

# Depression and Cost-Related Medication Nonadherence in Medicare Beneficiaries

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**Context:** Treatment for depression can be expensive and depression can affect the use of other medical services, yet there is little information on how depression affects the prevalence of cost-related medication nonadherence (CRN) in elderly patients and patients with disabilities.

**Objective:** To quantify the presence of CRN in depressed and nondepressed elderly Medicare beneficiaries and nonelderly Medicare beneficiaries with disabilities prior to the implementation of the Medicare Drug Benefit.

**Design and Setting:** 2004 Medicare Current Beneficiary Survey.

**Participants:** Depressed and nondepressed elderly Medicare beneficiaries and beneficiaries with disabilities.

**Main Outcome Measures:** Cost-related medication nonadherence included taking smaller doses or skipping doses of a prescription to make it last longer, or failing to fill a prescription because of cost, controlling for health insurance status, comorbid conditions, age, race, sex, and functional status.

**Results:** In a nationally representative sample of 13 835 noninstitutionalized elderly Medicare enrollees and Medicare enrollees with disabilities, 44% of beneficiaries with disabilities and 13% of elderly beneficiaries reported being depressed during the previous year. Among enrollees with disabilities reporting depressive symptoms, 38% experienced CRN compared with 22% of enrollees with disabilities who did not report depressive symptoms. Among elderly enrollees who reported depressive symptoms, 19% experienced CRN, compared with 12% of elderly enrollees who did not report such symptoms. In adjusted analyses, depressive symptoms remained a significant predictor of CRN in both groups (persons with disabilities: odds ratio, 1.7; 95% confidence interval, 1.3-2.3; elderly persons: odds ratio, 1.4; 95% confidence interval, 1.1-1.7).

**Conclusions:** Depressive symptoms were associated with CRN in elderly Medicare enrollees and Medicare enrollees with disabilities. Providers should elicit information on economic barriers that might interfere with treatment of Medicare beneficiaries with depression.

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**A** NUMBER OF ARTICLES DOCUMENT how depression can lead to numerous adverse health, social, and economic outcomes.<sup>1-3</sup> Depression is particularly problematic for people with lower socioeconomic statuses, higher rates of comorbid medical diseases, and coexisting cognitive or psychiatric disorders, because these characteristics can inhibit access to care and adherence to treatment.<sup>4-9</sup> In addition, treatment for depression can be expensive and can cause undesirable side effects; inadequate depression management can lead patients to be nonadherent to treatment for both depression and other mental and physical disorders.<sup>10-13</sup> For all of these reasons, it seems plausible that the presence of depression could also have a negative impact on the use of pharmaceuticals, particularly in vulnerable populations, such as nonelderly patients with disabilities and the elderly. Research also demonstrates that

people with multiple morbidities have problems with adherence to treatment, including higher rates of cost-related medication nonadherence (CRN).<sup>14-16</sup>

Cost-related medication nonadherence is estimated to occur in 13% to 25% of elderly persons and in 29% of patients with disabilities.<sup>14-16</sup> It is particularly problematic in people with multiple comorbid disorders and in those without prescription drug coverage.<sup>14-17</sup> Most patients who underuse medications because of their cost do not discuss this with their physician.<sup>18,19</sup> A recent study using nationally representative data demonstrated that 21% of people with depression did not fill a treatment-related prescription in the last year because of the cost, and 14% of these respondents with depression did not refill a medication because of cost.<sup>20</sup> The rates of CRN reported by respondents with depression were among the highest levels of CRN found in patients with a variety of different medical disorders.<sup>20</sup> From

these findings, we predict that CRN is not only particularly burdensome in sick and uninsured populations, but that depression may also represent an additional, important risk factor for CRN.

In our study, we used detailed and well-validated measures of CRN<sup>14-16</sup> that were integrated into the 2004 wave of the Medicare Current Beneficiary Survey (MCBS).<sup>21</sup> Although CRN measures were new to the MCBS in 2004, they have been extensively tested and validated, and used in national surveys of Medicare beneficiaries conducted by the study team since 2001<sup>14-16</sup>; they have recently been shown to exhibit high test-retest reliability.<sup>14</sup> These CRN measures examine whether a respondent is nonadherent to any or all of his or her medications owing to their cost; they are not medication specific. The purpose of our study is to assess the association of depression with CRN in nationally representative samples of nonelderly Medicare patients with disabilities and elderly Medicare patients using the CRN measures newly included in the MCBS.

## METHODS

### SAMPLE AND DATA SOURCE

The MCBS is a longitudinal, nationally representative survey of Medicare beneficiaries. It is composed of an in-person interview conducted in 3 rounds every year, each round lasting 4 months. Participants are selected according to a stratified area-probability design. Additional details about the MCBS sampling techniques can be found elsewhere.<sup>14,21,22</sup> New measures of CRN were added to the fall 2004 round of the MCBS data collection.<sup>14,21</sup>

### STUDY GROUPS

The study sample included Medicare beneficiaries aged 65 years and older and beneficiaries with disabilities who were younger than 65 years.<sup>14</sup> The definition of disability, according to Medicare, may differ from other uses of the term (such as those based on activities of daily living or other indicators of functional status). According to Medicare, people under the age of 65 years are eligible only after being diagnosed with qualifying medical conditions that are expected to last at least 12 months or result in death. Except for people diagnosed with end-stage renal disease or amyotrophic lateral sclerosis, they must complete a 24-month waiting period before Medicare benefits commence.<sup>23</sup>

### MEASURES

Our primary outcome variable was CRN. We considered participants to have CRN if they reported any of the following 3 behaviors (in a yes-or-no question) in the current survey year: (1) skipping doses to make the medicine last longer, (2) taking less medicine than prescribed to make the medicine last longer, or (3) not filling a prescription because it was too expensive. The latter question was only asked of respondents who reported having failed to obtain 1 or more medicines prescribed for them during the current survey year.<sup>14</sup> These measures have not only been shown to be valid and reliable in previous research,<sup>14-16</sup> but they have also shown high correlations with the number of patient comorbidities and level of income in recent research, further demonstrating construct validity, because we would expect people with lower income, less education, and higher comorbidity burdens to have higher rates of CRN.<sup>14-16</sup>

Our key variable of interest was depressive symptoms. The MCBS includes 2 key items to assess the presence of depres-

sion based on *DSM-IV* criteria,<sup>24</sup> namely sadness or anhedonia. These 2 items formed the basis for our study's principal depression-indicator questions: (1) "In the past 12 months, how much of the time did you feel sad, blue, or depressed?" and (2) "In the past 12 months, have you had 2 weeks or more when you lost interest or pleasure in things that you usually cared about or enjoyed?" Based on previously published methods,<sup>25</sup> those responding "all of the time" or "most of the time" to the first item (time depressed) and/or those responding affirmatively to the second item (lost interest) were classified as having depressive symptoms.

Our measure is similar to those used in other well-validated measures of depression, including the Primary Care Evaluation of Mental Disorders, its 2-item derivative (the Patient Health Questionnaire-2), and the Beck Depression Inventory.<sup>26-30</sup> Like the Patient Health Questionnaire-2, other case-finding instruments have demonstrated that depression can be detected with as few as 2 items, one of which focuses on sadness and a depressed mood.<sup>31</sup> Previous research also demonstrates that self-reported survey depression items are highly concordant with diagnoses of depression made in a formal clinical setting.<sup>32,33</sup>

Other variables used in our analyses included demographic and socioeconomic variables available from the MCBS Access to Care file, such as sex, age (classified as <55, 55-64, 65-74, 75-84, or ≥85 years), income (≤\$10 000, \$10 001-\$20 000, \$20 001-\$40 000, or >\$40 000), race (African American, white, or other), educational level (above high school, high school, or no high school), and additional health coverage besides Medicare (none, partial coverage [such as a Medicare health maintenance organization or Medigap insurance], employer-based coverage, or Medicaid).<sup>14</sup> Other health-related variables included self-reported medical conditions (cardiac disease, hypertension, cancer, diabetes mellitus, arthritis, a psychiatric disorder, a neurological condition other than dementia, and lung disease), the number of comorbid health conditions (0-1, 2-3, or ≥4), and limitations of functional status or activities of daily living (0, 1-2, or ≥3).

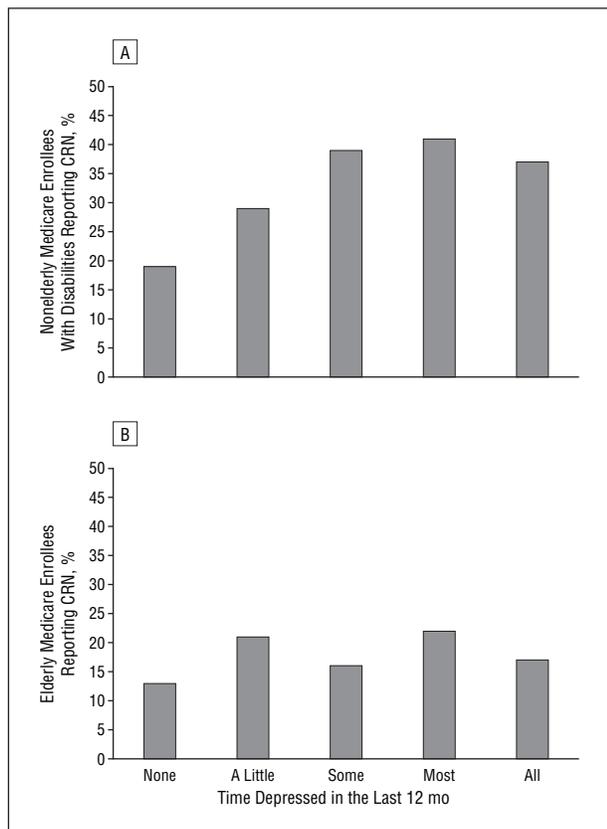
### STATISTICAL ANALYSIS

We conducted separate analyses for elderly enrollees and enrollees with disabilities to determine if there were differences in clinical and demographic characteristics, and the prevalence of depressive symptoms and CRN in these 2 populations. All analyses included sampling weights that applied the methodology recommended in the MCBS technical documentation.<sup>34</sup> We used SAS version 9.1 survey sampling and analysis procedures (eg, SURVEYMEANS and SURVEYLOGISTIC; SAS Institute Inc, Cary, NC) to obtain estimates of means, standard errors, and confidence intervals. The Taylor expansion method is used by these procedures to estimate variance.

We began by constructing national profiles of the characteristics of the subgroups of individuals with and without depression in elderly patients and patients with disabilities. We then characterized the prevalence of CRN in depressed and nondepressed elderly beneficiaries and beneficiaries with disabilities, according to demographic and clinical subgroups (eg, by sex, age, and race). Finally, we conducted logistic regression analyses to estimate the odds of CRN for depressed vs nondepressed beneficiaries with disabilities and elderly beneficiaries, controlling for clinical and demographic characteristics.<sup>14,34</sup>

## RESULTS

Our sample included 2321 nonelderly Medicare beneficiaries with disabilities and 11 514 elderly Medicare beneficiaries who were interviewed as part of the MCBS during



**Figure.** Rates of reported cost-related medication nonadherence (CRN) according to time spent being depressed in the last year in nonelderly Medicare enrollees with disabilities (<65 years old; N=2321) (A) and elderly enrollees (≥65 years old; N=11 514) (B). Only data from the time depressed variable, rather than our combined depression measure (which includes those who responded affirmatively to either the time depressed or lost interest questions), are included.

the fall of 2004; responses were weighted to the national population of Medicare beneficiaries. According to our weighted national estimates, 44% of the patients with disabilities and 13% of the elderly patients reported being depressed in the past year (according to our previously defined measure of depression). The **Figure** illustrates the relationship between the frequency of time reported being depressed (one of our indicators of depressive symptoms) and the prevalence of CRN. We found higher rates of CRN associated with those reporting longer periods of time spent depressed in enrollees with disabilities; as the amount of time spent depressed increased, the amount of CRN also increased (range, 19%-41%). Elderly Medicare enrollees had lower rates of CRN than enrollees with disabilities (range, 13%-22%). Compared with enrollees with disabilities, elderly enrollees also experienced smaller increases in CRN with increasing amounts of time spent depressed.

**Table 1** compares the sociodemographic, insurance coverage, and health characteristics of nonelderly Medicare beneficiaries with disabilities and elderly Medicare beneficiaries, with and without depressive symptoms. In contrast with those not reporting depressive symptoms, a greater proportion of those reporting depressive symptoms were women and had a lower income, a greater number of comorbidities, lower functional status, a higher prevalence of self-reported mental health conditions and

symptoms (prior psychiatric disease, trouble concentrating, lost interest, and problems with decisions), and higher rates of CRN; this was found in both populations.

**Table 2** presents the prevalence of CRN in elderly Medicare enrollees and enrollees with disabilities, according to socioeconomic, demographic, and clinical characteristics. Among enrollees with disabilities who reported depressive symptoms, 38% experienced CRN compared with 22% of enrollees with disabilities who did not report such symptoms. Among elderly enrollees who reported depressive symptoms, 19% experienced CRN, compared with 12% of elderly enrollees who did not report depressive symptoms. Participants with disabilities had much higher rates of CRN than elderly participants overall and in all subgroups. Characteristics significantly associated with higher rates of CRN were African American race, a greater number of comorbidities, poorer functional status, and less generous insurance coverage for medications.

Finally, **Table 3** presents the adjusted logistic regression results from our analyses. Both elderly participants and participants with disabilities who reported depressive symptoms in the previous year had significantly higher rates of CRN than those who did not (participants with disabilities: odds ratio, 1.7; 95% confidence interval, 1.3-2.1; elderly participants: odds ratio, 1.4; 95% confidence interval, 1.1-1.7). The statistical relationships between depressive symptoms and CRN were unchanged in both groups in adjusted models that controlled for age, race, sex, income, education, number of comorbidities, number of limitations of activities of daily living, and insurance coverage type.

## COMMENT

There are several key findings from this research not previously documented in other studies of Medicare beneficiaries. First, controlling for clinical and demographic characteristics, reported depressive symptoms are significantly associated with CRN in both persons with disabilities and elderly persons. Second, the higher rate of CRN in those who spent more time depressed, especially for those with disabilities, is striking. Third, in the population of persons with disabilities, CRN was substantially lower in beneficiaries with depression who had Medicaid drug coverage compared with those with other forms of prescription drug coverage or no coverage.

These findings support and extend the limited existing literature documenting rates of depression in the MCBS.<sup>22,25</sup> However, there have been no previously published papers documenting how the presence of depression in Medicare beneficiaries is related to CRN. Clearly, lower income level, lower education level, greater comorbidity burden, and less generous insurance coverage are all associated with both depressive symptoms and CRN. This may partly explain why there are higher rates of CRN in patients with depression.

It is not surprising that depressive symptoms are associated with CRN in elderly Medicare beneficiaries (particularly those who lack a prescription drug benefit), because elderly patients are known to take multiple daily medications, and psychiatric medications are some of the

**Table 1. Demographic, Socioeconomic, and Clinical Characteristics in Medicare Enrollees With and Without Possible Depression\*†**

Characteristic	Nonelderly Enrollees With Disabilities (n = 2321)		Elderly Enrollees (n = 11 514)	
	With Depression	Without Depression	With Depression	Without Depression
Sex‡§				
M	506 (46)	719 (54)	503 (34)	4438 (44)
F	506 (54)	590 (46)	966 (66)	5607 (56)
Age, y‡§				
<55	769 (61)	888 (47)	NA	NA
55-64	243 (39)	421 (53)	NA	NA
65-74	NA	NA	631 (50)	4574 (53)
75-84	NA	NA	620 (39)	3982 (36)
≥85	NA	NA	218 (11)	1489 (11)
Income, \$‡§				
≤10 000	475 (43)	581 (38)	312 (22)	1483 (15)
10 001-20 000	272 (31)	333 (27)	459 (34)	2602 (26)
20 001-40 000	146 (17)	241 (24)	423 (32)	3302 (36)
>40 000	76 (9)	106 (10)	164 (13)	1983 (23)
Race				
African American	165 (16)	258 (20)	126 (8)	792 (8)
Other	109 (11)	117 (8)	96 (6)	542 (6)
White	732 (72)	933 (72)	1242 (86)	8689 (86)
Educational level§				
Above high school	365 (39)	441 (37)	439 (31)	4239 (44)
High school	316 (30)	448 (34)	418 (30)	3008 (30)
No high school	325 (30)	401 (29)	602 (40)	2762 (26)
Morbidity categories				
Cardiac disease‡§	359 (43)	419 (36)	762 (51)	4277 (41)
Hypertension§	501 (56)	577 (51)	1012 (68)	6308 (61)
Stroke§	124 (14)	134 (12)	258 (17)	1082 (10)
Cancer‡	130 (15)	116 (10)	272 (19)	1886 (18)
Diabetes mellitus§	238 (27)	267 (23)	393 (27)	1946 (19)
Arthritis‡§	571 (63)	592 (55)	1031 (69)	5949 (58)
Psychiatric disease‡§¶	772 (75)	527 (36)	536 (37)	970 (10)
Neurological condition other than dementia‡§	114 (12)	165 (13)	113 (8)	391 (4)
Lung disease‡§	294 (31)	236 (19)	327 (22)	1360 (13)
No. of comorbidities‡§				
0-1	187 (15)	466 (28)	190 (14)	2764 (30)
2-3	432 (40)	530 (45)	603 (43)	4991 (49)
≥4	374 (45)	299 (27)	640 (43)	2188 (21)
No. of functional limitations‡§				
0 ADLs	498 (48)	840 (62)	714 (53)	7479 (77)
1-2 ADLs	287 (31)	297 (27)	389 (28)	1888 (18)
≥3 ADLs	206 (21)	117 (10)	304 (19)	563 (5)
Other health insurance§#				
None	363 (39)	461 (38)	545 (36)	3522 (34)
Partial	79 (9)	113 (11)	324 (22)	2318 (23)
Employer‡	169 (20)	263 (24)	441 (31)	3578 (37)
Medicaid‡	401 (33)	472 (28)	159 (11)	627 (6)
Mental health				
Trouble concentrating‡§	600 (59)	290 (20)	469 (30)	888 (8)
Problems with decisions‡§	384 (36)	178 (12)	291 (18)	417 (4)
Any CRN‡§	375 (38)	278 (22)	272 (19)	1181 (12)

Abbreviations: ADL, activity of daily living; CRN, cost-related medication nonadherence; NA, not applicable.

\*Participants were considered depressed if they responded affirmatively to at least 1 of the following 2 questions: (1) "In the past 12 months, how much of the time did you feel sad, blue, or depressed?" Those who responded "all of the time" or "most of the time" were considered depressed. Participants who said they felt depressed some, little, or none of the time were not considered to be depressed. (2) "In the past 12 months, have you had 2 weeks or more when you lost interest or pleasure in things that you usually cared about or enjoyed?" Those who answered yes were considered depressed, and those who answered no were not considered to be depressed.

†Data are given as number (percentage).

‡Significant difference between those with and without depression among nonelderly enrollees with disabilities ( $P < .05$ ).

§Significant difference between those with and without depression among elderly enrollees ( $P < .05$ ).

||Includes American Indian/Alaskan native and Asian individuals.

¶Can include any lifetime depression, as the question reads, "Has a doctor ever told you that you have a mental or psychiatric disorder, including depression?"

#We examined the difference between insurance coverage among people with and without depression, looking at the differences among insurance types overall as well as within each type (ie, Medicaid).

**Table 2. Prevalence of CRN by Demographic, Socioeconomic, and Clinical Characteristics in Medicare Enrollees**

Characteristic	CRN, % (95% Confidence Interval)			
	Nonelderly Enrollees With Disabilities (n = 2321)		Elderly Enrollees (n = 11 514)	
	With Depression	Without Depression	With Depression	Without Depression
Total CRN, %	38	22	19	12
Sex				
M*†	38 (32-44)	20 (16-24)	17 (13-21)	10 (9-12)
F*†	38 (31-46)	25 (21-30)	20 (16-23)	13 (11-15)
Age, y				
<55*	38 (33-43)	20 (16-23)	NA	NA
55-64*	39 (32-46)	25 (20-30)	NA	NA
65-74†	NA	NA	22 (17-26)	12 (10-14)
75-84†	NA	NA	17 (13-21)	12 (10-13)
≥85	NA	NA	13 (8-18)	10 (8-13)
Income, \$				
≤10 000*†	30 (24-37)	20 (15-26)	20 (14-25)	13 (11-16)
10 001-20 000*†	47 (38-56)	24 (19-30)	21 (16-27)	14 (12-16)
20 001-40 000*†	46 (35-57)	24 (17-32)	18 (15-22)	11 (9-13)
>40 000*	32 (19-45)	18 (9-27)	11 (6-17)	8 (7-10)
Race				
African American*†	35 (27-44)	20 (14-26)	26 (18-35)	17 (13-20)
Other*‡	44 (32-57)	22 (13-31)	17 (8-26)	11 (8-15)
White*†	38 (32-43)	23 (19-27)	18 (15-21)	11 (10-13)
Educational level				
Above high school*†	43 (35-51)	26 (20-31)	19 (15-22)	10 (9-12)
High school*†	33 (25-41)	21 (15-27)	18 (13-23)	12 (10-14)
No high school*†	37 (30-44)	20 (15-25)	19 (15-24)	13 (11-16)
Morbidity categories				
Cardiac disease*†	43 (35-51)	27 (21-32)	21 (17-25)	13 (12-15)
Hypertension*†	42 (36-48)	27 (22-31)	20 (17-23)	13 (11-14)
Stroke*†	37 (27-48)	23 (15-31)	20 (15-25)	12 (10-15)
Cancer*†	42 (32-52)	31 (23-39)	17 (12-22)	12 (10-14)
Diabetes mellitus*†	42 (23-52)	25 (18-31)	23 (17-29)	13 (11-15)
Arthritis*†	41 (35-48)	29 (24-33)	21 (17-25)	13 (11-14)
Psychiatric disease‡	39 (33-45)	26 (19-33)	21 (16-26)	18 (15-21)
Neurological condition other than dementia†	43 (32-53)	21 (11-31)	18 (11-24)	14 (11-17)
Lung disease*†	44 (36-52)	31 (25-38)	24 (19-29)	12 (11-14)
No. of comorbidities				
0-1*	26 (18-34)	14 (10-18)	16 (9-24)	9 (7-11)
2-3*†	36 (30-42)	21 (16-26)	16 (12-19)	13 (11-14)
≥4*†	45 (37-53)	33 (26-40)	22 (18-27)	14 (12-15)
Functional status				
0 ADLs*†	28 (22-33)	20 (16-24)	16 (12-19)	11 (9-12)
1-2 ADLs*†	42 (34-50)	25 (19-32)	25 (19-30)	15 (13-17)
≥3 ADLs*†	56 (46-65)	34 (24-43)	18 (13-23)	17 (13-21)
Other health insurance				
None*†	48 (39-57)	27 (21-32)	24 (20-29)	15 (12-18)
Partial†	42 (28-55)	27 (11-43)	19 (14-24)	12 (11-13)
Employer*†	35 (27-43)	21 (16-26)	14 (10-18)	9 (8-11)
Medicaid*	27 (21-34)	16 (15-24)	13 (7-19)	8 (6-10)
Mental health				
Trouble concentrating†	40 (34-46)	27 (11-21)	17 (13-22)	17 (15-19)
Problems with decisions†	40 (34-47)	23 (11-35)	14 (9-19)	13 (8-17)

Abbreviations: ADL, activity of daily living; CRN, cost-related medication nonadherence; NA, not applicable.

\*Significant difference in CRN between those with and without depression among nonelderly enrollees with disabilities ( $P < .05$ ).

†Significant difference in CRN between those with and without depression among elderly enrollees ( $P < .05$ ).

‡Includes American Indian/Alaskan native and Asian individuals.

more costly medications.<sup>35</sup> For example, in 2001, 3 of the top 10 drugs ranked in terms of prescription drug sales were antidepressants, with prices ranging from \$78 to \$100 per prescription.<sup>36</sup> Finally, while rates of self-reported depressive symptoms in the elderly (as docu-

mented by the MCBS) were lower than rates in enrollees with disabilities, older people may be experiencing nonmajor depression<sup>37</sup> and may not attribute depressive symptoms to being depressed. While reported depressive symptoms were present in a smaller proportion

of elderly Medicare beneficiaries than in beneficiaries with disabilities, it is noteworthy that the presence of depressive symptoms was still a significant predictor of CRN in this population. This indicates the burden of depressive symptoms is still substantial for the minority of beneficiaries who have depression.

Higher rates of reported depressive symptoms and associated CRN in beneficiaries with disabilities may be explained by the fact that a substantial portion of them gain eligibility because of psychiatric illness. A recent report found that psychotherapeutics ranked as the category of most-filled prescription drugs in persons with disabilities, whereas they ranked tenth among elderly Medicare beneficiaries.<sup>23</sup> This suggests that part of the difference in CRN between the elderly and persons with disabilities may be because of the different types of medications they use; however, the relationship between depression and disabilities is undoubtedly complex and it is hard to disentangle the concepts of functional or physical disability from emotional, social, and cognitive disability.<sup>38</sup> What we have demonstrated here, however, is that there is a significant and important relationship between depression, disabilities, and CRN.

While the MCBS is a rich data source that yields nationally representative estimates of the burden of depressive symptoms in persons with disabilities and the elderly, there are some limitations of our analyses worth noting. These limitations are particularly relevant to the results found in individuals with disabilities, who may have higher rates of more serious psychiatric disorders than the elderly population. The MCBS is based on self-reported measures, and in this study we did not have access to patient claims data (to corroborate diagnoses, use of health services, or pharmaceutical treatment), but instead we relied on patient-provided information, including depression status. While the questions that form the basis for our depression indicator map directly to those defined by *DSM-IV* criteria,<sup>24</sup> a clinician evaluating a patient for depression also has visual and auditory cues (eg, body language, voice tone, affect, and facial expression) to use in making a diagnosis. In addition, previous research has demonstrated substantial underreporting in self-reported measures of depression, suggesting that our observed rates may be conservative.<sup>22,25</sup> It is unclear whether CRN would also be higher in people who either fail to recognize that they have depression or who have depression but are not being treated for it. However, we feel that our measure of depressive symptoms actually strengthens the policy and clinical relevance of our findings, as it extends the importance of identifying cost-related barriers to accessing medications beyond those with major depression to those who may have subthreshold depression or depressive symptoms. In addition, because this analysis uses cross-sectional data, it is uncertain whether depressive symptoms lead to underuse or underuse exacerbates depressive symptoms. Additional research using longitudinal data is needed to confirm the relationship between depressive symptoms and CRN in elderly Medicare beneficiaries and Medicare beneficiaries with disabilities. This research will help us determine the direction of any potential causal relationship between depressive symptoms and CRN, and will better identify appropriate clinical and policy responses based on the findings. However, regardless of the causal pathways, this study clearly shows that Medicare beneficiaries with

**Table 3. Adjusted Predictors of Any Cost-Related Medication Nonadherence From Multivariate Logistic Regression**

Predictors*	Odds Ratio (95% Confidence Interval)	
	Nonelderly Enrollees With Disabilities (N = 2321)	Elderly Enrollees (N = 11514)
Depression (no)		
Yes	1.7 (1.3-2.3)†	1.4 (1.1-1.7)†
Age in nonelderly enrollees, y (<55)		
55-64	0.9 (0.7-1.1)	NA
Age in elderly enrollees, y (65-74)		
75-84	NA	0.8 (0.7-0.9)†
≥85	NA	0.6 (0.5-0.7)†
Sex (M)		
F	1.2 (0.9-1.6)	1.2 (1.1-1.4)†
Race (white)		
African American	0.8 (0.6-1.2)	1.4 (1.1-1.8)†
Other	0.9 (0.6-1.4)	1.0 (0.7-1.3)
Education (above high school)		
No high school	0.8 (0.6-1.2)	1.0 (0.9-1.2)
High school	0.9 (0.6-1.2)	1.0 (0.8-1.2)
Income, \$ (>40 000)		
≤10 000	1.5 (0.9-2.6)	1.6 (1.2-2.1)†
10 001-20 000	1.4 (0.8-2.7)	1.5 (1.2-2.0)†
20 001-40 000	1.4 (0.8-2.7)	1.3 (1.0-1.5)†
No. of morbidities (0-1)		
2-3	1.7 (1.2-2.6)†	1.5 (1.3-1.7)†
≥4	2.7 (1.8-4.0)†	1.6 (1.3-1.9)†
ADL (0)		
1-2	1.5 (1.1-2.0)†	1.5 (1.3-1.8)†
≥3	2.4 (1.8-3.3)†	1.5 (1.1-1.9)†
Drug coverage (Medicaid)		
None	2.1 (1.5-3.1)†	2.7 (2.0-3.7)†
Partial coverage	1.8 (0.9-3.6)	2.0 (1.5-2.7)†
Employer	1.4 (0.9-2.1)	1.6 (1.2-2.1)†

Abbreviations: ADL, activity of daily living; NA, not applicable.

\*Reference group is given in parentheses.

†Statistically significant at  $P < .05$ .

depressive symptoms are at an increased risk of CRN and should be monitored closely to identify any economic barriers to adherence.

Another potential concern is the lack of clarity about the extent to which patients with psychiatric disorders can accurately assess issues, such as the need for treatment or inability to access treatment. Evidence from the literature is limited, yielding mixed results. Rhodes et al<sup>39</sup> compared self-reported use of treatment for depression with claims information on use of services and found that people with depression overestimate rather than underestimate their use of services. This suggests that reports of CRN in patients with depression may understate the true extent of underuse.

## CONCLUSIONS

Given the substantially higher rates of CRN among Medicare enrollees with depression, particularly those with disabilities,<sup>14</sup> it is imperative that policymakers carefully evaluate the effects of Medicare Part D coverage in

these populations. Furthermore, clinicians and insurers should pay careful attention to all Medicare beneficiaries with depression to identify potential economic barriers to adherence to long-term therapies, as well as to assist patients in finding alternative ways to meet their treatment needs. Our findings highlight the magnitude of the CRN identified in patients with depression as well as the value of the new MCBS items for evaluating the effectiveness of Medicare Part D in decreasing barriers to medication use over time. This is relevant for both clinicians, so that they can be consistent and attentive to barriers to antidepressant adherence (including cost), and policymakers, so that they can monitor rates of CRN in vulnerable subgroups, like depressed patients with disabilities and depressed elderly patients.

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