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Assistant Secretary for Planning and Evaluation
Office of Disability, Aging and Long-Term Care Policy



MEDICATION USE IN LONG-TERM CARE FACILITIES AND COMMUNITY SETTINGS FOR MEDICARE BENEFICIARIES WITH CARDIOVASCULAR DISEASE

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CARDIOVASCULAR DISEASE**

Becky Briesacher
Jalpa Doshi
Bruce Stuart
Ilene Zuckerman

University of Maryland

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ABSTRACT

Objectives

This report compares medication use in long-term care facilities and community settings for Medicare beneficiaries with heart conditions. The purpose of this comparison was to evaluate the utility of a new file of institutional drug use in the Medicare Current Beneficiary Survey (MCBS), the premier source of health care information on the Medicare population. Descriptions of medication use include the prevalence of drugs from 12 cardiovascular drug classes and 28 other major therapeutic drug categories. Characteristics of beneficiaries include type of heart disease, co-morbidities, functional levels and health status, demographics, Medicare supplemental coverage, and regional residence.

Methods

Data are from the 1998 MCBS public use files merged with a new dataset of drug administrations for the survey's facility sample. The MCBS captures a comprehensive picture of the health status, health care use, health insurance coverage, and socioeconomic and demographic characteristics of Medicare beneficiaries residing in the community or institutions (nursing homes and assisted living and related facilities). The institutional drug administration file contains medical record abstracts of medications prescribed and administered to residents while institutionalized. The study sample comprises 821 institutionalized beneficiaries and 5,692 community-dwelling beneficiaries with Medicare Part A or Part B claims indicating cardiovascular-related diagnoses. Estimates are weighted to reflect the drug use patterns of the Medicare population with heart disease.

Results

In 1998, approximately 58% (17.6 million) of the community-dwelling Medicare population and 75% (1.7 million) of the institutionalized Medicare population were treated for cardiovascular conditions. Use of certain heart medications was similar across the two populations, although facility residents were less likely to use other classes of heart drugs. Among beneficiaries treated for heart disease, nearly all (80%) used some type of cardiovascular drug therapy during the year, regardless of residential setting. Diuretics were the most commonly prescribed category of heart medications for both groups (50% of institutional residents vs. 40% of community residents). Use of angiotensin-converting enzyme (ACE) inhibitors--the second most common heart medicine--was also similar (27% of institutional residents vs. 25% of community residents). Large differences were noted in the prescribing of the following categories of drugs: institutionalized beneficiaries with heart disease were three times *less likely* to be

prescribed cholesterol-lowering agents (6% vs. 19%) as those treated in the community setting, two times *less likely* to take beta-blockers (12% vs. 24%), and one-third *less likely* to take calcium channel blockers (22% vs. 30%). Institutionalized beneficiaries were *more likely* than community beneficiaries to use digitalis (24% vs. 14%). These differences can be explained, in part, by the dissimilarities in the cardiovascular conditions suffered by the two population groups. Facility-dwelling beneficiaries tended to exhibit more advanced forms of heart disease than their counterparts in the community, and they often had co-existing illnesses that can complicate the selection of cardiovascular agents. Almost 70% of all cardiovascular treatment in the institutional setting was for heart failure, cardiomyopathy or other complications of heart disease compared to 45% in the community. About 25% of the institutional population had arteriosclerosis compared to 8% in the community. Institutionalized residents with heart disease more often suffer from concomitant illnesses such as mental disorders (70%), cerebrovascular disease (37%), and diabetes (30%). In contrast, less than 25% of community-dwelling beneficiaries with heart disease had evidence of any of these chronic conditions.

Conclusions

These national estimates of cardiovascular drug use in Medicare beneficiaries with heart disease serve as the first comparison in a consistent dataset of prescribing patterns across long-term care and community settings. The comparison showed that medication use and disease burden varied greatly for beneficiaries depending on residence. These differences are important when evaluating population-level patterns of care because prescribers must assess both the type of heart disease and the potential for interaction with concomitant conditions or therapies when selecting cardiovascular agents. Nevertheless, the lower use of some heart medicines in the institutional setting was notable given the overall severity of cardiovascular disease in this population. Since facility residents tended to use more medications than community residents in 27 of 28 other major drug categories, the lower use of some types of heart medicines (especially those used in secondary prevention) is anomalous. Future research should assess the possibility of under-treatment of cardiovascular disease in institutional settings.

STUDY OBJECTIVES

This study compares drug use in the community settings and long-term care facilities for Medicare beneficiaries with heart conditions. The purpose of this comparison was to evaluate the utility of a new file of institutional drug use in the MCBS, the premier source of health care information on the Medicare population. This analysis focused on beneficiaries with cardiovascular disease, because heart conditions are commonly treated in both settings and heart medicines encompass a wide variety of therapeutic choices. Our two main research aims are:

1. **To characterize beneficiaries with cardiovascular diseases by residence:** How do Medicare beneficiaries with cardiovascular disease differ by residence in the community or long-term care facilities? To what extent do they share similarities in type of heart disease, demographic characteristics, health care coverage, health status and co-morbidities?
2. **To characterize the prevalence of cardiovascular drug use for beneficiaries by residence:** How do pharmacologic treatments differ for beneficiaries with cardiovascular disease between the two settings? Do Medicare beneficiaries use different types of cardiovascular medications depending on the site of residence?

METHODS

This study used the 1998 MCBS Cost and Use files merged with an institutional drug administration file for the survey's facility sample. The institutional drug administration file fills an important gap in our understanding of the medical care administered to beneficiaries living in facilities, and it provides the first opportunity for a cross-setting comparison of national drug use patterns for Medicare beneficiaries. The study sample consisted of all community-dwelling and institutional beneficiaries with at least one diagnosis of cardiovascular disease in their Part A or Part B Medicare claims (inpatient or outpatient care). (See Appendix Tables A1 and Table A2 for details on sample selection). Beneficiaries were classified as community-dwelling or institutionalized according to the living situation codes in the MCBS. MCBS sample persons are drawn from Medicare enrollment records without regard for their residential status. MCBS interviewers locate sample persons and if they are living in institutions with at least three long-term care beds and offering specified services they are assigned a facility residence. It should be noted that while the MCBS facility sample is representative of the Medicare population that lives in long-term care facilities, it is not representative of the universe of all residents of long-term care facilities. Institutionalized beneficiaries include residents of licensed nursing homes, assisted living or related facilities, and mental health or retardation facilities. For this analysis, we assigned beneficiaries with multiple living situations to institutional status because prescription drug data were captured more completely during the facility stay. Information on beneficiary characteristics (demographics, income, geographic

residence, supplemental insurance, general health status and functional status) came from the MCBS survey. Type of heart disease and prevalence of other chronic conditions were drawn from the diagnostic fields in Medicare Part A and Part B claims.

Information on drug use came from the MCBS's institutional drug administration file for facility residents and the MCBS's prescribed medicine event file for community residents. The prescribed medicine event file contains self-reports of prescriptions filled and refilled during the year (over-the-counter medication use is not captured). MCBS respondents living in the community are asked to present all prescription drug containers and saved insurance receipts at each interview round as well as to keep a medication log for the entire year. The institutional drug administration file contains monthly record abstracts of all medications prescribed and administered to residents during their institutional stay. This file includes drugs never administered and medicines designated as over-the-counter drugs in the community setting since all drugs are prescribed in the facility setting. In our analysis, we excluded both drugs not administered and prescribed over-the-counter, such as aspirin.

All results were weighted to be nationally representative. Estimates failing reliability thresholds of at least 20 sample persons per analytic cell are noted.

RESULTS

Prevalence of heart disease. Table 1 shows the prevalence of heart disease in the study population by living situation. In 1998, approximately 58% (17.6 million) of the community-dwelling Medicare population and 76% (1.7 million) of the institutionalized Medicare population were treated for cardiovascular-related conditions.

Beneficiary characteristics. Table 2 shows that although both populations share cardiovascular disease they differ substantively across many other characteristics. The institutional group is much older than the community-dwelling group (over 50% are at least age 85 vs. 12%), and they are more often female (71% institutional vs. 57% community-dwelling). Nearly 60% of institutional beneficiaries with heart conditions have annual incomes of \$10,000 or less, compared to about 40% of those in the community. Among beneficiaries with heart disease, those in institutions more often live in the Midwestern part of the United States than those in the community (34% vs. 24%) and less often in the South (33% vs. 39%). Medicare supplemental coverage is vastly different in the two settings. Only one-third of all institutionalized beneficiaries with heart disease have private forms of health insurance (e.g, Medigap or employer-sponsored benefits) and they instead rely heavily upon Medicaid (61%). In contrast, over 70% of community-dwelling beneficiaries with cardiovascular conditions have private health insurance and less than 15% have Medicaid coverage. The last row in this table shows that nearly one-third of the institutional population changed their living situation during the year.

Health status. The two groups also differ by types of cardiovascular disease, concomitant illnesses, functional status, and mortality rates. As Table 3 shows, facility-dwelling beneficiaries tend to exhibit more advanced forms of heart disease than their counterparts in the community, and they often have co-existing illnesses that can complicate the selection of cardiovascular agents. Almost 70% of all cardiovascular treatment in the institutional setting was for heart failure, cardiomyopathy or other complications of heart disease compared to 45% in the community. About 25% of the institutional population had arteriosclerosis (compared to 8% in the community). Only hypertensive disease was more common in the community-dwelling population (80% vs. 68%). More than one-third of the institutional population was treated for three or more types of heart disease during the year (vs. 22% in the community). Institutionalized residents with heart disease more often suffered from concomitant conditions such as mental disorders (70%), cerebrovascular disease (37%), and diabetes (30%). In contrast, less than 25% of community-dwelling beneficiaries with heart disease had evidence of any of these chronic conditions. Given this difference in disease burden, it is not surprising to find that institutional beneficiaries with heart disease were twice as likely as their community counterparts to report poor general health status and 52% had difficulty performing five or more activities of daily living (vs. 4% in the community). Lastly, nearly one-quarter of the institutional population with heart disease died during the year compared to 4% of the community-dwelling population.

Use of cardiovascular medications. Use of heart medications was similar in some ways across the two populations, although facility residents were less likely to use certain classes of heart drugs (see Table 4). Among beneficiaries treated for heart disease, nearly all (80%) used some type of cardiovascular drug therapy during the year, regardless of residential setting. Diuretics were the most commonly prescribed category of heart medications for both groups (50% of institutional residents vs. 40% of community residents). Use of ACE inhibitors--the second most common heart medicine--was also similar (27% of institutional residents vs. 25% of community residents). Large differences were noted though in the prescribing of the following categories of drugs: institutionalized beneficiaries with heart disease were three times *less likely* to be prescribed cholesterol-lowering agents (6% vs. 19%) as those treated in the outpatient setting, two times *less likely* to take beta-blockers (12% vs. 24%), and one-third *less likely* to take calcium channel blockers (22% vs. 30%). Institutionalized beneficiaries were *more likely* than community beneficiaries to use digitalis (24% vs. 14%).

Use of non-cardiovascular medications. Table 5 provides information about the other medications that these populations used while being treated for heart disease. In 27 of 28 cases, facility residents had higher rates of drug use in non-cardiovascular therapeutic classes than the community-dwellers. Particular differences in these types of drug used between the institutional and community populations include: narcotic analgesics (30% vs. 18%), antibiotics (52% vs. 26%), antidepressants (39% vs. 14%), antipsychotics (22% vs. 2%), anti-ulcer agents (34% vs. 18%) and bronchodilators (19% vs. 9%).

DISCUSSION

These national estimates of cardiovascular drug use by Medicare beneficiaries with heart disease serve as the first comparison in a consistent dataset of prescribing patterns across long-term care and outpatient settings. The comparison shows that medication use and disease burden varied greatly for beneficiaries depending on their residence. These differences are important when evaluating population-level patterns of care because prescribers must assess both the type of heart disease and the potential for interaction with concomitant conditions or therapies when selecting cardiovascular agents. Nevertheless, the lower use of some heart medicines in the institutional setting was notable given the severity of cardiovascular disease in this population. Since facility residents tended to use more medications than community residents in 27 of 28 other major drug categories, the lower use of some types of heart medicines (especially those used in secondary prevention) is anomalous. Future research should assess the possibility of under-treatment of cardiovascular disease in institutional settings.

The analysis also demonstrates some of the capabilities and challenges of using the new MCBS institutional drug administration file. As noted earlier, the MCBS captures medication use in the community as self-reported prescription fills while medication use in institutions is monthly record abstracts of drug administrations. This difference presented several analytic complexities. First, drug use in the community suffers from some under-reporting bias (estimated at about 15%) not evident in the institutional drug records. Thus, the differences in cardiovascular medication use that we observed between the two settings may be even greater than reported here. Second, the distinction between administered drugs versus filled prescriptions may have influenced the capture of drugs, although we excluded any medications never administered in institutions to address this concern. Third, the distinction of over-the-counter versus prescribed drugs does not exist in the institutional setting, but it does in the community. We excluded over-the-counter medications such as aspirin to address this source of potential bias, nevertheless prescribing patterns are surely influenced by this systematic difference. Despite these challenges, the MCBS institutional drug administration file allowed for new insights into the medication use of beneficiaries in long-term care facilities.

TABLE 1. Medicare Beneficiaries with Cardiovascular Disease by Living Situation, 1998		
Type of Heart Disease	Institutionalized Beneficiaries (N=2.3 million)	Community-Dwelling Beneficiaries (N=30.6 million)
Any Heart Disease*	75.6%	57.6%
Chronic Rheumatic Heart Disease	2.9	2.2
Hypertensive Disease	51.1	46.3
Ischemic Heart Disease	31.2	21.5
Pulmonary Heart Disease	2.4	1.8
Heart Failure, Cardiomyopathy and Other Complications of Heart Disease	52.0	25.9
Atherosclerosis	19.3	4.8
SOURCE: Medicare Current Beneficiary Survey, 1998		
* Only includes heart diseases listed below. Refer to Appendix Table A1 for details.		

TABLE 2. Characteristics of Medicare Beneficiaries with Cardiovascular Disease by Living Situation, 1998		
Beneficiary Characteristics	Institutionalized Beneficiaries (N=1.7 million)	Community-Dwelling Beneficiaries (N=17.6 million)
Age (years)		
Under 65	5.9%	9.1%
65-74	10.7	41.6
75-84	31.5	37.3
85-94	42.4	11.4
95+	9.4	0.7
Gender		
Female	70.6	57.3
Male	29.4	42.7
Race		
White	87.1	85.9
Non-white	12.9	14.1
Income		
<\$5,000	15.1	6.9
\$5,000-\$10,000	43.6	32.7
\$10,001-\$20,000	25.6	37.7
\$20,001-\$30,000	9.6	13.3
>\$30,000	6.1	9.4
Urban/Rural Residence		
Urban	69.9	71.4
Rural	30.1	28.6
Census Region		
Midwest	34.2	24.4
South	32.9	38.6
Northeast	21.5	23.7
West	11.4	13.4
Source of Medicare Supplemental Coverage		
Private only	23.4	70.2
Medicaid only	49.1	12.2
Private and Medicaid	12.2	1.9
Other	9.0	10.1
No Medicare Supplemental Coverage	6.4	5.6
Lived in Community Any Time During the Year		
Yes	29.5	100.0
No	70.5	---
SOURCE: Medicare Current Beneficiary Survey, 1998		

TABLE 3. Health and Functional Status of Medicare Beneficiaries with Cardiovascular Conditions by Living Situation, 1998		
Beneficiary Characteristics	Institutionalized Beneficiaries (N=1.7 million)	Community-Dwelling Beneficiaries (N=17.6 million)
Type of Heart Disease		
Chronic rheumatic heart disease	3.9%	3.7%
Hypertensive disease	67.6	80.4
Ischemic heart disease	41.3	37.3
Pulmonary heart disease	3.1	3.1
Heart failure, cardiomyopathy and other complications of heart disease	68.8	44.9
Atherosclerosis	25.5	8.3
Number of Heart Disease Types*		
1	35.1	50.3
2	30.0	27.8
3	26.3	16.7
4 or more	8.6	5.2
Other Chronic Conditions**		
Diabetes	30.4	24.8
Cerebrovascular disease	37.4	15.9
Mental disorder	70.2	20.0
Alzheimer's	20.1	1.2
Osteoporosis	11.9	9.1
Arthritis	34.9	31.1
Asthma/COPD	12.6	11.0
Cancer	21.2	29.4
Number of Other Chronic Conditions		
0	7.6	22.3
1-2	45.6	59.0
3-4	39.5	16.9
5 or more	7.3	1.8
General Health Status		
Excellent to Very Good	7.8	34.5
Good	27.8	33.3
Fair	44.1	21.3
Poor	20.4	10.8
Activities of Daily Living (ADL) Limitations		
0	9.8	66.6
1-2	23.1	21.5
3-4	15.6	7.5
5-6	51.5	4.4
Died During the Year		
	25.5	4.4
SOURCE: Medicare Current Beneficiary Survey, 1998		
* Count includes chronic rheumatic heart disease, hypertensive disease, ischemic heart disease, pulmonary heart disease, other forms of heart disease, atherosclerosis.		
** Identified from claims data in 1998.		

TABLE 4. Prevalence of Cardiovascular Medication Use by Medicare Beneficiaries with Cardiovascular Disease by Living Situation, 1998*		
Therapeutic Class	Institutionalized Beneficiaries % With Any Use (N=1.7 million)	Community-Dwelling Beneficiaries % With Any Use (N=17.6 million)
Any Cardiovascular Medication**	78.9%	79.0%
Diuretics	49.9	39.4
ACE Inhibitors	27.3	25.4
Digitalis	24.0	13.6
Calcium Channel Blockers	21.6	30.0
Vasocoronary Agents	19.1	14.0
Beta-Blockers	11.8	24.4
Antiadrenergic Agents	10.7	9.5
Cholesterol-Lowering Agents	5.5	19.1
Antiplatelet	4.3	2.9
Angiotensin-Receptor Blockers	3.0*	4.1
Antiarrhythmic	2.2*	2.9
Vasodilator	0.8*	0.9
SOURCE: Medicare Current Beneficiary Survey, 1998		
* Cell size less than 20		
** Only includes cardiovascular medications listed below. Does not include over-the-counter medications such as aspirin		

TABLE 5. Prevalence of Non-Cardiovascular Medication Use by Medicare Beneficiaries with Cardiovascular Diseases by Living Situation, 1998		
Therapeutic Class	Institutionalized Beneficiaries % With Any Use (N=1.7 million)	Community-Dwelling Beneficiaries % With Any Use (N=17.6 million)
Analgesics, Narcotics	29.7%	17.8%
NSAIDs, Cyclooxygenase Inhibitor - type	18.0	16.8*
Antihistamines	16.8	8.9
Anti-Cancer Agents	3.5	2.2
Antibiotics	51.7	26.2
Antibacterials	14.6	5.4
Antifungal Agents	7.1	2.9
Antiparasitic Agents	3.7	2.0
Antiviral Agents	3.1	1.0
Anti-Alzheimer Agents	5.8	1.0
Alpha-Adrenergic Blockers	4.9	6.9
Anticholinergic Agents	3.2	2.2
Anticoagulants/Thrombolytics	17.6	13.2
Antidepressants	38.8	14.6
Anxiolytics, Sedatives and Hypnotics	27.6	14.6
Antipsychotics	22.1	2.1
Anticonvulsants	13.7	4.4
Antiparkinsonism Agents	11.4	1.8
Miscellaneous, CNS Agents	11.0	8.4
Anti-Ulcer Agents	33.8	18.1
Intestinal Motility Stimulants	9.6	3.4
Adrenocortical Hormones	9.4	12.2
Insulin and Anti-Diabetic Agents	17.8	11.4
Thyroid and Antithyroid Agents	14.2	10.3
Parathyroid/Bone Resorption Drugs	6.3	3.9
Female Hormonal Agents	4.8	10.2
Anti-incontinence/Antispasmodic Agents	4.3	1.2
Bronchodilators	19.0	9.2
SOURCE: Medicare Current Beneficiary Survey, 1998.		
* Does not include over-the-counter medications and hence is an underestimate.		
** Therapeutic classes with cell sizes less than 20 are not reported.		

APPENDIX

TABLE A.1. Unweighted Sample Sizes Based on Claims Data			
Type of Cardiovascular Disease	Specific Conditions	Institutionalized Beneficiaries	Community-Dwelling Beneficiaries
	ICD-0-CM Codes	Unweighted N (%)	Unweighted N (%)
Total		821	5692
Hypertensive Disease	401.xx-405.xx	547 (66.6)%	4561 (80.1%)
Heart Failure, Cardiomyopathy and Other Complications of Heart Disease*	424.0-424.3, 425.xx-428.xx, 429.0-429.2	567 (69.1%)	2645 (46.5%)
Ischemic Heart Disease	410.xx-414.xx	329 (40.1%)	2135 (37.5%)
Atherosclerosis	440.xx	206 (25.1%)	496 (8.7%)
Chronic Rheumatic Heart Disease	394.0, 394.2, 395.0, 395.2, 396.0-396.8, 397.0, 398.90, 398.91	31 (3.8%)	232 (4.1%)
Pulmonary Heart Disease	415.xx, 416.xx	23 (2.8%)	186 (3.3%)
SOURCE: Medicare Current Beneficiary Survey, 1998			
* Includes valve disorders, cardiomyopathy, conduction disorders, cardiac dysrhythmias, heart failure, and ill-defined descriptions and complications of heart disease.			

TABLE A.2. Distribution of Sample by the Number of Cardiovascular-Related Claims in 1998		
Beneficiary Characteristics	Institutionalized Beneficiaries Unweighted N (%)	Community-Dwelling Beneficiaries Unweighted N (%)
Total	821	5692
Number of Cardiovascular-Related Claims in 1998		
1	56 (6.8%)	493 (8.7%)
2	44 (5.4%)	378 (6.6%)
3 or more	721 (87.8%)	4821 (84.7%)
SOURCE: Medicare Current Beneficiary Survey, 1998.		

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