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RESEARCH ARTICLE

# Impact of Distance and Facility of Initial Diagnosis on Depression Treatment

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**Objective.** To assess whether distance to services or diagnosis at a hospital-based medical center compared with a community clinic influences the receipt of psychotherapy versus pharmacotherapy for depression.

**Data Source.** Veterans Affairs (VA) administrative data for 132,329 depressed veterans between October 2003 and September 2004.

**Study Design.** Multivariable logistic and multinomial regression models were used to examine the relationship between distance to the nearest mental health facility and the facility of initial depression diagnosis on receipt of any and adequate psychotherapy and/or pharmacotherapy, adjusted for patient characteristics.

**Principal Findings.** Compared with those living within 30 miles of the nearest mental health treatment facility, depressed patients living between 30 and 60 miles away had a decreased likelihood of receiving psychotherapy (OR = 0.71; 95 percent CI: 0.66, 0.76) and a greater likelihood of receiving antidepressant treatment (OR = 1.27; 95 percent CI: 1.22, 1.33). Initial diagnosis at a small community clinic compared with a VA medical center was not associated with a difference in receipt of any psychotherapy (OR = 0.95; 95 percent CI: 0.83, 1.09), but it was associated with decreased likelihood of receiving eight or more psychotherapy visits (OR = 0.46; 95 percent CI: 0.35, 0.61) or any antidepressant treatment (OR = 0.69; 95 percent CI: 0.63, 0.75).

**Conclusions.** The VA and similar health systems should make efforts to insure adequate psychotherapy is provided to patients who initiate treatment at small community clinics and provide psychotherapy alternatives that may be less sensitive to travel barriers for patients living remote distances from mental health treatment. Extending services to small community clinics that support antidepressant treatment should also be considered.

**Key Words.** Access, geographic, psychotherapy, antidepressant, services

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Evidence-based psychotherapies are effective treatments for depression (Steinbrueck, Maxwell, and Howard 1983; Cuijpers et al. 2008), and primary care patients frequently cite psychotherapy as their preferred treatment modality for depression (Priest et al. 1996; Brody, Khaliq, and Thompson 1997;

Bedi et al. 2000; Churchill et al. 2000). However, delivery of adequate psychotherapy to this population has proved difficult. Fewer than 20 percent of primary care patients with depression receive referrals for psychotherapy (Grembowski et al. 1999), and approximately half of those who initiate psychotherapy fall out of treatment (Wierzbicki and Pekarik 1993). In the largest integrated health system in the United States, the Veterans Health Administration, fewer than 5 percent of depressed patients received a sufficient number of psychotherapy sessions to be considered guideline-concordant treatment, whereas 30 percent of depressed patients received guideline-concordant pharmacotherapy (Chermack et al. 2008).

Many patient factors may contribute to low psychotherapy referral and treatment retention rates for patients with depression. Depression severity itself is associated with less psychotherapy treatment retention, and specific concerns regarding costs, emotional discomfort discussing personal issues, and stigma regarding mental health treatment may also limit initiation or continuation with treatment (Hatchett 2003; Mohr et al. 2006). Concerns regarding transportation difficulties, however, may represent one of the most significant practical barriers to psychotherapy for depression (Mohr et al. 2006).

Previous studies have established that patients who live farther away from available treatment centers make fewer visits to specialty mental health providers and are less likely to receive guideline-concordant depression care when compared with patients who live closer to where they receive treatment (Rost et al. 1998; Fortney et al. 1999). However, prior studies have not examined whether distance or the type of facility where a patient is initially diagnosed with depression has a differential effect on the receipt of psychotherapy versus pharmacotherapy for depression. It is important to establish

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the relationships that distance and facility characteristics have with the receipt of treatment for depression in order to inform individual treatment planning and allocation of health system resources for patients living far from available mental health treatment or those who receive services from smaller facilities.

We used Department of Veterans Affairs (VA) health system data to test the hypothesis that increased distance to mental health treatment and diagnosis at a small community clinic would negatively impact receipt of psychotherapy and increase the likelihood of patients receiving pharmacotherapy. In addition, we sought to determine the likelihood of receiving psychotherapy, pharmacotherapy, both treatments, or neither treatment among patients residing within readily identifiable distance categories from facilities offering mental health services.

## METHODS

### *Subjects*

Patient data were obtained from the VA's National Registry for Depression (NARDEP) database, maintained by the VA National Serious Mental Illness Treatment Research and Evaluation Center (SMITREC) in Ann Arbor, Michigan. The NARDEP contains data on patient diagnoses, demographic characteristics, and the provision of VA inpatient and outpatient services (Blow and Owen 2003). Our sample included patients who (1) received at least two depression diagnoses (ICD-9 codes: 311, 296.3, 300.4, 296.2, 309.0, 293.83, 296.90, 309.1, 296.99, 301.12) on separate visit days; (2) had a 120-day period without a diagnosis of depression or antidepressant fills before the index date, which was their earliest diagnosis date in FY2004 (October 1, 2003 to September 30, 2004); and (3) survived at least 1 year following their index date. We excluded patients with diagnoses of bipolar disorder types I and II, schizophrenia, schizoaffective disorder, and personality disorders. Our final sample consisted of 132,329 patients with a depression diagnosis in FY2004. The study was conducted with approval from the VA Ann Arbor Health System Institutional Review Board.

### *Measures*

Psychotherapy utilization was measured as counts of psychotherapy visits in the 90 days following the index diagnosis of depression. Our definition of psychotherapy included any individual or group psychotherapy identified using current procedural technology (CPT) codes (90804–90815, 90845,

90847, 90853, 90857). Adequate psychotherapy was defined as eight or more psychotherapy visits, consistent with prior studies of psychotherapy utilization and the minimum number of sessions generally used in clinical trials of psychotherapy (Fortney et al. 1999; Wang, Berglund, and Kessler 2000).

We defined any pharmacotherapy for depression based on whether patients received any antidepressant medication fills from VA pharmacies within 90 days of the index depression diagnosis. Adequate pharmacotherapy for depression was defined as receiving a 72-day supply of medication during the 90 days after the index diagnosis. A similar measure of adequacy of antidepressant treatment duration has been found to predict fewer psychiatric hospitalizations (Charbonneau et al. 2004).

To determine type of facility of initial depression diagnosis, we categorized VA facilities into VA medical centers, large community-based outpatient clinics (CBOCs), or small CBOCs. VA medical centers generally serve more than 10,000 unique patients and have extensive specialty and subspecialty mental health services. CBOCs are each associated with a parent VA medical center and range in size and capabilities. Large CBOCs (>5,000 unique patients) are required to provide the majority of mental health services required by their patients, whereas small CBOCs (<5,000 patients) provide more limited access to on-site mental health services (Department of Veterans Affairs 2004a, 2008). When calculating distance to nearest mental health treatment facility we, therefore, excluded small CBOCs. In a sensitivity analysis, we calculated distance to the nearest VA facility of any size.

Distance to closest VA mental health treatment facility was calculated as a straight-line distance from the most densely populated area of the patient's zip code (i.e., population centroid), as done in previous studies (Piette and Moos 1996; Druss and Rosenheck 1997; McCarthy et al. 2006). For policy and planning purposes, VA measures travel time to routine care in 30 minute increments (Department of Veterans Affairs 2004b); thus, we categorized distance into three categories to reflect distance to treatment facility in miles: 0–30 miles, 30–60 miles, and >60 miles. Straight-line distance may offer a reasonable estimate of travel time (Phibbs and Luft 1995). We also included whether the facility of initial depression diagnosis was in an urban or rural setting by matching facility zip codes to the metropolitan statistical area database (U.S. Census Bureau 2008).

Measures of demographic characteristics included age (<35 years, 35–49 years, 50–64 years, 65–79 years, and >80 years), race (white, black, unknown, and other), ethnicity (Hispanic or non-Hispanic), sex, and marital status (married or unmarried).

Comorbidities were identified by ICD-9-CM diagnoses codes and included past-year diagnoses of the following disorders: posttraumatic stress disorder, other anxiety disorders (including generalized anxiety disorder, panic disorder, phobias, obsessive-compulsive disorder, anxiety disorder not otherwise specified), and substance use disorders (including alcohol use disorders). We created a variable that indicated whether patients had an inpatient psychiatric hospitalization in the year before their index date of depression diagnosis. We assessed comorbid general medical conditions using a modified version of the Charlson comorbidity index, based on the presence of 19 medical conditions in the year before the index depression diagnosis. We used three categories of Charlson scores: 0; 1 or 2; and 3 or greater (Charlson et al. 1987; Valenstein et al. 2006).

### *Analyses*

We used chi-square tests to compare distance with mental health treatment facility between patients that received psychotherapy, pharmacotherapy, both treatments, or neither treatment.

We conducted four separate multivariable logistic regressions using (1) any psychotherapy, (2) adequate psychotherapy, (3) any pharmacotherapy, and (4) adequate pharmacotherapy as the dichotomous outcome variables. Distance and facility type were the primary predictor variables of interest, and all other demographic and clinical characteristics as covariates. Adequate psychotherapy and pharmacotherapy regressions were conducted using only those patients who received any of those respective treatments. We used robust cluster estimation to adjust for potential covariance among veterans within treatment facilities. We tested for an interaction between distance and facility type in these models by including the product of these covariates.

We also conducted a multinomial logistic regression predicting receipt of any psychotherapy only, any pharmacotherapy only, any of both treatments, or none of either treatment, using the same distance and facility type independent variables and other covariates. To interpret the results from the multinomial regression, we used the method of recycled predictions (or predicted margins) to generate predicted probabilities of the various outcomes for each distance and facility type category. This method calculates the mean predicted probability of the outcome variable based on the coefficients from the fitted regression model, fixing the independent variable of interest at a specific value (e.g., distance < 30 miles) while letting the others vary at their original values for every individual in the sample (Korn and Graubard 1999,

pp. 126–40). The process is then repeated fixing the independent variable of interest at the alternate values (e.g., distance 30–60 miles). We used the same method to report the predicted probabilities of the outcomes from our logistic regression analyses where the interaction term between distance and facility type was significant.

## RESULTS

Of the 132,329 veterans included in this study who received treatment for depression within the VA in FY2004, 90.5 percent were male, 69.9 percent were white, and 70.4 percent were over age 50. The complete demographic and clinical characteristics are presented in Table 1. Patients who lived farther from a mental health facility were more likely to be diagnosed with depression at a small CBOC. Of those needing to travel more than 60 miles to a mental health facility, 51.4 percent were instead diagnosed at a small CBOC, whereas only 7 percent of those living within 30 miles of a mental health facility were diagnosed at a small CBOC. 36.3 percent of patients diagnosed at a small CBOC were diagnosed in a rural setting compared with 8.3 percent of patients diagnosed at larger facilities.

Among all depressed patients included in the study, 34.6 percent received at least one psychotherapy visit during the year following their index depression diagnosis and 3.9 percent received an adequate course. We found 70.3 percent of patients filled at least one prescription for an antidepressant medication and 35.8 percent received an adequate supply of antidepressant medication.

There was a significant difference in the distribution of patients who received any psychotherapy across distance categories with 37.2 percent of patients living within 30 miles receiving any psychotherapy compared with 28.5 percent of those living 30–60 miles and 26 percent of those living more than 60 miles from a mental health treatment facility ( $p < .001$ ). Patients also received any psychotherapy more frequently when diagnosed at a VA medical center (36.1 percent) or large CBOC (35.0 percent) compared with those diagnosed at a small CBOC (27.3 percent,  $p < .001$ ).

Any antidepressant treatment was provided to 69.6 percent of depressed patients living within 30 miles of a mental health treatment facility compared with 73 percent of those living 30–60 miles and 70.3 percent of those living more than 60 miles away ( $p < .001$ ). Patients received any antidepressant treatment less frequently when diagnosed with depression at small CBOCs

Table 1: Characteristics of Veterans Affairs (VA) Patients Diagnosed with Depression in FY2004 ( $N = 132,329$ )

<i>Variable</i>	<i>N (%)</i>
Distance to nearest mental health facility* (miles)	
0–30	95,366 (72.1)
31–60	24,463 (18.5)
>60	12,500 (9.5)
Facility type of initial depression diagnosis (892 missing)	
VA medical center	84,486 (64.3)
Large community clinic	27,459 (20.9)
Small community clinic	19,492 (14.8)
Diagnosing facility is in rural area (1,350 missing)	16,337 (12.5)
Age (years)	
<35	9,236 (7.0)
35–49	29,887 (22.6)
50–64	59,782 (45.2)
65–79	25,048 (18.9)
80 or greater	8,376 (6.3)
Gender, female	12,620 (9.5)
Race	
White	92,445 (69.9)
Black	20,025 (15.1)
Other	3,128 (2.4)
Unknown	16,734 (12.6)
Ethnicity, Hispanic	6,737 (5.1)
Marital status, married	67,043 (51.1)
Comorbid mental health conditions	
Posttraumatic stress disorder	17,338 (13.1)
Other anxiety disorder	17,322 (13.1)
Substance use disorder	20,190 (15.3)
Psychiatric hospitalization	5,073 (3.8)
Comorbid medical conditions (238 missing)	
None	76,773 (58.1)
1 or 2	41,569 (31.5)
3 or more	13,804 (10.5)

\*Small community clinics excluded.

(65.5 percent) compared with those diagnosed at large CBOCs (69.8 percent) or VA medical centers (71.5 percent,  $p < .001$ ).

In adjusted analyses using separate logistic regressions, distances > 30 miles from the nearest mental health treatment facility were associated with decreased likelihood of receiving any or adequate psychotherapy and an increased likelihood of receiving any or adequate antidepressant pharmacotherapy (Table 2). Facility of initial depression diagnosis was not significantly

Table 2: Effects of Distance, Facility of Initial Diagnosis, and Covariates on Receipt of Depression Treatment among Depressed Veterans\*

Variable	Psychotherapy, OR (95% CI)		Pharmacotherapy, OR (95% CI)	
	Any	Adequate	Any	Adequate
Distance to nearest mental health facility (miles)				
< 30 (reference)	1.0	1.0	1.0	1.0
30-60	<b>0.71 (0.66, 0.77)</b>	<b>0.63 (0.55, 0.73)</b>	<b>1.26 (1.21, 1.32)</b>	<b>1.13 (1.06, 1.19)</b>
> 60	<b>0.65 (0.57, 0.75)</b>	<b>0.67 (0.55, 0.81)</b>	<b>1.21 (1.12, 1.31)</b>	<b>1.26 (1.15, 1.37)</b>
Type of facility where diagnosed				
Veterans affairs medical center (reference)	1.0	1.0	1.0	1.0
Large community clinic	1.03 (0.88, 1.20)	<b>0.55 (0.42, 0.71)</b>	0.92 (0.82, 1.02)	0.93 (0.85, 1.02)
Small community clinic	0.96 (0.83, 1.11)	<b>0.47 (0.35, 0.62)</b>	<b>0.69 (0.63, 0.75)</b>	<b>0.88 (0.80, 0.97)</b>
Diagnosing facility is in rural area	0.93 (0.74, 1.15)	0.90 (0.64, 1.26)	1.04 (0.94, 1.14)	1.02 (0.92, 1.13)
Age group				
< 35 (reference)	1.0	1.0	1.0	1.0
35-49	0.96 (0.91, 1.02)	<b>1.44 (1.26, 1.65)</b>	<b>0.89 (0.84, 0.94)</b>	<b>1.16 (1.09, 1.24)</b>
50-64	<b>0.77 (0.73, 0.82)</b>	<b>1.26 (1.10, 1.45)</b>	<b>0.83 (0.79, 0.88)</b>	<b>1.23 (1.16, 1.31)</b>
65-79	<b>0.45 (0.42, 0.49)</b>	<b>0.71 (0.57, 0.89)</b>	<b>0.76 (0.71, 0.82)</b>	<b>1.34 (1.25, 1.44)</b>
> 80	<b>0.36 (0.33, 0.40)</b>	<b>0.70 (0.50, 0.98)</b>	<b>0.70 (0.65, 0.76)</b>	<b>1.28 (1.17, 1.40)</b>
Gender, female	0.98 (0.92, 1.03)	<b>0.83 (0.73, 0.95)</b>	1.02 (0.96, 1.08)	<b>1.09 (1.03, 1.15)</b>
Race				
White (reference)	1.0	1.0	1.0	1.0
Black	<b>1.11 (1.02, 1.21)</b>	<b>1.21 (1.07, 1.38)</b>	<b>0.88 (0.82, 0.94)</b>	<b>0.57 (0.53, 0.61)</b>
Other	<b>1.20 (1.10, 1.32)</b>	1.11 (0.88, 1.40)	<b>0.84 (0.77, 0.92)</b>	<b>0.78 (0.71, 0.86)</b>
Unknown	1.03 (0.96, 1.11)	<b>0.77 (0.66, 0.89)</b>	0.98 (0.92, 1.04)	0.98 (0.92, 1.04)
Ethnicity, Hispanic	<b>1.19 (1.05, 1.34)</b>	0.90 (0.72, 1.13)	1.04 (0.92, 1.17)	<b>0.72 (0.65, 0.79)</b>
Marital status, married	<b>0.91 (0.88, 0.93)</b>	<b>0.69 (0.64, 0.74)</b>	<b>1.13 (1.10, 1.17)</b>	<b>1.12 (1.09, 1.16)</b>

continued



Table 2. Continued

Variable	Psychotherapy, OR (95% CI)		Pharmacotherapy, OR (95% CI)	
	Any	Adequate	Any	Adequate
Psychiatric hospitalization	1.10 (1.01, 1.20)	1.36 (1.15, 1.60)	0.88 (0.80, 0.96)	0.96 (0.88, 1.05)
Comorbid mental health conditions				
Substance use disorder	1.73 (1.63, 1.83)	4.55 (4.00, 5.17)	0.80 (0.76, 0.84)	0.86 (0.82, 0.90)
Posttraumatic stress disorder	2.34 (2.21, 2.48)	1.68 (1.51, 1.87)	0.99 (0.94, 1.05)	0.83 (0.79, 0.87)
Other anxiety disorder	1.19 (1.13, 1.25)	0.81 (0.73, 0.89)	1.00 (0.96, 1.04)	1.03 (0.99, 1.08)
Comorbid medical conditions				
None (reference)	1.0	1.0	1.0	1.0
1-2	0.84 (0.82, 0.87)	0.84 (0.78, 0.91)	1.00 (0.97, 1.03)	1.01 (0.98, 1.05)
3 or more	0.87 (0.84, 0.92)	0.71 (0.61, 0.83)	0.94 (0.90, 0.98)	1.04 (0.99, 1.10)
Any antidepressant use	1.52 (1.44, 1.62)	0.91 (0.83, 1.00)	—	—
Any psychotherapy	—	—	1.53 (1.44, 1.62)	1.01 (0.96, 1.06)

\*Logistic regressions including distance and facility type simultaneously, adjusting for age, gender, race, Hispanic ethnicity, marital status, comorbid PTSD, other anxiety disorders, substance use disorders, psychiatric hospitalization, and general medical comorbidity score. Boldface values are statistically significantly based on a 95% confidence interval that does not include 1.0.

associated with receipt of any psychotherapy, but diagnosis at a facility other than a VA medical center was associated with decreased likelihood of receiving adequate psychotherapy. Patients initially diagnosed with depression at a small CBOC were less likely to receive any or adequate antidepressant treatment than patients diagnosed at VA medical centers. All covariates except whether the diagnosing facility was in a rural setting were significantly associated with at least one of the outcomes (Table 2). The interaction between distance and facility type was significant only in the model predicting any psychotherapy. Patients living within 30 miles of a mental health facility were less likely to receive any psychotherapy when diagnosed at a small CBOC versus a VA medical center (predicted probability 32.7 percent versus 36.6 percent). However, patients living farther than 30 miles from a mental health facility were more likely to receive any psychotherapy when diagnosed at a small CBOC versus a VA medical center (predicted probability 31.0 percent versus 28.6 percent for patients living 30–60 miles away).

In sensitivity analyses where distance was calculated to the nearest VA facility of any size (i.e., including small CBOCs with typically more limited mental health services), 87.9 percent of patients lived within 30 miles of a facility, 10.8 percent lived between 30 and 60 miles, and 1.3 percent lived more than 60 miles away. The significance of distance as a predictor of receipt of depression treatment did not change except that patients living more than 60 miles away were no longer significantly more likely to receive any antidepressant treatment (OR = 1.13; 95 percent CI: 1.00, 1.28) compared with those living within 30 miles.

Using the method of recycled predictions from the multinomial logistic regression model, the predicted probability of receiving only psychotherapy or the combination of medications and psychotherapy decreased with increasing distance from the nearest mental health treatment facility, whereas the predicted probability of receiving only antidepressant treatment increased with distance (Table 3). The predicted probabilities of receiving antidepressants only or of receiving combined antidepressants and psychotherapy were lower, and the probabilities of receiving psychotherapy only or no treatment were greater, in small CBOCs compared with larger facilities.

## DISCUSSION

Ensuring initial access and sustained treatment for depression is a challenging but important goal for health care providers and health systems. Psychotherapy

Table 3: Predicted Probabilities of Receiving Any Psychotherapy, Pharmacotherapy, Both Treatments, or Neither for Depression\*

<i>Variable</i>	<i>Psychotherapy Only % (95% CI)</i>	<i>Pharmacotherapy Only % (95% CI)</i>	<i>Psychotherapy and Pharmacotherapy % (95% CI)</i>	<i>Neither Treatment % (95% CI)</i>
Distance to nearest mental health facility (miles)				
< 30	9.1 (8.6, 9.7)	41.9 (40.7, 43.1)	27.4 (26.2, 28.5)	21.6 (20.9, 22.3)
30-60	6.2 (5.6, 6.8)**	49.7 (48.2, 51.2)**	23.7 (22.4, 25.1)**	20.4 (19.6, 21.2)**
> 60	7.1 (6.1, 8.2)**	51.4 (49.1, 53.7)**	21.0 (19.0, 22.9)**	20.5 (19.2, 21.8)
Type of facility where diagnosed				
Veterans Affairs (VA) medical center	7.9 (7.3, 8.5)	45.1 (43.5, 46.7)	26.8 (25.3, 28.2)	20.2 (19.3, 21.1)
Large community clinic	8.9 (7.7, 10.0)	43.9 (41.4, 46.4)	26.2 (23.8, 28.5)	21.0 (19.8, 22.3)
Small community clinic	10.5 (9.4, 11.6)†	40.9 (39.0, 42.9)†	22.6 (20.9, 24.4)†	25.9 (24.4, 27.4)†

\*Using the method of recycled predictions from a multinomial regression model, adjusted for age, gender, race, Hispanic ethnicity, marital status, comorbid posttraumatic stress disorder, other anxiety disorders, substance use disorders, psychiatric hospitalization, and general medical comorbidity score.

\*\* $p < .05$  using chi-square test for significance compared with < 30 miles.

†  $p < .05$  using chi-square test for significance compared with VA medical center.

and antidepressant pharmacotherapy are the most commonly used treatments for depression, and understanding the facilitators and barriers to receipt of these treatments may help individual treatment planning and allocation of health system resources. Using national VA health system data, we found distance to the nearest mental health treatment facility was a significant barrier to receiving any or adequate psychotherapy, whereas distance increased the likelihood of receipt of any or adequate pharmacotherapy. Interestingly, the decrease in psychotherapy (with or without antidepressant treatment) associated with greater distance from a mental health treatment facility was largely offset by an increase in pharmacotherapy, such that the predicted probabilities of receiving some form of depression treatment were similar.

Our finding regarding the negative association between distance and receipt of psychotherapy for depression is consistent with a prior study of guideline-based care for depression in which psychotherapy and pharmacotherapy were not considered separately (Fortney et al. 1999). Our findings regarding distance to treatment facilities as a barrier to psychotherapy also complement studies that have shown increased distance to be associated with gaps in treatment for patients with serious mental illness and decreased services utilization after a psychiatric hospitalization (Druss and Rosenheck 1997; McCarthy et al. 2007b). When nonpharmacologic treatments for depression are indicated for patients who live in outlying areas, alternatives to in-person psychotherapy that may be less sensitive to distance barriers should be considered. Telephone-administered psychotherapy has demonstrated efficacy for depression and deserves further investigation of its comparative effectiveness for patients with depression who live at remote distances (Mohr et al. 2008). The VA has made recent efforts to increase the use of telemental health services; however, the impact of these initiatives on receipt of adequate psychotherapy is not yet known.

Beyond confirming the hypothesis that travel distance would negatively impact psychotherapy, we also investigated whether being initially diagnosed with depression at a smaller community-based clinic might impact subsequent receipt of psychotherapy, as these clinics may be closest to patients living in outlying areas and health systems may consider the addition of more community clinics to remote areas to improve access. We encouragingly found that receiving treatment at community clinics did not impact overall receipt of initial psychotherapy, and patients living farther than 30 miles from a mental health facility were actually more likely to receive any psychotherapy when diagnosed at a small community clinic. However, patients were less likely to receive an adequate number of psychotherapy sessions if they were initially

diagnosed at a community clinic compared with a VA medical center. This finding could result if patients with more severe or complicated illness are more likely to be referred (or self-refer) to VA medical centers and adhere to an adequate course of psychotherapy. However, the possibility that patients diagnosed at CBOCs receive limited treatment at those facilities or do not transition to another facility to receive an adequate course of psychotherapy has important quality of care implications. This finding is particularly concerning among patients diagnosed at large CBOCs that are expected to provide more robust mental health services to their patients. The VA has made efforts to increase the use and availability of evidence-based psychotherapies at the largest CBOCs since the time of this study; however, the impact of these initiatives is yet unknown.

The finding that greater distance from a mental health treatment facility was associated with increased likelihood of receiving any or adequate pharmacotherapy is novel. Prior studies have found antidepressant treatment among patients living in remote or rural areas to either have similar or less antidepressant use than patients living in urban areas or areas with greater access to mental health treatment, although travel distance was not specifically examined in these studies (Goldney, Taylor, and Bain 2007; Morrison et al. 2009). These findings suggest patients and/or providers may include travel barriers (i.e., burden of subsequent appointments) in the decision to start an antidepressant medication and to prescribe and obtain an adequate supply of medication. The extensive use and convenience of mailed prescriptions within the VA may also contribute to this finding.

We found diagnosis at a small CBOC to be negatively associated with prescription of any or adequate antidepressant pharmacotherapy after adjusting for all covariates. This finding is in contrast to a prior report which, in unadjusted analyses, found greater rates of adequate antidepressant coverage among patients treated at VA CBOCs compared with VA medical centers and suggested this may be due to more frequent initial prescriptions for a 90-day supply of medication (thereby automatically fulfilling the criteria for adequate antidepressant coverage) at the community clinics (McCarthy et al. 2007a). Our findings demonstrate that distance and facility type have different, potentially opposing, effects on antidepressant prescribing and should be considered separately in future studies of antidepressant prescribing patterns.

The decreased likelihood of receiving an initial antidepressant at a small CBOC may be due to differences in preferences for depression treatment at these clinics compared with VA medical centers. In analyses comparing the predicted probability of receiving psychotherapy, pharmacotherapy, both

treatment or neither, patients diagnosed at small CBOCs did have a greater predicted probability of receiving psychotherapy only compared with patients diagnosed at VA medical centers; however, this was not sufficient to offset the lower probabilities of receiving pharmacotherapy or combined treatment. Patients diagnosed at small CBOCs do not appear to be simply choosing between the two depression treatment modalities and instead were more likely to receive no treatment. Depression care management services within primary care clinics, which have established efficacy for improving antidepressant treatment (Gilbody et al. 2006), have been developed specifically for VA clinical settings and are now required of all VA medical centers and large CBOCs (Post and Van Stone 2008). Extending depression care management to smaller outpatient clinics may improve the disparity in antidepressant treatment initiation and adequacy, although such programs may be less cost-effective in rural versus urban settings (Fortney et al. 2007; Pyne et al. 2010).

Our finding that urban or rural location of the diagnosing facility was not related to receipt of adequate depression care is consistent with prior work which found similar quality of depression care between rural and urban residents despite rural residents receiving less specialty mental health care (Rost et al. 1998).

Although the primary aim of this study was to determine the effect of distance and facility type on receipt of treatment for depression, other factors associated with receipt of care may inform efforts to improve treatment engagement and adherence. Patients younger than 35 years were generally more likely to initiate treatment than older patients, but as they were less likely to receive adequate psychotherapy compared with middle-aged patients or adequate pharmacotherapy compared with all older patients, services for younger patients might prioritize retaining them in care. On the other hand, older patients may benefit more from efforts to improve treatment initiation. Low utilization of psychotherapy among patients older than 65 years has been demonstrated in other populations, and these patients may need particular assistance in overcoming access barriers (Wei et al. 2005). Consistent with prior studies, married patients were less likely to receive adequate psychotherapy and more likely to receive adequate pharmacotherapy, suggesting family responsibilities may be a barrier to attending psychotherapy sessions or that the social support provided by a spouse may affect patients' real or perceived need for psychotherapy (Olfson et al. 2002; Busch, Leslie, and Rosenheck 2004; Chermack et al. 2008). Although women in the general U.S. population receive psychotherapy at higher rates than men (Olfson et al. 2002), female VA patients were less likely than male patients to receive

adequate psychotherapy and men were less likely to receive adequate pharmacotherapy compared with women, an issue that deserves further study particularly because women comprise an increasing proportion of the veteran population. The greater likelihood of psychotherapy use by blacks compared with whites is contrary to U.S. national trends but consistent with previous finding within the VA and may better reflect differences in treatment preferences when patients have similar access and benefits to care (Olfson et al. 2002; Chermack et al. 2008).

Patients with comorbid substance use and posttraumatic stress disorders were more likely to receive psychotherapy than those without these comorbidities likely because the subspecialty services provided for these conditions within the VA generally include psychotherapy. Patients with general medical comorbidities had significantly decreased odds of receiving any or adequate psychotherapy and yet did not have increased odds of receiving pharmacotherapy. These patients may be more likely to receive their care exclusively in primary care or nonpsychiatric medical specialty settings and therefore have more limited access to psychotherapy. Integration of psychotherapy services into primary care and medical specialty settings or initiatives to bundle psychotherapy appointments with other medical appointments should be considered to improve adequacy of depression treatment for medically ill patients. We also note the relationship between receipt of psychotherapy and pharmacotherapy. While receiving one treatment increased the odds of receiving the other, neither treatment increased the likelihood of receiving adequate treatment of the other modality. This is consistent with clinical trial data which show combined treatment is more efficacious than monotherapy but does not result in improved treatment adherence (Pampallona et al. 2004).

Because of limitations imposed by the available data, our study was not able to include several potentially important predictors of psychotherapy or pharmacotherapy utilization such as measures of depression severity (other than psychiatric hospitalization), employment, education, or patient treatment preferences. In a related study of mental health visits for depression which included some of these covariates, distance had the strongest marginal effect (Fortney et al. 1999). The relationships between distance and facility type may be related to unmeasured differences in attitudes or preferences for treatment among patients who live in outlying areas or seek treatment in community settings. An Australian study found people living in remote or outlying areas to be less likely to consider psychologists to be helpful; however, the direction of causality is unclear and this finding may be due to less exposure to psychological services due to distance barriers (Goldney, Taylor, and Bain 2007). Our

analyses only included VA services, and patients living remote distances from VA facilities could potentially receive more services (i.e., psychotherapy) through non-VA providers. As our study population consisted of veterans receiving care in the VA health system, our findings may not generalize to depression in individuals within general populations, which on average are younger, predominantly female, and have less comorbidity with posttraumatic stress disorder. Our findings may also not generalize to the uninsured or insured patients whose health plans place administrative or cost barriers to receiving depression treatment. Finally, our method for calculating distance is only a proxy for actual travel time.

In summary, distance to treating facility is a significant barrier to receiving any or adequate psychotherapy for depression yet is associated with greater likelihood of receiving any or adequate pharmacotherapy. Patients diagnosed at smaller community clinics are less likely to receive adequate psychotherapy and less likely to initiate antidepressant treatment. Implications for health systems include providing alternatives to in-person psychotherapy for patients living in remote areas, insuring small community clinics are capable of providing adequate psychotherapy to those who initiate treatment, and extending depression care management services to small community clinics to support antidepressant treatment.

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