

# Clinician Burden and Depression Treatment: Disentangling Patient- and Clinician-Level Effects of Medical Comorbidity

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**BACKGROUND:** Efforts to improve primary care depression treatment have assessed strategies across heterogeneous groups of patients, but few have examined clinician-level influences on depression treatment.

**OBJECTIVE:** To examine clinician characteristics that affect depression treatment in primary care settings, using multilevel ordinal regression modeling to disentangle patient- from clinician-level effects.

**DESIGN:** Secondary analysis from the Quality Improvement in Depression Study dataset.

**PARTICIPANTS:** The participants were 1,023 primary care patients with depression who reported on treatment in the 6-month follow-up and whose clinicians (n=158) had at least 4 patients in the study.

**MEASUREMENTS:** Primary outcome variable was depression treatment intensity, derived from assessment of concordance with AHCPR depression treatment guidelines based on patient-reported data on their treatment. Primary independent variable was clinical practice burden for treating depression, derived from patient- and clinician-reported composite measures tested for significant association with clinician-reported practice burden.

**RESULTS:** Clinicians who treat patients with more chronic medical comorbidities perceive less burden from treating depressed patients in their practice (Spearman's rho=-.30, p<.05). Clinicians who treat patients with more chronic medical comorbidities also provide greater intensity of depression treatment (adjusted OR=1.44, p=.02), even after adjusting for the effects of patient-level chronic medical comorbidities (adjusted OR=0.95, p=.45).

**CONCLUSIONS:** Clinicians who provide more chronic care also provide greater depression treatment intensity, suggesting that clinicians who care for complex patients can integrate depression care into their practice.

Targeting interventions to these clinicians to enhance their ability to provide guideline-concordant depression care is a worthwhile endeavor and deserves further investigation.

**KEY WORDS:** depression; comorbidity; multilevel modeling.  
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## INTRODUCTION

Depression<sup>5-9</sup> is a common,<sup>1-3</sup> disabling,<sup>4-6</sup> and expensive<sup>5-9</sup> chronic condition in the primary care setting. Moreover, it frequently occurs in the presence of other chronic conditions,<sup>10</sup> compounding their morbidity,<sup>10-11</sup> rendering them more difficult to treat,<sup>12-14</sup> and increasing the cost of care.<sup>6,15</sup> For 3 decades efforts have been underway to improve the quality of treatment of depression in primary care,<sup>16-23</sup> and much has been learned about the elements that contribute to effective practice improvement.<sup>20-21,24-26</sup> Numerous investigators have explored how individual patient factors<sup>27-35</sup> and patient-related variables, such as family, neighborhood, and school,<sup>36-40</sup> affect depression symptoms and treatment. Much less is known about how clinician and practice characteristics affect depression care.<sup>41-44</sup> For example, there is modest and inconsistent literature suggesting that competing demands on primary care clinicians, which may be conceptualized as practice burden, may limit clinicians' ability to deal with patients' multiple problems.<sup>45-48</sup> There is at least one study that specifically suggests that clinicians who perceive depression care as particularly burdensome do not render adequate depression care;<sup>22</sup> thus, clinicians with more competing demands, greater barriers, and fewer resources may experience greater burden treating depressed patients and in turn, provide less than optimal treatment to their patients. Should this turn out to be true, it would have implications for how clinicians need to be supported and interventions need to be structured for better depression care. It should be possible, using multilevel modeling,<sup>49-51</sup> to disentangle the effects of patient factors, clinician factors, and practice factors (Fig. 1) in depression treatment.

This study tests the hypothesis that clinicians who treat more complex patients (e.g., patients with more chronic medical comorbidities) have greater competing demands,

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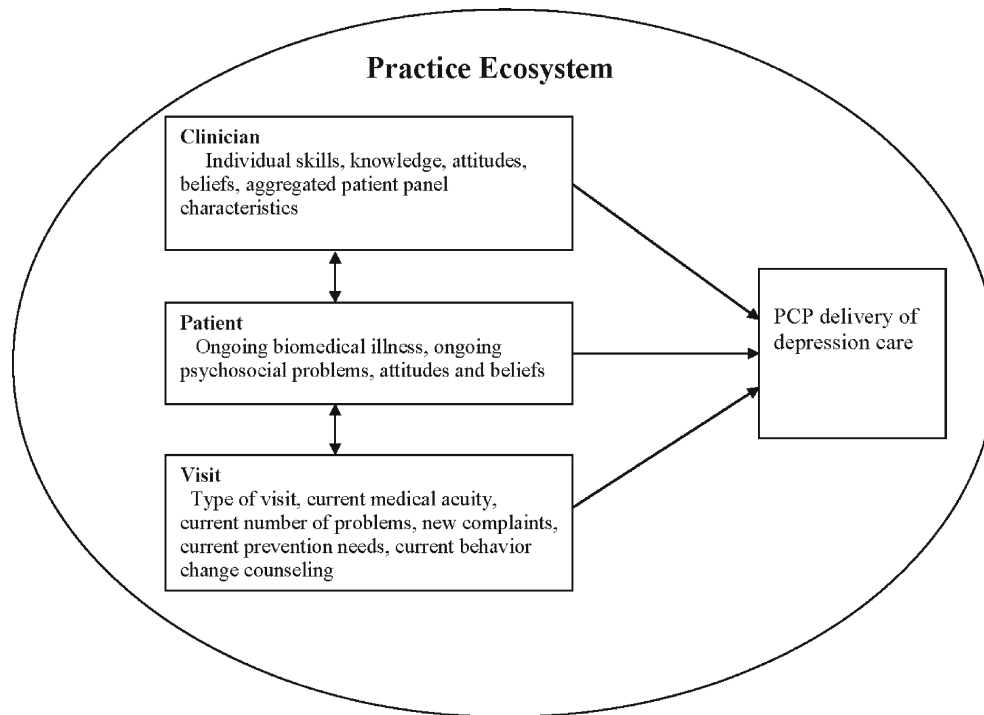


Figure 1. Hierarchical nature of primary care.

experience greater burden, and deliver less intensive depression treatment to patients. Since it is impossible to measure clinician attitudes directly by survey, we proposed to develop an alternative measure of clinician burden that could be obtained from administrative data rather than direct questioning of the clinician. Thus, this paper reports the development of an indirect measure of clinician burden that is derived from patient and visit characteristics in the clinician's practice and a test of the hypothesis that clinician practice burden would predict reduced depression treatment intensity.

## METHODS

**Data Source.** The research team conducted this investigation using data from the Quality Improvement in Depression (QID) collaborative. The QID collaborative consisted of four linked group-randomized trials that collected data from primary care clinicians and their depressed patients to test the effect of quality improvement interventions on the process and outcomes of depression care. The design and methods used in the QID studies are described in detail elsewhere.<sup>19</sup> Consecutive patients were recruited from within practices. Patients who screened positive for current depression symptoms at the index visit brief CIDI depression screen<sup>52</sup> and met DSM-IV criteria for a major depressive disorder on a structured interview<sup>52</sup> were invited to enroll. The QID collaborative was approved by Institutional Review Boards at each participating institution, and study participants provided written informed consent.

This analysis includes 1,023 depressed patients for whom we had baseline and 6-month follow-up data treated by 158 clinicians who had four or more patients in the study.

**Clinician Burden Measures.** Since one of our objectives was to develop a valid measure of clinician burden from data more readily available than direct clinician interview, we first tested the association of five candidate measures against a clinician interview we had available in the QID dataset for a subset of 87 clinicians. The first candidate measure of clinician burden was simply the score from the MOS Chronic Disease Survey,<sup>6</sup> a validated and fully field-tested patient-completed instrument that queries for the presence of common chronic diseases. For each clinician, a score was derived from the average of all enrolled patients' Chronic Disease scores. The remaining composite measures characterized patient mix and visit types by measuring for each clinician the total number of visits per week as well as the percentage of total weekly visits that were new patient visits, follow-up visits, or urgent/emergent care visits.

Eighty-seven clinicians in the QID studies had completed a depression-specific practice burden questionnaire consisting of seven questions from the Physician Belief Scale,<sup>53</sup> modified specifically for depression.<sup>54</sup> This scale is scored from 0–100; the excellent psychometric properties of this scale are reported elsewhere,<sup>54</sup> as is its use in other studies.<sup>22</sup> The instrument consists of statements regarding the practice burden associated with treating depression, such as "evaluating and treating depression problems will cause me to be more overburdened than I already am."

**Covariates.** Patient and clinician covariates were selected from those factors suggested by previous studies that may be associated with depression treatment. Clinician-level covariates included clinician age, gender, race/ethnicity, and medical specialty. Patient-level covariates included patient age, gender, race/ethnicity, educational level, marital status, number of chronic medical comorbidities,<sup>6</sup> and baseline depression severity. Severity of depressive symptoms at baseline was

measured using a 23-item adaptation of the Center for Epidemiological Studies Depression Scale (CES-D)<sup>55</sup> developed by Ford et al.<sup>19</sup> Continuous patient-level variables were centered at the grand mean prior to analysis.

**Dependent Variable.** Although basic provision of antidepressant medication (or psychotherapy) for depressed patients is a minimum quality goal for primary care clinicians, the AHCPR Depression Guideline Panel<sup>56</sup> states that further clinical management, which includes providing support, advice, reassurance, side-effect monitoring, dosage adjustments, and adequate follow-up, is important. A set of quality indicators, based on AHCPR guidelines and expert panel review, has been defined for primary care<sup>57</sup> and used in the QID dataset. Based on these standards, the outcome variable for this analysis, depression treatment intensity, was operationalized using patient-reported responses to six questions about depression treatment. These represent four key criteria for quality depression treatment in primary care (also see Table 3): (a) PCP-initiated referral to MH professional for counseling; (b) PCP-initiated antidepressant therapy and/or antidepressant medication adjustment; (c) discussion of side effects of medications or encouragement to stay on antidepressants; and (d) adequate PCP follow-up—three or more visits. Based on the answers to these questions, intensity of treatment was categorized into four levels, creating an ordinal response variable: (1) no depression treatment—negative on criteria a and b, (2) antidepressant therapy or referral for counseling—positive response on criteria a or b or both and negative on criteria c and d, (3) treatment augmented with communication about medication or adequate follow-up—positive response on criteria a or b or both plus positive response on either c or d, and (4) treatment augmented with both communication about medication and adequate follow-up—positive response on criteria a or b or both and positive on both c and d.

**Statistical Analysis.** Statistical analysis was performed using SAS, version 9.1 for personal computers.<sup>58–59</sup> Descriptive statistics and frequency distributions were generated for clinician and patient characteristics; t-tests and chi-square tests were used to identify differences between (1) patients and clinicians in the analysis and those excluded because of clinicians having fewer than four patients enrolled in the QID collaborative and (2) eligible patients with 6-month assessments who did not respond to the questions used to create the depression treatment intensity score and those who responded.

Two main analyses were carried out in order to: (1) test associations between dataset measures of practice burden and the clinician-reported perceived burden measure and (2) test associations between practice burden and depression treatment intensity, adjusting for relevant clinician and patient covariates. To test whether composite measures were associated with direct report of clinician burden, we examined bivariate associations using Spearman's correlation coefficients, since this non-parametric measure of association does not assume normality of the underlying variables. Next, to test whether burden measures predicted depression treatment intensity, we used multilevel ordinal regression with clinician as a random effect.<sup>60–61</sup> Conceptually, this approach is similar to a series of logistic regressions modeling the log odds of being in (1) response category 1 vs. 2, 3, or 4, (2) categories 1 or 2 vs. 3 or 4, and (3) categories 1, 2, or 3 vs. 4 (Statistical Appendix available online).

Patient- and clinician-level covariates considered clinically significant or with  $p$ -values  $< .2$  were included in all models, as well as the intervention group variable to control for the impact of intervention condition on depression treatment intensity. Sample size varied slightly across the models due to missing data.

Multiple imputation was used for item non-response in the QID dataset, as described previously,<sup>19</sup> resulting in five replicates of the dataset for both patients and clinicians. We performed analyses on all five imputed datasets and combined the results (mean) or pooled estimates (multilevel analyses) using standard methods<sup>62–63</sup> to obtain pooled variance estimates that incorporate both within and between dataset variance.

## RESULTS

### Participant Characteristics

Baseline characteristics of the 1,023 patients and 158 clinicians who met eligibility criteria for the analysis compared to the 1,078 patients and 250 clinicians excluded from analysis are shown in Tables 1 and 2. Patients eligible for analysis were more likely to be female (77.15% versus 69.08%), non-Hispanic white (71.69% versus 60.97%), have completed a high school education (89.56% versus 83.84%), and have more severe depression at baseline (35.90 vs 30.46). We also compared patients who responded to all depression treatment questions with those who had some missing data on these items. Patients who responded were less likely to report arthritis (28.0% vs. 36.6%) or pulmonary disease (14.3% vs. 32.3%) and were more likely to be married (50.1% vs. 40.5%) and in intervention practices (66.4% vs. 56.3%).

Eligible and excluded clinicians were comparable on all variables except mean number of patients enrolled in the study, the criterion variable for eligibility.

**Relationship of Database-derived Measures of Practice Burden to Clinician-reported Burden.** Fifty-three of the 158 study clinicians had usable scores on the clinician burden instrument. Measures that were significantly associated ( $p < .05$ ) with the direct measure of perceived burden included mean number of chronic medical conditions for patients in the clinician's panel, percentage of total visits that were follow-up visits, and urgent care visits ( $\rho = -.30$ ,  $\rho = -.28$ , and  $\rho = .30$ , respectively). Percentage of total visits that were depression visits and total number of visits per week were not associated with perceived burden. Contrary to our initial hypothesis, we found that clinicians who provided more chronic care (i.e., those with patients having more chronic medical comorbidities) perceived less burden from treating depressed patients in their practice. Clinicians who had a greater percentage of total visits as follow-up visits and less as urgent care visits perceived less burden from treating depressed patients in their practice. Additionally, clinicians who provided more chronic care had fewer visits overall ( $\rho = -.23$ ,  $p < .05$ ); clinicians who had a higher percentage of follow-up visits had fewer visits overall ( $\rho = -.19$ ,  $p < .05$ ) and a lower percentage of urgent care visits ( $\rho = -.81$ ,  $p < .01$ ).

**Relationship Between Measures of Clinician Burden and Treatment Intensity.** Outcome measures of depression treatment intensity at the 6-month follow-up were available for 744

Table 1. Baseline Patient Characteristics

	Excluded N=1,078	Eligible for analysis N=1,023	Total* N=2,101
Age, mean (sd)	44.29 (14.59)	43.89 (13.02)	44.09 (13.85)
Women (%)**	69.08%	77.15%	72.04%
Non-Hispanic White**	60.97%	71.69%	66.16%
Baseline Depression Severity (CESD scores)**	30.46 (14.49)	35.90 (14.20)	33.14 (14.60)
≥ High school education**	83.84%	89.56%	86.61%
Currently married	48.18%	47.46%	47.83%
% patients with angina	5.17%	5.34%	5.25%
% of patients with arthritis	30.45%	30.73%	30.58%
% of patients with back problems	41.98%	39.9%	40.97%
% of patients with diabetes	14.22%	13.70%	13.97%
% of patients with gastrointestinal problems*	13.19%	17.01%	15.04%
% of patients with pulmonary disease**	13.44%	19.3%	16.26%
% of patients with hypertension	24.63%	26.7%	25.66%
Number of chronic medical conditions	1.43 (1.38)	1.53 (1.45)	1.48 (1.42)

\* $p < .05$ , \*\* $p < .01$ 

+ total sample size for individual items ranges from 2,092 to 2,101

patients. Table 3 shows that 39% of patients were referred for psychotherapy, 56% had provider-initiated antidepressant therapy, 30% had adequate follow-up with their PCP, and 43% discussed medications with their PCP. Overall, 34% reported no PCP-initiated psychotherapy referral or antidepressant treatment from the index visit to the 6 month follow-up, 16% reported either antidepressant therapy or a referral for counseling or both, 25% reported antidepressant therapy or psychotherapy referral along with communication about

medication or adequate follow-up, and 25% reported antidepressant therapy or psychotherapy referral along with communication about medications and adequate follow-up.

Results of the multilevel ordinal regression analysis using proportional odds models and controlling for patient and clinician covariates suggest that more clinician chronic care (i.e., lower perceived burden) is associated with patients being in a higher depression treatment intensity category (coefficient 0.365,  $p = .02$ ) (Table 4; Statistical Appendix available online).

Table 2. Baseline Clinician Characteristics

	Excluded N=250	Eligible for analysis N=158	Total N=408
Age, mean (SD)	43.30 years (9.47) N=156	43.61 (6.91) N=120	43.44 (8.44)
Female, %	40.26% N=154	41.18% N=119	40.66%
% General internist	41.67% N=156	36.67% N=120	39.49%
Number of patients enrolled in QID studies**	2.60 (1.84)	9.15 (5.36)	5.13 (4.83)
Number of patient visits per week, mean (SD)	96.45 (34.07) N=146	91.03 (39.33) N=116	94.05 (36.52)
<b>Composite measures for analysis</b>			
Clinician burden: mean number of chronic conditions in clinician's caseload	1.57 (1.20) N=250	1.46 (0.72) N=158	1.53 (1.04)
% new patient visits, mean (SD)	16.60 (13.69) N=134	14.18 (13.60) N=107	15.55 (13.68)
% follow-up visits, mean (SD)	56.51 (23.19) N=134	58.47 (23.14) N=106	57.37 (23.15)
% urgent/emergent care visits, mean (SD)	26.88 (21.02) N=134	27.35 (19.65) N=107	27.08 (20.41)
% depression visits, mean (SD)	7.61 (8.47) N=130	7.62 (6.37) N=107	7.62 (7.62)
<b>Clinician beliefs about depression</b>			
1. Evaluating and treating depression problems will cause me to be more overburdened than I am.			
2.* I am not too pressed for time to routinely investigate depression issues.			
3. One reason I do not consider information about depression is the limited time I have available.			
4. Patients will not become more dependent on me if I open up depression concerns.			
5. Consideration of depression problems will require more effort than I have to give.			
6.* Investigating issues of depression increases my efficiency.			
7. Patients with depression concerns tend to become dependent on me.			
Clinician beliefs about depression burden score (high score means greater burden) (N=52)	47.18 (18.78)	45.08 (16.40)	46.30 (17.78)

\*Reverse coded

\*\* $p < .01$

**Table 3. Outcome: Depression Treatment Intensity. Patient-reported: Baseline to 6-month Follow-up**

Criteria	% Positive	Description
Referral for psychotherapy	38.9%	Medical provider recommended another doctor for counseling
Antidepressant (AD) therapy	55.7%	Medical provider prescribed (or changed) medication to help with emotional problems ( <i>only if</i> patient took antidepressant during this period)
Adequate follow-up	29.7%	Medical provider discussed personal or emotional problems on 3 or more visits during previous 6 months
Medication discussion	42.9%	Medical provider discussed side effects of medications or encouraged you to stay on antidepressants (if treated with antidepressant) during previous 6 months
Outcome response category		
1	33.9%	No treatment for depression
2	16.4%	Initial treatment: antidepressant therapy, referral for counseling
3	24.8%	Initial treatment + communication medication <i>or</i> adequate follow-up
4	24.9%	Initial treatment + communication about medication <i>and</i> adequate follow-up

while the percentage of visits that were follow-up visits ( $p > .50$ ) and the percentage of visits that were urgent care visits ( $p > .50$ ) were not predictive. For every 1-unit increase in the average number of chronic conditions at the clinician level, the odds of patients being in a higher treatment category increase by a factor of 1.44. However, the relationship between patient-level medical comorbidity and intensity of depression treatment was not statistically significant (coefficient  $-0.0493$ ,  $p = .4508$ ), suggesting that within clinicians, patients who had more comorbid medical conditions received similar depression treatment intensity as patients with fewer comorbid conditions.

**DISCUSSION**

The analysis presented here suggests that clinicians who provide more care for chronic medical problems perceive less burden from treating depressed patients and provide greater depression treatment intensity to their patients. Additionally, the data suggest that clinicians whose practices consist of a higher percentage of visits that were follow-up visits and a lower percentage that were urgent/emergency care visits perceive less burden on their practice from treating depressed patients, although neither of these variables was associated with depression treatment intensity.

Other investigators have examined the role of patient medical comorbidity in depression identification and treatment, with mixed results.<sup>12-14,23,28,41,45</sup> In studies in primary care and community settings, Nutting<sup>45</sup> and Fortney<sup>28</sup> found that having fewer medical comorbidities was associated with greater likelihood of discussing depression as a possible diagnosis in the primary care visit and a greater likelihood of receiving guideline-concordant depression care. Bogner<sup>12</sup> reported that older patients with heart failure and stroke who were identified as depressed were less likely to receive active management for depression than older adults without heart failure, but these effects were not statistically significant after adjusting for sociodemographic and clinical variables. Conversely, Koike<sup>14</sup> reported that depression treatment (rates of antidepressant use and counseling) did not differ by patient medical comorbidity, and Schoenbaum<sup>23</sup> found that the number of chronic diseases patients reported was not associated with receiving appropriate depression care. Harman<sup>13</sup> found that older depressed patients with hypertension and/or diabetes, but not arthritis or heart disease, were more likely to receive adequate depression care, and Lagomasino<sup>33</sup> found that patients in managed care settings with three or more chronic

diseases were more likely to receive antidepressants or counseling. Finally, using multilevel logistic models, Tai-Seale investigated the effects of visit, patient, and physician factors on propensity to assess for depression in elderly patients<sup>41</sup> and found that, contrary to previous reports regarding competing demands in the medical visit, visits in which multiple topics were covered were more likely to include depression assessment.

As described above, investigators have examined patient-level medical comorbidity and depression and have used multilevel methods to explore patient and physician characteristics that may affect care. However, compositional effects of chronic medical problems at the clinician level (i.e., patient-level variables aggregated to the clinician level while including the patient-level variable in the model),<sup>51</sup> as an indirect measure of contextual effects, have not been investigated.

Medical comorbidity measured at the patient level may influence depression identification and treatment by one of three paths. The first path proposes that comorbid medical conditions within an individual patient compete with depression for priority in the medical visit and adversely affect depression treatment.<sup>45,47-48</sup> The second path is that the presence of certain specific conditions increases contact with the clinician and may allow for better co-management of co-occurring conditions, or at least does not interfere with depression treatment.<sup>13</sup> The third path is that visits in which patients are allowed to bring up multiple problems may allow experienced clinicians to recognize multiple complaints as a sign of depression and enhance clinician understanding of patients' problems in a comprehensive way.<sup>41</sup>

**Table 4. Multilevel Ordinal Regression Analyses**

Variables	Coefficient (SE)	Adjusted OR (95% CI)
Intercept	.7754 (.2054)	—
Baseline CESD	.0186 (.0256)	1.02 (0.97, 1.07)
Intervention	.3215 (.2128)	1.38 (0.91, 2.09)
Number chronic medical conditions (individual)	-.0493 (.0652)	0.95 (0.84, 1.08)
Clinician specialty (GIM vs other)	-.6010 (.2323)	0.55 (0.35, 0.86)
Male gender (patient)	-.3191 (.1912)	0.73 (0.50, 1.06)
Minority status (patient)	-.2689 (.1774)	0.76 (0.54, 1.08)
Age	-.0048 (.0070)	1.00 (0.98, 1.01)
<b>Composite variables</b>		
Chronic care	<b>.3650 (.1513)</b>	1.44 (1.07, 1.94)
Threshold 2	.8086	
Threshold 3	1.2982	

Clinician chronic care,  $t = 2.41$ ,  $p = .017$ ; threshold  $1 = 0$

Medical comorbidity measured at the clinician level raises the possibility of a fourth path, which may co-exist with any of the above three. We believe that our composite measure, derived from aggregated patient medical comorbidities, may actually reflect attributes of the clinician's practice style. That is, clinicians who are willing to care for patients with multiple chronic conditions may have a personal or practice style that makes them more willing to provide depression care and allows them to more effectively manage and support depressed patients. Additionally, clinicians who care for more patients with multiple chronic problems may have practice systems, such as those based around the chronic care model,<sup>64</sup> that enable improved care for chronic conditions, including depression. It is possible that the positive relationship between providing more chronic care and providing higher-intensity depression treatment stems largely from organizational features/resource availability, congruent with findings from Meredith's study of staff/group model versus network-model managed care organizations in which both available resources and provision of depression care differ between the two models.<sup>22</sup> While differences in populations and study designs limit our ability to draw conclusions across investigations, our results suggests that future research should investigate both patient- and clinician-level attributes in identifying predictors of high-quality processes and outcomes of care. The finding that clinicians who provide more chronic care also provide greater depression treatment intensity provides compelling evidence that clinicians who care for complex patients can and do integrate depression care into their practice.

There are several limitations of this study. First, clinician-level scores created by aggregating patient measures could only be obtained using information from depressed patients enrolled in the study and therefore do not represent the full patient panel. Further research is needed to determine whether aggregating medical comorbidity from administrative database measures of full panels has a comparable relationship to depression treatment intensity. However, clinician-reported percent of follow-up visits reflects clinicians' entire patient panel and is positively correlated with the aggregated score based on chronic medical conditions. While our measure of depression treatment intensity has not been directly linked to outcomes, it is concordant with guideline recommendations for high-quality depression treatment.<sup>56</sup> Another limitation concerns differences between patients who were eligible for this analysis and those who weren't, although differences among eligible and excluded clinicians were minimal. Differences between eligible patients who were missing a depression treatment intensity score and those who weren't were minimal and unlikely to cause generalizability issues from missing patient data.

In conclusion, disentangling patient- and clinician-level effects is necessary to better understand the role of medical comorbidity in depression care. This approach provides somewhat counter-intuitive (if reassuring) results that clinicians who treat patients with multiple medical problems can and do provide more intensive depression care. This suggests that targeting interventions to these clinicians to enhance their ability to provide guideline-concordant depression care is a worthwhile endeavor and deserves further investigation.

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