Published in final edited form as:

J Am Geriatr Soc. 2007 February ; 55(2): 221–226.

Epidemiology of Medicare Abuse: The Example of Power Wheelchairs R2

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Abstract

Background—Press reports and government investigations have uncovered widespread abuse in power wheelchair prescriptions reimbursed by Medicare, with specific targeting of minority neighborhoods for aggressive marketing.

Objective—We sought to determine the impact of neighborhood ethnic composition on power wheelchair prescriptions.

Design—The 5% non-cancer sample of Medicare recipients in the Surveillance, Epidemiology and End Results (SEER)-Medicare linked database, from 1994–2001

Setting—SEER regions

Participants—Individuals covered by Medicare living in SEER regions without a cancer diagnosis

Measurements—Individual characteristics (age, gender, ethnicity, justifying diagnosis, and comorbidity), primary diagnoses, neighborhood characteristics (% black, % Hispanic, % with <12 years education and median income) and SEER region

Results—The rate of power wheelchair prescriptions increased 33 fold from 1994 to 2001, with a shift over time from justifying diagnoses more closely tied to mobility impairment, such as strokes, to less specific medical diagnoses, such as osteoarthritis. In multilevel, multivariate analyses,

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This study used the linked SEER-Medicare database. The interpretation and reporting of these data are the sole responsibility of the authors. The authors acknowledge the efforts of the Applied Research Program, NCI; the Office of Research, Development and Information, CMS; Information Management Services (IMS) Inc.; and the Surveillance, Epidemiology, and End Results (SEER) Program tumor registries in the creation of the SEER-Medicare database.

Author Contributions: J. Goodwin directed the conception and design, data analysis, preparation of manuscript and final approval of version to be published; K. Ottenbacher contributed to the study design, data analysis and preparation of manuscript; Y-F Kuo contributed to data analysis and interpretation and manuscript preparation; and T. Nguyen-Oghalai contributed to study design, data acquisition, analysis and interpretation, and manuscript preparation.

Sponsor's Role: Sponsors had no role in the design, methods, subject recruitment, data collection, analysis or preparation of this article.

Sources of Support: This research was supported by funding from the National Institutes of Health, the National Institute on Aging, and the American College of Rheumatology Research and Education Foundation-ASP, J. Goodwin (P50-CA105631); K. Ottenbacher (K02-AG01973); and T. Nguyen-Oghalai (T. Franklin Williams Junior Career Development Award).

Financial Disclosure(s): This research was supported by funding from the National Institutes of Health, the National Institute on Aging, and the American College of Rheumatology Research and Education Foundation-ASP, J. Goodwin (P50-CA105631); K. Ottenbacher (K02-AG01973); and T. Nguyen-Oghalai (T. Franklin Williams Junior Career Development Award).

individuals living in neighborhoods with higher percentages of blacks or Hispanics were more likely to receive power wheelchairs (OR= 1.09 for each 10% increase in black residents and 1.23 for each 10% increase in Hispanic residents), after controlling for ethnicity and other characteristics at the individual level.

Conclusion—These results support allegations that minority neighborhoods have been specifically targeted by marketers promoting power wheelchairs.

Keywords

Power wheelchair; policy; ethnicity; fraud; abuse

INTRODUCTION

Health insurance fraud was estimated in 2003 to cost 50 to 85 billion dollars in the U.S.¹ Fraud and abuse contribute to rising costs of the Medicare and Medicaid programs. However, there has been little systematic study of this issue.^{2,3} In this report, we focus on one example of fraud and abuse, involving claims and reimbursement by Medicare for power wheelchairs.

Power wheelchairs, including motorized scooters, are covered by Medicare for severely mobility impaired patients who cannot operate a manual wheelchair.⁴ Over the past several years, there have been a number of complaints alleging fraud and abuse in the power wheelchair program.^{5–7} This led to investigations by the General Accounting Office and the Office of Inspector General of the U.S. Department of Health and Human Services.^{4,8,9}

There has been considerable concern raised about improper marketing of power wheelchairs.^{5,10} There were allegations that minority neighborhoods were targeted, using door-to-door solicitation, and that fully ambulatory older residents were offered kickbacks for participating and bounties for recruiting others.¹⁰ These individuals were then directed to specific physicians, some of whom also received kickbacks from the power wheelchair distributors.^{7,11} One factor contributing to the abuse was the large profit margin for suppliers of power wheelchairs. Medicare was paying more than \$5,000 per power wheelchair claim in 2003, while the Veteran's Administration paid closer to \$3,000 per chair,⁸ which suggests that there was substantial profit in power wheelchairs reimbursed by Medicare.

Although Medicare reimbursement for power wheelchairs grew from less than \$150 million in 1997 to more than \$1.1 billion in 2003, the specific pattern of growth in power wheelchair claims has not been described in detail.⁴ In this paper, we examine the growth in wheelchair prescriptions from 1994 through 2001. We were interested in whether the pattern of diagnoses used to justify the prescription of power wheelchairs changed over time, from diagnoses clearly tied to mobility impairment such as multiple sclerosis, strokes and amputation, to more nonspecific diagnoses such as osteoarthritis. We also were interested in whether there was evidence of targeting minority neighborhoods, as suggested in press reports.⁷ Using multilevel analysis, we assessed the impact of neighborhood ethnic composition on power wheelchair prescriptions, independent of the ethnicity of the individual. We hypothesized that prescriptions for power wheelchairs would be highest in minority neighborhoods.

PATIENTS AND METHODS

Data Sources and Study Sample

We analyzed data from the 5% non-cancer control subjects included in the Surveillance, Epidemiology and End Results (SEER)-Medicare database.¹² The 5% control sample included in the SEER database contains relevant Medicare files and is linked to the 2000 Census data.

In the 1990's, the SEER program consisted of a group of 11 tumor registries (the metropolitan areas of Atlanta, Detroit, Los Angeles, San Jose, San Francisco/Oakland, and Seattle; and the states of Connecticut, Hawaii, Iowa, New Mexico and Utah) representing approximately 14% of the U.S. population. The data used in this study included the Medicare Enrollment file, the Medicare Provider Analysis and Review file (hospital inpatient claims), the Outpatient file (outpatient claims), the Carrier File (physician services claims) and the Durable Medical Equipment file (claims submitted to Durable Medical Equipment regional carriers). Medicare recipients in SEER areas are similar to the U.S. Medicare population, with a somewhat larger percentage of non-whites and urban dwellers.^{12,13}

All subjects with at least one month of Medicare part A & B coverage (wheelchair is a part B benefit), not a member of a health maintenance organization that month, and residing in one of the SEER areas between 1994 and 2001 were included in the initial sample. We further refined the sample by excluding subjects who were not enrolled in both Medicare Part A & B in the 12 months before each study year (11,556 person-years) and were members of a health maintenance organization (10,186 person-years).

To examine the relationships between power wheelchair prescriptions and neighborhood characteristics, the SEER-Medicare data were linked with the 2000 U.S. Census data. The linkage was based on subjects' zip code from Medicare enrollment data for each year. This linkage included only Medicare subjects 65 years and above in 1999 to 2001 and allowed us to compare persons with and without power wheelchair claims during a defined period when power wheelchair prescription rates were at their highest levels. The study month for subjects with a power wheelchair claim was the month of the prescription. The study month for subjects without a power wheelchair claim was randomly assigned from a given year. The Institutional Review Board of the University of Texas Medical Branch, Galveston, Texas, granted approval of this study. De-identified data were used in the analyses and individual subject consent was not required.

Data Collection and Measures

The primary outcome was rate of power wheelchair claims (K0011) from 1994 to 2001. Power wheelchair claims were calculated as the number of claims submitted divided by all eligible person-years in the Medicare Enrollment file. We used submitted claims in the analyses instead of paid claims to obtain a more complete record of services received. Between 89 and 91% of the submitted claims included in the analyses were paid for by Medicare. The primary claim diagnosis code in the Durable Medical Equipment file was used to assess reasons for the wheelchair prescription. For some analyses, we dichotomized the diagnoses into two groups: neurologic/orthopedic and medical. The neurologic/orthopedic category included stroke, Parkinson's disease, cerebral palsy, multiple sclerosis, spinal cord injury, other paralytic syndromes, amputations, and fractures. The medical category included hypertension, cardiac and pulmonary diseases; arthritis and related diseases; endocrine/metabolic diseases; and others (see Table 1).

Potential moderating variables included characteristics of the individual and neighborhood or environmental factors. Individual characteristics included age (years), gender, ethnicity, region, and comorbid conditions. A comorbidity index was calculated by the Klabunde's method using the Medicare inpatient and outpatient physician claim data.¹⁴ Ethnicity was categorized as non-Hispanic white, black, Hispanic and other (Asian, Native American and unknown). Unlike the U.S. Census, Medicare does not separate race and ethnicity. Hispanics must choose between Hispanic or some other race. This results in underreporting of Hispanics in Medicare data relative to census data.¹⁵

Neighborhood and environmental factors obtained from the linkage with the U.S. Census data included median income, percent of adults with less than 12 years education, percent black, and percent Hispanic. Neighborhood characteristics were aggregated at the level of zip code for the purpose of statistical analyses.

Statistical Analyses

Descriptive statistics were used to explore the unadjusted rates of wheelchair claims and the primary diagnosis for claims. The comparison of neighborhood and sociodemographic characteristics between persons with and without power wheelchair claims (1999–2001) was conducted using hierarchical generalized linear models (HGLM). HGLM models were computed for all eligible neighborhoods with at least five subjects. Five subjects is considered sufficient for level two variables when fixed effects are being tested.^{16,17} We also repeated the analyses using only neighborhoods with at least 125 subjects and found the same patterns as reported here. Analyses were performed using SAS v. 9.1 (SAS Institute, Inc., Cary, NC).

RESULTS

Time Trend in Claims for Power Wheelchairs from 1994 To 2001

There were 1,166,325 person-years available for this analysis. There was a 33-fold increase in the rate of power wheelchair claims from 1994 (0.11 per 1000 Medicare patients per year) to 2001 (3.60 per 1000).

Table 1 presents the primary diagnoses to justify the power wheelchair prescriptions. Neurological and orthopedic diagnoses accounted for slightly fewer than 40% of all wheelchair claims, while hypertension, cardiopulmonary diseases, arthritis and endocrine/metabolic diseases accounted for approximately 60%. The table includes Medicare subjects of all ages; that is, those 65 years of age and older enrolled in traditional Medicare and also those younger than age 65 who were eligible for Medicare because they were considered disabled under Social Security provisions. The use of a medical (vs. neurologic/orthopedic) diagnosis as justification for power wheelchair prescriptions was higher among those 65 and older than among younger patients (67.6% vs. 48.7%, $p < 0.001$). The use of a medical diagnosis was also higher among nonwhites (67.0%) than among whites (57.7%, $p < 0.001$), and among women (59.9%) than men (40.1%, $p < 0.001$).

Figure 1 traces the growth in all power wheelchair claims by year, and also stratified by whether the primary diagnosis justifying the prescription was neurologic/orthopedic or medical. The major growth in wheelchair claims during the period of study was in patients with a medical diagnosis ($p < 0.001$). In 1994–1996, 33.3% of the power wheelchair claims were for a medical diagnosis, while, by 2001, 68% were for patients with a medical diagnosis. Of the medical diagnoses, 41.3% were for osteoarthritis or non-specific or unspecified joint or back problems.

We next examined the relationship of ethnicity, income, and educational status to power wheelchair prescriptions. Ethnicity was examined both at an individual level and at a neighborhood level (% Black and % Hispanic in zip code of residence), while income and education were only examined at the level of the zip code. We limited analyses to Medicare patients 65 and older for the years 1999 to 2001, because those were the years reflecting the greatest increase in prescriptions (two thirds of all power wheel chair prescriptions from 1994 to 2001 were in 1999–2001), and older patients were alleged to be specific targets for power wheelchair marketers.^{6,7,18}

There were 367,468 person years available for this analysis. Bivariate analyses were performed to look for associations between demographic characteristics or neighborhood characteristics and wheelchair claims. Black patients were about six times as likely to receive a power

wheelchair during 1999–2001 than were whites, with Hispanic patients having a rate in between. Residents of the South were more than six times as likely to receive power wheelchairs than those in the Northeast or Midwest. Power wheelchair claims were also more common in neighborhoods with low income, low education, or higher percentages of black or Hispanic residents.

Table 2 presents multivariable HGLM analyses of odds of receiving a power wheelchair. In Model 1, only individual characteristics are included, while Model 2 is a multilevel analysis including characteristics of the neighborhood environment. In Model 1, there are clear associations of increased power wheelchair use with older age, male gender, black race and increasing comorbidity. Prescriptions were also substantially greater in the South and West versus the Northeast and Midwest. The increased rate of power wheelchair use for Hispanics seen in the bivariate analyses is no longer seen after controlling for other individual characteristics in Model 1. Model 2 shows that the overall ethnic composition of the neighborhood was a major predictor of power wheelchair prescriptions independent of the ethnicity at the individual level of the residents of the neighborhood. Each 10% increase in percent black residents was associated with a 9% increase in wheelchair prescriptions, while each 10% increase in Hispanic residents was associated with a 23% increase in power wheelchair prescriptions. Adding neighborhood ethnicity, poverty (income) and education variables had little effect on the odds associated with individual characteristics.

We repeated the HGLM analyses in Table 2, restricting the dependent variable to those receiving power wheelchairs for a medical (i.e., not neurologic/orthopedic) diagnosis. The odds associated with year, age, ethnicity, region and comorbidity were very similar to those shown in Table 2. The effect of gender was eliminated (odds of receiving power wheelchairs for women versus men, 0.98; 95% CI = 0.89, 1.07), while the effect of neighborhood percent black (OR = 1.13, 95% CI = 1.05, 1.22) and percent Hispanic (OR = 1.28, 95% CI = 1.19, 1.39) were somewhat higher than in the analysis of power wheelchairs prescribed for any diagnosis.

DISCUSSION

Fraud and abuse of third-party payors by providers of healthcare services are increasingly recognized as a serious problem in American medicine.^{1–3,10,18} Fraud typically is a criminal offense and involves the knowing intent to deceive for financial gain. Abuse includes providing unnecessary services or services which fail to meet recognized standards.¹⁸ There are, remarkably, few studies of fraud and abuse, presumably because they are difficult to establish.^{2,3} In that regard, it should be noted that none of the data presented in our analyses establish the existence of fraud or abuse. Instead, the pattern of prescriptions for power wheelchairs in this population-based sample was consistent with the allegations in press reports and federal investigations.^{4–11,19} Specifically, we found a rapid increase in power wheelchair use from 1994 to 2001. This increase was mostly in recipients whose justification was relatively loosely tied to the Medicare criteria for power wheelchairs (i.e., those with diagnoses of osteoarthritis or cardiopulmonary disease rather than those with neurologic conditions.) The most striking finding was the association of wheelchair prescriptions with neighborhood concentration of black and Hispanic ethnicity. In multivariable, multilevel analyses, black ethnicity was associated with a 2.78 fold increase in odds of receiving a wheelchair. In addition, Medicare enrollees living in neighborhoods with higher concentrations of blacks had higher odds of receiving a wheelchair, independent of their individual ethnicity. The effect of Hispanic ethnicity was entirely at the neighborhood level. In multivariable, multilevel analyses, Hispanic ethnicity was not associated with increased odds of receiving a wheelchair (OR = 0.81, 95% CI = 0.64, 1.01), but Medicare enrollees in neighborhoods with higher concentrations of Hispanics had greater odds of receiving a wheelchair (OR = 1.23, 95% CI = 1.15, 1.31 for each 10% increase in percentage of residents who were Hispanic).

On the other hand, black ethnicity was associated with increased odds of power wheelchair prescriptions at both the individual and neighborhood level. The increased rate of power wheelchair prescriptions for blacks might be partially explained by the higher rates of disability experienced by this group.²⁰ Hispanics are also at greater risk for disability than non Hispanic whites,^{21,22} but this was not reflected in a greater rate of power wheelchair prescription for this group. We can think of no plausible medical explanation for the higher rate of power wheelchairs by residents of minority neighborhoods, independent of individual ethnicity.

The targeting of minority neighborhoods, especially Hispanic neighborhoods, has been noted in press reports. For example, a recent NY Times article described how recruiters canvassed Mexican-American neighborhoods in Arizona, offering kickbacks and organizing busloads of residents who would travel to California to receive multiple, unnecessary surgeries at several outpatient surgical centers.¹

Another striking finding was the geographic variation in rate of power wheelchair prescriptions. Given the marked discrepancies among regions, there is concern that the rapid growth in the South and West regions could be duplicated in the Northeast and Midwest regions.

As noted above, our data cannot prove fraud or abuse. The Office of Inspector General for the Department of Health and Human Services audited 300 randomly selected claims for power wheelchairs from 2001, contacting suppliers, physicians and recipients for additional information.⁴ Almost one third of the claims failed to meet criteria, even for a standard non-motorized wheelchair. Another 45% met criteria for a standard wheelchair. Only 13% met Medicare criteria for a power wheelchair. Twenty-eight percent of recipients stated they were not using the wheelchairs or were using them only outside the home. These findings clearly demonstrate widespread abuse of the system.

There are a number of regulations already in place designed to curb abuse. These include a statute forbidding telephone solicitation by Durable Medical Equipment suppliers and forbidding providers from waiving the 20% co-pay. In addition, the prescription of one form of motorized wheelchairs, the scooter, is supposed to be limited to certain specialists.²³ Such restrictions have been linked to decreased abuse in other settings.²

Changing the Medicare reimbursement rate is another proposed strategy to reduce potential abuse.⁴ In 2004, the Medicare rate for the most popular power wheelchair, a K-11 model, was \$5,297, the same wheelchair could be purchased on-line for \$3,863, from wholesalers for \$2,363, and from distributors and manufacturers for \$1,550.⁴

Perhaps the most difficult issue in combating abuse is in applying rigid criteria to complex clinical situations. There is no doubt that power wheelchairs represent a major advance that has had a dramatic effect on the quality of life and independence of many persons with severe mobility impairment. Healthcare insurers must construct relatively rigid criteria that dichotomize patients with a complex spectrum of need into those who do or do not qualify. Some individuals who do not meet Medicare criteria might still benefit from a power wheelchair. On the other hand, leaving the decision on whether or not an individual should receive a power wheelchair reimbursed by Medicare up to his or her personal physician or any other physician does not seem to be working, particularly in the face of aggressive marketing to the public emphasizing the message that individuals deserve power wheelchairs as part of their rights under Medicare.^{7,10}

CONCLUSION

In conclusion, there was a rapid rise in power wheelchair prescriptions between 1994 and 2001, coincident with growing reports of abuse in this area. Recent efforts by the Center for Medicare and Medicaid Services to tighten the process of power wheelchair prescriptions may be successful in reducing the abuse.²⁴ Successful efforts to combat abuse may require more active participation of the medical community, working with third-party payors such as Medicare, to design and test programs to identify and control abuse within the payment systems. This study shows how administrative datasets can be used to more fully describe the pattern of utilization of medical technologies which may in turn provide evidence which raises concern for potential abuse.

Acknowledgements

James S. Goodwin was supported by a grant from the National Institutes of Health for the Center for Population Health and Health Disparities (P50 CA105631). Kenneth J. Ottenbacher was supported by a grant from the National Institute on Aging (K02 AG01973).

Tracy U. Nguyen-Oghalai was supported by an American College of Rheumatology Research and Education Foundation-ASP-Junior Career Development Award.

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Figure 1.

Rate of Wheelchair Prescriptions for Medicare Enrollees in the 5% Non-cancer Sample Residing in SEER Areas, and also Stratified by Whether the Justifying Diagnosis was Medical or Neurologic/Orthopedic. The change in rate for wheelchair prescriptions justified by a medical diagnosis was significantly greater than that for a neurologic/orthopedic diagnosis ($p < 0.001$ by Chi Square).

Table 1

Primary Diagnoses Justifying Prescriptions for Power Wheelchairs, from 5% Sample of Medicare Patients Living in SEER Areas, 1994–2001

Diagnoses (ICD-9 Code)	Number of prescriptions	Percent of power wheelchairs prescribed for this diagnosis
Neurologic diseases	584	34.2
Parkinson's disease (332)	36	2.1
Multiple sclerosis (340)	68	4.0
Hemiplegia and hemiparesis (342–342.9)	27	1.6
Infantile cerebral palsy (343–343.9)	34	2.0
Other paralytic syndromes (344–344.9)	75	4.4
Cerebral vascular accident, acute (436–436.9)	191	11.2
Others	153	9.0
Orthopedic conditions	63	3.7
Traumatic amputation (897–897.7)	30	1.8
Fractures (805.2–825)	15	0.9
Others	18	1.1
Hypertensive, cardiac and pulmonary diseases	407	23.8
Coronary artery & heart diseases (428–428.9 & 414– 414.9)	179	10.5
Lung diseases (491.2–519.8)	177	10.4
Unspecified peripheral vascular diseases (443.9)	23	1.3
Hypertension (401–402.9)	20	1.2
Other	8	0.5
Arthritis and related conditions	466	27.3
Rheumatoid arthritis (714–714.9)	56	3.3
Lupus, scleroderma, myositis (710.0–710.4)	6	0.4
Osteoarthritis (715–715.9)	269	15.8
Unspecified arthropathy (716–716.9)	27	1.6
Unspecified disorder of the joints (719.44–719.99)	12	0.7
Spondylosis (721–721.9)	15	0.9
Nonspecific disorder of the back (724–724.9)	32	1.9
Disorder of the disc without myelopathy (722–722.9)	18	1.1
Insomnia, malaise and fatigue (780.53, 780.7, 780.79, 780.9)	21	1.2
Others	10	0.6
Endocrine and Metabolic diseases	81	4.7
Osteoporosis, without pathologic fracture (733.00)	19	1.1
Diabetes (250–250.9)	55	3.2
Others	7	0.4
Others	96	5.6
Psychosis	4	0.2
Mental disorder	1	0.1
Impotence	1	0.1
Others	90	5.3
Miscoded or missing codes	10	0.6

Table 2

Odds of Receiving a Power Wheelchair among Medicare Enrollees in 1999–2001 aged 65 and Older, as a Function of Individual and Neighborhood Characteristics

		Model 1*	Model 2*
Demographic Characteristic		OR (95 % CI)	OR (95 % CI)
Year	1999	1.00	1.00
	2000	1.37 (1.23, 1.53)	1.37 (1.22, 1.54)
	2001	1.92 (1.73, 2.14)	1.98 (1.78, 2.20)
Age	(each 5 years increased)	1.06 (1.03, 1.09)	1.06 (1.03, 1.09)
Gender	Male	1.00	1.00
	Female	0.88 (0.81, 0.96)	0.87 (0.80, 0.95)
Ethnicity	White	1.00	1.00
	Black	3.26 (2.80, 3.79)	2.78 (2.36, 3.27)
	Hispanic	0.90	0.81 (0.64, 1.01)
	Other/Unknown	2.18 (1.90, 2.50)	2.09 (1.82, 2.39)
Region	Northeast	1.00	1.00
	Midwest	0.69 (0.44, 1.08)	0.71 (0.44, 1.14)
	South	4.53 (2.87, 7.13)	3.59 (2.23, 5.79)
	West	2.50 (1.69, 3.69)	1.83 (1.21, 2.77)
Comorbidity	0	1.00	1.00
	1	2.72 (2.44, 3.04)	2.74 (2.45, 3.06)
	2	4.28 (3.78, 4.85)	4.25 (3.74, 4.82)
	3	8.19 (7.29, 9.19)	8.05 (7.17, 9.05)
Zip median income	< 37,000	1.00	1.00
	37,000 – 46,999		0.80 (0.60, 1.08)
	47,000 – 59,999		0.71 (0.51, 1.00)
	>= 60,000		0.67 (0.44, 1.00)
Zip education (% adult < 12 years education)	<= 12.5%		1.00
	12.6 – 20.0%		1.04 (0.73, 1.48)
	20.1 – 27.5%		0.93 (0.63, 1.37)
	> 27.5%		0.92 (0.58, 1.48)
Zip % black	(each 10% increase)		1.09 (1.02, 1.16)
Zip % Hispanic	(each 10% increase)		1.23 (1.15, 1.31)

OR = odds ratio

CI = confidence interval

* Results from hierarchical generalized linear model