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### Title

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### Permalink

<https://escholarship.org/uc/item/1p007946>

### Journal

Annals of internal medicine, 161(10 Suppl)

### ISSN

0003-4819

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### Publication Date

2014-11-01

### DOI

10.7326/m13-3011

Peer reviewed

# 12-Month Outcomes of Community Engagement Versus Technical Assistance to Implement Depression Collaborative Care

## A Partnered, Cluster, Randomized, Comparative Effectiveness Trial

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**Background:** Depression collaborative care implementation using community engagement and planning (CEP) across programs improves 6-month client outcomes in minority communities, compared with technical assistance to individual programs (resources for services [RS]). However, 12-month outcomes are unknown.

**Objective:** To compare effects of CEP and RS on mental health-related quality of life (MHRQL) and use of services among depressed clients at 12 months.

**Design:** Matched health and community programs ( $n = 93$ ) in 2 communities randomly assigned to receive CEP or RS. (ClinicalTrials.gov: NCT01699789).

**Measurements:** Self-reported MHRQL and services use at baseline, 6 months, and 12 months.

**Setting:** Los Angeles, California.

**Patients:** 1018 adults with depressive symptoms (8-item Patient Health Questionnaire score  $\geq 10$ ), 88% of whom were an ethnic minority.

**Intervention:** CEP and RS to implement depression collaborative care.

**Measurements:** The primary outcome was poor MHRQL (12-item mental health composite score  $\leq 40$ ) at baseline, 6 months, and 12 months; the secondary outcome was use of services at 12 months.

**Results:** At 6 months, the finding that CEP outperformed RS to reduce poor MHRQL was significant but sensitive to underlying statistical assumptions. At 12 months, some analyses suggested that CEP was advantageous to MHRQL, whereas others did not confirm a significant difference favoring CEP. The finding that CEP reduced behavioral health hospitalizations at 6 months was less evident at 12 months and was sensitive to underlying statistical assumptions. Other services use did not significantly differ between interventions at 12 months.

**Limitation:** Data are self-reported, and findings are sensitive to modeling assumptions.

**Conclusion:** In contrast to 6-month results, no consistent effects of CEP on reducing the likelihood of poor MHRQL and behavioral health hospitalizations were found at 12 months. Still, given the needs of underresourced communities, the favorable profile of CEP, and the lack of evidence-based alternatives, CEP remains a viable strategy for policymakers and communities to consider.

**Primary Funding Source:** National Institute of Mental Health, Robert Wood Johnson Foundation, California Community Foundation, National Library of Medicine, and National Institutes of Health/National Center for Advancing Translational Science for the UCLA Clinical and Translational Science Institute.

*Ann Intern Med.* 2014;161:523-534. doi:10.7326/M13-3011

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Depression and depressive symptoms are main causes of disability in the United States (1, 2), where racial disparities persist in access to and quality and outcomes of care (3–9). Depression collaborative care provided in primary care settings can improve quality and outcomes of care for depressed adults while reducing outcome disparities by race (10–18), but safety-net primary care settings generally have limited capacity for full implementation of collaborative care (19–21). Encouraging safety-net clinics to collaborate with other key agencies (for example, social services or faith-based organizations) using community engagement (22–26) may support successful implementation of depression collaborative care across underresourced communities.

Community Partners in Care (CPIC) was designed to compare the effects of 2 depression collaborative care implementation approaches: 1) community engagement and planning (CEP), which supports collaborative planning and implementation across myriad community programs, and 2) more traditional resources for services (RS) models, which rely on time-limited expert technical assistance for collaborative care to individual programs (27–29). Earlier

See also:

**Web-Only**  
Data Supplements

This article is part of the *Annals* supplement "RWJF Clinical Scholars in Pursuit of the Value Proposition: Evaluations of Low-Cost Innovations for Prevention and Management of Conditions." The Robert Wood Johnson Foundation provided funding for publication of this supplement, which is only available online at [www.annals.org](http://www.annals.org). Carol M. Mangione, MD, MPH (co-director of the RWJF Clinical Scholars Program at the University of California, Los Angeles); Jaya K. Rao, MD, MHS (*Annals* Deputy Editor); and Christine Laine, MD, MPH (*Annals* Editor in Chief), served as editors for this supplement.

**Table 1. Baseline Characteristics of Depressed Clients, by Intervention\***

Characteristic	Overall (n = 1018)	RS Group (n = 504)	CEP Group (n = 514)
Service sector, n (%)			
Primary care or public health	290 (28.5)	134 (26.6)	156 (30.4)
Mental health services	195 (19.2)	110 (21.8)	85 (16.5)
Substance abuse	230 (22.6)	111 (22.0)	119 (23.2)
Homeless services	162 (15.9)	92 (18.3)	70 (13.6)
Community-based	141 (13.9)	57 (11.3)	84 (16.3)
Mean age (SD), y	44.8 (12.7)	44.2 (12.3)	45.3 (13.0)
Female, n (%)	595 (58.4)	286 (56.7)	309 (60.1)
Ethnicity, n (%)†			
Latino	409 (40.2)	194 (38.5)	215 (41.8)
African American	488 (47.9)	239 (47.4)	249 (48.4)
Non-Hispanic white	86 (8.4)	45 (8.9)	41 (8.0)
Other	35 (3.4)	26 (5.2)	9 (1.8)
Married or living with partner, n (%)	231 (22.7)	116 (23.0)	115 (22.5)
Less than high school education, n (%)	446 (43.8)	221 (43.9)	224 (43.7)
≥3 chronic medical conditions, n (%)	548 (53.8)	270 (53.6)	278 (54.0)
Family income from work in the past 12 mo ≤\$10 000, n (%)	755 (74.1)	374 (74.2)	381 (74.0)
Family income under federal poverty level, n (%)	750 (73.7)	373 (74.0)	377 (73.3)
No health insurance, n (%)	545 (53.5)	286 (56.7)	259 (50.4)
Working for pay, n (%)	205 (20.1)	105 (20.9)	100 (19.4)
12-mo depressive disorder, n (%)	629 (61.8)	311 (61.8)	318 (61.8)
Probable depression (PHQ-8 score ≥10), n (%)	992 (97.7)	490 (97.4)	502 (98.0)
Mean PHQ-8 score (SD)	14.9 (4.1)	15.0 (4.2)	14.8 (4.1)
Alcohol abuse or use of illicit drugs in the past 12 mo, n (%)	398 (39.1)	180 (35.8)	218 (42.4)
Poor mental health–related quality of life, n (%)‡	546 (53.6)	271 (53.7)	275 (53.5)

CEP = community engagement and planning; PHQ-8 = 8-item Patient Health Questionnaire; RS = resources for services.  
 \* Data were multiply imputed. The chi-square test was used to compare the groups, taking into account the design effect of the cluster randomization.  
 †  $P > 0.30$  for all comparisons except for ethnicity, for which  $P = 0.030$ .  
 ‡ 12-item Mental Composite Score ≤40 (1 SD below the population mean).

studies concluded that at 6 months, compared with RS, CEP reduced the probability of poor mental health–related quality of life (MHRQL) among depressed clients, increased their physical activity, and reduced risk factors for homelessness (28–30). Moreover, CEP reduced behavioral health hospitalizations and specialty medication visits among visitors to mental health specialists while increasing use of primary care, faith-based, and park-based services for depression among such clients. To our knowledge, CPIC is the first randomized U.S. study of the added value of CEP beyond more traditional expert assistance to individual programs and the first depression collaborative care study to span the health care and social community sectors.

We examined the effects of CEP over RS on poor MHRQL and services use at 6 and 12 months, as well as changes in outcomes from baseline to 6 months and baseline to 12 months. We hypothesized that compared with RS, CEP would decrease the proportion of clients with poor MHRQL at 12 months.

**METHODS**  
**Study Design**

Community Partners in Care is a group-level randomized comparative effectiveness trial comparing CEP with RS. Both interventions were designed to provide extensive depression collaborative care training to mental health, medical, and community-based agencies. The RS model provided preset, time-limited training to individual agen-

cies, whereas CEP encouraged these diverse agencies to develop a strategy and training plan to jointly provide care for depression (Table 1 in Data Supplement 4, available at [www.annals.org](http://www.annals.org)). The interventions and study methods are described elsewhere (28–31).

The study and CEP intervention were guided by community-partnered participatory research principles (32–35), a community-based participatory research variant (36, 37) promoting equal authority among community and academic partners (Data Supplement 1, available at [www.annals.org](http://www.annals.org)). The study council, co-led by the University of California, Los Angeles (UCLA); RAND Corporation; Healthy African American Families II; Behavioral Health Services; and QueensCare Health and Faith Partnership supported workgroups and community forums for study input (27–31, 38, 39).

**Setting**

The study took place in 2 Los Angeles County communities: South Los Angeles and Hollywood-Metro. These communities have high rates of poverty and avoidable hospitalizations and low rates of insurance (40–42). We hosted community meetings to identify community-based settings that support vulnerable depressed populations, with the aim of oversampling from these settings, which included mental health, primary care, public health, substance abuse, and social services; faith-based programs; parks; senior centers; hair salons; and exercise clubs. South Los Angeles partners emphasized inclusion of large samples

of substance abuse clients and African American persons, whereas Hollywood-Metro emphasized homeless clients and seniors.

### Participants and Randomization Programs

We began by identifying a pool of relevant agencies and organizations through county program lists and nominations from community partners. We then contacted each to assess interest, eligibility, and enrollment. This process resulted in a pool of 60 potentially eligible agencies with 194 programs. Programs were eligible if they served 15 or more clients per week, had 1 or more staff members, and did not focus exclusively on psychotic disorders or home services. A total of 133 of these 194 programs were potentially eligible.

Within each community, programs or clusters of smaller programs were paired on the basis of location, service sector, size, population served, services provided, and funding streams; 2 larger agencies were their own single stratum. Within pairs, one program or cluster was randomly assigned to CEP and the other to RS (43). A statistician uninvolved with recruitment supported council members in producing seed numbers for randomization (44).

The 133 programs were randomly assigned to the interventions (65 to RS and 68 to CEP) (Figure). After randomization, RAND staff who were blinded to assignment conducted site visits to finalize enrollment; 20 programs were determined ineligible, 18 declined participation, and 95 programs from 50 consenting agencies were enrolled (46 in RS and 49 in CEP) (Figure).

Administrators were informed of intervention status by letter. Participating and nonparticipating agencies were similar in terms of clients' age, sex, and race; population density; and client income by ZIP code (each  $P > 0.10$ ), as determined by analysis of census tract data.

### Clients

To achieve a 6-month follow-up sample of 780 depressed clients, we planned to enroll 557 to 600 clients per intervention (assuming 65% to 70% retention). We powered the study to identify a detectable effect size ranging from 0.20 to 0.22 and a percentage point difference between groups ranging from 9.98 to 10.91, assuming 80% power with a 2-sided  $\alpha$  value of 0.05 and an intraclass correlation coefficient assumed to range from 0.00 to 0.02 (43, 45, 46).

Within programs, clients were screened in waiting rooms (approached consecutively) or at events (approached randomly) from March to November 2010. Allocating 2 to 3 days per program, RAND staff who were blinded to intervention status approached 4649 adults (aged  $\geq 18$  years) allocating 2 to 3 days per program; of these, 4440 (95.5%) agreed to screening. Eligibility was limited to clients who provided contact information and had at least

mild depressive symptoms, as indicated by a score of 10 or greater on the 8-item Patient Health Questionnaire (47). Of 4440 persons screened, 1322 (29.8%) were eligible; 1246 (94.3%) of eligible persons enrolled, a high rate for such studies (11, 14, 16).

Between April 2010 and January 2011, 981 clients (79% of those enrolled) completed a baseline telephone survey conducted by RAND survey staff who were blinded to intervention. Of 1093 participants approached for 6-month telephone follow-up surveys between November 2010 and August 2011, 759 (70%) participated. Of 974 participants approached for 12-month telephone follow-up surveys between May 2011 and March 2012, 733 (75%) participated. **Data Supplement 2** (available at [www.annals.org](http://www.annals.org)) shows the survey questions. We did not attempt to contact 272 participants because their survey response at baseline ( $n = 153$ ) or 6 months ( $n = 119$ ) was final refusal, ill, incarcerated, unable to contact, or dead.

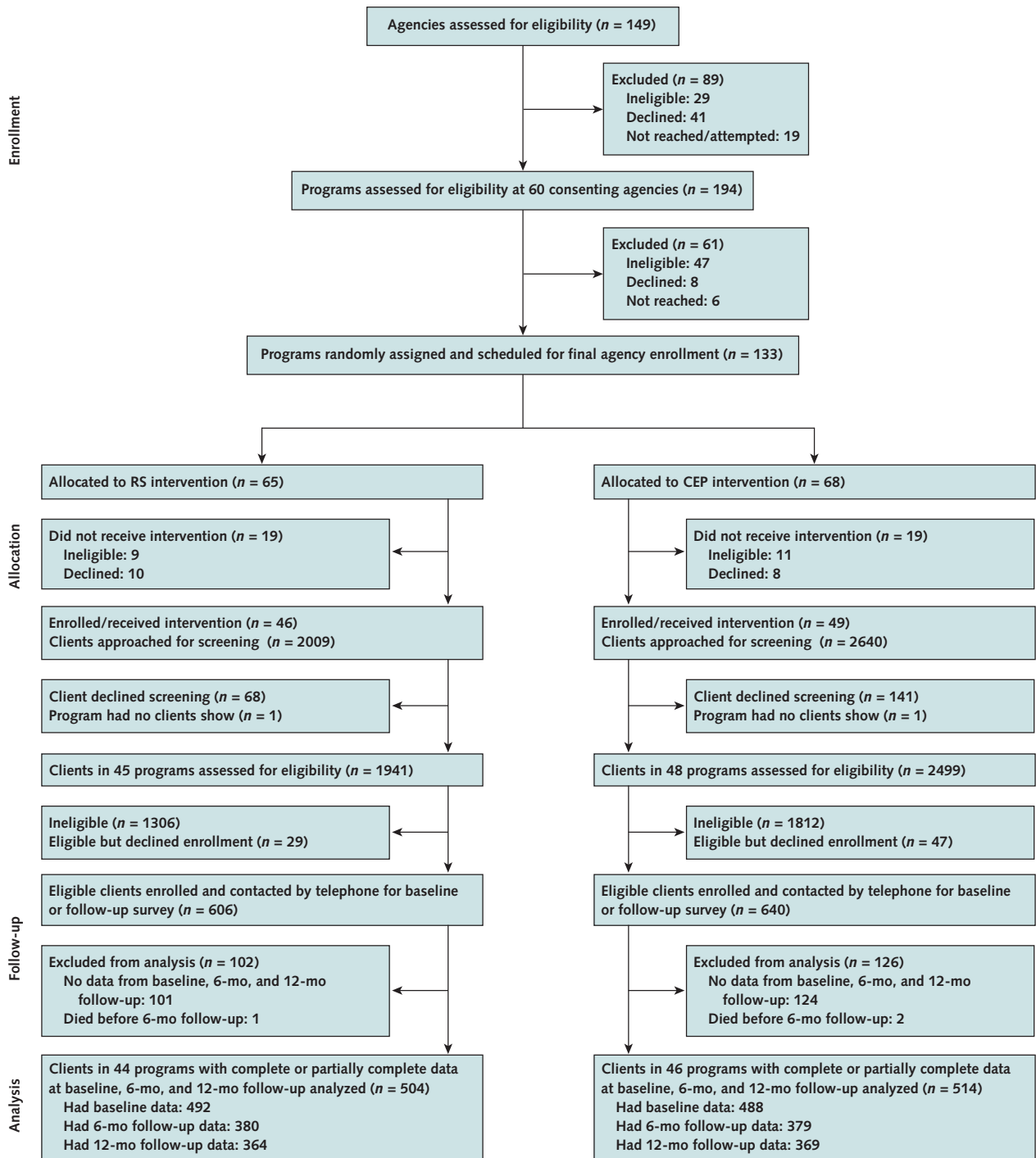
Our analytic sample comprises 1018 individuals (77% of eligible; 82% of enrolled) who completed 1 or more surveys at baseline, 6 months, or 12 months (Figure). Characteristics of persons who completed the 12-month survey differed from those who did not complete it by intervention: The RS group had significantly higher nonresponse rates among men, clients recruited from substance abuse programs, and those with no health insurance. In the CEP group, responders were more likely to have lower family income and to be African American (Tables B2 to B4 in **Data Supplement 3**, available at [www.annals.org](http://www.annals.org)).

### Interventions

The compared interventions, CEP and RS, were designed to expose a range of health care and social community agencies to the same depression collaborative care toolkits. Between December 2009 and July 2011, CEP supported program administrators to work as councils: one in Hollywood-Metro and another in South Los Angeles. Each council met biweekly over 5 months to adapt depression care toolkits and trainings to each community. In addition, each council developed plans for a coordinated services network across health care and social community programs to support depressed adults. Planning was co-led by community and academic council members following community-partnered participatory research principles (for example, shared authority and 2-way knowledge exchange) (39) (Table 1 in **Data Supplement 4**, available at [www.annals.org](http://www.annals.org)).

In RS, technical assistance was offered to assigned programs for the depression care toolkits by using a "train-the-trainer" model. Between December 2009 and July 2010, training was conducted through 10 webinars plus site visits to primary care for each community (39). Trainers included a nurse care manager, a cognitive-behavioral therapist who was a licensed psychologist, 3 board-certified psychiatrists for medication management, and community

Figure. Study flow diagram.



Five programs (2 in the RS group and 3 in the CEP group) had no clients with data for outcome analysis. CEP = community engagement and planning; RS = resources for services.

service administrators to support participation and cultural competence.

The CPIC Council modified depression collaborative care toolkits (48) that supported clinician assessment, medication management, case management (screening, care co-

ordination, and patient education), patient education, and cognitive-behavioral therapy (14, 16, 17, 48, 49), adding a lay health worker manual and team support tools (50, 51). Toolkits introduced to programs before randomization at 1-day kick-off conferences in each community were avail-



able online, on flash drives, and on hard copy (27, 38, 39), for participating programs in both interventions (Table 1 in Data Supplement 4).

After randomization and enrollment, within each intervention, training invitations were offered by phone, e-mail, and postcards to staff who attended prior CPIC study meetings; circulation to all eligible staff was encouraged. Providers and clients in enrolled programs could use intervention resources for free, even if they were not individually enrolled as participants. Incentives to participate in training included continuing education credits and food during training sessions. Enrolled client lists were provided to CEP but not to RS administrators, except at 1 agency that had a shared waiting room where both were given lists.

The institutional review boards of RAND and other participating agencies approved the study procedures before initiation. The National Institutes of Health did not consider the study a clinical trial when it was funded in 2007, and no data safety monitoring board was required. After data collection, the study was registered with ClinicalTrials.gov (NCT01699789). No major design changes were made after recruitment began.

### Outcomes and Follow-up

All outcomes were based on client self-report during telephone surveys and were assessed by RAND staff at baseline, 6 months, and 12 months. Baseline measures include program intervention assignment and sector, and client data from the screening and baseline survey on demographic characteristics (age and sex), presence of 3 or more chronic conditions (among 18 conditions), education level, race/ethnicity, physical health composite score and mental health composite score (MCS-12) from the 12-item Short-Form Health Survey (52, 53), and meeting federal criteria for family poverty (54). Using the Mini-International Neuropsychiatric Interview (55), we assessed for the following conditions on the basis of *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, criteria: 12-month major depressive or dysthymic disorder, current manic episode, recent anxiety disorder (panic or post traumatic stress in the past month, or generalized anxiety disorder within the past 6 months), and alcohol abuse or use of illicit drugs in the past 12 months.

The primary study outcome was percentage of clients with poor MHRQL, as indicated by an MCS-12 of 40 or less (1 SD below the U.S. population mean) at 12 months (52, 53). A sensitivity analysis was conducted using the MCS-12 as a continuous measure. Secondary outcomes were services use indicators (for example, primary care visits and nights spent in a hospital because of behavioral health problems).

We report 6- and 12-month outcomes, and the change in outcomes from baseline to 6 and 12 months. For all outcomes, we also report results of sensitivity analyses, with survey follow-up time as a class variable and varying imputed data assumptions.

We assessed services use in the past 6 months for behavioral health (mental health, alcohol abuse, and substance abuse). In particular, we asked clients about the number of nights spent in a hospital; use of overnight substance abuse rehabilitation facilities; emergency department visits; outpatient mental health or self/family group visits; hotline calls; and use of outpatient primary care or public health clinics, substance abuse or social services programs, parks and community centers, and faith-based and other community programs. Services for which the client reported receiving information, referral, counseling, or medication management for depression or emotional problems were classified as depression-related visits. We developed indicators for any service use and being above the baseline median number of visits and counts of contacts. Because a single overnight stay could reflect emergency department use, we performed a sensitivity analysis that included 4 or more hospital nights. To account for potential bias in self-report, we asked participants to provide names and addresses for up to 4 providers per sector; for high utilizers and "other" locations, we confirmed sector and count feasibility through searching the Internet and calling programs.

### Statistical Analysis

We conducted intention-to-treat analyses of repeated measures that included all participants with available data at baseline, 6 months, or 12 months by using SAS software, version 9.2 (SAS Institute). Initial explorations of 3-level, random-effects logistic models using SAS proc glimmix for binary outcomes yielded unstable estimates for program-specific random effects.

We analyzed dichotomous and count outcomes by using a generalized estimating equation framework. Specifically, we fitted logistic regression models for binary outcomes and Poisson models for count data using SAS proc genmod, specifying exchangeable correlation at the program level, with regression adjustment for baseline covariates (age, sex,  $\geq 3$  chronic conditions, education, race/ethnicity, family poverty, alcohol abuse or use of illicit drugs in the past 12 months, depressive disorder in the past 12 months, and community). We then developed a contrast involving a linear combination of coefficients to test intervention effects at each end point (baseline, 6 months, and 12 months) and tested differences between intervention groups in change from baseline to 6 and 12 months.

The results of analyses of binary outcomes are presented as odds ratios, and the results of Poisson regression analyses of count data are presented as rate ratios. We summarized effect sizes by presenting unadjusted means and proportions by intervention group (16, 56) (Data Supplement 3). We treated time as a continuous variable and examined the fixed effects for time and intervention, and their interactions. We included quadratic terms (squared effect of time and its interaction with the intervention),

**Table 2. Proportion of Clients With Poor Mental Health–Related Quality of Life and Mean MCS-12 at 6 and 12 Months\***

Quality of Life Measure	Clients, <i>n</i>	CEP Group	RS Group	Odds Ratio (95% CI)	
				CEP vs. RS at Specific Time	CEP vs. RS in Change From Baseline
<b>MCS-12 ≤40, <i>n/N</i> (%)</b>					
Baseline	962	257/479 (53.7)	259/483 (53.6)	1.00 (0.79 to 1.28)	–
6 mo	755	166/376 (44.1)	198/379 (52.2)	0.71 (0.55 to 0.91)**	0.71 (0.51 to 0.98)**
12 mo	717	160/361 (44.3)	181/356 (50.8)	0.77 (0.61 to 0.97)**	0.77 (0.55 to 1.07)
<b>Mean MCS-12 (SD)</b>					
Baseline	962	39.2 (7.3)	39.2 (7.5)	0.12 (–0.82 to 1.06)	–
6 mo	755	40.3 (7.0)	39.7 (7.4)	0.60 (–0.36 to 1.57)	0.48 (–0.61 to 1.58)
12 mo	717	40.7 (7.0)	40.4 (7.1)	0.35 (–0.73 to 1.44)	0.23 (–1.21 to 1.67)

CEP = community engagement and planning; MAR = missing at random; MCS-12 = 12-item mental health composite score; NMAR = nonignorable missing at random; RS = resources for services.

\* Adjusted analyses used multiply imputed data based on 1018 clients. A generalized estimating equation logistic regression model was used for the binary variable MCS-12 ≤40 (presented as odds ratios). A 3-level mixed-effect regression model was used for the continuous variable MCS-12 score (presented as mean difference), adjusted for age, sex, ≥3 chronic conditions, education, race/ethnicity, income, family income below the federal poverty level, 12-mo alcohol abuse or use of illicit drugs, 12-mo depressive disorder, and community.

† Analysis with time as a continuous variable and multiple imputation procedures assuming that the missing data are MAR.

‡ Analysis with time as a continuous variable and NMAR by multiplying the ignorable model's imputed data by 1.1.

§ Analysis with time as a continuous variable and NMAR by multiplying the ignorable model's imputed data by 0.9.

|| Analysis with time as a categorical variable with 2 indicators for 6- and 12-mo time points and MAR.

\*\* *p* < 0.05.

which allowed insight into whether changes are greater from baseline to 6 months or subsequent months.

In analyzing continuously scaled MCS-12 as the dependent variable, we used a 3-level, mixed-effect regression model by using SAS proc mixed. We accounted for the multilevel data structure with clients nested within programs and repeated measurements nested within clients. To account for the intraclass correlation expected in the data, we specified random effects at the program level and an autoregressive (1) covariance structure within clients to account for within-client correlation over time.

We used item-level imputation for missing data and wave-level imputation for missing surveys to adjust findings to the observed analytic sample (*n* = 1018). In our prior outcome study (30), we used weights to account for nonenrollment and nonresponse. In the current study, we used a model-based approach with unweighted data (56). As a result, the current study's baseline and 6-month estimates differ slightly from those in prior reports (28, 29).

We conducted sensitivity analyses for alternative representations of time as a continuous or class variable and for alternative weighting approaches. To investigate possible nonignorable effects, we used 2 methods. For continuous measures (such as MCS-12 and number of service visits), we multiplied ignorable-model imputations alternatively by 1.1 and 0.9 to reveal sensitivity to 10% departures from ignorable-model predictions with dichotomized versions of continuous measures (MCS-12 ≤40) based on the imputed continuous value. For categorical imputations where reference cells were based on an underlying continuous measure (that is, predicted response propensity) in-

cluding an indicator for any utilization and adjusted Bayesian bootstrap imputations reflecting unit nonresponse at a particular time point, nonignorable imputations for cases in nonboundary reference cells were generated by borrowing values from the reference cell with either the next higher or next lower value of the underlying continuous measure (57).

**Role of the Funding Source**

The National Institute of Mental Health, UCLA Clinical and Translational Science Institute, Robert Wood Johnson Foundation, National Library of Medicine, and California Community Foundation supported the study. The National Institute of Mental Health project officer served as an advisor to the CPIC Council, but otherwise, funders had no role in design, conduct, or analysis of the study; interpretation of the data; manuscript preparation; or the decision to submit the manuscript for publication.

**RESULTS**

**Baseline Participant Characteristics**

Of 1018 depressed clients in 12-month outcome analyses, 58.4% were female, 88.1% were Latino or African American, 43.8% had less than a high school education, 73.7% had an income below the federal poverty level, 53.5% had no health insurance, and 20.1% were employed. The percentage with 12-month depressive disorder was 61.8%, whereas 39.1% had substance or alcohol abuse and 53.8% had 3 or more chronic medical conditions (Table 1). The CEP group had more Latino and African American participants than the RS group (85.9% vs

Table 2—Continued

Odds Ratio (95% CI)					
Higher NMAR Value†‡		Lower NMAR Value†§		Categorical Time Value†	
CEP vs. RS at Specific Time	CEP vs. RS in Change From Baseline	CEP vs. RS at Specific Time	CEP vs. RS in Change From Baseline	CEP vs. RS at Specific Time	CEP vs. RS in Change From Baseline
0.97 (0.76 to 1.25)	–	1.03 (0.81 to 1.31)	–	1.00 (0.78 to 1.27)	–
0.73 (0.58 to 0.93)**	0.75 (0.55 to 1.04)	0.79 (0.61 to 1.02)	0.77 (0.56 to 1.07)	0.72 (0.55 to 0.95)**	0.73 (0.51 to 1.04)
0.83 (0.66 to 1.06)	0.86 (0.61 to 1.21)	0.86 (0.67 to 1.09)	0.83 (0.59 to 1.18)	0.79 (0.59 to 1.05)	0.79 (0.56 to 1.13)
Group Difference	Group Difference in Change From Baseline	Group Difference	Group Difference in Change From Baseline	Group Difference	Group Difference in Change From Baseline
0.27 (–0.73 to 1.26)	–	–0.02 (–0.96 to 0.91)	–	0.11 (–0.84 to 1.05)	–
0.68 (–0.35 to 1.7)	0.41 (–0.74 to 1.56)	0.53 (–0.41 to 1.47)	0.55 (–0.53 to 1.63)	0.61 (–0.51 to 1.73)	0.50 (–0.77 to 1.77)
0.44 (–0.71 to 1.58)	0.17 (–1.37 to 1.71)	0.27 (–0.79 to 1.33)	0.29 (–1.10 to 1.69)	0.28 (–1.03 to 1.60)	0.18 (–1.43 to 1.78)

90.2%;  $P = 0.030$ ). There were no other significant differences by intervention in baseline characteristics.

### Outcomes

In planned analyses comparing study end points, CEP compared with RS significantly decreased the odds of reduced MHRQL at 6 months ( $P = 0.009$ ) and 12 months ( $P = 0.028$ ) (Table 2; Figure 1 in Data Supplement 4). In an analysis of change from baseline in likelihood of poor MHRQL, CEP also showed a significant advantage at 6 months ( $P = 0.038$ ), but not at 12 months.

A modest degree of nonignorability in imputations for missing data or changing the representation of time in statistical models from a continuous to a categorical variable affects interpretations, with most findings becoming either borderline significant or nonsignificant, but with a direction favoring CEP. In addition, sensitivity analyses reflecting MCS-12 on a continuous scale did not reveal any significant differences between interventions at 6 or 12 months (Table 2; Figures 2 and 3 in Data Supplement 4).

### Service Utilization

Analyses comparing percentages of any behavioral health hospitalizations in the prior 6 months confirmed a significant reduction in the CEP group at 6 months ( $P = 0.042$ ), but no significant difference at 12 months (Table 3). When analyzed as change from baseline, CEP showed significant reductions in likelihood of behavioral health hospitalizations at 6 months ( $P = 0.002$ ) and 12 months ( $P = 0.002$ ).

At 6 months, qualitatively similar findings were observed for 4 or more behavioral health hospital nights, but at 12 months, the change from baseline was only borderline significant. No observed significant differences between CEP and RS were observed for other services use measures. For certain sectors (such as parks), there were too few users to develop reliable estimates of mean depression visits at 12 months.

Sensitivity analyses with time as a class variable and varying imputed data assumptions confirmed favorable ef-

fects of CEP at 6 months on any behavioral health hospitalizations and 4 or more behavioral health hospital nights, but all 12-month results on behavioral health hospitalizations were sensitive to analysis choices.

### DISCUSSION

Although the significance of study findings was sensitive to underlying statistical assumptions and CEP effects were not significant in terms of a continuous MCS-12, CEP was found to have advantages over RS in that it reduced the likelihood of poor MHRQL (MCS-12  $\leq 40$ ), the primary outcome for depressed clients from health care and social community programs in underresourced, communities of color in Los Angeles. Evidence of persistence of CEP intervention effects at 12 months is less clear, with greater sensitivity of findings to underlying statistical assumptions.

Our analyses confirm the effect of CEP on reducing behavioral hospitalizations at 6 months (30), but the significance of a similar effect from baseline to 12 months is more speculative, owing to sensitivity to statistical methods. We found no significant differences by intervention status on utilization variables, including health care–based depression treatments (medication or counseling). For some sectors (such as parks), there were too few users of depression services to estimate differences in mean visits. Overall, the shift of outpatient visits toward alternative sectors reported at 6 months was not apparent at 12 months (30). In addition, the baseline findings reported here differ slightly from those in prior publications, owing to differences in weighting and statistical analysis procedures (29, 30).

The effects of CEP at 12 months may have been due to decreased intervention support after the first 6 months, or the variable level of CEP implementation resulting in clients with positive outcomes being outweighed by clients with no evidence of positive outcomes. Future research should examine whether additional implementation sup-



Table 3. Services Utilization at 6 and 12 Months\*

Measure	Clients, n	CEP Group	RS Group	Odds or Rate Ratio (95% CI)	
				CEP vs. RS at Specific Time	CEP vs. RS in Change From Baseline
<b>Any behavioral health hospitalizations in the past 6 mo, n (%)</b>					
Baseline	970	77/482 (16.0)	58/488 (11.9)	1.38 (0.91–2.11)	–
6 mo	759	22/379 (5.8)	35/380 (9.2)	0.60 (0.37–0.98)**	0.43 (0.26–0.74)**
12 mo	731	18/367 (4.9)	17/364 (4.7)	0.70 (0.4–1.22)	0.51 (0.27–0.96)**
<b>≥4 behavioral health hospital nights, n (%)</b>					
Baseline	970	44/482 (9.1)	33/488 (6.8)	1.33 (0.85–2.08)	–
6 mo	759	8/379 (2.1)	19/380 (5.0)	0.47 (0.23–0.97)**	0.35 (0.17–0.75)**
12 mo	730	10/367 (2.7)	9/363 (2.5)	0.70 (0.33–1.48)	0.52 (0.25–1.11)
<b>≥2 emergency department visits, n (%)</b>					
Baseline	970	167/482 (34.6)	177/488 (36.3)	0.88 (0.62–1.23)	–
6 mo	759	91/379 (24.0)	107/380 (28.2)	0.79 (0.57–1.11)	0.91 (0.6–1.38)
12 mo	730	75/367 (20.4)	88/363 (24.2)	0.75 (0.55–1.03)	0.86 (0.58–1.27)
<b>Any mental health outpatient visit, n (%)</b>					
Baseline	970	277/482 (57.5)	286/488 (58.6)	1.13 (0.73–1.77)	–
6 mo	758	206/378 (54.5)	207/380 (54.5)	1.19 (0.78–1.81)	1.04 (0.69–1.57)
12 mo	728	165/366 (45.1)	163/362 (45.0)	1.05 (0.66–1.66)	0.92 (0.56–1.52)
<b>Any primary care visit, n (%)</b>					
Baseline	969	335/482 (69.5)	333/487 (68.4)	0.98 (0.68–1.43)	–
6 mo	759	262/379 (69.1)	262/380 (68.9)	1.06 (0.76–1.47)	1.07 (0.78–1.48)
12 mo	729	263/366 (71.9)	231/363 (63.6)	1.31 (0.98–1.76)	1.33 (0.90–1.99)
<b>Any primary care visit with depression service, n (%)</b>					
Baseline	952	195/472 (41.3)	196/480 (40.8)	0.93 (0.66–1.31)	–
6 mo	756	117/377 (31.0)	111/379 (29.3)	1.05 (0.77–1.45)	1.13 (0.82–1.56)
12 mo	728	106/366 (29.0)	89/362 (24.6)	1.03 (0.74–1.42)	1.10 (0.74–1.65)
<b>Mean (SD) counseling visits from mental health specialty or primary care, n</b>					
Baseline	948	7.3 (13.7)	6.4 (3.8)	1.11 (0.81–1.52)	–
6 mo	755	7.1 (12.5)	8.8 (22.9)	0.73 (0.45–1.19)	0.66 (0.41–1.06)
12 mo	724	4.7 (10.3)	5.1 (11.2)	0.87 (0.58–1.30)	0.78 (0.51–1.21)
<b>Any faith-based program participation, n (%)</b>					
Baseline	967	280/481 (58.2)	299/486 (61.5)	0.84 (0.62–1.14)	–
6 mo	759	217/379 (57.3)	229/380 (60.3)	0.84 (0.60–1.17)	1.00 (0.72–1.40)
12 mo	729	195/366 (53.3)	214/363 (59.0)	0.79 (0.60–1.05)	0.95 (0.67–1.34)
<b>Any use of parks or community centers, n (%)</b>					
Baseline	967	225/481 (46.8)	239/486 (49.2)	0.88 (0.67–1.16)	–
6 mo	759	150/379 (39.6)	161/380 (42.4)	1.00 (0.72–1.39)	1.14 (0.83–1.55)
12 mo	730	132/366 (36.1)	133/364 (36.5)	0.97 (0.72–1.32)	1.10 (0.79–1.53)
<b>Took antidepressant ≥2 mo in the past 6 mo, n (%)</b>					
Baseline	945	151/471 (32.1)	145/474 (30.6)	1.30 (0.86–1.96)	–
6 mo	757	125/377 (33.2)	149/380 (39.2)	0.91 (0.55–1.50)	0.70 (0.45–1.08)
12 mo	730	108/366 (29.5)	123/364 (33.8)	0.87 (0.55–1.39)	0.67 (0.43–1.04)
<b>Mean (SD) total outpatient contacts for depression, n</b>					
Baseline	929	28.2 (54.5)	30.4 (51.0)	0.93 (0.68–1.26)	–
6 mo	759	21.6 (43.9)	21.0 (46.8)	0.96 (0.60–1.53)	1.03 (0.65–1.64)
12 mo	719	18.0 (40.4)	19.4 (43.6)	0.91 (0.65–1.29)	0.99 (0.69–1.41)

CEP = community engagement and planning; MAR = missing at random; MCS-12 = 12-item mental health composite score; NMAR = nonignorable missing at random; RS = resources for services.

\* Adjusted analyses used multiply imputed data based on 1018 clients. A generalized estimating equation logistic regression model was used for a binary variable (presented as odds ratios). A generalized estimating equation Poisson regression model was used for a count variable (presented as rate ratios), adjusted for age, sex, ≥3 chronic conditions, education, race/ethnicity, income, family income below the federal poverty level, 12-mo alcohol abuse or use of illicit drugs, 12-mo depressive disorder, and community.

† Analysis with time as a continuous variable and multiple imputation procedures assuming that the missing data are MAR.

‡ Analysis with time as a continuous variable and NMAR by multiplying the ignorable model's imputed data by 1.1.

§ Analysis with time as a continuous variable and NMAR by multiplying the ignorable model's imputed data by 0.9.

|| Analysis with time as a categorical variable with 2 indicators for 6- and 12-mo time points and MAR.

\*\* P < 0.05.

Table 3—Continued

Odds or Rate Ratio (95% CI)					
Higher NMAR Value††		Lower NMAR Value†§		Categorical Time Value†	
CEP vs. RS at Specific Time	CEP vs. RS in Change From Baseline	CEP vs. RS at Specific Time	CEP vs. RS in Change From Baseline	CEP vs. RS at Specific Time	CEP vs. RS in Change From Baseline
1.34 (0.89–2.03)	–	1.35 (0.88–2.05)	–	1.41 (0.93–2.16)	–
0.71 (0.42–1.18)	0.53 (0.31–0.91)**	0.55 (0.24–1.23)	0.41 (0.19–0.89)**	0.53 (0.30–0.95)**	0.38 (0.20–0.72)**
0.79 (0.40–1.55)	0.59 (0.29–1.18)	0.65 (0.30–1.41)	0.48 (0.21–1.09)	0.92 (0.50–1.66)	0.65 (0.34–1.24)
1.31 (0.82–2.09)	–	1.28 (0.82–2.00)	–	1.39 (0.87–2.20)	–
0.55 (0.27–1.10)	0.42 (0.21–0.82)**	0.38 (0.16–0.91)**	0.29 (0.12–0.69)**	0.36 (0.16–0.83)**	0.26 (0.10–0.65)**
0.79 (0.31–2.00)	0.60 (0.24–1.50)	0.57 (0.26–1.26)	0.45 (0.20–1.00)**	1.01 (0.43–2.34)	0.73 (0.33–1.58)
0.87 (0.62–1.22)	–	0.88 (0.63–1.23)	–	0.89 (0.63–1.26)	–
0.81 (0.59–1.12)	0.93 (0.64–1.37)	0.87 (0.61–1.25)	0.99 (0.67–1.46)	0.76 (0.52–1.12)	0.86 (0.53–1.37)
0.77 (0.53–1.11)	0.88 (0.57–1.37)	0.77 (0.52–1.14)	0.87 (0.55–1.38)	0.77 (0.54–1.10)	0.87 (0.58–1.30)
1.12 (0.72–1.75)	–	1.12 (0.72–1.75)	–	1.15 (0.74–1.79)	–
1.29 (0.80–2.08)	1.15 (0.72–1.84)	1.23 (0.81–1.86)	1.09 (0.72–1.66)	1.14 (0.76–1.71)	0.99 (0.67–1.45)
1.20 (0.74–1.93)	1.06 (0.66–1.71)	1.04 (0.69–1.55)	0.92 (0.58–1.47)	1.08 (0.68–1.73)	0.94 (0.57–1.54)
0.98 (0.67–1.42)	–	1.00 (0.69–1.46)	–	1.00 (0.69–1.45)	–
1.11 (0.78–1.57)	1.13 (0.79–1.62)	1.08 (0.70–1.68)	1.08 (0.71–1.64)	0.98 (0.66–1.46)	0.99 (0.67–1.46)
1.38 (1.03–1.86)**	1.41 (0.97–2.05)	1.33 (0.90–1.97)	1.33 (0.83–2.13)	1.44 (1.05–1.99)**	1.45 (0.94–2.23)
0.95 (0.67–1.34)	–	0.95 (0.68–1.33)	–	0.94 (0.66–1.34)	–
1.14 (0.82–1.58)	1.20 (0.86–1.67)	1.17 (0.83–1.66)	1.24 (0.89–1.72)	0.96 (0.66–1.38)	1.02 (0.68–1.52)
1.13 (0.81–1.57)	1.19 (0.80–1.76)	1.10 (0.78–1.54)	1.16 (0.78–1.73)	1.12 (0.79–1.58)	1.19 (0.79–1.80)
1.12 (0.81–1.53)	–	1.10 (0.80–1.51)	–	1.13 (0.83–1.54)	–
0.73 (0.44–1.21)	0.65 (0.40–1.07)	0.74 (0.46–1.17)	0.67 (0.43–1.05)	0.70 (0.43–1.15)	0.62 (0.38–1.01)
0.88 (0.58–1.32)	0.79 (0.50–1.23)	0.86 (0.58–1.28)	0.78 (0.51–1.19)	0.96 (0.64–1.43)	0.85 (0.53–1.35)
0.83 (0.60–1.13)	–	0.81 (0.58–1.13)	–	0.83 (0.61–1.14)	–
0.81 (0.56–1.16)	0.98 (0.68–1.42)	0.82 (0.59–1.13)	1.01 (0.70–1.46)	0.83 (0.62–1.12)	1.00 (0.71–1.40)
0.73 (0.54–0.98)**	0.88 (0.62–1.25)	0.81 (0.60–1.10)	1.01 (0.70–1.44)	0.80 (0.58–1.11)	0.96 (0.66–1.39)
0.90 (0.68–1.19)	–	0.91 (0.69–1.20)	–	–	–
1.00 (0.73–1.38)	1.11 (0.82–1.50)	1.04 (0.76–1.43)	1.16 (0.80–1.67)	0.90 (0.61–1.33)	0.99 (0.67–1.46)
0.99 (0.70–1.41)	1.10 (0.80–1.51)	1.00 (0.73–1.38)	1.12 (0.78–1.60)	1.05 (0.76–1.45)	1.15 (0.81–1.65)
1.27 (0.83–1.92)	–	1.28 (0.85–1.92)	–	1.30 (0.87–1.96)	–
1.02 (0.62–1.67)	0.81 (0.55–1.18)	0.93 (0.62–1.40)	0.73 (0.51–1.03)	0.86 (0.50–1.47)	0.66 (0.40–1.08)
0.90 (0.59–1.39)	0.71 (0.48–1.06)	0.87 (0.57–1.34)	0.68 (0.42–1.11)	0.93 (0.60–1.44)	0.72 (0.47–1.10)
0.93 (0.69–1.27)	–	0.92 (0.68–1.26)	–	0.93 (0.68–1.27)	–
0.95 (0.58–1.56)	1.02 (0.63–1.67)	0.96 (0.62–1.51)	1.04 (0.67–1.62)	0.95 (0.57–1.56)	1.02 (0.62–1.69)
0.92 (0.65–1.30)	0.99 (0.69–1.41)	0.91 (0.64–1.29)	0.99 (0.69–1.42)	0.93 (0.64–1.36)	1.01 (0.69–1.47)

port would offer more consistent evidence of sustained CEP effects beyond 6 months.

Our study has important limitations. We did not have a usual care group, but rather compared 2 active interventions that are each likely to be effective relative to usual care. We did not have data on hospitalization and medica-

tion use for general health conditions other than behavioral health. Because our sample includes only 1018 clients, precision was low for definitive services use estimates. The study was conducted in 2 Los Angeles communities where study leaders have a long history of applying community-partnered participatory research to depression (58–63). It

is unknown whether applying this approach in communities without this history would yield similar effects.

In addition, response rates were moderate for agencies and high for programs. Although initial client enrollment rates were high, retention was lower relative to other studies of quality improvement in depression care, but similar to that in studies of clients in safety-net settings (64, 65). Client outcomes relied on self-reported data, and clinical process data linking programs to clients were unavailable. We did not adjust significance for multiple comparisons because, as noted in our protocol, we focused on 1 primary outcome: poor MHRQL.

Finally, the significance of CEP effects was sensitive to underlying statistical assumptions of representation of time in models (class or continuous variable); to possible departures from nonignorable model predictions for imputed values; and to whether we used a generalized estimating equation longitudinal analysis with an exchangeable working correlation assumption or a design-based analysis using SUDAAN (RTI International) to incorporate sampling and nonresponse weights for 12-month outcomes (Table B8 in Data Supplement 3).

In conclusion, our results confirm the short-term effect of CEP on reducing the percentage of depressed clients with poor MHRQL and behavioral health hospitalizations at 6 months, with less evident effects at 12 months. Short-term change in avoiding poor quality of life and behavioral health hospitalizations, and possibly longer term, are clinically important owing to consistent mental health disparities (3–5), depression-related costs (66, 67), and the recurrent chronicity of depression (68, 69). Given the unmet needs of underresourced communities, the absence of evidence-based alternatives, and the modestly favorable profile and limited risk of CEP, community engagement remains a viable strategy that policymakers and communities could consider for collaborative care implementation (70) to improve population-based health outcomes of depression among vulnerable individuals.

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**Note:** Drs. Chung and Wells are affiliated with the RAND Corporation, and the work described herein was performed through their roles at RAND.

**Acknowledgment:** The authors thank the Los Angeles programs, providers, staff, and clients who participated; and the RAND Survey Research Group and community members who conducted client data collection. They also thank Loretta Jones for her study leadership and vision; Esmeralda Pulido, Ana Ramos, Rosie Cardenas, and Liz Lizaola for project management support; Lily Zhang for statistical programming

support; Ira Lesser, Charles Grob, and Christina Wang for support at Harbor-UCLA/Los Angeles Biomedical Research Institute; UCLA Clinical and Translational Science Institute for analyses and manuscript preparation support; and Paul Steinberg, Marcia Meldrum, and David Miklowitz for support during manuscript revisions. The authors also thank the 25 participating agencies of the Council and their representatives: QueensCare Health and Faith Partnership; COPE Health Solutions; UCLA Center for Health Services and Society; Cal State University Dominguez Hills; RAND; Healthy African American Families II; Los Angeles Urban League; Los Angeles Christian Health Centers; Los Angeles County Department of Mental Health and West Central Mental Health Center; Homeless Outreach Program/Integrated Care System; National Alliance on Mental Illness Urban Los Angeles; Behavioral Health Services; Avalon Carver Community Center; USC Keck School of Medicine Department of Psychiatry and Behavioral Sciences; Kaiser Watts Counseling and Learning Center; People Assisting the Homeless; Children's Bureau; Saban Free Clinic; New Vision Church of Jesus Christ; Jewish Family Services of Los Angeles; St. John's Well Child and Family Center; Charles Drew University of Medicine and Science; City of Los Angeles Department of Recreation and Parks; To Help Everyone Clinic; and QueensCare Family Clinics.

**Grant Support:** By the National Institute of Mental Health (awards R01MH078853, P30MH082760, and P30MH068639), the Robert Wood Johnson Foundation (award 64244), California Community Foundation, National Library of Medicine (award G08LM011058), and the National Institutes of Health/National Center for Advancing Translational Science for the UCLA Clinical and Translational Science Institute (award UL1TR000124).

**Disclosures:** Disclosures can be viewed at [www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M13-3011](http://www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M13-3011).

**Reproducible Research Statement:** *Study protocol:* Available at [http://hss.semel.ucla.edu/documents/CPIC\\_Protocol\\_Dec2012.pdf](http://hss.semel.ucla.edu/documents/CPIC_Protocol_Dec2012.pdf). *Statistical code and data set:* Available from Dr. Tang (e-mail, [lqtang@ucla.edu](mailto:lqtang@ucla.edu)).

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## References

- Insel TR, Charney DS. Research on major depression: strategies and priorities. *JAMA*. 2003;289:3167-8. [PMID: 12813123]
- Kessler RC, Chiu WT, Demler O, Merikangas KR, Walters EE. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005;62:617-27. [PMID: 15939839]
- González HM, Vega WA, Williams DR, Tarraf W, West BT, Neighbors HW. Depression care in the United States: too little for too few. *Arch Gen Psychiatry*. 2010;67:37-46. [PMID: 20048221]
- González HM, Tarraf W, Whitfield KE, Vega WA. The epidemiology of major depression and ethnicity in the United States. *J Psychiatr Res*. 2010;44:1043-51. [PMID: 20537350]
- McGuire TG, Miranda J. New evidence regarding racial and ethnic disparities in mental health: policy implications. *Health Aff (Millwood)*. 2008;27:393-403. [PMID: 18332495]
- Miranda J, McGuire TG, Williams DR, Wang P. Mental health in the context of health disparities. *Am J Psychiatry*. 2008;165:1102-8. [PMID: 18765491]
- Wang PS, Berglund P, Kessler RC. Recent care of common mental disorders in the United States: prevalence and conformance with evidence-based recommendations. *J Gen Intern Med*. 2000;15:284-92. [PMID: 10840263]
- Wang PS, Lane M, Olsson M, Pincus HA, Wells KB, Kessler RC. Twelve-month use of mental health services in the United States: results from the National Comorbidity Survey Replication. *Arch Gen Psychiatry*. 2005;62:629-40. [PMID: 15939840]
- Williams DR, González HM, Neighbors H, Nesse R, Abelson JM, Sweetman J, et al. Prevalence and distribution of major depressive disorder in African Americans, Caribbean blacks, and non-Hispanic whites: results from the National Survey of American Life. *Arch Gen Psychiatry*. 2007;64:305-15. [PMID: 17339519]
- Asarnow JR, Jaycox LH, Duan N, LaBorde AP, Rea MM, Murray P, et al. Effectiveness of a quality improvement intervention for adolescent depression in primary care clinics: a randomized controlled trial. *JAMA*. 2005;293:311-9. [PMID: 15657324]
- Gilbody S, Bower P, Fletcher J, Richards D, Sutton AJ. Collaborative care for depression: a cumulative meta-analysis and review of longer-term outcomes. *Arch Intern Med*. 2006;166:2314-21. [PMID: 17130383]
- Gilbody S, Whitty P, Grimshaw J, Thomas R. Educational and organizational interventions to improve the management of depression in primary care: a systematic review. *JAMA*. 2003;289:3145-51. [PMID: 12813120]
- Katon WJ, Lin EH, Von Korff M, Ciechanowski P, Ludman EJ, Young B, et al. Collaborative care for patients with depression and chronic illnesses. *N Engl J Med*. 2010;363:2611-20. [PMID: 21190455]
- Unützer J, Katon W, Callahan CM, Williams JW Jr, Hunkler E, Harpole L, et al; IMPACT Investigators. Collaborative care management of late-life depression in the primary care setting: a randomized controlled trial. *JAMA*. 2002;288:2836-45. [PMID: 12472325]
- Wells KB, Tang L, Miranda J, Benjamin B, Duan N, Sherbourne CD. The effects of quality improvement for depression in primary care at nine years: results from a randomized, controlled group-level trial. *Health Serv Res*. 2008;43:1952-74. [PMID: 18522664]
- Wells KB, Sherbourne C, Schoenbaum M, Duan N, Meredith L, Unützer J, et al. Impact of disseminating quality improvement programs for depression in managed primary care: a randomized controlled trial. *JAMA*. 2000;283:212-20. [PMID: 10634337]
- Miranda J, Chung JY, Green BL, Krupnik J, Siddique J, Revicki DA, et al. Treating depression in predominantly low-income young minority women: a randomized controlled trial. *JAMA*. 2003;290:57-65. [PMID: 12837712]
- Wells K, Sherbourne C, Schoenbaum M, Ettner S, Duan N, Miranda J, et al. Five-year impact of quality improvement for depression: results of a group-level randomized controlled trial. *Arch Gen Psychiatry*. 2004;61:378-86. [PMID: 15066896]
- Rieselbach RE, Crouse BJ, Frohna JG. Teaching primary care in community health centers: addressing the workforce crisis for the underserved. *Ann Intern Med*. 2010;152:118-22. [PMID: 20008743]
- National Association of Community Health Centers; Robert Graham Center. Access Granted: The Primary Care Payoff. Washington, DC: National Association of Community Health Centers, Robert Graham Center; 2007.
- National Association of Community Health Centers; Robert Graham Center. Access Denied. Washington, DC: National Association of Community Health Centers, Robert Graham Center; 2007.
- National Research Council. Promoting Health: Intervention Strategies from Social and Behavioral Research. Washington, DC: National Academies Pr; 2000.
- Thomas SB, Quinn SC, Butler J, Fryer CS, Garza MA. Toward a fourth generation of disparities research to achieve health equity. *Annu Rev Public Health*. 2011;32:399-416. [PMID: 21219164]
- Agency for Toxic Substances and Disease Registry. Principles of Community Engagement. 2d ed. 1 August 2011. Accessed at [www.atsdr.cdc.gov/communityengagement/pce\\_ctsa.html](http://www.atsdr.cdc.gov/communityengagement/pce_ctsa.html) on 30 March 2014.
- Institute of Medicine. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. Washington, DC: National Academies Pr; 2003.
- Institute of Medicine. The CTSA Program at NIH: Opportunities for Advancing Clinical and Translational Research. Washington, DC: National Academies Pr; 2013.
- Chung B, Jones L, Dixon EL, Miranda J, Wells K; Community Partners in Care Steering Council. Using a community partnered participatory research approach to implement a randomized controlled trial: planning Community Partners in Care. *J Health Care Poor Underserved*. 2010;21:780-95. [PMID: 20693725]
- Miranda J, Ong MK, Jones L, Chung B, Dixon EL, Tang L, et al. Community-partnered evaluation of depression services for clients of community-based agencies in under-resourced communities in Los Angeles. *J Gen Intern Med*. 2013;28:1279-87. [PMID: 23670566]
- Wells KB, Jones L, Chung B, Dixon EL, Tang L, Gilmore J, et al. Community-partnered cluster-randomized comparative effectiveness trial of community engagement and planning or resources for services to address depression disparities. *J Gen Intern Med*. 2013;28:1268-78. [PMID: 23649787]
- Mango J, Cabiling E, Wright A, Jones F, Jones L, Ramos A, et al. Community Partners in Care (CPIC): video summary of rationale, study approach/implementation, and client 6-month outcomes. CES4Health.info. 2014. Accessed at [www.ces4health.info/find-products/view-product.aspx?code=87LWR5H2](http://www.ces4health.info/find-products/view-product.aspx?code=87LWR5H2) on 10 May 2014.
- Chang ET, Gilmore J, Tang L, Morgan A, Wells KB, Chung B. Comorbid depression and substance abuse in safety-net clients of health and community-based agencies in Los Angeles: clinical needs and service use patterns. Findings from Community Partners in Care. *Psychiatr Serv*. 2014. [Forthcoming].



32. Jones L, Wells K. Strategies for academic and clinician engagement in community-participatory partnered research. *JAMA*. 2007;297:407-410. [PMID: 17244838]
33. Jones L, Meade B, Forge N, Moini M, Jones F, Terry C, et al. Begin your partnership: the process of engagement. *Ethn Dis*. 2009;19(4 Suppl 6):S6-8-16. [PMID: 20088077]
34. Jones L, Wells K, Norris K, Meade B, Koegel P. The vision, valley, and victory of community engagement. *Ethn Dis*. 2009;19(4 Suppl 6):S6-3-7. [PMID: 20088076]
35. Wells K, Jones L. "Research" in community-partnered, participatory research. *JAMA*. 2009;302:320-321. [PMID: 19602693]
36. Israel BA, Eng E, Schulz AJ, Parker EA, eds. *Methods in Community-Based Participatory Research for Health*. San Francisco: Jossey-Bass; 2005.
37. Israel BA, Schulz AJ, Parker EA, Becker AB. Review of community-based research: assessing partnership approaches to improve public health. *Annu Rev Public Health*. 1998;19:173-202. [PMID: 9611617]
38. Khodyakov D, Mendel P, Dixon E, Jones A, Masongsong Z, Wells K. Community Partners in Care: leveraging community diversity to improve depression care for underserved populations. *Int J Divers Organ Communities Nations*. 2009;9:167. [PMID: 21528111]
39. Mendel P, Ngo VK, Dixon E, Stockdale S, Jones F, Chung B, et al. Partnered evaluation of a community engagement intervention: use of a kickoff conference in a randomized trial for depression care improvement in underserved communities. *Ethn Dis*. 2011;21(3 Suppl 1):S1-78-88. [PMID: 22352084]
40. Los Angeles County Department of Public Health. Key indicators of health by service area. June 2009. Accessed at [www.publichealth.lacounty.gov/ha/docs/2007%20LACHS/Key\\_Indicator\\_2007/KIHReport.2009.FINAL.pdf](http://www.publichealth.lacounty.gov/ha/docs/2007%20LACHS/Key_Indicator_2007/KIHReport.2009.FINAL.pdf) on 15 September 2013.
41. U.S. Census Bureau. Los Angeles County, California. Accessed at <http://quickfacts.census.gov/qfd/states/06/06037.html> on June 23, 2012.
42. California Pan-Ethnic Health Network. Los Angeles County Multicultural Health Fact Sheet. Los Angeles: California Pan-Ethnic Health Network; 2012.
43. Murray DM. *Design and Analysis of Group-Randomized Trials*. New York: Oxford Univ Pr; 1998.
44. Belin TR, Stockdale S, Tang L, Jones F, Jones A, Wright A, et al. Developing a randomization protocol in a community-partnered participatory research project to reduce the burden of depression. In: *Proceedings of the American Statistical Association Health Policy Statistics Section, Joint Statistical Meetings; 31 July-5 August 2010, Vancouver, British Columbia, Canada*. Abstract 309027.
45. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum; 1988.
46. Kish L. *Survey Sampling*. New York: Wiley; 1965.
47. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr Ann*. 2002;32:509-15. Accessed at [www.lphi.org/LPHIadmin/uploads/PHQ-9-Review-Kroenke-63754.PDF](http://www.lphi.org/LPHIadmin/uploads/PHQ-9-Review-Kroenke-63754.PDF) on 8 April 2010.
48. Community Partners in Care depression care toolkit. Accessed at [www.communitypartnersincare.org/depression-care-resources/](http://www.communitypartnersincare.org/depression-care-resources/) on 1 April 2014.
49. Rubenstein LV, Jackson-Triche M, Unützer J, Miranda J, Minnium K, Pearson ML, et al. Evidence-based care for depression in managed primary care practices. *Health Aff (Millwood)*. 1999;18:89-105. [PMID: 10495595]
50. Wennerstrom A, Vannoy SD 3rd, Allen CE, Meyers D, O'Toole E, Wells KB, et al. Community-based participatory development of a community health worker mental health outreach role to extend collaborative care in post-Katrina New Orleans. *Ethn Dis*. 2011;21(3 Suppl 1):S1-45-51. [PMID: 22352080]
51. Bentham W, Vannoy SD, Badger K, Wennerstrom A, Springgate BF. Opportunities and challenges of implementing collaborative mental health care in post-Katrina New Orleans. *Ethn Dis*. 2011;21(3 Suppl 1):S1-30-37. [PMID: 22352078]
52. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Med Care*. 1992;30:473-83. [PMID: 1593914]
53. Ware JE Jr, Kosinski M, Turner-Bowker DM, Gandek B. *How to Score Version 2 of the SF-12 Health Survey (With a Supplement Documenting Version 1)*. Lincoln, RI: QualityMetric; 2002.
54. U.S. Department of Health and Human Services. The HHS poverty guidelines for the remainder of 2010 (August 2010). Accessed at <http://aspe.hhs.gov/poverty/10poverty.shtml> on 14 April 2014.
55. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry*. 1998;59 Suppl 20:22-33. [PMID: 9881538]
56. Korn E, Graubard B. *Analysis of Health Surveys*. Hoboken, NJ: Wiley-Interscience; 1999.
57. Belin TR, Hu MY, Young AS, Grusky O. Performance of a general location model with an ignorable missing-data assumption in a multivariate mental health services study. *Stat Med*. 1999;18:3123-35. [PMID: 10544311]
58. Chung B, Jones L, Jones A, Corbett CE, Booker T, Wells KB, et al. Using community arts events to enhance collective efficacy and community engagement to address depression in an African American community. *Am J Public Health*. 2009;99:237-44. [PMID: 19059844]
59. Chung B, Jones L, Terry C, Jones A, Forge N, Norris KC. Story of Stone Soup: a recipe to improve health disparities. *Ethn Dis*. 2010;20(1 Suppl 2):S2-9-14. [PMID: 20629241]
60. Bluthenthal RN, Jones L, Fackler-Lowrie N, Ellison M, Booker T, Jones F, et al. Witness for Wellness: preliminary findings from a community-academic participatory research mental health initiative. *Ethn Dis*. 2006;16(1 Suppl 1):S18-34. [PMID: 16681126]
61. Patel KK, Koegel P, Booker T, Jones L, Wells K. Innovative approaches to obtaining community feedback in the Witness for Wellness experience. *Ethn Dis*. 2006;16(1 Suppl 1):S35-42. [PMID: 16681127]
62. Chung B, Corbett CE, Boulet B, Cummings JR, Paxton K, McDaniel S, et al; Talking Wellness Group of Witness for Wellness. Talking Wellness: a description of a community-academic partnered project to engage an African-American community around depression through the use of poetry, film, and photography. *Ethn Dis*. 2006;16(1 Suppl 1):S67-78. [PMID: 16681130]
63. Jones D, Franklin C, Butler BT, Williams P, Wells KB, Rodriguez MA. The Building Wellness Project: a case history of partnership, power sharing, and compromise. *Ethn Dis*. 2006;16(1 Suppl 1):S54-66. [PMID: 16681129]
64. Ell K, Xie B, Quon B, Quinn DI, Dwight-Johnson M, Lee PJ. Randomized controlled trial of collaborative care management of depression among low-income patients with cancer. *J Clin Oncol*. 2008;26:4488-96. [PMID: 18802161]
65. Miranda J, Green BL, Krupnick JL, Chung J, Siddique J, Belin T, et al. One-year outcomes of a randomized clinical trial treating depression in low-income minority women. *J Consult Clin Psychol*. 2006;74:99-111. [PMID: 16551147]
66. Mrazek DA, Hornberger JC, Altar A, Degtler I. A review of the clinical, economic, and societal burden of treatment-resistant depression: 1996-2013. *Psychiatr Serv*. 2014;65:977-87. [PMID: 24789696]
67. Jacob V, Chattopadhyay S, Sipe T, Thota A, Byard G, Chapman D; Community Preventive Services Task Force. Economics of collaborative care for management of depressive disorders: a community guide systematic review. *Am J Prev Med*. 2012;42:539-549. [PMID: 22516496]
68. Wang JL, Patten S, Sareen J, Bolton J, Schmitz N, MacQueen G. Development and validation of a prediction algorithm for use by health professionals in prediction of recurrence of major depression. *Depress Anxiety*. 2014;31:451-7. [PMID: 24877248]
69. Kessler RC, Bromet EJ. The epidemiology of depression across cultures. *Annu Rev Public Health*. 2013;34:119-38. [PMID: 23514317]
70. SAMSHA-HRSA Center for Integrated Health Solutions. Behavioral health homes for people with mental health and substance use conditions: core clinical features. 2012. Accessed at [www.integration.samhsa.gov/integrated-care-models/health-homes](http://www.integration.samhsa.gov/integrated-care-models/health-homes) on 4 March 2014.