85 Years or Over	1,890	12,656	0.15
Asian Total	307,253	725,849	0.42
Males	137,436	303,355	0.45
65-74 Years	75,377	189,631	0.40
75-84 Years	51,412	90,137	0.57
85 Years or Over	10,647	23,587	0.45
Females	169,817	422,494	0.40
65-74 Years	96,201	263,965	0.36
75-84 Years	59,432	122,980	0.48
85 Years or Over	14,184	35,549	0.40

NOTES: Census counts are the resident population, age 65 or over, 1990. This table includes all enrollees, both fee-for-service and those enrolled in health maintenance organizations. Medicare enrollment is based on Part A enrollment on July 1, 1997.

SOURCES: Medicare population from the Health Care Financing Administrtion, Office of Information Services, Annual Denominator Files. U.S. Census population Estimates Program, Population Division, U.S. Census Bureau, Internet Release Date: December 23, 1999.

for all causes and for the four leading causes of death: cancer, cardiovascular disease, cerebrovascular disease, and COPD. In 1997, the mortality rate for all causes of death for persons age 65 or over was 5,075 per 100,000 persons. The four leading causes of death accounted for 82 percent of this total. Cardiovascular disease was the leading cause of death (2,342 per 100,000 persons, 46 percent of the total), followed by cancer (22 percent), cerebrovascular disease (8 percent), and COPD (5 percent).

Mortality among aged black persons was 10 percent greater than for white persons, although the rate for COPD was 41 percent lower than for white persons. The other racial groups had mortality rates considerably below that of the white group, ranging from a relative risk of 0.55 for Asians to a relative risk of 0.69 for Native-Americans. This pattern of lower mortality was similar across the four major causes of mortality. Thus, based on mortality rates, it would appear that the greatest disease burden among the elderly falls on black persons, followed by white persons, Native-Americans, Hispanics, and Asians.

It should be noted, however, that the mortality rates from NCHS underestimate mortality for certain racial groups. This is because the count of deaths relies on race coding from death records and it has been shown that certain groups such as Asians and Native Americans are often reported incorrectly as white persons (National Center for Health Statistics, 1993).

Hospitalization Rates by Race/Ethnicity

Table 3 presents hospital discharge rates (number of hospital discharges per 1,000 beneficiaries) by race/ethnicity from Medicare data for 1998. Total rates are shown for selected principal diagnoses, many of which are also leading causes of death among the elderly. These diagnoses are for all types of heart disease, IHD, cancer (breast, colon, prostrate, lung), stroke, pneumonia, hip fracture, diabetes, COPD, and diseases of the gallbladder. All rates are adjusted to the age and sex distribution of the total Medicare population.

In 1998, the total hospitalization rate from short-stay hospitals was 359.2 per 1,000 aged Medicare persons. Black persons and Native-Americans had the highest hospitalization rates among all racial/ethnic groups (426.1 and 487.4 per 1,000 persons, respectively). Asians had the lowest hospitalization rate, totaling 239.6 per 1,000 persons. As with mortality, the highest rates of hospitalizations among all aged Medicare beneficiaries were for heart disease (77.1 discharges per 1,000 persons) and cancer (20.3 discharges per 1,000 persons). COPD and stroke were also important causes of hospitalization at 13.4 and 12.4 discharges per 1,000 persons, respectively.

Hospitalization rates by race paralleled the mortality rates to a limited extent. Among black persons, the risk ratios (compared with white persons) for total hospitalization for cancer and heart disease were similar to the mortality rate risk ratios. However, black Medicare beneficiaries had an 8 percent higher rate of hospitalization for COPD compared with the 41 percent lower mortality rate for COPD. Black beneficiaries had much higher rates of hospitalization for diabetes, but lower rates for gallbladder disease and hip fracture.

The hospitalization rate for aged Asians was 32 percent lower than for white aged persons, somewhat less than the disparity for mortality. The disparity was similar across all causes of hospitalization, ranging from a risk ratio of 0.50 for breast cancer to a 7-percent higher hospitalization rate for stroke than white persons.

Table 2

Death Rates, by Cause of Death for the Population Age 65 or Over, United States: 1997

Population Race/Hispanic Origin	Cause of Death	Death rate per 100,000	Relative Rate to Non-Hispanic White Persons
All Persons	All causes of death	5,075	—
	Cancer	1,124	—
	Cardiovascular diseases	2,342	—
	Cerebrovascular diseases	412	—
	COPD	277	—
White	All causes of death	5,190	1.00
	Cancer	1,141	1.00
	Cardiovascular diseases	2,401	1.00
	Cerebrovascular diseases	420	1.00
	COPD	300	1.00
Black	All causes of death	5,684	1.10
	Cancer	1,359	1.19
	Cardiovascular diseases	2,592	1.08
	Cerebrovascular diseases	468	1.11
	COPD	178	0.59
Hispanic	All causes of death	3,091	0.60
	Cancer	652	0.57
	Cardiovascular diseases	1,393	0.58
	Cerebrovascular diseases	230	0.55
	COPD	122	0.41
Asian	All causes of death	2,849	0.55
	Cancer	668	0.59
	Cardiovascular diseases	1,292	0.54
	Cerebrovascular diseases	314	0.75
	COPD	120	0.40
Native-American	All causes of death	3,606	0.69
	Cancer	721	0.63
	Cardiovascular diseases	1,448	0.60
	Cerebrovascular diseases	254	0.60
	COPD	172	0.57

NOTES: COPD is chronic obstructive pulmonary disease. Mortality rates are age- and sex- adjusted.

SOURCE: National Center for Health Statistics, 1997.

Hispanic Medicare beneficiaries had an overall hospitalization rate higher than white beneficiaries (risk ratio of 1.12). This is considerably greater than the relative mortality rate differential of 0.60. This was most noticeable for heart disease where the hospitalization risk ratio was 1.05 compared with the mortality risk ratio of 0.57. As with black Medicare beneficiaries, Hispanic Medicare beneficiaries were much more likely to be hospitalized for diabetes (3.03 risk ratio) and less likely to be hospitalized for breast cancer (risk ratio 0.65) compared to white Medicare beneficiaries.

Native-American Medicare beneficiaries had the highest hospitalization rate among all race groups, 37 percent higher than white Medicare beneficiaries, despite a 31-percent lower total mortality rate. However, much of the difference seems to be related to conditions which are not among the leading causes of death, such as diabetes, pneumonia, and gallbladder disease. Hospitalization for heart disease was higher than the rates for white beneficiaries (1.15 risk ratio) and was slightly lower for all types of cancer (0.93 risk ratio), although not as great as the differential in mortality would suggest. Still, there are

Table 3

Number of Hospital Discharges per 1,000 Aged Medicare Beneficiaries, by Principal Diagnosis: 1998

Diagnosis	All Persons	White	Black	Hispanic	Asian	Native-American
Total	359.2	354.9	426.1	395.9	239.6	487.4
Heart Disease						
All Types	77.1	77.1	82.6	81.3	47.4	88.7
Ischemic Heart Disease	34.4	35.2	27.1	34.9	22.2	37.0
Cancer						
All Types	20.3	20.2	23.7	17.3	14.8	18.7
Breast	1.6	1.6	1.5	1.1	0.8	1.1
Colon	3.2	3.2	3.5	2.2	2.3	2.9
Prostate	3.8	3.7	6.0	3.6	1.9	2.6
Lung	2.7	2.7	3.4	1.9	1.9	3.0
Stroke	12.4	11.9	19.0	13.5	12.7	15.2
Pneumonia	22.1	22.1	22.4	25.3	17.1	49.3
Disease of Gallbladder	4.8	4.8	3.8	7.3	4.2	10.7
Hip Fracture	8.6	9.1	4.1	6.8	5.2	10.2
Diabetes	4.4	3.6	11.4	11.0	3.5	14.7
COPD	13.4	13.4	14.5	15.0	8.3	20.0
			Rate Relative to White Persons			
Total	—	1.00	1.20	1.12	0.68	1.37
Heart Disease						
All Types	—	1.00	1.07	1.05	0.61	1.15
Ischemic Heart Disease	—	1.00	0.77	0.99	0.63	1.05
Cancer						
All Types	—	1.00	1.18	0.86	0.73	0.93
Breast	—	1.00	0.93	0.65	0.50	0.68
Colon	—	1.00	1.10	0.67	0.71	0.90
Prostate	—	1.00	1.62	0.98	0.52	0.70
Lung	—	1.00	1.24	0.69	0.70	1.10
Stroke	—	1.00	1.60	1.14	1.07	1.28
Pneumonia	—	1.00	1.01	1.15	0.77	2.23
Disease of Gallbladder	—	1.00	0.79	1.51	0.88	2.21
Hip Fracture	—	1.00	0.45	0.74	0.57	1.12
Diabetes	—	1.00	3.13	3.03	0.98	4.04
COPD	—	1.00	1.08	1.12	0.62	1.50

NOTES: Hospitalization rates are age and sex- adjusted. COPD is chronic obstructive pulmonary disease.

SOURCES: Health Care Financing Administration, Office of Information Services, Annual Denominator Files, and Medicare Provider Analysis and Review Files (MEDPAR).

obvious inconsistencies between the mortality data and the hospitalization data for Native-Americans. An example is cerebrovascular disease. NCHS mortality data suggest that Native-Americans have a 40-percent lower mortality rate for cardiovascular disease than white beneficiaries. Medicare data show Native-Americans to have twice the hospitalization rate for stroke than white beneficiaries. Whether this represents underreporting of Native-Americans on death records, a bias in Medicare race codes, or some combination is not evident. More in-depth studies of the Native-American population is indicated.

Surgical Procedures for Heart Disease

Table 4 shows the number of aged Medicare beneficiaries hospitalized for IHD per 1,000 enrollees in 1998. Also shown is the number of aged Medicare beneficiaries per 1,000 enrollees receiving selected cardiac procedures. This rate is included because IHD is the principle diagnosis for which these procedures are performed. Cardiac catheterization is a diagnostic procedure generally conducted to assess the degree of coronary arterial blockage and is used as a part of the decisionmaking

Table 4

Persons Hospitalized for Ischemic Heart Disease (IHD) and Persons Receiving Cardiac Procedures per 1,000 Aged Medicare Beneficiaries, by Race: 1998

Diagnosis and Procedure	Total	White	Black	Hispanic	Asian	Native-American
Diagnosis						
IHD	26.3	26.8	21.4	26.9	17.7	27.6
Procedures						
Cardiac Catheterization	18.4	18.9	14.9	18.6	11.4	16.6
PTCA	7.5	7.9	4.3	6.9	4.9	6.1
CABG	4.8	5.0	2.4	4.0	3.1	4.1
		Rate Relative to White Persons Rate				
Diagnosis						
IHD		1.00	0.80	1.00	0.66	1.03
Procedures						
Cardiac Catheterization		1.00	0.79	0.98	0.60	0.88
PTCA		1.00	0.54	0.88	0.62	0.77
CABG		1.00	0.47	0.80	0.63	0.81

NOTES: PTCA is percutaneous transluminal coronary angioplasty. CABG is coronary artery bypass graft. Rates of persons hospitalized are age- and sex-adjusted.

SOURCES: Health Care Financing Administration, Office of Information Services, Annual Denominator Files, and Medicare Provider Analysis and Review Files (MEDPAR).

process prior to performing a revascularization procedure. The two revascularization procedures are PTCA and CABG.

Overall, the number of persons hospitalized for IHD was 26.3 persons per 1,000 Medicare beneficiaries.[2] This ranges from a high of 27.6 for Native-American beneficiaries to a low of 17.7 for Asian beneficiaries. Relative to white beneficiaries, hospitalization for IHD is about 20 percent lower for black beneficiaries and about two-thirds as great for Asian beneficiaries. The hospitalization rates for IHD were nearly identical for Hispanic and white beneficiaries, and were slightly higher for Native-American beneficiaries (1.03 risk ratio).

Table 4 also shows the rates of persons receiving cardiac catheterization, ranging from 18.9 per 1,000 white beneficiaries to 11.4 per 1,000 Asian beneficiaries. The relative use of cardiac catheterization is comparable to the relative hospitalization for IHD. That is, the rate of cardiac catheterization among black beneficiaries is about 80 percent than that among white beneficiaries and the rate among Asian beneficiaries is about 60 percent that of white beneficiaries. Hispanic beneficiaries had similar rates of cardiac catheterization as white beneficiaries. However, it appears that the relative rate of persons receiving a cardiac catheterization is lower among Native-American beneficiaries (0.88) compared to the probability of being hospitalized with IHD (1.03).

Relative rates of persons receiving PTCA or CABG are uniformly lower among all racial groups compared with white beneficiaries. For PTCA, the relative rate ranges from a low of 0.54 among black beneficiaries to a high of 0.88 among Hispanic beneficiaries. For CABG, the relative rate ranges from a low of 0.47 among black beneficiaries to a high of 0.81 among Native-American beneficiaries.

Based solely on the rates shown in Table 4, it would appear that there might be a significant access disparity to revascularization among all racial groups compared with white beneficiaries, with the exception that

[2] The rates in Table 3 are based on the number of hospital discharges per 1,000 beneficiaries, whereas, the hospital discharge rates in Table 4 are based on unduplicated counts of persons hospitalized for IHD per 1,000 beneficiaries. The hospital discharge rate in Table 3 of 34.4 per 1,000 beneficiaries is higher than the rate in Table 4 of 26.3 per 1,000 beneficiaries because persons can be hospitalized more than once for the same diagnosis.

Table 5

Number of Persons Receiving Selected Cardiac Procedures per 100 Aged Medicare Beneficiaries with At Least One Ischemic Heart Disease Hospitalization, by Race: 1998

Procedure	Total	White	Black	Hispanic	Asian	Native-American
Cardiac Catheterization	70.2	70.4	69.6	69.0	64.5	60.2
PTCA	28.7	29.4	19.9	25.6	27.7	22.0
CABG	18.1	18.7	11.1	14.8	17.7	14.7
		Rate Relative to White Person Rate				
Cardiac Catheterization		1.00	0.99	0.98	0.92	0.85
PTCA		1.00	0.68	0.87	0.94	0.75
CABG		1.00	0.59	0.79	0.95	0.79

NOTES: PTCA is percutaneous transluminal coronary angioplasty. CABG is coronary artery bypass graft.

SOURCES: Health Care Financing Administration, Office of Information Services, Annual Denominator Files, and Medicare Provider Analysis and Review Files (MEDPAR). Rates of persons hospitalized are age- and sex-adjusted.

Hispanic beneficiaries have similar rates of cardiac catheterization as white beneficiaries (0.98) and Native-American beneficiaries have relatively high rates of cardiac catheterization (0.88). However, the rates of persons receiving a revascularization in Table 4 are calculated based on all beneficiaries, regardless of need for surgery. The number of persons hospitalized for IHD, also shown in Table 4, raises the question whether the need for revascularization among minority groups may also be less.

To gain additional perspective, Table 5 shows the number of persons undergoing these cardiac procedures per 100 persons with at least one hospitalization for IHD. For example, in Table 5 the rate of persons receiving a cardiac catheterization (70.2/100) is calculated by dividing the cardiac catheterization rate (18.4/1,000) by the IHD rate (26.3/1,000)[3] from Table 4. Overall, about two-thirds of the persons hospitalized for IHD received a cardiac catheterization (ranging from 70.4 per 100 white IHD beneficiaries to 60.2 per 100 Native-American IHD beneficiaries).

For all race groups combined, slightly more than one-quarter of IHD hospitalized patients receive a PTCA and one-fifth receive a CABG[4]. The PTCA rates range from a high of 29.4 among white IHD beneficiaries to a low of 19.9 among black IHD beneficiaries. For CABG, the rates range from a high of 18.7 for white IHD beneficiaries to a low of 11.1 among black IHD beneficiaries. Because the rates in Table 5 are calculated on persons hospitalized for IHD and Table 4 show lower IHD rates for black and Asian beneficiaries, the relative revascularization rates for the two races are higher in Table 5. For example, the relative rate of PTCA among black beneficiaries increases from 0.54 in Table 4 to 0.68 in Table 5. Similarly, the relative rate of CABG among black beneficiaries increases from 0.47 in Table 4 to 0.59 in Table 5, still a considerable differential. The most striking change, however, occurs for Asians. Table 4 shows revascularization rates roughly 60 percent that of white beneficiaries. However, hospitalization for IHD is also only about two-thirds that of white beneficiaries. Consequently, Table 5 suggests that access to revascularization for Asian beneficiaries very nearly equal to that of white beneficiaries, with relative use rates of 0.94 for PTCA, and 0.95 for CABG among the IHD hospitalized population. Estimates of the relative rates of revascularization for Hispanic and Native- American beneficiaries change little between Tables 4 and 5 because these rates of hospitalization for IHD are similar to that of white beneficiaries.

[3] Numbers differ slightly because of rounding.

4 The counts of persons receiving a PTCA and CABG are not mutually exclusive. Some persons receive both a PTCA and a CABG within a calendar year.

DISCUSSION

Our study goes beyond most previous research on racial disparities in one important way. This study uses Medicare's expanded race codes to examine differences in hospitalization and mortality rates and the use of surgical procedures for cardiovascular disease among white persons, black persons, Hispanics, Asians, and Native-Americans. Most other studies on health disparities have focused on black-American/white beneficiary differences because Hispanics, Asians, and Native-Americans often represent a small proportion of the total sample population. Information on Hispanics, Asians, and Native-Americans often goes unanalyzed because sample sizes are too small to provide reliable estimates. This study is the first attempt to examine Medicare data with the expanded race codes to further examine disparities among different racial and ethnic groups, beyond black persons, white, and Hispanic persons.

Other studies have demonstrated the importance of examining the use of Medicare services in relation to health outcomes (Gornick 2000a; 2000b). The health status of any racial and ethnic group is reflected in part by data on hospitalizations, mortality, and surgical procedure rates for particular medical conditions. Our findings show that black persons and other minorities were less likely to undergo specific medical procedures for IHD. As shown in Table 5, black persons were 41 to 32 percent less likely as white persons to undergo medical treatment for IHD (CABG and PTCA, respectively). Our findings indicate that Asians had relatively similar patterns of IHD as Hispanics and white persons, but their death rates were lower than white persons. Among Medicare beneficiaries, one study showed that black patients were only one-half as likely as white patients to receive specialty cardiac services including angioplasty and CABG (Gornick et al., 1996). Our study suggests that the black/white beneficiary differential may be closer to 30 to 40 percent. Another study recently reported disparities in access to cardiac care treatment for Medicare beneficiaries, in which black patients were less likely than white patients to receive reperfusion therapy for IHD (Canto et al., 2000).

Among the leading causes of death, our study shows differences among race/ethnic groups in hospitalizations and mortality. Cancer is the second leading cause of death among aged Medicare beneficiaries, accounting for approximately 20 percent of all deaths among the elderly. Our findings indicate that black persons have a significantly higher death rate and hospitalization rate for all types of cancer (except breast cancer) than white persons. Black females had a slightly lower rate of hospitalization for breast cancer compared to white females. In particular, black persons had a significantly higher hospitalization rate for prostate cancer than white males (6.0 per 1,000 persons versus 3.7 per 1,000 persons, respectively). This is consistent with the NCHS (1999) findings from which report that black males suffer the highest incidence and mortality rates from prostate cancer compared with white males. In 1998, the age-adjusted mortality rate for prostate cancer among black males was 31.4 per 100,000 persons, compared with rates of other groups, including white (12.6), Hispanic (8.6), Native-American (8.6), and Asian males (5.3). Also, the death rate for black persons for all types of cancer is nearly 20 percent higher than white persons. However, it is important to stress that a comparison between mortality rates and hospitalization rates does not provide sufficient information to assess the appropriateness of Medicare utilization pat-

terns. Much more information needs to be developed about the ongoing use of diagnosis and preventive services for cancer care.

Stroke is the third leading cause of death in the United States. Our findings indicate that black persons had a higher hospitalization rate and death rate (nearly 20 percent) for stroke than white persons. This finding is consistent with data that are based on the NCHS National Vital Statistics system in which black persons had a significantly higher age-adjusted death rate for cerebrovascular disease than white persons in 1997 (42.5 versus 24 per 100,000 population).

The fourth leading cause of death among aged Medicare beneficiaries is from COPD. Our findings show that black persons had a lower mortality rate for COPD than white persons, ranging from a relative risk of 0.59 for black persons to 0.40 for Asians. This finding is consistent with data that are based on the NCHS National Vital Statistics system in which black persons and Asians had a significantly lower age-adjusted death rate for COPD (17.4 and 8.6 per 100,000 persons, respectively) than white persons in 1997 (21.7 per 100,000). However, hospitalization for COPD was higher among black persons, Hispanics, and Native- Americans compared with white persons. Notably, Native-Americans had 50 percent higher hospitalization rates for COPD than white persons. Why the hospitalization for COPD differs from the mortality pattern is not evident. Perhaps, COPD as the principal cause of hospitalization is not the best indicator of COPD morbidity or prevalence. Hospitalization rates (not shown) based on COPD in any diagnostic position show lower rates among minority groups compared to white persons.

Our findings show that Native-Americans, black persons and Hispanics had significantly higher hospitalization rates for diabetes than white persons and Asians. Diabetes is the fourth leading cause of death among elderly Native-Americans. Table 3 shows that Native Americans had four times the hospitalization rate for diabetes than white persons. In comparison, black persons and Hispanics had three times the hospitalization rate for diabetes than white persons. This is consistent with findings from NCHS (1999), which shows that diabetes is disproportionately high among Native-Americans, black persons, and Hispanics.

Our findings show that mortality rates were lower among Hispanics and Asians compared with white persons. This finding is consistent with the literature. One of the reasons for low death rates among Hispanics and Asians may relate to consistency in how race is identified between the death certificate and U.S. Census Bureau data. In calculating death rates, data from the death certificates is used as the numerator and U.S. Census Bureau data is used as the denominator. While consistency in race identification is high for white and black persons, it is lower for Hispanic and Asian subgroups. For instance, death rates are typically underestimated for Hispanics by about 7 percent, and for Asian/Pacific Islanders about 12 percent (NCHS, 1998; Sorlie, Rogot, and Johnson 1992), as well as for Native-Americans. Underestimates are based on incorrectly reporting race/ethnicity on death certificates and imputing race/ethnicity variables when race/ethnicity variables were left blank. Consequently, the death rates for Hispanics, Asians, and Native-Americans are typically biased downward.

As previously noted, survey efforts by HCFA to obtain more accurate classifications of race/ethnicity of its Medicare beneficiaries yielded a 40-percent response rate. HCFA still has "unknown" or "other" race coding for approximately 473,000

Medicare beneficiaries. It is possible that persons who responded to HCFA's survey differ from non-respondents in important ways affecting health. At this point in time, it is not possible to assess whether any bias exists. However, the updated race coding reflects a significant improvement in obtaining more accurate information on Medicare beneficiaries' race/ethnicity.

CONCLUSIONS

As previously discussed, the majority of the studies on differences in access to health care and differences in health outcomes have focused on black/white persons disparities, few studies have focused on health disparities among Hispanics, Asians, and Native-Americans. Due to recent expansions in the race coding in the Medicare EDB, it is now possible to explore some of these additional racial/ethnic differentials. The recent expansions have allowed us to analyze 1998 health care utilization trends for about 495,000 Hispanics, 307,000 Asians, and 34,000 Native-Americans. As noted by Arday et al. (2000), analytical results based on Medicare race coding should be interpreted with some caution, and findings should be validated, whenever possible. However, while Medicare data has limitations in terms of reliability of race coding, it nonetheless provides information that has not been previously available on Hispanics, Asians, and Native-Americans.

Future research could be enhanced through linkages with other data sets, such as SSA, which has information on country of birth, and Census data on small geographic areas (ZIP-code U.S./Bureau for example) racial enumeration. For example, country of birth would be helpful in determining the validity of race for groups with higher recent rates of immigration, such as Hispanics, and some Asian groups.

A database linked with SSA country of birth data could provide useful information to support research on subgroups of minority populations. For instance, the Hispanic population in the United States represents a diverse array of ancestry, culture, socioeconomic conditions, and needs. Five main Hispanic subgroups include: Mexican-American, Puerto Rican, Cuban-American, Central and South American, and persons of other Hispanic origin. Hispanic subgroups are likely to have different patterns in health care utilization and different health care needs. A linked database would allow analyses of foreign-born persons and determine whether their patterns of health care utilization and mortality rates differ from persons born in the United States and non-Hispanic whites.

Additionally, a database linked with the U.S. Census Bureau could provide useful information to support research on the role of socioeconomic status (SES) in racial/ethnic disparities in health and health care. There is strong evidence that low SES is a risk factor for cardiovascular disease, lung cancer, and other diseases. More research should be conducted using linked Medicare—U.S. Census Bureau data that investigate the relationship between SES, race, health utilization, and outcomes.

Much work needs to be done to improve the quality of morbidity and mortality data. The Federal initiative—OMB Directive 15—requires reporting standards for race and ethnicity categories for new data collection efforts. For example, Asian or Pacific Islander category now will be separated into two categories: "Asian" and "Native Hawaiian or Other Pacific Islander" and the term for Hispanic will be changed to "Hispanic or Latino." Revisions to the Standards for the Classification of Federal data on race and ethnicity will now reflect five categories on race: American

Indian or Alaska Native; Asian; Black or African American; Native Hawaiian or Other Pacific Islander; and White. (*Federal Register*, 1997). Consequently, we shall have more specific race coding data in the future. However, the current HCFA databases provide unique opportunities to further our knowledge of racial disparities in health use and health outcomes.

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