
Racial Disparities in Prescription Drug Use Among Dually Eligible Beneficiaries

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Well-documented racial disparities in use of medical services raise concerns about such disparities in other aspects of health care. We compare the difference in Medicaid pharmacy use between black and white dually eligible Medicare beneficiaries. Controlling for the presence of chronic illnesses, we find that black beneficiaries have significantly fewer prescriptions filled and lower pharmacy costs in 8 of the 10 States examined, despite having higher physician costs. If this disparity stems from a lack of provider or beneficiary knowledge, programs to educate providers or beneficiaries may hold the greatest promise for reducing it, whether pharmacy coverage is obtained from Medicaid or from a new Medicare benefit.

INTRODUCTION

Racial disparities in prescription drug and other health service use, and the relationship of these disparities to differences in health have been explored extensively in the literature (Smedley, Stith, and Nelson, 2003; Mayberry, Mili, and Ofili, 2000; and Mayberry et al., 1999). For example, members of racial minorities are less likely than those of non-minorities to receive appropriate medications for cardiovascular disease and AIDS (U.S. General Accounting Office, 2003). One commonly investigated basis

for these disparities is that minority individuals are less likely than non-minority ones to have adequate health insurance. Elderly black Medicare beneficiaries are more than twice as likely as white beneficiaries to not have supplemental insurance and to not fill prescriptions because they cannot afford them (Reed, Hargraves, and Cassil, 2003). Nevertheless, having comparable insurance does not always eliminate disparities. For example, Kuno and Rothbard (2002) found that black Medicaid beneficiaries with schizophrenia were less likely than their white beneficiaries to receive appropriate medications. Likewise, Schneider, Zaslavsky, and Epstein (2002), found that black Medicare managed care enrollees who had suffered heart attacks were less likely than their white beneficiaries to receive beta-blockers. What, then, is the cause of these racial disparities?

Hypotheses abound concerning the causes of racial disparities in health service use even among those with similar insurance coverage and the same medical conditions. These hypotheses include possible differences among racial groups in (1) literacy levels; (2) knowledge about managing chronic conditions (such as monitoring symptoms and adhering to treatment recommendations); (3) expectations of, and trust in the health care system; (4) rapport with or trust in physicians, (5) perceptions about the availability, effectiveness, and risk of medical procedures; (6) tolerance for and attitudes toward pain or functional limitations; and (7) cultural traditions favoring non-traditional or

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non-invasive care (Chen et al., 2001; DeLew and Weinick, 2000; Gornick, 2000; Katz, 2001). Racial disparities may also be due to provider and system-level problems, including overt or subtle racism; provider beliefs about patient preferences and attitudes; cultural barriers to effective communication, particularly in describing technologically sophisticated procedures and the importance of self-care for chronic conditions; and distance from, and lack of transportation to, care centers (Chen et al., 2001; DeLew and Weinick, 2000; Epstein and Ayanian, 2001; Katz, 2001).

While much research has focused on racial disparities in the receipt of specific medical procedures and the use of preventive and other health care services, relatively little research has examined whether disparities exist in the receipt of prescription medications. However, a few studies have confirmed the existence of racial disparities in utilization of specific prescription medications, especially anti-retrovirals (Nelson, Norris, and Mangione, 2002; Palacio et al., 2002). Receiving a prescription for, and taking, appropriate medications can have enormous effects on health, quality of life, and mortality. Moreover, the broader question remains as to whether historic differences in medical service use by individuals of different races carry over to the use of prescription drugs.

The purpose of this study is to examine racial differences in prescription drug use by Medicare beneficiaries who have comprehensive prescription drug coverage by virtue of also being enrolled in Medicaid. By limiting the population studied to people with the same insurance coverage, and to a group with more homogeneous socioeconomic status than the general Medicare population, and by controlling statistically for the incidence of chronic medical conditions, age, and other characteristics, we are

able to examine the magnitude of remaining unexplained differences in prescription drug use.

Among the many potential explanations for racial disparities in health service use nationally, those with particular relevance to differences in use of the Medicaid pharmacy benefit include beneficiary characteristics and health care delivery system characteristics. Beneficiary-specific differences include the incidence of chronic conditions for which prescription medications are considered standard treatment, the propensity to use routine health service providers primarily responsible for prescribing medications (such as physicians), and the propensity to adhere to treatment recommendations (such as renewing and filling prescriptions). Black and white beneficiaries also are distributed among States very differently. This difference could contribute to racial disparities in pharmacy benefit use nationally among dually eligible beneficiaries if the proportion of black beneficiaries in a State were correlated with (say) the stringency of Medicaid eligibility requirements or with how tightly controlled the drug benefit is.

System-level differences include variations in (1) how physicians and pharmacists educate beneficiaries about the importance of medication adherence, (2) knowledge of beneficiaries' physicians concerning state-of-the-art prescribing practices, and (3) access to pharmacies participating in the Medicaid Program. If black beneficiaries tend to see different physicians and pharmacists than white beneficiaries, and if these providers differ in their ability to educate patients or in their knowledge of prescribing practices, this might contribute to racial differences in benefit use. Even if there is a large overlap in physicians seen by different racial groups, some physicians may be better able, or

more willing, to communicate effectively with their white patients than with their black patients. Black persons make up a much smaller proportion of physicians than of the general Medicare (or dually eligible) population, so far fewer black persons may see a physician of their same race/ethnicity. If beneficiaries are more likely to trust, understand, and follow the advice of a physician of the same race, this also could cause racial differences in benefit use. Similarly, if beneficiaries of different races live in areas that differ in the availability of pharmacies participating in Medicaid, this could also contribute to benefit use differences.

STUDY POPULATION, METHODS, AND LIMITATIONS

This study uses 1995 claims data on approximately 1.5 million Medicare beneficiaries from 10 States who were also enrolled in Medicaid.¹ In 1998, dually eligible beneficiaries in the 10 study States made up roughly 36 percent of the national population of dually eligible beneficiaries, primarily because California and Florida (2 study States) have such large dually eligible populations (Ellwood and Quinn, 2001). Although States were selected for inclusion in the database based on the availability and quality of their Medicaid data, rather than on national representativeness, the 10 States in this study include a geographically diverse mix of large and small States.

To identify the presence of medical conditions in this analysis, we used diagnostic cost groups (DCGs) (DxCG[®], Inc., 1999). This coding scheme is based on primary and secondary diagnoses recorded on all types of Medicare and Medicaid service

claims (including, but not limited to, hospital claims). Identifying medical conditions in this way misses conditions that did not result in medical treatment. It is unlikely to miss serious conditions, however, since most beneficiaries taking medications for a serious condition will have visited a physician to obtain the prescription or have been hospitalized or had some other medical treatment for it.² However, the DCGs do not measure disease severity.

The study focuses on 1995 per beneficiary average monthly Medicaid prescription drug reimbursement, and average monthly number of prescriptions filled, as defined by the number of paid pharmacy claims. For each beneficiary, monthly reimbursement and number of prescriptions are averaged over those months in 1995 when the beneficiary had full Medicaid benefits in the Medicaid FFS sector (with or without any pharmacy benefit use during the month). The study population only includes beneficiaries who, in 1995, had at least 1 month of full Medicaid coverage in the FFS sector and Medicare coverage sometime during the year. Individual months during which a beneficiary was in Medicaid managed care or did not have Medicaid drug benefits are not included in averages of monthly reimbursement or use.

The following analysis presents mean values of pharmacy benefit reimbursement and use for dually eligible beneficiaries with different characteristics. Because we have data for the entire population of dually eligible beneficiaries in these 10 States, there is no sample variance of the calculated means. Therefore, we do not conduct tests of whether the means for white beneficiaries are significantly different from the means for black beneficiaries. The focus

¹ The data were drawn from CMS' dually eligible beneficiary database for California (restricted to 16 counties), Colorado, Florida, Georgia, Indiana, Kentucky, Michigan, New Jersey, Washington, and Wisconsin.

² Because Medicare is first payer for dually eligible beneficiaries, most diagnosis data for this analysis come from Medicare claims. Therefore, these data should be more uniformly reported across States and more reliable than if we relied on Medicaid diagnoses alone.

Table 1
Distribution of Beneficiaries, by State of Residence and Race: 1995

State	Analysis Sample	Black	White	Other Race ¹
		Percent		
Total	100	17.1	72.3	10.6
California	23.6	11.3	57.9	30.8
Florida	19.9	21.0	64.9	14.1
Georgia	10.5	45.2	51.7	3.1
New Jersey	9.3	21.4	64.3	14.3
Wisconsin	7.4	8.8	86.4	4.8
Michigan	7.4	29.2	64.7	6.1
Kentucky	6.9	9.9	87.2	2.9
Indiana	6.2	13.1	83.9	3.0
Washington	5.7	4.8	81.6	13.6
Colorado	3.2	5.9	80.5	13.6

¹ Other race includes: Hispanic, Asian, and Native American, as well as those of some other race or whose race was unknown.

NOTES: Overall percents weighted to give each State equal representation. Analysis based on the 10-State study sample of 1,482,136 dually eligible beneficiaries. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

here is on the magnitude of the differences observed. We also briefly describe the results of regression models that were estimated to explore the extent to which measured beneficiary characteristics other than race contributed to the variation in benefit use across groups defined by race.

Monthly beneficiary level data on pharmacy benefit use and spending were weighted to account for the number of months a beneficiary had full FFS Medicaid coverage in 1995. This weighting better reflects benefit use and cost to the State, since beneficiaries at risk of having drug expenses for relatively few months may have average monthly use and costs systematically different from those of beneficiaries at risk of having drug expenses for a longer time.

We also weighted observations to give each State equal representation in the pooled analysis. As noted, the States in the dually eligible database were not meant to be representative of the U.S. population. We weighted States equally because we are trying to depict the average experience across 10 study States, rather than the

average for the population of all beneficiaries in these particular States or the Nation as a whole.³

OVERALL PHARMACY BENEFIT USE AND SPENDING

The study includes all of the 1,482,136 beneficiaries dually eligible for Medicare and Medicaid in 1995 living in the 10 study States. However, California and Florida together account for 44 percent of the population; whereas, Colorado, Indiana, and Washington together account for just 15 percent (Table 1). As noted, statistics presented in this report based on the entire population give equal weight to observations in each State so that, for example, California and Florida averages do not dominate the results.

The study population was predominantly white (72 percent), about a one-sixth of beneficiaries (17 percent) were black, and just over one-tenth (11 percent) were of some other race (combining Hispanic,

³ Differences between weighted and unweighted estimates were generally small, suggesting that results for large States are not markedly different from those of smaller States.

Table 2
Distribution of Beneficiaries, by Selected Characteristics: 1995

Characteristic	Dually Eligible Beneficiary Analysis Sample
	Percent
Age	
Under 65 Years	35.1
65-74 Years	26.2
75-84 Years	22.7
85 Years or Over	16.0
Sex	
Male	34.9
Female	65.1
Area of Residence¹	
Urban	76.6
Rural	23.3
Type of Medicaid Eligibility	
Cash Recipients (e.g., Supplemental Security Income)	58.0
Non-Cash	42.0

¹ Urban/rural indicator based on mapping of Social Security Administration county codes developed by U.S. Bureau of the Census; codes were missing for 13,401 beneficiaries.

NOTES: N=1,482,136. Weighted to give each State equal representation. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

Asian, and Native American beneficiaries with those of some other race or whose race was not known).⁴ Thus, the population has a lower proportion of white beneficiaries than the overall Medicare dually eligible population, 86 percent of which was white in 1995 (Health Care Financing Administration, 1997). However, the racial composition of the study population varied considerably across States. For example, 45 percent of Georgia beneficiaries and 29 percent of Michigan beneficiaries were black, compared with just 6 percent in Colorado and 5 percent in Washington, broadly reflecting differences in the racial composition of the populations of those States.

The study population also has higher proportions of females than the overall Medicare population, as well as higher proportions younger than age 65 and 85 or over (Table 2). About one-third of the population was non-elderly and one-third male. The proportion of male beneficiaries was fairly constant across States. The proportion of

non-elderly beneficiaries varied somewhat. For example, 48 percent of Michigan's dually eligible beneficiaries were under age 65, compared with just 29 percent of Florida beneficiaries (data not shown).

We focus our examination of the relationship between health and pharmacy benefit use on four chronic conditions (or groups of related conditions) and one indicator of general frailty. Each affects between one-fifth and one-third of the study population and is associated with substantially increased benefit use or spending (at least one-third above the population average). The chronic conditions are: (1) heart disease associated with high future medical costs (including congestive heart failure and heart attack); (2) chronic obstructive pulmonary disease [COPD] (including asthma); (3) diabetes; and (4) stroke and cerebrovascular and other vascular diseases. Beneficiaries in the study also had high rates of conditions associated with frailty that may result from the debilitating effects of specific chronic illnesses and side effects of the many pre-

⁴ We do not analyze the difference between white beneficiaries, and other non-black beneficiaries because the category other is too heterogeneous to draw policy relevant conclusions.

Table 3
Distribution of Beneficiaries, by Incidence of High-Cost, Chronic Conditions: 1995

Description	Dually Eligible Beneficiary Analysis Sample
	Percent
Chronic Conditions Included in Analysis¹	
Stroke, Cerebrovascular, and Other Vascular Diseases	29.5
High-Cost Heart Disease ²	21.1
Chronic Obstructive Pulmonary Disease, Asthma, and Other Chronic Lung Problems	19.2
Diabetes	19.6
Dehydration, Malnutrition, and Other Metabolic Disorders ³	32.1
Number of Conditions⁴	
0	38.7
1	26.0
2	18.0
3 or More	17.3
Died During the Year	8.3
Number of Inpatient Hospital Stays During Year	
0	70.9
1	17.6
2	6.4
3 or More	5.1
Nursing Home Residence During Year⁵	
Not in Nursing Home	73.3
In a Medicare SNF Only	1.6
In a Medicaid Nursing Home Part of the Year	10.7
In a Medicaid Nursing Home Entire Year	14.4

¹ Beneficiaries may have more than one condition (i.e., among the 21 percent with high-cost heart disease, some have diabetes).

² High-cost heart diseases include congestive heart failure, acute myocardial infarction, and other acute ischemic heart disease.

³ Metabolic disorders include hypoglycemia, pituitary and thyroid problems, and vitamin deficiencies.

⁴ Number of conditions among the five listed.

⁵ Nursing homes include Medicare SNFs and Medicaid intermediate care facilities, and intermediate care facilities for people with mental retardation. Those in a Medicaid nursing home all or part of the year may also have been in a Medicare SNF during the year.

NOTES: N=1,482,136. Weighted to give each State equal representation. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

scription medications used to treat those illnesses. The indicator of general frailty included here is the presence of dehydration, malnutrition, or other endocrine or metabolic disorders (such as pituitary or thyroid conditions or vitamin deficiencies).

Dually eligible beneficiaries in our analysis have high rates of these serious and chronic illnesses, as reflected in diagnoses recorded on covered service claims. Just under one-third were treated in 1995 for symptoms due to, or for the effects of, a stroke or cerebrovascular disease. About one-fifth have a high-cost heart disorder, a fifth have chronic lung ailment, and a similar proportion have diabetes. Roughly one-third of the study population was treated

for dehydration, malnutrition, or metabolic disorders. More than 60 percent of the dually eligible beneficiaries had at least one of these five illnesses, and 17 percent have three or more of these conditions. During 1995, 8 percent of the population died during 1995 (Table 3).

Given the high prevalence of chronic conditions, it is not surprising that dually eligible beneficiaries in the study were much more likely than typical Medicare beneficiaries to go into the hospital and that they had higher overall health care costs. Nearly 30 percent of study beneficiaries were admitted to the hospital during 1995, compared with 19 percent of all Medicare beneficiaries (Social Security

Table 4
Monthly Number of Medicaid-Covered Prescriptions Filled Per Beneficiary: 1995

Prescription	Dually Eligible Beneficiary Analysis Sample
	Percent
Had at Least 1 Paid Prescription During the Year	87.6
Mean Monthly Number of Prescriptions	3.4
Median Monthly Number of Prescriptions	2.5
90th Percentile for Monthly Number of Prescriptions	7.7
Distribution of Monthly Number of Prescriptions	
None	12.4
1	23.0
2 to 3	25.8
4 to 6	24.0
7 to 9	9.1
10 or More	5.7

NOTES: N=1,482,136. Weighted to give each State equal representation and weighted for beneficiary months with full FFS Medicaid. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

Administration, 1997). Just over one-quarter of study beneficiaries were in some type of nursing home sometime during the year; just under 15 percent were in a Medicaid nursing home for the entire year (Table 3).

During 1995, 88 percent of the study population had at least one prescription filled. Study beneficiaries filled an average of 3.4 prescriptions per month.⁵ The top decile filled roughly eight or more prescriptions per month, on average (Table 4).

Mean monthly Medicaid reimbursement for pharmacy services was \$96, compared with median monthly reimbursement of just \$58, reflecting the fact that many beneficiaries had modest monthly pharmacy spending.⁶ On average, prescription spending in 1995 accounted for just under 7 percent of the total Medicaid reimbursement per beneficiary. Nevertheless, 10 percent of the study beneficiaries cost Medicaid \$229 or more per month in 1995 (Table 5). The average monthly cost of a prescription was \$28 (\$96 divided by 3.4 prescriptions per month). Medicaid spent \$970 per study beneficiary during 1995

(\$96 per month times the average 10.1 months with full FFS Medicaid), but spent \$1,152 for beneficiaries with full FFS benefits for the entire year (\$96 times 12 months).

These numbers differ considerably from those often cited based on the MCBS (Poisal et al., 1999). We attribute this difference to the inclusion in our study population of beneficiaries residing in nursing homes the entire year (whom Poisal excludes); the use of claims data rather than self-reports; and the fact that, unlike the MCBS sample, this study population is limited to dually eligible beneficiaries in 10 states.

PHARMACY USE VARIATION BY RACE

Black beneficiaries have substantially lower pharmacy use and costs than white beneficiaries (Table 6). Beneficiaries who were black filled an average of 2.8 prescriptions per month at a cost of \$81 per month, roughly 20 percent less than for beneficiaries who were white.⁷

Moreover, this pattern is generally consistent across the 10 study States. The sole exception is New Jersey, where average

⁵ For Indiana and Wisconsin, drug claims appeared to be missing from the dually eligible database for 3 calendar months. These months were excluded from the analysis.

⁶ Using CMS' estimate that prescription drug cost inflation averaged 14.8 percent per year between 1995 and 2003, the \$96 per month in 1995 would equate to \$290 per month in 2003.

⁷ The weights used in Tables 6-9 were renormalized so that each State receives equal weight (1/10) in calculating the overall means for both black and white beneficiaries.

Table 5
Monthly Medicaid Pharmacy Benefit Reimbursement Per Beneficiary: 1995

Monthly Reimbursement	Dually Eligible Beneficiary Analysis Sample
Mean	\$96.00
Median	58.00
90th Percentile	229.00
	Percent
Distribution of Mean	
\$0	12.4
\$1-\$50	34.1
\$51-\$100	19.9
\$101-\$150	12.8
\$151-\$200	7.8
\$201-\$300	7.5
\$300 or More	5.4

NOTES: N=1,482,136. Weighted to give each State equal representation and weighted for beneficiary months with full FFS Medicaid. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

Table 6
Monthly Number of Prescriptions and Reimbursement, by Race and State: 1995

State	Black (Percent)	Mean Number of Prescriptions Per Beneficiary			Mean Prescription Reimbursement Per Beneficiary Per Month		
		Black	White	Ratio	Black	White	Ratio
All 10 States	17.1	2.8	3.6	0.79	\$83	\$102	0.81
Georgia	45.2	2.5	3.5	0.71	65	96	0.68
Colorado	5.9	2.5	3.3	0.76	70	93	0.75
Florida	21.0	2.6	3.4	0.76	84	111	0.76
Kentucky	9.9	3.4	4.4	0.77	83	109	0.76
Wisconsin	8.8	2.7	3.7	0.73	76	98	0.78
Indiana	13.1	3.9	5.3	0.74	107	136	0.79
Washington	4.8	2.9	3.6	0.81	84	106	0.79
Michigan	29.2	3.0	3.3	0.91	73	89	0.82
California	11.3	2.0	2.1	0.95	65	68	0.96
New Jersey	21.4	2.9	3.3	0.88	119	113	1.05

NOTES: N=1,272,736. Weighted to give each State equal representation and weighted for beneficiary months with full FFS Medicaid. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

monthly reimbursement is slightly higher among black beneficiaries than white beneficiaries, although the average number of prescriptions filled is somewhat lower. In addition, while black beneficiaries in California had less drug use and spending than their white counterparts, the differences were smaller than in other States.

The higher pharmacy benefit reimbursement observed for white beneficiaries than for black beneficiaries among dually eligible beneficiaries is consistent with racial differences in drug spending found from the 1995 MCBS among all Medicare beneficiaries nationally with such coverage, but

the difference is more pronounced. Among Medicare beneficiaries with any type of prescription drug coverage, white respondents to the MCBS reported slightly higher annual drug spending (\$702) than black respondents (\$655) (Poisal et al., 1999). A similar spending trend continued into 1996 and 1998. However, the number of prescriptions filled was somewhat higher among black MCBS respondents in 1996 (23.1, compared with 20.9 for white respondents) and just slightly higher for black respondents in 1998 (24.9, compared with 24.3 for white respondents) (Poisal and Chulis, 2000; Poisal and Murray, 2001).

Table 7
Incidence of Selected High-Cost, Chronic Conditions, by Race: 1995

Condition	Beneficiaries			
	Black ¹		White ²	
	Has This Condition	Has Another One of These Conditions	Has This Condition	Has Another of the Four Conditions
	Percent			
Higher-Cost Heart Disease	19.1	88.0	21.2	88.1
Chronic Obstructive Pulmonary Disease	15.6	76.1	20.4	77.9
Diabetes	24.3	75.1	18.5	80.0
Stroke	27.3	78.7	31.0	75.2
Dehydration, Malnutrition, and Other Metabolic Disorders	30.7	75.9	32.6	73.3

¹ N=271,662.

² N=1,001,074.

NOTES: Observations were weighted by number of months in 1995 that the beneficiary had full FFS Medicaid coverage. Weights for beneficiaries in each State were normalized so that each State has equal representation among both black and white beneficiaries. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

The difference between this study and those based on the MCBS in patterns of benefit use by individuals of different races is probably due, at least in part, to the fact that MCBS respondents with any type of drug coverage differ from those with Medicaid coverage in ways that could affect their pharmacy benefit use.

The critical question in assessing the importance of racial disparities in use, and in seeking potential solutions is determining why these disparities exist. The administrative data available to this analysis can measure only a small number of the factors that may contribute to the substantial differences in pharmacy benefit use and costs observed for black and white dually eligible beneficiaries. Among these are differences in health and in preferences for use of health care. These attributes are reflected, albeit imperfectly, in the study's measures of the incidence of medical conditions and comorbidity and in combined Medicare and Medicaid reimbursement for physician services. Although the diagnosis data are useful in describing the types and numbers of conditions beneficiaries have, the severity of those conditions remains unmeasured. Average per beneficiary

physician reimbursement is a potentially useful indicator—it reflects differences in personal preferences for health service use, in that beneficiaries who prefer minimal contact with the health care delivery system shun physicians, even when moderately ill. Moreover, since most people must get their prescriptions from physicians, those who shun physicians are less likely to have medications prescribed. However, differences in average per beneficiary physician reimbursement also reflect differences in patients' health, and, to some degree, per visit payment rates.

Little of the difference in pharmacy benefit use and spending between black and white beneficiaries appears to be due to differences in the incidence of chronic diseases. Black and white beneficiaries appear to have roughly similar incidence of these five conditions, although black beneficiaries have a higher rate of diabetes, while white beneficiaries have a higher rate of chronic lung disease (Table 7). In addition, among those with any one of these conditions, black and white beneficiaries have a roughly similar chance of having more than one condition. For example, among black and white beneficiaries,

Table 8

Pharmacy Benefit Use and Spending, by Selected High-Cost Chronic Condition and Race: 1995

Condition	Beneficiary Monthly Average Number of Prescriptions			Beneficiary Monthly Average Pharmacy Reimbursement		
	Black ¹	White ²	Ratio	Black ³	White ⁴	Ratio
Higher-Cost Heart Disease	4.6	5.5	0.83	\$126	\$143	0.88
Chronic Obstructive Pulmonary Disease	4.3	5.0	0.86	126	146	0.86
Diabetes	4.4	5.3	0.83	126	147	0.86
Stroke	4.2	4.9	0.85	115	129	0.90
Dehydration, Malnutrition, and Other Metabolic Disorders	4.0	4.7	0.85	119	136	0.88

¹ N=271,662.

² N=1,001,074.

³ N=271,662.

⁴ N=1,001,074.

NOTES: Individuals' monthly averages were weighted by number of months in 1995 that the beneficiary had full FFS Medicaid coverage. Weights for beneficiaries in each State were normalized so that each State has equal representation among both black and white beneficiaries. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

nearly 9 of every 10 beneficiaries who have heart disease also have one or more of the other four conditions.

Moreover, even among beneficiaries who have the same medical condition, black beneficiaries have substantially lower prescription drug use and costs than do white beneficiaries. For example, white beneficiaries with high-cost heart disease have Medicaid spending of \$143 on drugs and fill 5.5 prescriptions per month, on average, compared with \$126 and 4.6 prescriptions for black beneficiaries (Table 8). This pattern holds for every disease examined, with black beneficiaries having pharmacy reimbursements 10 to 14 percent below that of white beneficiaries.

Black beneficiaries' lower use of prescription drugs also does not appear to be due to less access to physician services. Within groups who have the same conditions, average annual reimbursement for physician services (Medicare and Medicaid combined) tends to be substantially *higher* for black beneficiaries than for white beneficiaries.

For example, among those with high-cost heart conditions, average reimbursement for physician services was \$1,982 for black beneficiaries, compared with \$1,575

for white beneficiaries. Physician reimbursement was also 10 to 28 percent higher for black beneficiaries among those with other chronic diseases and those with dehydration/malnutrition. Thus, lower use of pharmacy benefits among black beneficiaries is not due to less use of physician services, but rather occurs in spite of having physician reimbursement that is substantially higher than that of white beneficiaries with the same chronic illness (Table 9).

Given the persistence of these racial differences in prescription drug use, it is not surprising that sizable differences remain when we control for various factors simultaneously. We used beneficiary-level observations to estimate regression models of average monthly Medicaid reimbursement, and average monthly number of prescriptions filled on race-State interaction terms, controlling for the presence of medical conditions, age, sex, State, urban/rural residence, and nursing home residence. Racial differences in number of prescriptions filled per month range from a high of 1.19 in Indiana to a low of 0.08 in California. Racial differences in costs per month range from \$6 to \$31. Taking a simple average of the 10 interaction terms yields statistically

Table 9
Physician Reimbursement, by Selected High-Cost Chronic Condition and Race: 1995

Condition	Beneficiaries		Ratio
	Black ¹	White ²	
Higher-Cost Heart Disease	\$1,982	\$1,575	1.26
Chronic Obstructive Pulmonary Disease	1,729	1,499	1.15
Diabetes	1,473	1,336	1.10
Stroke	1,705	1,332	1.28
Dehydration, Malnutrition, and Other Metabolic Disorders	1,797	1,499	1.20

¹ N=271,662.

² N=1,001,074.

NOTES: Observations were weighted by number of months in 1995 that the beneficiary had full FFS Medicaid coverage. Weights for beneficiaries in each State were normalized so that each State has equal representation among both black and white beneficiaries. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

significant estimated differences of 0.57 for number of prescriptions and \$23 for costs (Table 10), similar to the 0.80 and \$19 differences in the simple means reported in Table 6. Certain diagnoses (COPD, diabetes, heart disease, HIV, and ESRD) and nursing home residence were associated with substantially increased benefit use and costs.

It is likely that some of the unexplained racial difference in medication use and cost is due to differences in beneficiary attitudes toward, and knowledge about, adherence to recommended treatments, and in their subsequent adherence behavior. Variation in their providers' knowledge and skill regarding prescribing, monitoring for polypharmacy, and providing patient education may also contribute to the observed difference between black and white beneficiaries in pharmacy benefit use. None of these traits can be measured with administrative data, so we do not know if they vary across groups of beneficiaries defined by race, or, if they do vary, why. The relative importance of these different beneficiary and provider traits in ensuring that beneficiaries fill prescriptions and take them as directed is poorly understood. These and other unmeasured characteristics appear to be more important than differences in health or contact with physicians in explaining the substan-

tial difference in pharmacy benefit use between black and white dually eligible beneficiaries.

CONCLUSION

We conclude that the substantial difference in prescription drug use we observed between white and black dually eligible beneficiaries in 10 States in 1995 was not attributable to racial differences in the presence of costly chronic health conditions, nor to differences on other beneficiary characteristics measurable with administrative data. This finding of sizable racial differences is consistent with prior literature on disparities in the use of other types of health care. More strikingly, this difference was observed even though black beneficiaries had substantially higher physician costs, suggesting they had more contact than white beneficiaries with their providers.

This was a descriptive, exploratory investigation with several limitations (noted earlier). As such, it raises additional questions: was less benefit use among black beneficiaries a result of underprescribing by their physicians or of overprescribing by physicians for treating white beneficiaries? Did the differences in drug use lead to differences in health outcomes? Given that health and other measured beneficiary characteristics

Table 10
Regression Models for Number of Prescriptions Filled and Prescription Reimbursement Per Beneficiary Per Month: 1995

Control Variable	Number of Prescriptions		Reimbursement	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Age				
Under 65 Years	0.28	41.3	23	70.4
65-74 Years	(1)	N/A	(1)	N/A
75-84 Years	-0.06	-8.4	-7	-26.7
85 Years or Over	-0.38	-42.2	-23	-71.2
Sex				
Male	(1)	N/A	(1)	N/A
Female	0.64	114.5	12	41.5
State				
California	-0.95	-79.6	-19	-32.9
Colorado	-0.36	-19.4	-5	-5.6
Florida	-0.39	-31.8	6	9.5
Georgia	-0.51	-39.5	-12	-20.3
Indiana	0.99	52.3	19	26.2
Kentucky	0.76	43.7	8	13.3
Michigan	-0.06	-3.8	-11	-15.9
New Jersey	-0.63	-42.3	6	7.7
Washington	0.03	2.2	4	5.2
Wisconsin	(1)	N/A	(1)	N/A
State-Black Interactions Terms				
California	-0.08	-7.4	-9	-10.7
Colorado	-0.63	-13.0	-28	-12.6
Florida	-0.47	-43.1	-25	-29.2
Georgia	-0.51	-48.0	-24	-46.5
Indiana	-1.19	-34.1	-31	-20.4
Kentucky	-0.96	-27.3	-26	-20.9
Michigan	-0.41	-19.6	-21	-20.6
New Jersey	-0.24	-12.5	-6	-4.6
Washington	-0.54	-12.1	-28	-13.1
Wisconsin	-0.68	-23.4	-29	-21.8
Urban/Rural Beneficiary Residence				
Urban	-0.01	-1.6	1	4.8
Rural	(1)	N/A	(1)	N/A
Urban Rural Indicator Missing	-0.71	-26.2	-27	-16.4
Chronic Conditions and Comorbidity				
Diabetes	1.20	140.2	35	90.7
Stroke, Cerebrovascular, and Other Vascular Diseases	0.43	51.4	14	34.8
Dehydration, Malnutrition, and Other Metabolic Disorders	0.54	71.5	24	57.5
Chronic Obstructive Pulmonary Disease	1.09	125.6	35	85.1
High-Cost Heart Disease	1.09	119.9	22	50.7
Has 2 or More of These Conditions	0.04	3.2	0	0.6
Has HIV/AIDS	2.55	53.3	429	44.9
Died During 1995	0.24	18.4	17	18.3
Type of Medicaid Eligibility for Most of Year				
Cash Recipient	(1)	N/A	(1)	N/A
Medically Needy	-0.25	-23.8	2	2.9
Noncash Recipient	-0.05	-6.2	3	7.6
Current Reason for Medicare Entitlement				
ESRD or ESRD/Disabled	1.39	43.4	100	41.1
Managed Care Participation				
In Medicare Managed Care for at Least 1 Month During Year	-0.48	-48.3	-25	-56.3
In Medicaid Managed Care for at Least 1 Month During Year (but less than 12 months)	-0.06	-2.8	-15	-11.2

See footnotes at end of table.

Table 10—Continued
Regression Models for Number of Prescriptions Filled and Prescription Reimbursement Per Beneficiary Per Month: 1995

Control Variable	Number of Prescriptions		Reimbursement	
	Coefficient	t-Statistic	Coefficient	t-Statistic
In Both Medicare and Medicaid Managed Care for at Least 1 Month During Year	-0.54	-11.8	-26	-14.1
Not in Medicare or Medicaid	(1)	N/A	(1)	N/A
Nursing Home Residence				
Not in a Nursing Home During Year	(1)	N/A	(1)	N/A
In a Medicare Skilled Nursing Facility Only	-1.06	-46.5	-33	-25.9
In a Medicaid Nursing Home Part Year	1.03	84.1	10	15.2
In a Medicaid Nursing Home Entire Year	2.06	190.8	31	69.0
Intercept	1.69	135.4	46	84.8

¹ Omitted.

NOTES: N=1,272,736. With three exceptions, coefficients were significantly different from zero at the 0.01 level (two-tailed test) due primarily to the large number of observations in the regression models. $R^2 = 0.25$ for number of prescriptions, 0.13 for reimbursements. The 10-State sample includes: California, Florida, Georgia, New Jersey, Wisconsin, Michigan, Kentucky, Indiana, Washington, and Colorado. N/A is not applicable.

SOURCE: Schore, J., Brown, R., and Lavin, B., Mathematica Policy Research, Inc., 2004.

explained less than one-half the difference in mean usage, to what can this difference be attributed? When the new Medicare prescription drug benefit takes effect in 2006, should we expect to see the same racial disparity in its use?

If benefit use differences by race persist and result in more adverse outcomes for black beneficiaries, it is critical to determine the extent to which the differences are due to provider or beneficiary behavior amenable to change. For example, if differences were due to the failure of physicians to appropriately educate black beneficiaries about treatment adherence, an effort to train physicians on how to overcome the adherence barriers black beneficiaries face might be in order. Alternatively, education of beneficiaries might be provided best by other health professionals, perhaps in settings other than a physician's office. If differences were due to beneficiary attitudes, a broad public health campaign to correct misperceptions about the importance of treatment adherence, targeted to reach and appeal to black beneficiaries, might be needed.

Our findings strongly suggest that simply providing a Medicare prescription drug benefit will not eliminate the racial disparities in prescription drug use that have been observed among Medicare beneficiaries. One way to reduce the disparity, regardless of its causes, may be through well designed, well implemented, and culturally sensitive education programs. Such programs are sometimes referred to as disease management, care coordination, or case management. Strong disease management programs educate providers about the best medication regimens for particular chronic illnesses and monitor their prescribing practices, while educating patients about the importance of adherence to prescribed regimens and explaining how to take medications properly. CMS' current efforts to promote such disease management programs for both dually eligible beneficiaries and the Medicare FFS populations in general may be the most effective method for ensuring that all Medicare beneficiaries, regardless of race, receive the medications they need to combat their chronic illnesses and that they reap the sizable quality-of-life benefits associated with appropriate medication.

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