WICHE Center for Rural Mental Health Research

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STAKEHOLDER BENEFIT FROM DEPRESSION DISEASE MANAGEMENT: DIFFERENCES BY RURALITY?

Kathryn Rost, PhD
Stanley Xu, PhD
Fran Dong, MS
L. Miriam Dickinson, PhD

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Western Interstate Commission for Higher Education
Mental Health Program
3035 Center Green Drive
Boulder, CO 80301

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Dr. Rost is Elizabeth Freed Professor in the Department of Medical Humanities and Social Sciences at the Florida State University College of Medicine and former PI of the ORHP WICHE Center for Rural Mental Health Research. Dr. Xu is Head of Biostatistics in the Clinical Research Unit of Kaiser Permanente Health Plan and Assistant Professor in the Department of Preventive Medicine and Biometrics at the University of Colorado at Denver and Colorado Health Sciences Center. Fran Dong, M.S., is currently the Statistical Analyst for the WICHE Mental Health Program. Dr. Dickinson is a Biostatistician and Associate Professor at the Department of Family Medicine at the University of Colorado at Denver and Health Sciences Center.

Kathryn Rost, PhD is the corresponding author. Dr. Rost completed this work at Western Interstate Commission for Higher Education (WICHE) Mental Health Program, 3035 Center Green Dr., Boulder, Colorado 80301-9752. Dr. Rost's current e-mail is Kathryn.Rost@med.fsu.edu, telephone (850)645-7367 and fax is (850)645-1773.

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ABSTRACT

Background: Despite increasing consensus about the value of depression disease management programs, the field has not identified which stakeholders should absorb the relatively small additional costs associated with these programs.

Aims of Study: This paper investigates whether two of the multiple stakeholder groups (health plans and employer purchasers) in two delivery systems (rural and urban) economically benefit from improved depression treatment by testing whether depression care management results in: (1) a greater reduction of utilization costs in insured rural patients than their urban counterparts (health plan stakeholders), and (2) a greater reduction in work costs in employed urban patients than their rural counterparts (employer purchaser stakeholders).

Methods: We examined the main and differential effects of intervention on utilization and work costs over 24 months in a pre-planned secondary analysis of 479 depressed patients from rural and urban primary care practices who participated in a randomized controlled trial of depression disease management.

Results: Reductions in work costs were observable in both the rural and urban cohort, while reductions in utilization costs were observable in the urban cohort.

Discussion with Limitations: While our small sample size limits definitive conclusions, the economic incentives to assure improved depression treatment may differ across health plans and employer purchasers in rural and urban delivery systems. This dataset does not provide us the opportunity to examine how other potential stakeholders would be economically impacted by decisions to provide depression care management to rural America, including state Medicaid agencies, state taxpayers, state insurance commissions, rural communities and families

themselves. The internal validity of these results is strengthened by the use of a randomized design and by the research team's use of state-of-the-art measurement and analytic strategies to estimate economic outcomes for both stakeholder groups. The internal validity of these results is weakened by the limited power the available sample provided to demonstrate that substantial dollar differences we observed were statistically significant. The generalizability of our findings is strengthened by the fact that the depression disease management program was implemented by primary care professionals under normal practice conditions to estimate outcomes that usual care practices who adopt the model can obtain. However, readers should not generalize our results to the nation because the intervention was not tested in a representative sample or rural and urban practices.

Implications for Health Policy: Employers may have more consistent economic incentives than health plans to assure improve depression treatment across rural and urban delivery systems.

Introduction

There is increasing consensus that health care systems should increase the provision of evidence-based care for depression by adopting depression disease management programs. Even though the cost of these programs is relatively small,[1-5] stakeholders (constituency groups who influence program adoption) have generally volunteered each other, rather than themselves, to pay the extra costs. To contribute this debate, the first goal of this paper is to examine whether two stakeholder groups, health plans and employer purchasers, economically benefit from depression disease management. Health plans, particularly capitated health plans, potentially benefit if depression disease management lowers utilization costs.[6-8] Employer purchasers potentially benefit if depression disease management reduces work costs by improving the ability of depressed employees to perform their job.[6,9-12]

The second goal of this paper is to compare the stakeholders who economically benefit in rural versus urban communities to assure that policy decisions about which stakeholders should contribute to the extra costs of depression disease management are fair to both community types. Rural and urban health care delivery systems differ in multiple ways, perhaps most notably in access to mental health specialty care.[13] Evidence from observational studies documents that health plans covering rural residents realize $2.61 reduction in the cost of physical problems for each $1.00 they spend treating a patient with depression, while health plans covering urban residents did not economically benefit,[14] concordant with the hypothesis that rural delivery systems may be substituting services for physical problems when depression is not recognized or appropriately treated. Conversely, urban employers realize $2.54 per dollar expended on depression treatment compared to rural employers who realize $1.56.[14]

To address these goals, the research team conducted a pre-planned secondary analysis of

the one randomized trial to date to examine the impact of depression disease management in a sizable number of rural and urban practices, the Quality Enhancement for Strategic Teaming (QuEST),[17] to test the following hypotheses: (1) depression disease management will significantly reduce two year utilization costs in insured rural participants more than their urban counterparts, and (2) depression disease management will significantly reduce two year work costs in employed urban participants more than their rural counterparts. In addition, the study explored the impact of depression disease management on two year personal income in rural and urban participants.

Methods

Depression Disease Management

The QuEST team trained primary care professionals to improve the detection and management of major depression in the absence of an onsite mental health professional using a practice-based depression disease management model. Both the model[15] and it ability to improve clinical outcomes over two years have been described extensively in previous publications.[16,17]

Sites and Randomization

The study was conducted in 12 primary care practices located in eight metropolitan statistical areas (MSAs) and four non-metropolitan statistical areas (non-MSAs) in 10 states across the country (Colorado, Michigan, Minnesota, New Jersey, North Dakota, North Carolina, Oklahoma, Oregon, Virginia, and Wisconsin). The four non-MSA practices were located in Fergus Falls, MN in Otter Tail County (1996 county population = 53,857) approximately 50 miles from the nearest MSA; Minot, ND in Ward County (1996 county population = 59,755) approximately 115 miles from the nearest MSA; Reedsport, OR in Douglas County (1996 county population = 10,728) approximately 75 miles from the nearest MSA; and Mauston, WI in Juneau

County (1996 county population = 23,762) approximately 70 miles from the nearest MSA. The eight MSA practices were matched into four blocks by pre-baseline depression treatment patterns before randomizing one practice from each block to depression disease management (intervention) and one to usual care. A similar procedure was used to match the four non-MSA practices into two blocks before randomization.

Recruitment and Data Collection

Between April 1996 and September 1997, 653 of 11,006 screen-eligible patients screened positive for depression in the past two weeks on a two-stage screener; 73.2% (479 of 653) of screen-positive patients agreed to participate in the study and completed a blinded baseline interview. One hundred sixty of the 479 participating patients were recruited from non-MSA practices. Data were collected by telephone at 6, 12, 18, and 24 months using structured instruments administered by an independent member of the research team blinded to patients' intervention status, except for three patients for whom primary care practices had to be contacted to request updated contact information. Concordant with an intent-to-treat design, patients who left the practice were re-interviewed even though they could not participate in ongoing depression disease management. All follow-up interviews were blinded except for 5 patients where the research team had to contact the practice to get updated patient locator information. The follow-up interviews achieved response rates of 90.2% at 6 months, 81.6% at 12 months, 73.1% at 18 months, and 70.1% at 24 months.

Operational Definition of Major Constructs in Data Analysis:

Rurality – Patients recruited from MSA practices were classified as urban, while patients recruited from non-MSA practices were classified as rural. Intra-rural differences in county adjacency/population could not be meaningfully examined in the sample.

Outcomes

Utilization Cost – As described in detail in previous publications,[1] annual outpatient utilization costs in Year 2000 dollars were calculated by applying previously used cost estimating procedures[5] to patient-reported utilization at each wave. Utilization costs were log transformed before analysis to reduce the skewed distribution, and retransformed using smearing techniques.[18] We examined intervention impact on outpatient utilization costs (primary care, mental health care, and emergency room visits plus psychotropic medication), excluding inpatient costs, to avoid the extreme skewing that can occur when infrequent hospitalizations are included. Virtually all subjects interviewed at a given wave provided complete data on utilization. Three hundred eighty four (80.2%) patients with baseline health insurance of the 479 patients recruited to the study were included in the utilization cost analysis.

Work Cost – As described in detail in previous publications,[9] work costs in Year 2000 dollars were estimated at each wave from patient-reported absenteeism over 4 weeks and productivity at work over 2 weeks. To monetize the intervention's impact on absenteeism, we multiplied the two year proportional reduction in absenteeism in the intervention group times absenteeism days over 24 months in the usual care group times each subject's full-time equivalent daily earnings at baseline. To monetize the intervention's impact on productivity at work, we multiplied the two year proportional gain in productivity in the intervention group times the average number of work days over 24 months times each subject's full-time equivalent daily earnings at baseline. The research team then summed the economic gains from productivity and absenteeism to estimate combined work costs (see Data Analytic Section). Patients who reported no employment at a given wave were excluded in the estimate for that wave. Three

hundred twenty six (68.1%) patients with employment at one or more waves of the 479 patients in the parent study were included in the work cost analysis.

Personal Income - Personal income in Year 2000 dollars was measured at baseline, 12 months and 24 months by national survey items[19] which asked subjects to estimate annual pre-tax wages from a job/self-employment and income from disability, retirement, and unemployment payments. Personal income was log transformed before analysis to reduce the skewed distribution, and retransformed in our presentation of results using smearing techniques.[18] Four hundred sixty (96.0%) patients reporting personal income >$0 at one or more waves of the 479 patients in the parent study were included in the analysis, excluding a comparable number of subjects in the intervention and control conditions.

Covariates – Sociodemographic variables collected at baseline included age, sex, race/ethnicity, education, marital status, employment status, insurance status, and annual household income. Clinical covariates collected at baseline included depression severity, psychiatric comorbidity, physical comorbidity, depression treatment preferences, mental health status, physical health status, stressful life events, social support, recent depression treatment, recent primary care treatment, and recent hospitalization.

Data Analytic Procedures – We used two-sample t-tests for continuous variables and chi-square tests for dichotomous and categorical variables to evaluate sociodemographic and clinical differences between the rural and urban cohort, and between depression disease management and usual care patients within each cohort. Intent to treat analyses controlling for clinical and sociodemographic variables were carried out to analyze intervention impact on outcome by rurality, fitted to handle the correlation of repeated measures on a patient, patients nested within doctors, and doctors within practices as needed. [20] In the utilization cost analysis, the research

team used linear mixed models to fit log-transformed cost data, applying smearing retransformation[18] to transform log costs back to dollar values. In the work cost analysis, the research team used linear mixed models including time as a linear and a quadratic term as previously described[9] to estimate: (1) the dollar value associated with proportion gain in productivity attributable to the intervention by rurality, and (2) the dollar value associated with the proportion reduction in absenteeism attributable to the intervention by rurality. These dollar values were summed to estimate combined work costs. In the personal income cost analysis, the research team fit linear mixed models to log transformed personal income assuming that missing personal income data are at random, applying smearing retransformation to transform log income back to dollar values. Confidence intervals for intervention impact on all three outcomes were estimated from 2000 bootstrap samples of subjects eligible for the analysis.[22] All models controlled for differences between the intervention and control groups within the rural and urban cohort by adjusting for all covariates which predicted the outcome variable at $p<0.2$ in univariate analyses.[23-26] We used preplanned linear contrasts to obtain: (1) the change from baseline at each time point after baseline by intervention and rurality, and (2) the intervention effect at each time point after baseline by intervention and rurality.

Missing data patterns were examined to determine whether the data were missing completely at random (MCAR) or missing at random (MAR), with covariates identified in the latter case included in the analysis. Although unable to directly assess non-ignorable missingness (MNAR), the research team was not able to find any evidence that subjects dropped out of the study because of precipitous clinical decline. All statistical analyses were performed using SAS version 9.1.

Findings

Patient Characteristics

The baseline sample had an average age of 42.1 years, was 16.1% male, 14.8% minority, 43.8% currently married, and 79.1% high school educated. Over half (55.7%) were employed either full or part-time, 84.3% had health insurance, and the annual household income averaged $16,151. At baseline, patients reported an average of 6.7 of 9 criteria for major depression. Patients had been taking antidepressant medication for an average of 1.8 months, and 35.5% had received care from a mental health specialist in the previous six months. In this sample, 69.5% of patients reported that using antidepressants was acceptable and 75.6% indicated that specialty care counseling was acceptable. Overall, subjects reported an average of 2.0 physical comorbidities and 37.9% indicated having one or more panic attacks.

Baseline comparisons between the rural [rural depression disease management (RDM) + rural usual care (RUC)] and urban [urban depression disease management (UDM) + urban usual care (UUC)] groups indicated that the urban group had a significantly higher depression severity, as well as more physical and psychiatric comorbidity. Baseline comparisons between the RDM and RUC groups indicated that those in the RDM group were significantly more likely to be male, while those in the RUC group were significantly more likely to be employed. Baseline comparisons between the UDM and UUC group indicated that UDM patients were significantly more likely to have psychiatric comorbidity, while UUC patients were significantly older and had more physical comorbidity.

Depression Care Management Intensity

Following the same protocol, urban patients in the depression disease management condition received 6.7 care manager contacts in the first year, compared to rural patients who

received 8.0 contacts (rate ratio = 0.86, p<.01). Urban patients in the depression disease management condition received 4.9 care manager contacts in the second year, compared to rural patients who received 7.4 contacts (rate ratio = 0.67, p<.0001).

Outcomes

Utilization Costs - The intervention did not significantly reduce outpatient utilization costs in the entire cohort over 24 months (-$191, 95% CI =-$2083 to $1647, B=-0.15, p=0.65). A non-significant reduction in outpatient costs over 24 months was observed in the urban cohort (-$1426, 95% CI =-$3873 to $926, B=-0.59, p=.16), while a non-significant increase was observed in the rural cohort ($1584, 95% CI =-$894 to $4067, B=0.50, p=.32). Sensitivity analyses of utilization costs including hospitalization over 24 months produced qualitatively comparable findings. Figure 1 displays intervention impact on outpatient utilization costs with standard errors over 24 months by rurality.

Work Costs - The intervention reduced absenteeism by 22.8% over 24 months at the level of a trend (-2LL X^2=5.6, df= 2, p=.06) and increased productivity at work by 6.1% over 24 months (-2LL X^2=6.0, df= 2, p<.05) in the entire cohort as earlier reported.[9] While not significant in either cohort, intervention: (a) reduced absenteeism by 20.2% (-2LL X^2=2.0, df= 2, p=.37) in the urban cohort and 19.7% (-2LL X^2=2.1, df=2, p=.35) in the rural cohort, and (b) improved productivity at work by 7.3% (-2LL X^2=4.0, df=2, p=.13) in the urban cohort and by 3.7% (-2LL X^2=2.4, df=2, p=.30) in the rural cohort. The intervention decreased combined work costs over 24 months in the entire cohort (-$1970, 95% CI =-$3934 to -$92), in the urban cohort (-$2315, 95% CI =-$4942 to $260), and in the rural cohort (-$1315, 95% CI =-$4518 to $1546). Figure 1 displays intervention impact on combined work costs with standard errors over 24 months by rurality.

Exploratory analyses demonstrated that intervention patients reported statistically comparable changes in personal income compared to usual care patients over 24 months in the combined cohort ($465, 95% CI = -$5740 to $6662, B=-0.017, p=.94), in the rural cohort (-$3007, 95% CI=-$11091 to $5472, B=-0.24, p=.49) and in the urban cohort ($3755, 95% CI =-$5345 to $12842, B=0.18, p=.52).

Discussion

Our first hypothesis that the intervention's ability to reduce outpatient utilization costs would be greater in insured rural patients than their urban counterparts was not statistically confirmed. Neither was the predicted direction of the difference observable, as rural patients realized a $1584 increase in outpatient utilization costs over two years while urban patients realized a $1426 decrease. Our second hypothesis that the intervention's ability to reduce work costs would be greater in employed urban patients than their rural counterparts was not statistically confirmed; however, the predicted difference was qualitatively observable, as urban patients realized a $2315 reduction in work costs while rural patients realized a $1315 reduction. Thus, while economic outcomes did not significantly differ by rurality in this small sample size, improvements in outpatient treatment and work costs were more observable in the urban cohort than the rural cohort, consonant with the intervention's impact on clinical outcomes which was observable in the urban cohort only.[27]

How do these findings on economic outcomes compare to previous research? Multiple trials in urban practice settings[2-4] report that depression disease management programs increase outpatient utilization costs over one year. In contrast to these trials and observational research, [14] the intervention we tested appears to decrease outpatient utilization costs in urban patients. We explain this difference by our ability to capture a substantial decrease in utilization during second

year attributable to the intervention (data available from authors upon request). No studies to our knowledge have examined how depression disease management impacts outpatient utilization in a rural cohort.

The only trial examining the impact of depression disease management on absenteeism and productivity at work was conducted in this database.[9] Confirming the conclusions of observational studies of high quality depression care, [14] the intervention appears to reduce combined work costs in the urban cohort to a greater degree than the rural cohort. While the intervention has comparable effects on absenteeism in both groups, the economic value of improved absenteeism is higher in an urban population because urban workers are paid higher salaries than their rural counterparts.[28]

The internal validity of these results is strengthened by the use of a randomized design to evaluate the ability of depression disease management to improve stakeholder outcomes with a longitudinal intent-to-treat analysis over two years. The internal validity of these results is also strengthened by the research team's use of state-of-the-art measurement and analytic strategies to estimate economic outcomes for both stakeholder groups. The internal validity of these results is weakened by the limited power the available sample provided to demonstrate that substantial dollar differences we observed were statistically significant, a limitation facing secondary data analyses of the economic outcomes of many effectiveness studies. We acknowledge the block randomization design the parent study employed introduces a competing explanation for the rural-urban differences in intervention impact on personal income; however, we do not feel the block randomization design compromises our utilization or work cost findings because these cost estimates are derived from sociodemographically adjusted self-report items multiplied by a common metric.

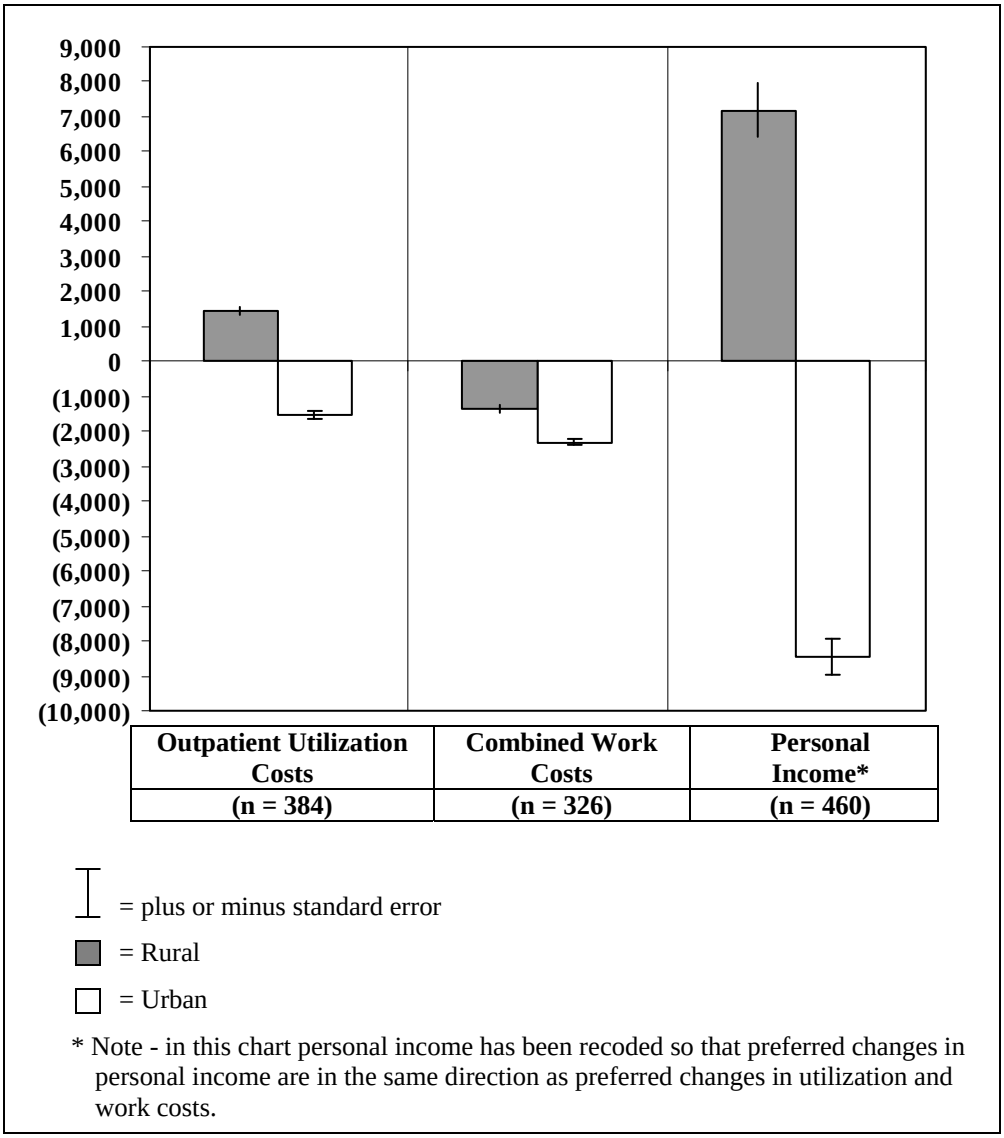
The generalizability of our findings is strengthened by the fact that the depression disease management program was implemented by primary care professionals under normal practice conditions to estimate outcomes that usual care practices who adopt the model can obtain. While QuEST recruited a population-based sample of diverse depressed primary care patients in participating practices, we note that readers should not generalize our results to the nation because the intervention was not tested in a representative sample or rural and urban practices; however, to our best knowledge, the QuEST database is and will remain for the foreseeable future the largest multiple state database available to examine differential stakeholder benefit in rural and urban communities. This dataset does not however provide us the opportunity to examine how other potential stakeholders would be economically impacted by decisions to provide depression care management to rural America, including state Medicaid agencies, state taxpayers, state insurance commissions, rural communities and families themselves. While it is reasonable to assume these stakeholders would support depression care management, the multiple studies documenting that depression care management programs enhance functioning have not been able to demonstrate that any of these groups benefit economically from such programs.

If research is going to definitively contribute to policy decisions about stakeholder contributions to treatment models that achieve better outcomes at additional cost, interventions like the one we tested will need to be longitudinally evaluated on multiple economic outcomes in diverse sociodemographic, clinical, and geographic patient groups. In the likely event that policy makers conclude that such studies are too unwieldy or expensive, they may opt instead for ‘best available’ data. We argue that ‘best available’ data is a better option than stakeholder perceptions

about what is fair or affordable, particularly when patients are not likely to be at the table when 'who should pay' decisions are made.

These findings suggest that employers may derive more economic benefit than health plans from ensuring that depression care management programs are available for both the urban and rural patients they employ. This analysis contributes to the literature by underscoring that the importance of ensuring that employers are fully educated about the potential value of depression disease management programs for the rural and urban workers they employ.

Figure 1 - Intervention Impact on Per-Participant Stakeholder Costs Over 24 Months by Rurality



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The WICHE Center for Rural Mental Health Research was established in 2004 to develop and disseminate scientific knowledge that can be readily applied to improve the use, quality, and outcomes of mental health care provided to rural populations. As a General Rural Health Research Center in the Office of Rural Health Policy, the WICHE center is supported by the Federal Office of Rural health Policy, Health Resources and Services Administration (HRSA), Public Health Services, grant number U1CRH03713.

The WICHE Center selected mental health as its area of concentration because: (1) although the prevalence and entry into care for mental health problems is generally comparable in rural and urban populations, the care that rural patients receive for mental health problems may be of poorer quality, particularly for residents in outlying rural areas and (2) efforts to ensure that rural patients receive similar quality care to their urban counterparts generally requires restructuring treatment delivery models to address the unique problems rural delivery settings face. Within mental health, the Center proposes to conduct the research development/dissemination efforts needed to ensure rural populations receive high quality depression care.

Within mental health, the Center will concentrate on depression because: (1) depression is one of the most prevalent and impairing mental health conditions in both rural and urban populations, (2) most depressed patients fail to receive high quality care when they enter rural or urban treatment delivery systems, (3) outlying rural patients are more likely to receive poorer quality care than their urban counterparts, (4) urban team settings are adopting new evidence-based care models to assure that depressed patients receive high quality care for the condition that will increase the rural-urban quality chasm even further, and (5) urban care models can and need to be refined for delivery to rural populations.

The WICHE Center is based at the Western Interstate Commission for Higher Education. For more information about the Center and its publications, please contact:
WICHE Center for Rural Mental Health Research
3035 Center Green Dr.
Boulder, CO 80301
Phone: (303) 541-0311
Fax: (303) 541-0291
http://www.wiche.edu/mentalhealth/ResearchCenter/ResearchCenter.asp

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