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# Associations Among Indicators of Depression in Medicaid-Eligible Community-Dwelling Older Adults

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**Purpose:** The purpose of this research was to examine associations among 2 separate Minimum Data Set-Home Care (MDS-HC) depression measures (the Depression Rating Scale [DRS] and medical diagnosis of depression) with billed antidepressant medications in Medicaid paid claim files. **Design and Methods:** The sample for this cross-sectional research included 3,041 Medicaid-eligible older adult participants in a Home and Community Based Waiver Program and used data from the MDS-HC, Version 1 and Medicaid Paid Claim Files. Sensitivity and specificity analyses, receiver operating characteristic (ROC) curve analysis, and *t* tests were utilized. **Results:** DRS scoring indicated that 15.4% of participants had behaviors indicative of depression, whereas 42% had a medical diagnosis of depression noted in the MDS-HC. Of those with a medical diagnosis of depression, 51% had a prescribed antidepressant medication. ROC analysis suggested that the DRS was a poor distinguisher of participants with and without a medical diagnosis of depression or prescribed antidepressant medications. **Implications:** Approximately half of Medicaid-eligible older adults medically diagnosed with depression were treated pharmacologically. Longitudinal research is recommended to assess responsiveness of the DRS over time to pharmacological and psychotherapeutic interventions for depression.

**Key Words:** Home and Community Based Services, Measurement, Mental health (services, therapy), Medicaid/Medicare, Depression

Depression is widely under-recognized and undertreated among older adults and should not be considered a normal part of aging (National Institute of Mental Health, 2007). Approximately 7 million adults aged 65 and older are affected by depression (Steinman et al., 2007), with 8%–16% of community-dwelling older adults experiencing clinically significant depressive symptoms (Blazer, 2003). Depression frequently co-occurs with other chronic diseases and is associated with increased health care utilization, greater pain, lower quality of life, increased risk of suicide, and diminished physical functioning among older adults (Blazer, 2003; Bruce et al., 2002; Gellis, 2009, 2010). Despite the prevalence and poor outcomes of depression among older adults, the negative stigma of mental illness may prevent older adults from seeking professional treatment for depression (Zartaloudi & Madianos, 2010).

Professional treatment of depression in older adults may consist of pharmacological and/or psychotherapeutic interventions. Psychotherapeutic treatments for depression include cognitive

behavior therapy, psychoeducation, psychotherapy, reminiscence/life review, physical exercise, and problem-solving therapy (Cuijpers, van Straten, & Smit, 2006). Psychotherapeutic interventions used alone or together with pharmacological interventions can lead to improved patient outcomes including mood, emotional distress, and physical functioning (Cuijpers et al., 2006; Pincus, Duberstein, & Lyness, 2007). Nonetheless, a trend analysis of Medicare Current Beneficiary Survey Data (1992–2005) has suggested that pharmacotherapy is assuming a more prominent role in the treatment of depression among older adults (Akincigil et al., 2011). Access to appropriate mental health services and improvements in the health, function, and quality of life of older adults have been prioritized by Healthy People 2020 (U.S. Department of Health & Human Services, 2010) and the Centers for Disease Control and Prevention (Benson & Aldrich, 2011). With the establishment of these guidelines for high-quality mental health care, there is a clear need to examine the occurrence and treatment of depression among older adults.

Health care services for older adults can be viewed as a continuum, moving from community to institutionalization. An alternative to institutionalization for older adults is to receive care services at home. The prevalence and undertreatment of depression among community-dwelling older adults receiving home care services is concerning. Bruce and colleagues (2002) noted that among older adults receiving home care services ( $n = 539$ ), 13.5% were diagnosed with major depression, of which only 22% were receiving antidepressant medication. Similarly, Gellis, McGinty, Horowitz, Bruce, and Misener (2007) found that only 12% of older adults receiving home care services and diagnosed with major depression received adequate antidepressant treatment ( $n = 40$ ).

Older adults who receive home care services through a Medicaid Home and Community Based Waiver Program (HCBWP) may be at higher risk for undertreatment of depression than other community-dwelling older adults. HCBWP participants are assumed to be impoverished because they are Medicaid eligible. Older adults who live at or below the poverty line have higher rates of depression than community-dwelling older adults living above the poverty line (Gum, Areal, & Bostrum, 2007). Previous research examining mental health among older adult HCBWP participants ( $n = 18,939$ ) found a 33% occurrence of depression

and a 27% use of antidepressants (Li & Conwell, 2007). The results of Li and Conwell (2007) suggest higher rates of depression among Medicaid-eligible older adults receiving home care services (33%) when compared with rates of depression among other populations of older adults receiving home care services (13.5%; Bruce et al., 2002).

Previous research examining depression and treatment of depression among Medicaid-eligible older adults receiving home care services has several limitations that this research addressed. First, to document antidepressant use, Li and Conwell (2007) used a single Minimum Data Set Home-Care (MDS-HC) item that documented whether antidepressants were taken in the last 7 days and coded as yes/no. General concerns about data accuracy (both overreporting and underreporting) in the Minimum Data Set (MDS) have been noted (Rahman & Applebaum, 2009; Shin & Scherer, 2009), and therefore, a complete representative use of antidepressant medication use may not have been captured. In this research, we instead utilized Medicaid paid claim file pharmacy data to examine the use of antidepressant medications among older adult HCBWP participants.

Second, the validity and reliability of an MDS depression-related item for use with older adult nursing home residents have been questioned and additional research has been recommended (Anderson, Buckwalter, Buchanan, Maas, & Imhof, 2003; Liang et al., 2011). Anderson and colleagues (2003) found that the MDS Depression Rating Scale (DRS) performed poorly among older adult nursing home residents ( $n = 145$ ) when correlated with the Geriatric Depression Scale ( $r = .13$ ), the Hamilton DRS ( $r = .24$ ), and charted medical diagnosis of depression ( $r = .31$ ). Liang and colleagues (2011) compared differences in the rate of depression among institutionalized older Chinese men ( $n = 595$ ) via the DRS and the Geriatric Depression Scale (GDS). The rate of depression according to the DRS was only 0.2%, whereas the rate of depression with the GDS was 8.7%. Liang and colleagues concluded that the effectiveness of the DRS as a screening instrument for depression among older adults may be limited. In summary, the earlier research results suggest that the DRS may not be as sensitive and specific as alternative measures in detecting depression among older adults. Therefore, this research will compare the DRS to other indicators of depression in the MDS-HC and Medicaid drug paid claim files to further examine the validity of the DRS.

Although there are multiple measures of depression within the MDS-HC, previous research has not explored associations between them. Measures are used to take note of the presence of specific signs or symptoms of disease manifested in the patient. Symptoms are conceptualized as "... important cues that bring problems to the attention of patients and clinicians" (Dodd et al., 2001, p. 669). Regarding depression, symptoms are patient behaviors that indicate the presence of depression for diagnostic purposes. Within the symptom management model (SMM; Dodd et al., 2001), the symptom experience, management, and management outcomes are in continual interaction with each other as well as with personal, health and illness, and environmental factors. For this research, we utilized the SMM to conceptualize associations between indicators of depression and prescribed antidepressant medications within the HCBWP environment.

This research was guided by the following research questions. Among Medicaid-eligible, community-dwelling older adults

1. What is the prevalence of behaviors indicative of depression, as noted by the DRS?
2. What is the prevalence of medically diagnosed depression?
3. What is the prevalence of prescribed antidepressant medications?
4. How do behaviors indicative of depression, as noted by the DRS, associate with the medical diagnosis of depression and prescribed antidepressant medications?

## Methods

The sample ( $N = 3,041$ ) was a subset from a larger longitudinal study that examined pain, pain management, and pain management outcomes among older adults aged 65 and older who participated in the Michigan Medicaid HCBWP, known as MIChoice, between January 1, 2002 and December 31, 2005. The MIChoice program allowed Medicaid-eligible older adults to receive care services in their homes instead of being admitted to a nursing home for similar care services. Assessments of MIChoice participants were completed using the MDS-HC Version 1 assessment tool on admission to MIChoice and approximately every 90 days thereafter. The MDS-HC items consisted of questions that were primarily asked by a trained assessor of the participant (if possible)

or the caregiver or family member of the participant if the participant was not capable of responding. Observations of the participant and medical record reviews were also made by the assessor.

For this research, we completed cross-sectional analyses on MDS-HC data from the second assessment for those participating in MIChoice. The data also included Medicaid paid claim file pharmacy data for 60 days prior to the second MDS-HC assessment. We selected a 60-day time period because preanalyses suggested that 99% of the prescribed antidepressant medications (any one antidepressant present—yes/no) were captured within a 60-day time period between assessments. We did not use a 90-day time period because approximately half of the second MDS-HC assessments occurred less than 90 days after the previous (first) assessment, which would have resulted in the inclusion of Medicaid paid claim file data that was before the previous (first) MDS-HC assessment.

## Procedures

The study was granted exempt status by the Michigan Department of Community Health (MDCH) Institutional Review Board and the Michigan State University Institutional Review Board, as the study was a secondary analysis of de-identified data. Data use and nondisclosure agreements were completed by the researcher as required by the MDCH. Specific measures used in the research are described in the following paragraphs.

*Depression Rating Scale.*—We used the DRS to represent the presence of behaviors that were indicative of depression. The DRS corresponded to the HCBWP participant or proxy observation of the HCBWP participant exhibiting in the 30 days prior to assessment feelings of sadness, persistent anger, repetitive anxious complaints, sad facial expressions, recurrent crying, and withdrawal from activities of interest. The responses were summed to create a possible score of 0–12, with a higher score evident of more behaviors indicative of depression. A DRS score greater than 3 is considered indicative of depression (Burrows, Morris, Simon, Hirdes, & Phillips, 2000; Li & Conwell, 2007). As such, the DRS score may also be dichotomized as 0 or 1, with 0–2 = 0 as not indicative of depression and a DRS score greater than 3 = 1 as indicative of depression (Burrows et al., 2000; Li & Conwell, 2007).

*Medical Diagnosis of Depression.*—We developed the measure of medical diagnosis of depression using questions 7 and 9 of the MDS-HC section I. Question 7 assessed for presence of health care provider-diagnosed depression in the participant's medical record with possible responses as 0 = not present; 1 = present, not subjected to focused treatment or monitoring by home care nurse; and 2 = present, monitored or treated by home care nurse. We then recoded the original responses as 0 = depression diagnosis not present and 1 = depression diagnosis present.

Question 9 allowed the MDS-HC assessor to enter in specific International Statistical Classification of Diseases-9 (ICD-9) codes for diagnoses not addressed or not addressed fully in question 7. We searched question 9 data for the presence of the ICD-9 coding for the following conditions: "major depression single episode" (296.2), "major depression recurrent" (296.3), "depression not otherwise specified" (311), "prolonged depressive reaction" (309.1), and "dysthymia" (300.4). Information regarding the ordering health care provider, diagnostic criteria used by the provider, or length of time of the diagnosis prior to entering the MIChoice program was not available in the data.

We then combined the responses from MDS-HC, section I, questions 7 and 9 to create a new measure, which denoted if the participant had a medical diagnosis of depression in the MDS-HC. If either or both of the participant's MDS-HC question 7 or 9 responses were positive for the presence of a medical diagnosis of depression, then the response for the new measure was "yes." If both of the responses for the participant's response to questions 7 and 9 were "no," then the response for the new measure was "no." Final coding for the measure of medical diagnosis of depression was 0 = no medical diagnosis of depression and 1 = medical diagnosis of depression.

*Prescribed Antidepressant Medications.*—We utilized the measure of prescribed antidepressant medications to represent the presence of prescribed antidepressant medications in the Medicaid paid claim files in the 60-day time period before the MIChoice participant's second MDS-HC assessment. We ascertained the 60-day time period through the use of the "claim service begin date," which is the start date for each particular claim and is considered the date of service for purchasing the antidepressant medication.

We searched the Medicaid paid claim files pharmacy data within the 60 days prior to the MDS assessment date using the claim service begin date, preexisting drug class coding, as well as searches for specific antidepressant medication. Selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors are considered mainstays of pharmacological treatment of depression among older adults (Swenson et al., 2003). Antidepressant medications included in the search were bupropion, citalopram, venlafaxine, fluoxetine, fluvoxamine, escitalopram, paroxetine, and sertraline (Burnett-Zeigler et al., 2012). Tricyclic and other cyclic antidepressants were excluded as they are frequently used to treat other conditions such as chronic pain and as a sleep aid (Burnett-Zeigler et al., 2012). Final coding for the measure was 0 = no prescribed antidepressant medications and 1 = prescribed antidepressant medications in the 60 days prior to the MDS-HC assessment.

We analyzed the data using PASW v.18. Tests had a 0.05 set level of significance. We utilized descriptive and predictive methods to characterize participants. Chi-square, sensitivity and specificity, receiver operating characteristic (ROC) curve, and *t*-test analyses were used to explore associations among the DRS, medical diagnosis of depression, and prescribed antidepressant medications.

## Results

We completed the analyses on 3,041 participants. Women comprised 81% of the sample. Participant's age at the time of assessment ranged from 65 to 102 years, with a mean age of 78 ( $SD = 7.53$ ). The sample was 78% Caucasian, 19% African American, 0.01% Hispanic, and 3% "other." "Other" ( $n = 68$ ) was comprised of American Indian ( $n = 3$ ), Asian and Pacific Islander ( $n = 9$ ), and unknown ( $n = 56$ ).

### Research Question 1

*Depression Rating Scale.*—Utilizing the dichotomized DRS cutoff criteria of greater than 3 as described earlier, 15.4% of participants exhibited behaviors that were indicative of depression. Cronbach's alpha for the DRS was 0.74 for this study. The sample DRS scores ranged from 0 to 12, with a mean score of 1.05 ( $SD = 1.75$ ) and median of 0. Participant age and mean DRS score were significantly associated

such that as participant age increased, the mean DRS score decreased ( $\beta = -0.017, p < .001$ ). We found no significant difference in mean DRS score in regards to sex. There was a significant difference in the mean DRS score in regards to race ( $F = 5.86, df = 3, p = .001$ ). When compared with Caucasian participants, African Americans participants had a significantly decreased mean DRS score ( $\beta = -0.33, SE = 0.08, p < .001$ ), indicating less behaviors indicative of depression. Race groups such as “other” and Hispanic did not have a significantly different mean DRS score when compared with Caucasian.

### Research Question 2

*Medical Diagnosis of Depression.*—Descriptive analysis of the measure of medical diagnosis of depression revealed that 42% of the participants had a diagnosis of depression documented in either question 7 or question 9 of section I of the MDS-HC. Thirteen percent of participants who had a diagnosis of depression documented from question 7 also had a depression-related ICD-9 code documented from question 9, indicating little overlap of the two measures. Although low, this was not of major concern as the purpose of question 9 was to capture ICD-9 coding for additional diagnoses not already covered in question 7.

Separate simple logistic regression models were used to assess for differences in the odds of having a medical diagnosis of depression in regards to age, sex, and race. As age increased, the odds of having a medical diagnosis of depression significantly decreased ( $\beta = -0.38, SE = 0.005, p < .001$ ). We did not find a significant difference in the odds of having a medical diagnosis of depression in regards to sex. Participants who self-identified with the race group “other” experienced significantly decreased odds of having a medical diagnosis of depression when compared with Caucasian participants ( $\beta = -1.12, SE = 0.38, p = .004$ ).

### Research Question 3

*Prescribed Antidepressant Medications.*—Among the sample, 27.5% of participants had a prescribed antidepressant medication in the Medicaid paid claim files in the 60 days prior to the MDS-HC assessment. We discovered that participants had multiple episodes of prescribed antidepressant medication within the 60-day period, for a total of 1,640 billed antidepressant medication episodes among the 837 participants with billed antidepressant medication. The

four most frequently billed antidepressant medications were paroxetine ( $n = 462$ ), sertraline ( $n = 438$ ), fluoxetine ( $n = 284$ ), and citalopram ( $n = 231$ ).

The mean age of participants who had a prescribed antidepressant medication (76.10 years) was significantly ( $p < .001$ ) younger than the mean age of participants with no prescribed antidepressant medication (78.10 years). We did not find a significant difference between male and female participants in the odds of having a prescribed antidepressant medication. In regards to race, participants who self-identified with the race group, “others” (American Indian, unknown, Asian, and Pacific Islander;  $n = 68$ ) experienced significantly lower odds of having a prescribed antidepressant medication when compared with Caucasian participants ( $\beta = -1.40, SE = 0.40, p = .001$ ).

Because of the close clinical association between the prescription of antidepressant medications and a medical diagnosis of depression, we completed chi-square testing to determine the statistical association between the measures of medical diagnosis of depression and prescribed antidepressant medication. Whether a participant had a medical diagnosis of depression had a significant effect on whether a participant would or would not have a prescribed antidepressant medication ( $X^2 = 607.12, df = 1, p < .001$ ), prescribing antidepressant medications by a health care provider would logically be preceded by a medical diagnosis of depression in the clinical setting and would therefore support a strong association between the measures of medical diagnosis of depression and prescribed antidepressant medications.

Nonetheless, of the participants who had a medical diagnosis of depression ( $n = 1,277$ ), only 51% had a prescribed antidepressant medication in the 60 days prior to assessment, suggesting that almost half of all older adult HCBWP participants with a medical diagnosis of depression did not receive pharmacotherapy (Table 1). There are several alternative explanations for the absence of prescribed antidepressant medications. The absence of antidepressant medications may have been due to a failed previous trial of antidepressant medications, a circumstance that was not captured in the data. Alternatively, medically diagnosed participants without a prescribed antidepressant may have been receiving psychotherapeutic interventions for their depression instead of pharmacotherapy and this information was also not contained in the data. Psychotherapeutic interventions are more preferred than pharmacological interventions by older primary

**Table 1. Cross-tabulation of Medical Diagnosis of Depression and Prescribed Antidepressant Medications**

<i>t</i>	Prescribed antidepressant medication		Total
	No (%)	Yes (%)	
0 = no medical diagnosis of depression	1578 (72)	186 (22)	1,764
1 = medical diagnosis of depression	626 (28)	651 (78)	1,277
Total	2204	837	3,041

care patients (Gum et al., 2006). Drug interactions are a valid concern of health care providers given that the average prescription medication count of community-dwelling older adults is seven medications (Orwig, Brandt, & Gruber-Baldini, 2006). The use of psychotherapeutic interventions for depression instead of antidepressant medications may therefore decrease the risk of drug interactions among older adults.

One could theorize that if a participant was on an antidepressant medication, then he or she may have less behaviors indicative of depression (as measured by the DRS) because symptoms or behaviors would be minimized by the use of an antidepressant medication. To test this theory, we carried out a *t*-test analysis to determine if there was a difference in the mean DRS score among participants with a medical diagnosis of depression in regards to the presence of prescribed antidepressant medications. Among participants with a medical diagnosis of depression, there was no significant difference in mean DRS score between those with and without a prescribed antidepressant medication. Interestingly, the mean DRS scores for participants who had a medical diagnosis of depression and prescribed antidepressant medications was 1.52, whereas participants who had a medical diagnosis of depression and had no prescribed antidepressant medications was 1.55—below the DRS cutoff of greater than 3 as indicative of depression (Burrows et al., 2000). However, those with a medical diagnosis of depression and no prescribed antidepressant medication could have been receiving psychotherapeutic interventions instead, which could account for a low DRS score.

#### Research Question 4

*DRS and Medical Diagnosis of Depression.*— Finally, we conducted sensitivity and specificity analyses to answer the fourth research question. First, the measure of medical diagnosis

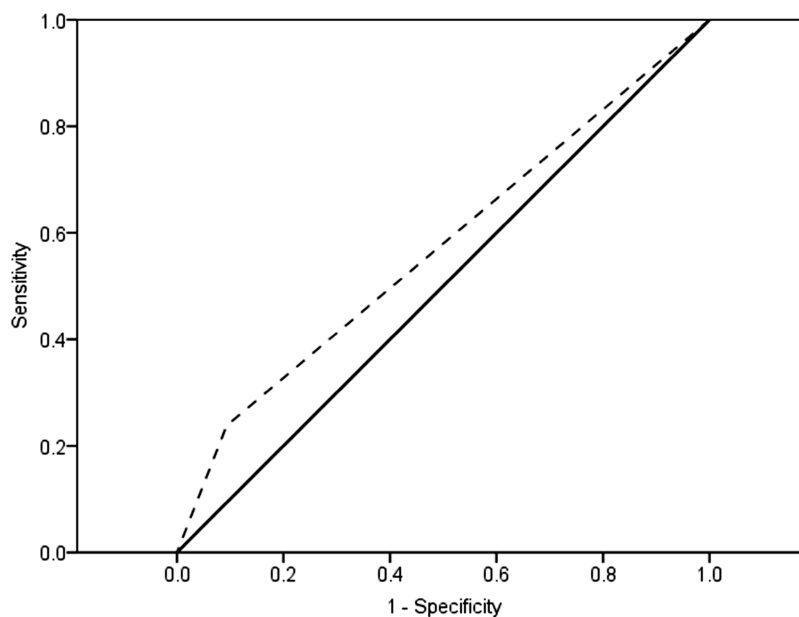
**Table 2. Cross-tabulation of the Dichotomized Depression Rating Scale (DRS) Score and Medical Diagnosis of Depression**

Dichotomized DRS score	Medical diagnosis of depression		Total
	No (%)	Yes (%)	
0 = not indicative of depression	1,599 (91)	972 (76)	2,571
1 = indicative of depression	165 (9)	304 (24)	469
Total	1,764	1,276	3,040

of depression was used as the standard for disease status and the dichotomized DRS score was used as the test for the disease of depression in a cross-tabulation (Table 2). To review, the DRS score was dichotomized as 0 (DRS score 0–2) and 1 (DRS score >3) with a DRS score of greater than 3 as indicative of depression (Burrows et al., 2000; Li & Conwell, 2007). The percentage of false positives was 76% and percentage of false negatives was 9%.

The sensitivity of the dichotomized DRS was 0.24 and specificity was 0.91 in relation to the medical diagnosis of depression. An ROC analysis was then completed (Figure 1). Results suggested that the dichotomized DRS was able to distinguish between participant with and without a medical diagnosis of depression significantly better than chance alone ( $p < .001$ ). However, the computed area under the curve (AUC) was 0.57 (95% CI [0.55, 0.59]), meaning that the dichotomized DRS was a poor distinguisher of whether a participant did or did not have a medical diagnosis of depression (Zhu, Zeng, & Wang, 2010). Utilizing the continuous version of the DRS (0–12, with a higher score indicating more behaviors indicative of depression) instead of the dichotomized version as the test in the ROC analysis only increased the AUC to 0.62 (95% CI [0.60, 0.65]), which still indicated poor performance (Zhu et al., 2010).

The positive predictive value (PPV) of the dichotomized DRS in relation to a medical diagnosis of depression was 65%. Practically, this meant that among participants who tested positive for depression per the dichotomized DRS, 35% were predicted to actually not have a medical diagnosis of depression. The negative predictive value (NPV) of the dichotomized DRS in relation to medical diagnosis of depression was 62%, or 38% of participants who tested negative for depression via the dichotomized DRS were predicted to actually have a medical diagnosis of depression.



**Figure 1.** Receiver operating characterization (ROC) curve for dichotomized Depression Rating Scale (DRS) as test and medical diagnosis of depression as disease state.

*DRS and Prescribed Antidepressant Medications.*—Next, we used the measure of prescribed antidepressant medications as the standard for disease status with the dichotomized DRS as the test for the disease of depression in a cross-tabulation (Table 3). The percentage of false positives was 78% and percentage of false negatives was 13%. The sensitivity of the dichotomized DRS in relation to the measure of antidepressant medication was 0.22 and specificity was 0.87. An ROC analysis was completed next (Figure 2). Results suggested that the dichotomized DRS was able to distinguish between participants with and without prescribed antidepressant medications significantly better than chance alone ( $p < .001$ ). The computed AUC was 0.54 (95% CI [0.52, 0.57]), indicating again that the dichotomized DRS was a poor distinguisher of whether a participant did or did not have prescribed antidepressant medications (Zhu et al., 2010). Utilizing the continuous version of the DRS instead of the dichotomized version as the test in the ROC analysis only increased the AUC to 0.58 (95% CI [0.56, 0.60]), still indicating poor performance (Zhu et al., 2010).

The PPV of the dichotomized DRS in relation to prescribed antidepressant medications was 39% and was interpreted to mean that among participants who tested positive for depression per the dichotomized DRS, 61% were predicted to actually not have depression, as indicated by the presence of prescribed antidepressant medications. The NPV of the dichotomized DRS in relation to prescribed

**Table 3.** Cross-tabulation of the Dichotomized Depression Rating Scale [DRS] Score and Prescribed Antidepressant Medications

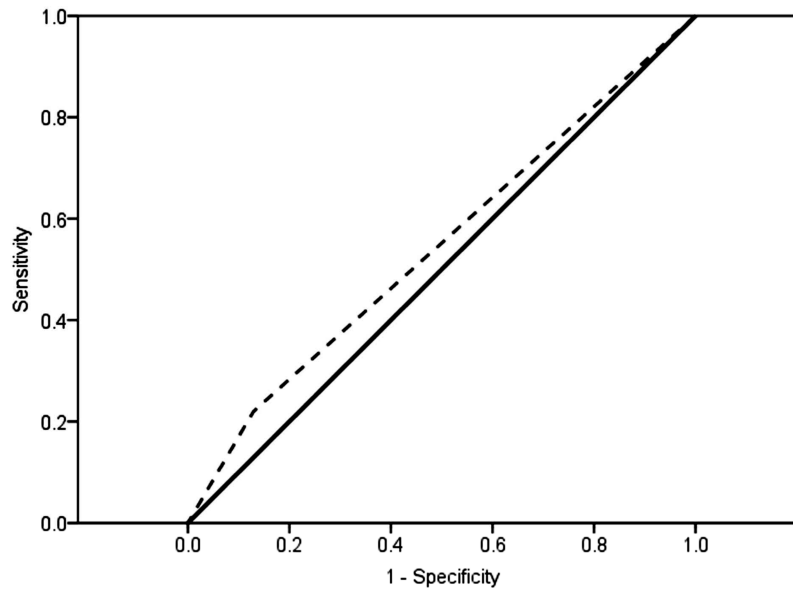
Dichotomized DRS score	Prescribed antidepressant medication		Total
	No (%)	Yes (%)	
0 = Not indicative of depression	1,919 (87)	652 (78)	2,571
1 = indicative of depression	285 (13)	184 (22)	469
Total	2,204	836	3,040

antidepressant medications was 75%, or 25% of participants who tested negative for depression via the dichotomized DRS were predicted to actually have depression, as indicated by the presence of prescribed antidepressant medications.

## Discussion

The results of the sensitivity and specificity analyses of the DRS were remarkably consistent when using either the medical diagnosis of depression or prescribed antidepressant medications as the standard for disease status. The percentages of false positives were especially striking, as approximately three quarters of those who were indicated as having depression via the DRS did not actually have depression, as indicated by either a medical diagnosis of depression or a prescribed antidepressant medication. On the other hand, the DRS had a high specificity (0.91 and 0.87) when using either





**Figure 2.** Receiver operating characterization (ROC) curve for dichotomized Depression Rating Scale (DRS) as test and prescribed antidepressant medications as disease state.

the medical diagnosis of depression or the prescribed antidepressant medications as the standard for disease status, suggesting that the DRS was able to correctly identify most of the participants who did not have behaviors indicative of depression as noted by the DRS.

Similarly, the NPV of the DRS was stronger on average than the PPV. The NPV results suggested that the DRS had a higher likelihood of predicting which participants did not actually have depression (as indicated by not having either a medical diagnosis of depression or prescribed antidepressant medications) among participants without behaviors indicative of depression. Additionally, the ROC analysis indicated that the DRS was a poor predictor of a medical diagnosis of depression or a prescribed antidepressant medication. In summary, these analyses of the DRS suggested that the DRS may be better at corroborating or supporting an already negative diagnosis of depression than distinguishing between persons with and without depression. However, the ROC analyses presented the DRS as a poor predictor of a medical diagnosis of depression or a prescribed antidepressant medication.

The mean DRS score of 1.55 of those with a medical diagnosis of depression but no prescribed antidepressant medications was below the cutoff of greater than 3 to be indicative of depression, according to DRS guidelines (Burrows et al., 2000; Li & Conwell, 2007). Additionally, the insignificant differences in the mean DRS between medically diagnosed participants with and without a prescribed

antidepressant medication further question the sensitivity of the DRS. Anderson and colleagues (2003) noted concerns about the ability of an MDS assessor to recognize behaviors indicative of depression. Liang and colleagues (2011) suggested that because the MDS relies heavily on verbal expression, the DRS may not be able to effectively screen for depression among older adults, particularly among older adults who may be reluctant to discuss mood. Thus, training that educates assessors regarding how to recognize behaviors indicative of depression as well as alternative questioning techniques may have an impact on the sensitivity of the DRS. Although the results of this research call into question the reliability and validity of the DRS as have other researchers (Anderson et al., 2003; Liang et al., 2011), caution must be exercised as this research did not examine the effect of psychotherapeutic interventions on behaviors indicative of depression. Longitudinal research examining changes in the DRS in response to diagnosis and pharmacological and psychotherapeutic treatment of depression would be helpful in determining the usefulness of the DRS.

The measure of the medical diagnosis of depression indicated that 42% of older adult HCBWP participants had a diagnosis of depression. This prevalence is higher than previous research that has varied from 16% to 33% (Blazer, 2003; Li & Conwell, 2007). Specifically, Li and Conwell (2007) examined mental health among older adult HCBWP participants and found a 33% prevalence rate of depression. The higher rate found in this research may be explained in part because data

from MDS-HC section I, question 9 was included in addition to question 7, allowing for additional opportunities to report a diagnosis of depression. At the same time, the measure of medical diagnosis of depression was a sensitive (0.77) and specific identifier (0.89) of the presence of prescribed antidepressant medications. Among older adult HCBWP participants who had a medical diagnosis of depression ( $n = 1,277$ ), 51% had a prescribed antidepressant medication prescribed and billed to Medicaid in the 60 days prior to assessment.

That approximately half of older adult MIChoice participants who had a medical diagnosis of depression received pharmacotherapy requires further investigation. Health care providers must treat depression aggressively given the poor outcomes of depression among older adults (Blazer, 2003; Bruce et al., 2002; Callahan et al., 2005; Gellis, 2009, 2010). Nonetheless, the antidepressant prescribing rate of 54% found in this research is over twice the 22% prescribing rate noted by Bruce and colleagues (2002) in their study of older adults receiving home care services that were diagnosed with major depression. The higher antidepressant prescription rate may be due to health care or participant characteristics within the MIChoice program. Longitudinal research examining depression rates and the use of pharmacologic and psychotherapeutic interventions among older adults at the time of admission to the HCBWP and then over time would assist in determining the benefits of HCBWP on the assessment and treatment of depression among Medicaid-eligible older adults.

This research has several limitations. First, this research examined only pharmacotherapy as a treatment for depression and the data did not detail whether participants actually took the prescribed antidepressant medication. Psychotherapeutic interventions such as cognitive behavior therapy, psychoeducation, psychotherapy, reminiscence/life review, physical exercise, and problem-solving therapy can also be used to treat depression (Cuijpers et al., 2006), and if they were used among the participants, they could have had an unaccounted for effect on the use of pharmacotherapy and the DRS score. Second, this research was cross-sectional and only examined depression and antidepressant therapy use at a single moment in time. Therefore, previous and/or failed uses of antidepressant medications were not captured. Third, this research examined the rates of depression and antidepressant use among Medicaid-eligible older adults participating in the MIChoice HCBWP based in Michigan. Generalizability to

other Medicaid-eligible older adult population may therefore be limited.

## Conclusion

As research funding opportunities continue to dwindle, secondary analysis of preexisting data are an attractive alternative. However, there may be multiple measures of the same concept in these data sets. Research is needed to clarify the use of these concepts to determine relationships between variables and their overall validity. If these measures are found to be invalid, research results will be questionable. Future research is needed not only to establish item validity for the purposes of research, but also clinical validity and usefulness. If validity is determined to be poor, then revisions of MDS-HC items must be supported at policy, administration, and clinical levels.

The purpose of this cross-sectional research was to examine associations among two separate MDS-HC depression measures (the DRS and medical diagnosis of depression) with the presence of antidepressant medications in Medicaid paid claim files. Depression may be undertreated pharmacologically in Medicaid-eligible older adults receiving Home and Community Waiver services, as only half of those with a medical diagnosis of depression had prescribed antidepressant medications. Longitudinal research examining changes in the DRS in response to medical diagnosis of depression and both pharmacological and psychotherapeutic treatment of depression would be beneficial in determining the validity of the DRS.

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