Rural Health Practice Applications

A Primary Care Intervention for Depression

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ABSTRACT: To assess a guideline-based intervention's impact on depression care provided in rural vs. urban primary care settings, 12 community primary care practices (four rural, eight urban) were randomized to enhanced (i.e., intervention) and usual care study conditions. The study enrolled 479 depressed patients, with 432 (90.2 percent) completing telephone follow-up at six months. Multilevel analytic models revealed that rural enhanced care patients had 2.70 times the odds (P=0.02) of rural usual care patients of taking a three-month course of antidepressant medication at recommended dosages in the six months following baseline; urban enhanced care patients had 2.43 times the odds compared with their urban usual care counterparts (P=0.007). Rural enhanced care patients had 3.00 times the odds of rural usual care patients of making eight or more visits to a mental health specialist for counseling in the six months following baseline (P=0.03). Comparisons of patients in enhanced care practices showed that rural enhanced care patients had 2.00 times the odds (P=0.12) of urban enhanced care patients of making at least one visit to a mental health specialist for counseling in the six months following baseline and had comparable odds to urban enhanced care patients (odds ratio [OR] = 1.06, P = 0.77) of making eight or more visits to such specialists during that interval. The study's intervention improved the care received by both rural and urban depressed primary care patients. Moreover, the intervention's effect appears to have been greater in rural settings, particularly in terms of increasing depressed rural patients' use of mental health specialists for counseling.

ajor depression is one of the more prevalent conditions observed in the primary care setting, afflicting an estimated 4.8 to 8.6 percent of presenting patients (Depression Guideline Panel, 1993a). Such prevalence, coupled with evidence that most depressed patients receive their mental health care from primary care physicians (Coyne, et al., 1994; Regier, et al., 1993; Rost, et al., 1998b), has prompted the development and rigorous evaluation of interventions (Katon, et al., 1995; Rost, et al., 2000; Rost, et al., in review, "Improving depression outcomes"; Schulberg, et al., 1996; Wells, 1999; Wells, et al., 2000) seeking to help improve the treatment provided to depressed primary care patients. Because the context of rural primary care practice can present unique challenges to efforts intended to improve the quality of depression management—e.g., increased

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stigma to seeking mental health care (Hoyt, et al., 1997; Van Hook, 1996), lesser availability of mental health specialists for referral (Holzer, et al., 1998), and greater caseloads for rural physicians (AMA Center for Health Policy Research, 1991; Rost, et al., 1994) interventions aimed toward enhancing depression treatment should be evaluated for their differential effectiveness in rural vs. urban applications. This investigation assesses the differential impact of one such intervention, the Quality Enhancement by Strategic Teaming (QuEST) intervention (Rost, et al., 2000, "Designing and implementing"), on the care provided for depression in rural vs. urban primary care settings.

The primary objective of the QuEST intervention was to increase the proportion of depressed primary care patients who complete a guideline-concordant (Depression Guideline Panel, 1993a, 1993b) course of antidepressant pharmacotherapy and/or psychotherapy in the six months following the index visit at which they were identified as depressed. Given the general availability of antidepressants, it was hypothesized that the intervention would have similar success in encouraging rural and urban depressed patients to complete a three-month course of antidepressant medication at guideline-concordant doses (Depression Guideline Panel, 1993b). However, due to the limited availability of mental health specialists in rural areas (Holzer, et al., 1998), the intervention was expected to be less effective in encouraging depressed rural patients to make eight or more visits to a mental health specialist for counseling during the six months following baseline in comparison to their urban counterparts.

Methods

Research Setting and Design. The study was conducted in 12 geographically diverse community primary care practices located across 10 U.S. states. The practices were members of the Ambulatory Sentinel Practice Network (ASPN), the Wisconsin Research Network (WReN) and the Minnesota Academy of Family Physicians Research Network (MAFPRN). Participant practices provided care to patients covered by a variety of managed care and fee-for-service health plans, as well as to uninsured patients. Because the study was intended to reflect the practice conditions of the two-thirds of primary care physicians who work in practices with no on-site mental health professionals (Williams, et al., 1999), none of the 12 participating practices employed an on-site mental health specialist who provided psychotherapy to patients enrolled in the study.

The study utilized a randomized block design to (a) match the 12 participating practices into six blocks (two practices per block) based on the participating physicians' proclivity to treat depression and the practices' rural-urban designation, and (b) randomly assign each of the two matched practices within each block to "enhanced" or "usual" care study conditions. Practices were designated as rural (n=4) if they were not located within a metropolitan statistical area (MSA); conversely, practices located within an MSA were designated as urban (n=8). Two physicians from each practice participated in the study, with one nurse from each enhanced care practice also participating as an integral resource in administering the study's intervention.

Intervention Training and Implementation in Enhanced Care Practices. Prior to patient recruitment, all participating physicians and nurses in enhanced care practices took part in a series of four academic, detailed telephone conference calls with one of the authors (P.A.N.) over a two-month period to become systematically engaged with the AHCPR depression treatment guidelines (Depression Guideline Panel, 1993a, 1993b). In addition, the six enhanced care nurses completed an intensive eight-hour training session conducted by the research team's clinical social worker, which incorporated the use of a specially prepared manual and a videotape to train nurses to educate depressed patients about treatment options for depression and monitor patients' progress following the index visit. The training also included interactive roleplaying exercises and written tests for the nurses so the research team could systematically ensure that the nurses demonstrated the aptitude to reliably administer the intervention. After patient recruitment began, the research team's clinical social worker ensured nurse fidelity to the intervention by reviewing weekly patient treatment logs completed by the nurses and by completing a series of telephone calls with each nurse to provide feedback and support as they adapted to their new roles.

When an eligible patient in an enhanced care practice consented to participate in the study, an administrative staff person within the practice placed a note on the front of the patient's chart. The note cued the enhanced care physician to (a) evaluate the patient for major depression, (b) give the patient a copy of AHCPR's Patient Guide to Depression (Depression Guideline Panel, 1993c) if the physician concurred with the diagnosis, and (c) ask the patient to make a return visit to the office in one week's time to meet with the study nurse before seeing the physician again. During the subsequent visit, the enhanced care nurse (a) reassessed the patient for all nine depression symptoms; (b) discussed treatment options (e.g., pharmacotherapy, psychotherapy, watchful waiting) to evaluate the patient's initial treatment preference; (c) provided written and verbal information to educate the patient about his or her preferred treatment; (d) intervened to address identified barriers to depression treatment by suggesting that patients complete specified assignments designed to increase or maintain their readiness to engage in active treatment (Prochaska, et al., 1992); and (e) arranged a time to talk with the patient during either an in-person visit or telephone conversation in the following week. At the end of the visit, the enhanced care nurse completed a short checklist summarizing the visit, which the physician reviewed prior to seeing the patient. Following this visit, enhanced care nurses used a similar protocol to conduct 15-minute telephone or in-person discussions with patients once a week for the next five weeks, with the option of extending the protocol for an additional two weeks if the nurse felt such was warranted. Treatment logs completed by enhanced care nurses documented that 60.4 percent of patient contacts were accomplished by telephone and the remaining 39.6 percent were by in-person visit at the practice (Rost, et al., 2000).

Patient Recruitment. Each participating physician consented to recruit 20 adult patients (actual range was 19 to 21, total n=479) reporting five or more Diagnostic and Statistical Manual for Mental Disorders-IV (DSM-IV) (American Psychiatric Association, 1994) symptoms of major depression in the two weeks preceding their index visit, which were identified by means of a two-stage screening procedure administered in 1996 through 1997. When patients arrived for their index office visit, a trained administrative staff person asked them to complete a written, two-minute, first-stage depression screener if they met the study's initial eligibility criteria: (a) 18 years of age or older; (b) not pregnant, breast feeding or less than three months postpartum; (c) literate in English with sufficient cognitive functioning to answer survey questions requiring six-month recall (determined by patients' capacity to independently read and complete screening instruments and/or clinical knowledge of patients' cognitive status); (d) absent of an acute, life-threatening condition; and (e) with access to a telephone. Of the 11,006 individual patients eligible for first-stage screening, 9,555 (86.8 percent) completed the screen. Patients screened first-stage positive for depression (n=1,704) if they reported on Composite International Diagnostic Interview (World Health Organization, 1996) questions that they had experienced two weeks or more during the past year when they felt sad, empty, depressed or uninterested in things they usually enjoyed and they reported one week or more of these symptoms during the past month without meeting DSM-IV criteria for a bereavement-related depression. First-stage positive patients were immediately invited by administrative staff to complete a written, five-minute, second-stage screener, with 1,433 (84.1 percent) of the 1,704 patients eligible for second-stage screening completing the questionnaire. Patients screened second-stage positive for depression if they reported five or more of the nine major depression criteria in the past two weeks on the Inventory to Diagnose Depression (IDD; Zimmerman, et al., 1986) without meeting additional study exclusion criteria assessed on the second-stage screener (i.e., a positive screen for self-reported lifetime mania, use of lithium, or current alcohol dependence [Rost, et al., 1993]). Of 653 secondscreen positives, 479 (73.4 percent) consented to participate in a longitudinal study "seeking to understand more about what people who feel sad or uninterested in things decide to do about their condition." The study neither excluded depressed patients who had been treated by antidepressant medications or by mental health specialists in the six months prior to their index visit nor patients reporting suicidal ideation. Administrative staff immediately informed physicians when subjects reported on screening instruments the intent to commit suicide; these people were not excluded from the study, however. The study's protocol was reviewed and approved by the Human Research Advisory Committee of the University of Arkansas for Medical Sciences and by the Colorado Multi-Institutional Review Board.

Further explanation of the study's design and intervention is available elsewhere for the interested reader (Rost, et al., 2000).

Data Collection. All data reported in this manuscript were collected in structured telephone interviews administered to patients by a trained research interviewer during the week following the index visit (baseline) and again at six months following the index visit. The interviewer was blinded to patient study conditions except in a very small number of cases (n=5) when the research team needed to contact the practice to get updated locator information to allow the interviewer to find subjects who had moved or could not be reached by telephone.

Operational Definition of Major Variables in the Study

Rural/Urban Designation. Patients recruited from the four primary care practices that were not located within an MSA were classified as rural; patients recruited from the eight practices located within MSAs were classified as urban. The average 1996 population of the counties where the study's rural primary care practices were located was 59,526, with a range of 23,762 to 100,728, and the average population of the counties where the urban practices were located was 375,452, with a range of 43,733 to 2,137,302 (U.S. Census Bureau, 1999). Although unintended, this study's randomization procedure resulted in both rural enhanced care (REC) practices being located in counties that were not adjacent to MSAs and both rural usual care (RUC) practices being located in counties that were adjacent to MSAs, likely resulting in a favorable condition for RUC practices in terms of availability of mental health specialists for referral. In this investigation, the QuEST intervention's impact on the care received for depression in rural vs. urban primary care settings during the six months following baseline is assessed by comparing reports of the following patient cohorts: REC, RUC, urban enhanced care (UEC) and urban usual care (UUC).

Process of Care. Major process measures that were evaluated were adequate pharmacotherapy and adequate psychotherapy. In congruence with a critical component of the National Committee for Quality Assurance's Health Plan Employer Data and Information Set's (HEDIS's) performance measure for antidepressant medication management (National Committee for Quality Assurance, 2000), and with earlier primary care depression intervention studies (Katon, et al., 1995), pharmacotherapy was defined as adequate if the patient reported taking an antidepressant medication at minimum therapeutic guideline-concordant (Depression Guideline Panel, 1993b) daily doses for a duration of at least three months between baseline and six-month follow-up. Psychotherapy was defined as adequate if patients reported making eight or more visits to a mental health specialist for counseling in

the six months following baseline, reflecting conclusions about the dose-effect relationship from metaanalysis of psychotherapeutic outcomes (Covi and Primakoff, 1988; Howard, et al., 1986).

Covariates. Sociodemographic covariates included in multivariate analyses were age, gender, minority status, education (high school educated vs. not), marital status (married vs. not), paid employment (full-/parttime vs. not), health insurance (insured vs. not) and annual household income adjusted by family size. Clinical covariates included physical comorbidity (measured as the patient-endorsed sum of 14 conditions assessed at baseline), reported use of antidepressants in the six months prior to the index visit, and reported use of mental health specialty care in the six months prior to the index visit. Baseline depression severity was also controlled for in analyses and was measured by means of a 23-item version of the Center for Epidemiologic Studies-Depression (CES-D) scale (Radloff, 1977), which removed seven original CES-D items that did not directly parallel DSM-IV major depression criteria and added 10 items to measure DSM-IV criteria not assessed in the original CES-D. Scores for this modified CES-D (mCESD; alpha coefficient=0.91), which has been used in other primary care depression intervention studies (Wells, et al., 2000), were standardized to reflect a range of 0 to 100, with higher scores indicating greater depression symptom severity. Analyses also controlled for patients' baseline attitudes toward depression treatment (i.e., acceptability of antidepressant medication and acceptability of counseling from a mental health professional). Acceptability of antidepressant medication was operationalized dichotomously as the patient reporting at baseline that use of antidepressant medication for help with feeling sad was probably/definitely acceptable vs. not acceptable. Similarly, acceptability of mental health counseling was dichotomized as the patient reporting at baseline that individual counseling with a mental health professional for help with feeling sad was probably/definitely acceptable vs. not acceptable.

Data Analysis. Chi-squares and *t*-tests were used to assess REC vs. RUC and UEC vs. UUC differences in baseline sociodemographic and clinical characteristics. For comparisons on the measures of interest across study conditions (i.e., REC vs. RUC, UEC vs. UUC, RUC vs. UUC and REC vs. UEC), the study's randomized block design aimed to yield comparable patient cohorts across intervention and control conditions. However, due to the small number of assignment units (i.e., practices) being randomized, some imbalance was unavoidable. Therefore, in addition to using regression models to control for the baseline covariates defined earlier, the authors used multilevel models (also called hierarchical models; [Bryk and Raudenbush, 1992]) to account for the multilevel data structure on measures of interest, with patients clustered within physicians and physicians clustered within practices. When the multilevel model indicated that there was no variation by practice and physician in the measure of interest, the model simplified to a standard fixed-effects regression model. Interaction between rural/urban residence and intervention was included in the models along with main effects for rural/urban residence and intervention in order to isolate REC vs. RUC, UEC vs. UUC, RUC vs. UUC and REC vs. UEC comparisons on the measures of interest. Finally, although the telephone interviews conducted by the research team kept missing data to a minimum, missing income values for 80 subjects were imputed using a general linear regression model that incorporated age, gender, race, education, employment status and marital status as predictors. Data were also imputed on the acceptability of antidepressant medication for 12 subjects by assigning them the median value.

Results

Patient Characteristics. The baseline sociodemographic and clinical characteristics of the 479 patients participating in the study are described in detail in Table 1.

REC vs. RUC. Table 1 shows that REC and RUC patients had comparable baseline mCESD depression severity (54.6 vs. 51.2, respectively; P=0.30), but that REC patients were less likely than RUC patients to have taken an antidepressant medication in the six months preceding their index visit (32.5 vs. 51.3 percent, respectively; P<0.05). REC patients were significantly more likely than RUC patients to be men (22.5 vs. 8.7 percent, respectively; P<0.05) and less likely to be employed (53.8 vs. 72.5 percent; P<0.05) at baseline. REC patients also reported significantly lower annual incomes per household member at baseline than RUC patients (\$8,341 vs. \$13,448, respectively; P<0.01).

UEC vs. UUC. Similar to the REC vs. RUC comparison noted above, UEC patients had comparable baseline mCESD depression severity to UUC patients (59.1 vs. 56.0, respectively; P=0.17). Age was the only significant UEC vs. UUC sociodemographic difference at baseline, with UEC patients being slightly younger than their UUC counterparts (40.8 vs. 44.0 years of age, respectively; P<0.05).

At six months postbaseline, 432 (90.2 percent) of the 479 patients enrolled at baseline completed follow-up interviews, with 153 (95.6 percent) of the 160 rural patients and 279 (87.5 percent) of the 319 urban patients from baseline responding. There were no significant differences between rural responders and nonresponders for any of the baseline covariates assessed (i.e., mCESD depression severity, age, minority status, education, physical comorbidity, marital status, health insurance, employment, gender, income, use of antidepressants in the six months prior to the index visit, use of mental health specialty care in the six months prior to the index visit, acceptability of using antidepressants for depression, acceptability of one-on-one counseling with a mental health professional for depression and intervention status (enhanced care vs. not). Urban patients completing six-month follow-up were comparable to those lost to follow-up for the baseline covariates noted above, except that urban responders were significantly more likely than nonresponders to be high school educated (78.6 vs. 64.1 percent, respectively; P=0.03) and to have been randomized to the usual care condition at baseline (91.9 vs. 83.0 percent, respectively; P=0.04). Results reported in the next sections are based on data collected from the 432 patients who completed both the baseline and sixmonth follow-up interviews: REC, n=77; RUC, n=76; UEC, n=132; UUC, n=147.

Intervention Effects on Process of Care for Enhanced vs. Usual Care Patients by Rural/ Urban Setting

REC vs. RUC. With regard to pharmacotherapy, REC patients were significantly more likely than RUC patients to report taking any antidepressant (89.6 vs. 73.7 percent, respectively; P=0.01) and were more likely to receive adequate pharmacotherapy (67.5 vs. 43.4 percent; P=0.02) in the six months following baseline. REC patients reported significantly greater likelihood than RUC patients of making one or more visits to a mental health specialist for counseling (53.3 vs. 18.4 percent; P=0.002) in the six months following baseline and were also more likely to have received adequate psychotherapy (15.6 vs. 5.3 percent; P=0.03). REC patients were significantly more likely than RUC patients to report having received either adequate pharmacotherapy or adequate psychotherapy at six months (75.3 vs. 47.4 percent; P=0.01). Adjusted odds ratios for these and other comparisons across study conditions of the depression care received by patients in the six months following baseline are shown in Table 2.

UEC vs. UUC. UEC patients were significantly more likely than UUC patients to have taken any antidepressant (84.1 vs. 64.6 percent, respectively; P=0.002) in the six months following baseline and were also more likely to have received adequate pharmacotherapy during that time (57.6 vs. 36.1 percent; P=0.007). UEC patients reported comparable likelihood to UUC patients of making one or more visits to a mental health specialist for counseling (36.4 vs. 29.9 percent, respectively; P=0.40) in the six months following baseline and had similarly comparable likelihood of receiving adequate psychotherapy (14.4 vs. 10.9 percent, respectively; P=0.31). UEC patients were significantly more likely than their UUC counterparts to report receipt of either adequate pharmacotherapy or adequate psychotherapy (67.4 vs. 45.6 percent; P=0.01) in the six months following baseline.

Rural/Urban Effects on Process of Care by Intervention Status

RUC vs. UUC. There were no significant RUC vs. UUC differences in patients reporting taking any antidepressant (73.7 vs. 64.6 percent, respectively; P=0.32) or receiving adequate pharmacotherapy (43.4 vs. 36.1 percent; P=0.44) in the six months following baseline. RUC patients were somewhat less likely than UUC patients to report making one or more visits to a mental health specialist for counseling (18.4 vs. 29.9 percent; P=0.16) or to report receipt of adequate psychotherapy (5.3 vs. 10.9 percent; P=0.16) in the six months following baseline, although these differences were not statistically significant. RUC and UUC patients were comparable in terms of receiving either adequate pharmacotherapy or adequate psychotherapy at six months (47.4 vs. 45.6 percent, respectively; P=0.85).

REC vs. UEC. In terms of pharmacotherapy, REC patients had comparable odds to UEC patients of taking any antidepressant in the six months following

baseline (89.6 vs. 84.1 percent, respectively; P=0.18) and had similarly comparable odds of completing a course of adequate pharmacotherapy during that interval (67.5 vs. 57.6 percent, respectively; P=0.23). As seen in Table 2, REC patients had twice the odds of UEC patients of making at least one visit to a mental health specialist for counseling (53.3 vs. 36.4 percent; P=0.12), a difference that approached statistical significance, and had comparable odds to UEC patients of receiving adequate psychotherapy (15.6 vs. 14.4 percent, respectively; P=0.77) in the six months following baseline. REC patients also had comparable odds to UEC patients of receiving either adequate pharmacotherapy or adequate psychotherapy in the six months following baseline (75.3 vs. 67.4 percent, respectively; *P*=0.35).

Discussion

The preceding results indicate that the QuEST intervention had a considerable impact on the depression care received by both rural and urban primary care patients in this study's small number of primary care practices. As hypothesized, rural and urban primary care patients receiving the study's intervention had significantly increased odds to their usual care counterparts (OR=2.70 and 2.43, respectively) and comparable odds to one another of taking antidepressant medications at guideline-concordant doses for three months or more in the six months following baseline, an important quality indicator in HEDIS 2000's health plan performance measure for antidepressant medication management (National Committee for Quality Assurance, 2000). In notable contrast to the hypothesis concerning use of specialty care, the intervention was markedly more influential than expected in terms of increasing rural patients' use of mental health specialists for counseling. Rural patients in enhanced care practices had five times the odds of using any specialty care counseling and three times the odds of making eight or more visits to specialists for counseling in the six months following baseline compared with their usual care counterparts. Furthermore, in comparison to urban patients receiving the intervention, REC patients had twice the odds of using any mental health specialty care and comparable odds of completing eight or more visits to a mental health specialist for counseling in the six months following baseline. The latter finding is particularly noteworthy given that earlier community studies have found that although

Table 1. Baseline Sociodemographic and Clinical Characteristics of Participants.¹

	Rural (n=160)		Urban (n=319)		
	REC (n=80)	RUC (n=80)	UEC (n=159)	UUC (n=160)	Total Sample (n=479)
Sociodemographic characteristics		· · · · · · · · · · · · · · · · · · ·			·
Age, mean (SD)	42.6 (15.3)	43.7 (11.4)	40.8 (12.1)*	44.0 (13.4)	42.6 (13.1)
Male, n (percent)	18 (22.5)*	7 (8.7)	21 (13.2)	31 (19.4)	77 (16.1)
Minority, n (percent)	3 (3.8)	3 (3.8)	34 (21.4)	35 (21.9)	75 (15.7)
Currently married, n (percent)	41 (51.3)	39 (48.8)	61 (38.4)	69 (43.1)	210 (43.8)
High school educated, n (percent)	64 (80.0)	70 (87.5)	125 (78.6)	120 (75.0)	379 (79.1)
Employed full- or part-time, n (percent)	43 (53.8)*	58 (72.5)	85 (53.5)	80 (50.0)	266 (55.5)
Health insured, n (percent)	71 (88.8)	75 (93.8)	130 (81.8)	127 (79.4)	403 (84.1)
Income per household member, mean \$ (SD)	\$8,431 (7,348)**	\$13,448 (13,066)	\$9,259 (10,083)	\$11,151 (20,035)	\$10,453 (14,390)
Clinical characteristics					
mCESD depression severity², mean (SD) Took antidepressant in past 6 months, n	54.6 (20.6)	51.2 (21.3)	59.1 (19.9)	56.0 (19.0)	56.0 (20.1)
(percent)	26 (32.5)*	41 (51.3)	65 (40.9)	72 (45.0)	204 (42.6)
Received care from mental health specialist in past 6 months, n (percent) Reported antidepressants unacceptable, n	29 (36.3)	24 (30.0)	56 (35.2)	63 (39.4)	172 (35.9)
(percent) Reported specialty care counseling unacceptable,	21 (26.3)	25 (31.3)	58 (36.5)	51 (31.9)	155 (32.4)
n (percent)	22 (27.5)	18 (22.5)	30 (18.9)	36 (22.5)	106 (22.1)
Number of physical comorbidities, mean (SD)	1.8 (1.7)	1.9 (1.7)	1.9 (1.7)	2.3 (1.8)	2.0 (1.8)

1. REC=rural enhanced care; RUC=rural usual care; UEC=urban enhanced care; UUC=urban usual care.

2. mCESD=23-item modified Center for Epidemiologic Studies—Depression scale; standardized to a scale of 0 to 100 with higher scores indicating greater depression severity.

* REC vs. RUC or UEC vs. UUC difference significant at P<0.05.

** REC vs. RUC or UEC vs. UUC difference significant at P<0.01.

rural subjects were just as likely as urban subjects to utilize mental health specialty care services for depression treatment, they made significantly fewer visits once they accessed such care (Rost, et al., 1998b).

This study's findings show that in the face of contextual challenges like decreased availability of mental health specialists (Holzer, et al., 1998) and increased stigma to seeking mental health care (Hoyt, et al., 1997; Van Hook, 1996) in rural settings compared with urban milieus, the QuEST intervention effected meaningful improvement in the care delivered to depressed primary care patients in rural as well as urban applications. Moreover, not only did the intervention elevate the standard of care provided to rural and urban depressed primary care patients above the usual standard of care delivered in these settings, but it also "leveled

the playing field" between rural and urban practices in terms of encouraging depressed patients to utilize mental health specialty services for counseling. Although it is not clear why the magnitude of the QuEST intervention's effect appears to have been greater in this study's rural settings (particularly in terms of increasing patients' utilization of mental health specialists for depression counseling), one potential explanation may be that rural primary care physicians and nurses could possibly have more established and less transient relationships with their patients than do their urban counterparts, perhaps making rural patients more amenable and compliant to their clinicians' suggested course of treatment (e.g., prescription of antidepressants or referral to a mental health specialist for counseling). This consideration is worthy of further study as it may help

Table 2. Adjusted Odds of Receiving Depression Care in the Six Months Following Baseline.¹

	Enhanced vs by Rural/U	s. Usual Care rban Setting	Rural vs. Urban by Intervention Status	
Process Measures	Adjusted Odds Ratios for REC vs. RUC	Adjusted Odds Ratios for UEC vs. UUC	Adjusted Odds Ratios for RUC vs. UUC	Adjusted Odds Ratios for REC vs. UEC
Taking any antidepressant	3.07*	2.91**	1.54	1.63
Receiving adequate pharmacotherapy ²	2.70*	2.43**	1.38	1.53
Making one or more visits to a mental health				
specialist for counseling	4.96**	1.33	0.53	2.004
Receiving adequate psychotherapy ³	3.00*	1.42	0.50	1.06
Receiving either adequate pharmacotherapy or				
adequate psychotherapy	3.39*	2.46*	1.07	1.47

1. REC=rural enhanced care; RUC=rural usual care; UEC=urban enhanced care; UUC=urban usual care.

2. Defined as taking antidepressant medication at AHCPR guideline-concordant daily doses for three months or more in the six months following baseline.

3. Defined as making eight or more visits to a mental health specialist for counseling in the six months following baseline.

4. Although the difference between REC and UEC patients was not statistically significant with regard to the probability of patients making at least one visit to a mental health specialist for counseling in the six months following baseline, the interaction between rural residence and intervention was significant (P=0.04), reflecting that the *magnitude* of the intervention's effect in terms of encouraging patients to make one or more visits to a mental health specialist was significantly greater in rural practice settings than it was in urban practice settings.

* P<0.05.

** P<0.01.

guide decisions concerning whether quality improvement initiatives seeking to improve depression management in rural primary care settings can be more successfully implemented by existing practice personnel rather than by introducing new personnel into practices to implement such programs.

The finding that this study's intervention significantly improved the care provided for depression in rural practice settings without addressing the deficiency of mental health specialists in these areas (Holzer, et al., 1998) supports the recent conclusion of Hartley, et al. (1998), that the treatment of depressed rural patients is more likely to be improved by increasing rural primary care physicians' knowledge and confidence regarding depression treatment than by efforts to increase the supply of mental health specialists in rural areas. Even so, although the mental health specialists located in this study's REC settings may have been able to accommodate the modestly increased caseloads brought about by the enhanced care patients' increased utilization of their services, consideration should be given to whether it may still be necessary to increase the number of mental health specialists in rural areas in order to accommodate such increased utilization as this intervention, and others like it, become more widely disseminated to larger patient populations. Without the structural reinforcement that an increased supply of mental health specialists in rural areas could provide as interventions like this study's are more broadly employed, the potential exists for depressed rural patients receiving such interventions to, over time, regress to former (i.e., preintervention) utilization rates for mental health specialty services if they consistently encounter long waits for initial and/ or subsequent visits to see a specialist.

Unfortunately, this study's rural sample size provided insufficient statistical power to draw meaningful conclusions in terms of rural/urban comparisons of the intervention's effect in reducing depression severity. However, collateral reports on this sample as a whole indicate that the QuEST intervention produces a significant reduction in mCESD depression severity

for enhanced care patients in comparison with their usual care counterparts (Rost, et al., 1998a, in review, "Improving depression outcomes"). Such work also identifies specific subsets of this primary care patient sample who derived significantly greater benefit in terms of improved depression outcomes compared with other subsets (Rost, et al., 1998a, in review, "Improving depression outcomes"). Identifying specific depressed primary care patient subgroups that derive a differential benefit from intensive primary care interventions like this study's is very important in terms of (a) targeting such interventions to those most likely to improve and (b) refining the interventions to address the needs of those who currently do not improve. Such targeting and refinement of interventions is necessary to help facilitate more efficient utilization of limited primary and specialty care resources to treat the condition, resources that are even more scarce in rural settings (Holzer, et al., 1998). Although the aforementioned reports of improved depression outcomes among this sample as a whole are encouraging, the next generation of studies seeking to improve primary care depression treatment in rural settings should be implemented in larger patient populations so intervention effects on important clinical outcomes as well as process of care can be determined.

Regarding intervention costs, estimates are that (a) the project spent an average of \$4,661 in each enhanced care practice to train the physicians, nurses and administrative staff who implemented the intervention, (b) costs to enhanced care practices for identifying each depressed patient were \$12 per identified patient and (c) enhanced care practice costs for delivering the nursing intervention were approximately \$61 per depressed patient (Rost, et al., 2000). Efforts to estimate and analyze the overall costs of the intervention (e.g., costs associated with primary care physician visits, mental health specialist visits, antidepressant prescriptions, etc.) are under way to inform cost-effectiveness analyses.

Limitations. Although this study is strengthened by its randomized block design, routine primary care setting, high overall follow-up rate and rigorous analytic methodology, its limitations should not be understated. First, the study is limited by its reliance on patient self-report to determine the care depressed patients received during the follow-up interval. A second limitation is the small number of rural and urban practices participating in the study, which introduces concerns about (a) whether the small pool of practices available for assignment-to-treatment arms (i.e., enhanced and

usual care) introduced an increased potential for bias effects on study outcomes and (b) the generalizability of reported findings. As an example of (a), the study's baseline results indicate that REC patients had a significantly lower probability of taking antidepressants in the six months prior to their index visit compared with their usual care counterparts despite the study's blocked randomization strategy aimed at minimizing such baseline imbalances between practices on important clinical characteristics like antidepressant prescribing. The multilevel models (Bryk and Raudenbush, 1992) employed in the analyses reported herein (controlling for practice, physician and patient characteristics) allowed for adjustment for such baseline imbalances among practices and physicians within and across rural and urban settings. Furthermore, although some might question whether REC patients' significantly increased odds to RUC patients of taking antidepressants at six-month follow-up is an artifactual result of their having more room for improvement at baseline, the authors' not applying a percent change in antidepressant use as the dependent measure for that analysis ensures that REC patients did not receive "credit" for simply making up the difference that existed at baseline. Although the multilevel analytic models did allow for control of observed and unobserved biases due to the small number of practices available for the treatment arm assignment, the study's intervention clearly should be implemented in larger practice and patient populations to increase the generalizability of findings. A third study limitation is that because all components of the QuEST intervention were uniformly applied in the study's enhanced care practices, individual components of the intervention that may have exerted greater influence in effecting the improved depression care observed cannot be identified. For example, this study's sample size was not powered sufficiently to accommodate an "attention-only" control arm where a subset of enhanced care patients would have only received periodic phone calls from project staff without their being exposed to the enhanced care nurses' patient-activation activities. Fourth, UEC patients' increased nonresponse to sixmonth follow-up presents issues of potential unmeasured selection bias in the comparisons involving that sample if nonresponders were either more or less likely than responders to receive guideline-concordant care. However, it should be noted that the study's important findings regarding the intervention's role in facilitating increased receipt of guideline-concordant pharmacotherapy and psychotherapy for REC patients compared with their usual care counterparts would be

immune to any selection bias because of UEC patients' nonresponse, if any such bias exists at all. Finally, although this investigation's brief follow-up period (six months) afforded an excellent opportunity for assessing the intervention's effect on the care depressed patients received during the acute phase of treatment, it did not allow for investigation of potential rural/urban differences in care received during the more longterm continuation and maintenance phases of treatment (Depression Guideline Panel, 1993b) where rural contextual challenges would persist.

Conclusions

This study's primary care depression intervention had a positive impact in helping improve the care depressed patients received in both rural and urban practices, which was above the usual care provided for the condition in these settings. Furthermore, the QuEST intervention was instrumental in helping rural primary care clinicians overcome contextual challenges to "level the playing field" between rural and urban practice settings in terms of encouraging depressed primary care patients to utilize mental health specialty services for treatment of this prevalent and disabling condition.

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