

Population-Based Care of Depression: Team Care Approaches to Improving Outcomes

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Objective: To describe evidence-based quality improvement interventions in the primary care system that have been shown in randomized trials to improve the quality of care and outcomes of patients with depression. **Methods:** Medical literature review, focused on the concept of population-based care and research-proven ways to decrease the prevalence of depression in primary care, including several meta-analyses that described the effect of collaborative care interventions in improving the quality and outcomes of primary care patients with depression. **Results:** A total of 37 randomized trials of collaborative care interventions have shown that collaborative care, compared with usual primary care, is associated with 2-fold increases in antidepressant adherence, improvements in depressive outcomes that last up to 2 to 5 years, increased patient satisfaction with depression care, and improved primary care satisfaction with treating depression. From a health plan perspective, cost-effectiveness analyses suggest that for most depressed primary care patients, collaborative care is associated with a modest increase in medical costs, but markedly improved depression and functional outcomes. The few studies that have used a societal perspective that included examination of both direct and indirect costs found that collaborative care was associated with overall cost savings. For patients with depression and diabetes and depression and panic disorder, there is evidence that the increase in mental health care costs associated with collaborative care is offset by greater savings in medical costs. **Conclusion:** Collaborative care is a high value intervention associated with improved quality of care, depression outcomes, and improved patient and primary care physician satisfaction. (J Occup Environ Med. 2008;50:459–467)

Primary care physicians, medical specialists, and mental health practitioners traditionally have viewed their principal responsibility as providing health care for patients presenting in their clinics each day. This is the tip of the iceberg of mental illness in the general population. As reviewed in Part I, many Americans with anxiety and depressive illnesses do not seek help with their illness or are not accurately diagnosed when they do seek help.¹ Among those who are accurately diagnosed, many dropout of treatment before recovery or remission.

Historically, primary care systems have been set up like “walk-in” or urgent care clinics that were geared for acute care problems and management.² These clinic systems are characterized by infrequent, brief visits with the doctor for acute problems whereas evidence strongly suggests that optimum chronic disease management requires a carefully organized team approach.³ The limitations of the traditional primary care model are evidenced by few patients receiving guideline recommended care for chronic illness. For example, only about half of patients with diabetes have HbA_{1c} levels below 8.0%⁴; only one-third of patients with hypertension receive adequate treatment to lower blood pressure below guideline recommended levels⁵; and only about 40% of patients in primary care who are accurately diagnosed with depression and receive an initial antidepressant prescription recover by 4 to 6 months (based on a $\geq 50\%$ decrease in symptoms).⁶

This article will describe an evidence-based public health model of

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chronic illness care for enhancing quality of depression care for primary care patients with major depression. This evidence-based model could also be integrated into medical specialty clinics that evaluate patients with a high prevalence of depressive illness such as Occupational and Environmental Medicine clinics. This paradigm builds upon the Chronic Care Model^{2,3} and has extensive evidence for its effectiveness.

Population-Based Care

Population-based care is a public health model that encompasses both the development and implementation of an organized strategy to care for all patients in a defined population with a chronic illness, not just those who seek care in the health care system.⁷ An underlying assumption in population-based care is that there are a finite amount of resources that are available to be allocated to different types of health care services. Consequently, the underlying disease burden in the population must be determined to guide appropriate resource allocation.

The prevalence rate (point prevalence) of a chronic episodic illness in a population, such as major depression, is the product of its incidence rate, mean episode duration and mean number of episodes over the life span.⁸

Prevalencerate = Incidence

× mean episode duration

× mean number of episodes

There are few effective approaches to primary prevention of major depression (ie, decreasing the incidence rate). Therefore, efforts to reduce the prevalence rate must focus on reducing episode duration and number of episodes.⁸ Since mean episode duration is strongly influenced by the minority of patients with a chronic course, and mean number of episodes is strongly influenced by patients with high frequency of relapse, reducing the population prevalence depends

heavily on preventing both chronicity and relapse. The lack of accurate diagnosis of depression by primary care clinicians and medical specialists leads to delay in provision of effective treatment and may also increase chronicity of illness and increase the prevalence rate.⁹ These observations suggest three approaches to reducing the prevalence of major depression on a population basis through improved primary care: 1) improving accuracy of diagnosis; 2) preventing chronicity among patients beginning to make the transition from acute to persistent or chronic illness; and 3) preventing relapse/recurrence among patients who have responded to treatment but are at high risk of relapse to reduce the mean number of episodes over the life span.

Chronic Illness Model

Wagner et al^{2,3} have described four elements of the organization of care that must be implemented to improve outcomes of a population of patients with chronic illness:

1. The delivery system must be designed so that each patient's care includes proactive follow-up visits or telephone contacts, adherence monitoring, and tracking response to treatments
2. Information systems must be established to support the use of disease registries to track provision of care according to guidelines and individual treatment plans
3. Self management training and support must be provided to patients and key family members so that they are equipped with the information and skills required to effectively manage their illness to develop an active partnership with the health care team
4. Decision support must be provided to primary care physicians, including facile access to guidelines, expert systems, and specialty consultation within the context of a structured care program

These organizational changes in practice usually require a team approach with an allied health professional such as a nurse providing the close monitoring and frequent contacts.^{2,3,7} This article will describe the adaptations of the chronic illness model that have been developed to improve quality of care and outcomes of patients with depression.

Changing the Way We Approach the Problem

To apply the principles of population-based care and chronic disease management to decrease the prevalence rate of major depression, consider the challenge faced by a mental health care administrator in an integrated health care system who is tasked with maximizing the quality of care provided and given a fixed, limited number of dollars to provide mental health services. The steps that this administrator should consider to accomplish these goals include ensuring that the primary care physicians and other medical specialists in the system have competent mental health diagnostic and treatment skills and receive the necessary support to recognize depression symptoms and accurately diagnose depression; manage uncomplicated cases of depression including providing appropriate acute and continuation phase treatment; and monitor patients in remission and prevent relapse.

Applying a Population-Based Approach to Depression Care

Improving Accuracy of Diagnosis

As described in the previous article, gaps in quality of care may be attributed in part to primary care physicians failing to detect and diagnose patients with depression. Limitations in accuracy of diagnosis of depression are likely to be at least as common in other medical specialties. Detection of depression could be improved by adopting validated screening tools that would enhance ability of the primary care physicians and medical specialists to diagnose de-

pression accurately. The PHQ-9 has been recommended both as a screening tool as well as a tool to follow outcomes by a joint panel of the APA and several primary care organizations as well as the MacArthur and Robert Wood Johnson Foundations.¹⁰ High-risk patients such as high utilizers¹¹ and patients with specific medical illness with high risk of depression (eg, patients with myocardial infarction, stroke, or diabetes¹²) should be routinely screened. Improved accuracy of diagnosis must be connected to structured programs aimed at providing effective treatment to lead to improved outcomes.⁹ It is especially important that enhanced detection in subgroups who present with medically unexplained symptoms (such as headache or fatigue) or amplification of symptoms of chronic medical illness (eg, pain in patients with osteoarthritis) be followed by education about the biology of affective illness and the connection between depression and physical symptoms.

Enhancing Acute Phase Management

Gaps in quality of care also may be attributed in part to primary care physicians and other medical specialists failing to adequately treat patients with depression—in terms of the dosage and duration of therapy as well as the appropriate follow-up visits or telephone contacts. Embedding evidence based-guidelines and reminders into clinical information systems at the point of care, a key component of improving chronic illness care, represents an ideal means of addressing the inadequate dosage and duration of therapy problem. As described later in the context of collaborative care models, staffing delivery systems with case managers who are assigned to provide patient education and to activate the patient to become a partner in care, track outcomes of depression with a tool like the PHQ-9, track adherence to medication and psychotherapy, and

facilitate return visits to the primary care physician (or potential referral to a mental health specialist) for patients with persistent symptoms is an evidence-based, cost-effective means of optimizing the acute and continuation phases of treatment. This closer monitoring by an allied health professional such as a nurse depression care specialist helps decrease the tendency of patients to get discouraged and dropout in the early stages of treatment and targets increasing intensity of services for patients who are not improving.

Relapse Prevention

Gaps in quality of care also may be attributed in part to primary care physicians and other medical specialists failing to detect patients at risk for relapse and promptly initiating interventions to prevent or abate the severity of any relapses. The perception of depression has shifted from viewing this affective illness as an acute condition to a chronic disorder much like asthma.¹³ As with asthma, a subset of depressed patients have persistent symptoms despite receiving the best pharmacologic treatment or evidence-based psychotherapy. Approximately 20% of patients with depression in primary care have double depression often experiencing a lifelong history of dysthymia (a chronic low-grade depression with less depressive symptoms) and intermittent major depressive symptoms during times of life stress.¹⁴ A large percentage of the other 80% of patients with major depression will have a relapsing remitting course. Thus, much like asthma, it is not a question of *if* they will have another episode but *when* the next episode will occur. When patients are screened for depression in primary care, approximately two-thirds of the patients who are diagnosed as meeting *Diagnostic and Statistical Manual*, 4th revision (DSM-IV) criteria for major depression have experienced three or more prior episodes.¹⁴

The data on chronicity and relapse suggest that initial effective treatment

to achieve remission is important since persistent residual symptoms are the best predictor of relapse.¹⁵ Also depression disease management programs have recognized that developing a relapse prevention plan is essential once acute symptoms have been effectively treated. Elements of relapse prevention programs that have proven effectiveness include 1) education about frequency of relapse and prodromal symptoms such as insomnia that may signal to the patient and their family that relapse is imminent; 2) a plan to stay on the dosage of antidepressant medication that was associated with remission for a prescribed length of time; 3) positive behavioral strategies to cope with stress such as exercise, psychotherapy, and avoidance of high-risk behaviors (eg, drug and alcohol use); and 4) a strategy to implement if relapse occurs.¹⁶ The Agency for Health Care Policy and Research (AHCPR) depression guidelines recommend that patients with three or more episodes of depression receive maintenance antidepressant treatment for 2 years or more.¹⁷ Recent evidence suggests that patients with double depression should also receive maintenance antidepressant treatment.¹⁸

New depression quality improvement programs that have included relapse prevention strategies have shown that initial improvements in depressive symptoms that occurred during the intervention year extended to a second year when active treatment by the study interventionists ended, compared with controls.^{19,20}

Stepped Collaborative Care Models

During the last decade, an intervention model termed “collaborative care” has been developed to provide population-based care of depression by reorganizing care to improve detection, patient education, quality of care and outcomes of primary care patients with major depression.²¹ This model of care recognizes that

improving quality of depression care includes the premise that patients and their physicians work together in an interactive, iterative process to find the most effective medication and psychosocial (and lifestyle) approaches to managing illness. Most care of chronic illness occurs outside of physicians' offices and hospitals and requires methods to improve patient education and activation to enhance adherence to medication regimens as well as efforts to change lifestyle (such as increasing exercise) and implement psychosocial changes. Improving self-management by patients often requires time, energy, and supportive visits from health care professionals, which can be difficult without team approaches.

Effective collaborative care is a multimodal intervention that includes two key components. The first is use of allied health professionals such as nurses (termed "depression care managers") to increase frequency of patient contact to enhance patient education and to activate the patient to become a partner in care, track outcomes of depression with a tool like the PHQ-9, track adherence to medication and psychotherapy, and facilitate return visits to the primary care physician (or potential referral to a mental health specialist) for patients with persistent symp-

TABLE 1**Key Components of Collaborative Care**

Patient education and activation (videotapes, books, pamphlets)
 Allied health professional to provide team approach to care
 More frequent follow-ups to measure adherence, outcomes, patient questions
 Standardized depression measure such as PHQ-9
 Caseload registry to track visits, outcomes, medication doses, reminders for contacts
 Caseload supervision by psychiatrist
 Stepped care—augmenting initial treatment with changes in medication or addition of psychotherapy for those with persistent symptoms
 Relapse prevention plan

toms. The second is consultation by a psychiatrist who provides back-up for emergencies as well as caseload supervision and decision support to primary care physicians that focuses on patients who are not improving with initial treatment (see Table 1).²¹

Collaborative care relies upon a stepped care approach, a process of increasing intensity of care for patients with chronic illness based on persistent symptoms (described in Table 2).²² Von Korff and Tiemens have described the following three major assumptions of stepped care models: 1) different people require different levels of care; 2) finding the best level of care depends on monitoring outcomes (such as using the PHQ-9 to monitor outcome of depression treatment); and 3) moving from lower to high levels of care based on observed outcomes can increase effectiveness of care while lowering overall costs.²³ Although stepped-care principles are guided by outcomes, they can be tailored to patient preferences and initial complexity and severity, so first line

treatment is not always the least expensive and intensive.

In this stepped care approach for depression, primary care physicians provide screening, diagnostic and preventative services, and initial education to patients (step 1). Medical specialists, such as Occupational and Environmental Medicine physicians may also provide this initial step. Allied health professionals such as nurses or social workers help provide close follow-up for patients who are newly diagnosed or those who have relapsed (step 2). Patients who do not improve after an initial course of primary care-initiated treatment can be referred to a psychiatrist who will see the patient for several sessions in the primary care clinic to improve pharmacologic treatment or to provide a more accurate diagnosis (step 3). Patients who do not respond to this modified treatment plan—those with higher complexity, severity, or persistence of symptoms—can be referred to a psychiatrist or a psychotherapist who assumes primary responsibility

TABLE 2**Levels of Intensity of Service in Stepped-Care Models**

Step-Care Levels	Type of Problem	Health Care Practitioner Roles
Level 1	Preventative services and diagnosis of subclinical disorders	Primary care physician provides screening, diagnosis, preventative services, and patient education as well as monitors outcomes
Level 2	A newly diagnosed disorder or relapse or exacerbation of chronic disorder	Primary care physician provides diagnosis and prescription of medication and recommends lifestyle changes. Allied professional helps with increasing frequency of contact, monitoring symptoms and side-effects, support for self-management activities (ie, exercise, increasing positive activities) and referral back to primary care doctor for adverse outcomes. Psychiatrist supervises caseload of allied health professional
Level 3*	Patients with adverse outcomes in Level 2 care	Psychiatrist consults with patient and primary care physician and recommends changes in medication and/or lifestyle alterations; specialist may provide several visits, preferably within primary care
Level 4*	Patients with adverse outcomes in Level 3 care	Specialist takes over care for patients with adverse outcomes despite Level 3 care or those with higher initial levels of complexity

*For patients with severe illness or a high degree of initial complexity, primary care physicians may refer directly to Levels 3 and 4.

for managing the patient (step 4). Patients referred to the last step (tertiary care) will often need several pharmacologic trials often with combination antidepressants, combination of antidepressants and evidence-based depression psychotherapy, or antidepressants plus other classes of medication (mood stabilizers and atypical antipsychotics). In some severe and persistently ill patients, electroconvulsive therapy (ECT) may be necessary.

Collaborative Care in Action

Implementing the Model

Collaborative care interventions have been provided in a range of ways from all contacts between care managers and patients by telephone to a combination of in-person and telephone visits. Collaborative care interventions with nurse or masters level clinicians that have included case load supervision by a psychiatrist have been associated with improved adherence to antidepressant medication and improved depressive outcomes.²⁴ The depression care specialist is the bridge between the mental health specialist and the primary care physician and communicates psychiatrist recommended changes in antidepressant medication to the primary care physician (see Fig. 1). In some collaborative care studies, case managers have also been trained by psychologists to provide brief evidence-based therapies such as problem focused therapy.^{25,26} The advantage of this approach is that patients can be offered a choice of starting antidepressant medication or an evidence-based psychotherapy. Because patients often have strong preferences for one or the other of these treatment modalities,²⁷ it allows for treatment of a broader range of people. This approach has also been shown to improve satisfaction with care and adherence to treatment.²⁵ These models of care also include the option of augmenting the initial choice of treatment modality (ie, augmenting antidepressant treatment with evidence-based psychotherapy or vice versa) or changing to the

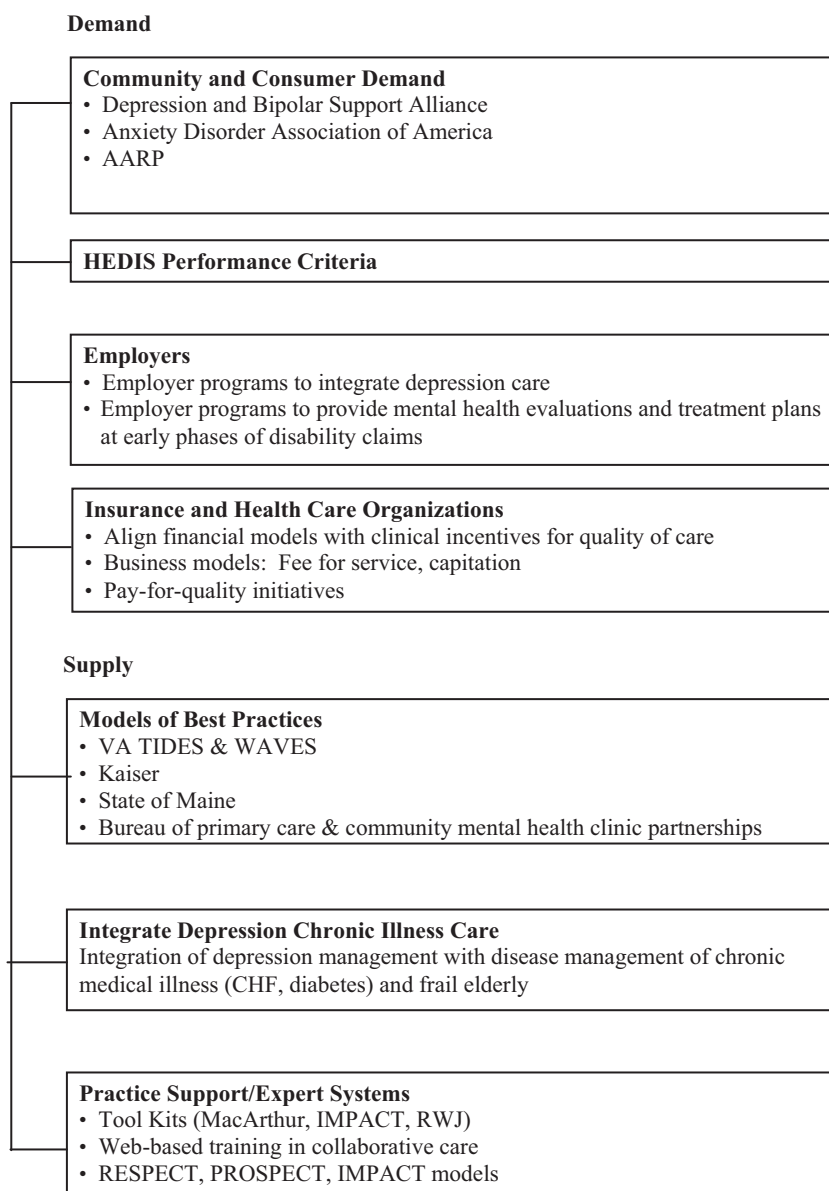


Fig. 1. Key levers to aid dissemination of collaborative care models.

other modality for those with persistent symptoms.^{25,26}

Evidence for Effectiveness in Patients With Depression

A recent meta-analysis of 37 trials of collaborative care found evidence of a 2-fold increase in adherence to antidepressant medication in the first 6 months of treatment, compared with usual primary care.²⁴ There was also evidence of enhanced depressive and functional outcomes that lasted from 2 to 5 years. There was heterogeneity in outcomes in this

meta-analysis. Collaborative care models that were more effective showed three key characteristics: 1) they improved adherence to antidepressant medications; 2) they utilized depression care specialists with mental health backgrounds; and 3) they included caseload supervision by a psychiatrist.²⁴

Cost-effectiveness research has determined that in representative primary care populations with depression, collaborative care models cost between \$125 and \$500 more per patient per year in direct medical

costs but markedly improve depression outcomes.²⁸ Most of these studies have only evaluated costs from the perspective of the medical plan (ie, direct costs only) instead of a societal perspective, which would also include indirect costs; few investigations have evaluated the impact of improvements in depression outcomes on indirect costs such as increased job productivity, decreased absenteeism, and improved job retention. However, several recent studies suggest that improving depression outcomes is associated with savings in indirect costs because of improvements in job retention, productivity, and reduced absenteeism.^{29–31}

Evidence for Effectiveness in Comorbid Populations

Outcome studies in primary care have examined comorbid factors associated with poor outcomes of depression. Studies have shown that low socioeconomic status, higher depression severity, high neuroticism (ie, a personality trait associated with increased risk of anxiety and depressive episodes when faced with life stressors), presence of comorbid anxiety disorders, more severe medical comorbidity, and chronic pain predict poor outcomes of depression in patients treated in usual primary care and psychiatric clinics.³² Several collaborative care studies have examined the cost-effectiveness of this approach versus usual primary care in selected comorbid populations.

Two recent studies have examined the effect of nurse collaborative care interventions in patients with diabetes and major depression/dysthymia.^{20,33} These interventions provided an initial patient choice of starting treatment with enhanced antidepressant management or problem solving therapy by a nurse who worked with the primary care physician. The nurses were trained by psychologists in the use of problem solving therapy and had weekly supervision by a psychiatrist and primary care physician. These trials showed that com-

pared with usual primary care, the interventions improved the quality of depression care (adherence to antidepressant medication and exposure to evidence-based psychotherapy) and improved depression outcomes over a 2-year period.^{20,33} Cost-effectiveness analysis showed that the increased costs associated with enhanced mental health treatment (based on adding case manager visits for depression and improved adherence to antidepressant medication) were offset by a larger savings in overall medical costs over a 24-month period.^{20,33}

Two recent trials have also examined the effect of collaborative care interventions in primary care patients with panic disorder (the majority of whom also had comorbid major depression).^{34,35} Patients with panic disorder often present to primary care or emergency room settings with frightening cardiorespiratory symptoms and receive costly medical work-ups. In one study, a psychiatrist integrated into primary care provided a mean of approximately two in person visits and three telephone visits to enhance patient education, provide more frequent visits, monitor symptoms and adherence to medication, and improve psychopharmacology.³⁴ In the second study, therapists provided brief cognitive behavioral therapy and attempted to improve adherence and effective pharmacologic treatment based on psychiatric supervision.³⁵ Both trials showed enhanced quality of mental health care compared with usual care and both were associated with improved depression and anxiety outcomes over a 1-year period.^{34,35} Cost-effectiveness analyses showed that the increase in cost of improving mental health care was offset by larger savings in overall medical costs over a 1-year period.^{34,35}

How to Incentivize and Fund Collaborative Care in Primary Care and Occupational and Environmental Medicine

Researchers have developed excellent methods to improve out-

comes for patients with depression and other chronic illnesses, but major organizational changes will be needed to adapt existing primary care services and medical specialty clinics to optimize care of patients with chronic medical illness. These changes include investing in clinical electronic information systems such as registries to help track quality and outcomes of care in specific populations, linking these systems to medical records, and designing decision support systems that will develop and implement treatment guidelines in a timely manner. Organizational changes will also be needed to create delivery systems such as disease management teams to implement more frequent follow-up and monitoring of outcomes, promote integration of specialists into primary care, and develop self-management “tool kits” for patients and providers.

Berwick has emphasized that economic incentives and regulatory changes will be needed to implement these costly changes in care. “For most organizations, investment on this scale is a strategic issue and will only be undertaken if the market—employers and government purchasers, principals, and consumers—permits and rewards these strategies.”³⁶

Figure 1 describes key “levers” that may help incentivize dissemination of collaborative care models. These include demand-side levers such as increasing community, consumer, and employer demand for integrating evidence-based changes in systems of care, aligning financial models of care to defray the costs of reorganizing health care services to provide collaborative care, and developing new Health Plan Employer Data Information Set (HEDIS) depression performance criteria that are associated with improved outcomes. Supply-side “levers” include developing models of “real” world, large scale dissemination of collaborative care (such as successful efforts by Kaiser,³⁷ VA QUERI,³⁸ and the State of Maine³⁹), integrating collaborative care models of depression

into existing medical disease management programs for diabetes and congestive heart failure, and development of “tool kits” and dissemination centers to provide practice and expert support for health care systems that want to reorganize services to develop collaborative team approaches to care.

Increasing demand will require educating consumer groups, employers, and insurers on cost-effective models to improve depression care. Several of the research groups involved in dissemination of collaborative care are working with consumer groups such as the American Association of Retired Persons (AARP), the Depression and Bipolar Support Alliance (DBSA), and the Anxiety Association of America to lobby insurers to develop payment systems for collaborative care.

Employers have also recognized the adverse impact of poor quality of care for chronic illnesses like depression on the workforce in terms of decreased productivity, absenteeism, and disability.⁴⁰ Recent research suggests that employed patients with depression who have poorer adherence to acute and continuation phase antidepressant treatment were 39% to 46% more likely, respectively, to file short-term disability claims.⁴¹ Based on research demonstrating the effectiveness of collaborative care, the National Business Coalition on Health has recently strongly recommended that employers and public purchasers support the implementation of a payment for evidence-based collaborative care programs for depression.⁴²

The Centers for Medicare and Medicaid and other insurers are experimenting with methods of payment that may lead to improved quality of care for chronic illness. Promising approaches to incentivizing collaborative care include pay-for-performance and pay-for-outcomes experiments where systems that can demonstrate higher quality of care and improved outcomes receive higher rates of payment.⁴³ Increased

capitation rates for patients with a diagnosis of depression under the Hierarchical Condition Coding Categories used as the basis for collecting Centers for Medicare and Medicaid Service (CMS) payment to the Medicare Advantage Programs also provide incentives for health care organizations to implement enhanced screening for depression and evidence-based collaborative care programs. Finally, the recommendation in the President’s New Freedom Commission on Mental Health to include collaborative care as one of seven key evidence-based mental health programs⁴⁴ that should be implemented by health care systems has influenced CMS to begin to develop payment mechanisms for this program.

Employers and insurers are increasingly tracking quality of care with HEDIS performance criteria and other benchmarks of quality. Several research groups are collaborating with HEDIS to develop changes in existing depression performance criteria to recommend evidence-based quality of care markers that are associated with improved depression outcomes.⁴⁴

A key supply-side lever includes developing models of best practices that have successfully integrated collaborative care models into large systems of care. Collaborative care models have been successfully integrated into Southern California Kaiser,³⁷ the VA,³⁸ the State of Maine³⁹ and many Bureau of Primary Care clinics. Also, several states have started pilot programs with the Bureau of Primary Care and Community Mental Health Clinics to share personnel. In these models, mental health professionals from community mental health clinics consult in primary care clinics and, in return, Advanced Registered Nurse Practitioners (ARNPs) or primary care doctors spend several days a week in community mental health clinics to provide enhanced medical care.

Another promising new development is the integration of key com-

ponents of collaborative care into disease management programs for patients with other chronic illnesses such as diabetes or congestive heart failure. Studies have shown that comorbid depression in patients with diabetes and congestive heart failure is associated with poor adherence to medical regimens (diet, exercise, and taking medication as scheduled), increased medical costs, and increased medical morbidity and mortality.¹² Disease management firms market disease management of chronic illnesses as a way to improve quality of medical care and to save health care systems money. The awareness that depression has an adverse impact on adherence to self care regimens and medical costs in these populations has incentivized integrating evidence-based approaches to improving depression care into disease management.

Several foundations, including the Robert Wood Johnson Foundation (<http://www.rwjf.org>), Hartford Foundation (<http://impact-uw.org>), and MacArthur Foundation (<http://www.macfound.org>) have funded efforts to disseminate collaborative care approaches. These efforts include development of depression tool kits for patients, providers and systems of care, web-based training in collaborative care, and methods to bill for collaborative care services. The dissemination centers funded by these foundations also help with networking, so that researchers can connect systems of care to other, similar systems in the United States that have already worked out common problems associated with adapting collaborative care models such as billing for case manager services, the number of cases that can be followed up per year and development of a clinical registry.

Conclusion

The Collaborative Care Model has been shown to significantly improve the quality of depression care and outcomes of patients. This model holds a great deal of promise as a method to improve outcomes of the

population of depressed patients within primary care and Occupational and Environmental Medicine clinics. Multiple large organized systems of care have adapted and integrated collaborative care models into their primary care clinics. Both demand and supply-side levers are needed to continue to incentivize and fund dissemination of this model of care.

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References

- Seeling MD, Katon W. Gaps in depression care: Why primary care physicians should hone their depression screening, diagnosis, and management skills. *J Occup Environ Med.* 2008;50:451–458.
- Wagner EH, Austin BT, Von Korff M. Organizing care for patients with chronic illness. *Milbank Q.* 1996;74:511–544.
- Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, Bonomi A. Improving chronic illness care: translating evidence into action. *Health Aff (Millwood).* 2001;20:64–78.
- Adams AS, Mah C, Soumerai SB, Zhang F, Barton MB, Ross-Degnan D. Barriers to self-monitoring of blood glucose among adults with diabetes in an HMO: a cross sectional study. *BMC Health Serv Res.* 2003;3:6.
- Wassertheil-Smoller S, Anderson G, Psaty BM, et al. Hypertension and its treatment in postmenopausal women: baseline data from the Women's Health Initiative. *Hypertension.* 2000;36:780–789.
- Simon GE. Evidence review: efficacy and effectiveness of antidepressant treatment in primary care. *Gen Hosp Psychiatry.* 2002;24:213–224.
- Katon W, Von Korff M, Lin E, et al. Population-based care of depression: effective disease management strategies to decrease prevalence. *Gen Hosp Psychiatry.* 1997;19:169–178.
- Von Korff M, Parker RD. The dynamics of the prevalence of chronic episodic disease. *J Chronic Dis.* 1980;33:79–85.
- Pignone MP, Gaynes BN, Rushton JL, et al. Screening for depression in adults: a summary of the evidence for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2002;136:765–776.
- Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16:606–613.
- Katon W, Von Korff M, Lin E, et al. Distressed high utilizers of medical care. DSM-III-R diagnoses and treatment needs. *Gen Hosp Psychiatry.* 1990;12:355–362.
- Katon WJ. Clinical and health services relationships between major depression, depressive symptoms, and general medical illness. *Biol Psychiatry.* 2003;54:216–226.
- Klinkman MS, Schwenk TL, Coyne JC. Depression in primary care—more like asthma than appendicitis: the Michigan Depression Project. *Can J Psychiatry.* 1997;42:966–973.
- Gaynes B. Primary vs specialty care outcomes for depressed outpatients managed with measurement based care: results from the STAR-D. 47th Annual NCDEU Meeting, Boca Raton, Florida, June 11–14, 2007.
- Lin EH, Katon WJ, VonKorff M, et al. Relapse of depression in primary care. Rate and clinical predictors. *Arch Fam Med.* 1998;7:443–449.
- Katon W, Rutter C, Ludman EJ, et al. A randomized trial of relapse prevention of depression in primary care. *Arch Gen Psychiatry.* 2001;58:241–247.
- Agency for Health Care Policy and Research. *Depression in Primary Care. Treatment of Major Depression.* Rockville, MD: US Dept of Health and Human Services; 1993. AHCPR 93-0511.
- Klein DN, Schwartz JE, Rose S, Leader JB. Five-year course and outcome of dysthymic disorder: a prospective, naturalistic follow-up study. *Am J Psychiatry.* 2000;157:931–939.
- Hunkeler EM, Katon W, Tang L, et al. Long term outcomes from the IMPACT randomised trial for depressed elderly patients in primary care. *BMJ.* 2006;332:259–263.
- Katon W, Unutzer J, Fan MY, et al. Cost-effectiveness and net benefit of enhanced treatment of depression for older adults with diabetes and depression. *Diabetes Care.* 2006;29:265–270.
- Katon W, Unutzer J. Collaborative care models for depression: time to move from evidence to practice. *Arch Intern Med.* 2006;166:2304–2306.
- Katon W, Von Korff M, Lin E, Simon G. Rethinking practitioner roles in chronic illness: the specialist, primary care physician, and the practice nurse. *Gen Hosp Psychiatry.* 2001;23:138–144.
- Von Korff M, Tiemens B. Individualized stepped care of chronic illness. *West J Med.* 2000;172:133–137.
- Gilbody S, Bower P, Fletcher J, Richards D, Sutton A. Collaborative care for depression: a systematic review and cumulative meta-analysis. *Arch Intern Med.* 2006;166:2314–2321.
- Unutzer J, Katon W, Callahan CM, et al. Collaborative care management of late-life depression in the primary care setting: a randomized controlled trial. *JAMA.* 2002;288:2836–2845.
- Katon WJ, Von Korff M, Lin EH, et al. The Pathways Study: a randomized trial of collaborative care in patients with diabetes and depression. *Arch Gen Psychiatry.* 2004;61:1042–1049.
- Dwight-Johnson M, Sherbourne CD, Liao D, Wells KB. Treatment preferences among depressed primary care patients. *J Gen Intern Med.* 2000;15:527–534.
- Simon GE, Katon WJ, VonKorff M, et al. Cost-effectiveness of a collaborative care program for primary care patients with persistent depression. *Am J Psychiatry.* 2001;158:1638–1644.
- Schoenbaum M, Unutzer J, Sherbourne C, et al. Cost-effectiveness of practice-initiated quality improvement for depression: results of a randomized controlled trial. *JAMA.* 2001;286:1325–1330.
- Wang PS, Patrick A, Avorn J, et al. The costs and benefits of enhanced depression care to employers. *Arch Gen Psychiatry.* 2006;63:1345–1353.
- Rost K, Smith JL, Dickinson M. The effect of improving primary care depression management on employee absenteeism and productivity. A randomized trial. *Med Care.* 2004;42:1202–1210.
- Gopinath S, Katon WJ, Russo JE, Ludman EJ. Clinical factors associated with relapse in primary care patients with chronic or recurrent depression. *J Affect Disord.* 2006;101:57–63.
- Simon GE, Katon WJ, Lin EH, et al. Cost-effectiveness of systematic depression treatment among people with diabetes mellitus. *Arch Gen Psychiatry.* 2007;64:65–72.
- Katon WJ, Roy-Byrne P, Russo J, Cowley D. Cost-effectiveness and cost offset of a collaborative care intervention for primary care patients with panic disorder. *Arch Gen Psychiatry.* 2002;59:1098–1104.
- Katon W, Russo J, Sherbourne C, et al. Incremental cost-effectiveness of a collaborative care intervention for panic disorder. *Psychol Med.* 2006;36:353–363.
- Berwick DM, James B, Coye MJ. Connections between quality measurement and improvement. *Med Care.* 2003;41(Suppl 1):I30–I38.

37. Grypma L, Haverkamp R, Little S, Unutzer J. Taking an evidence-based model of depression care from research to practice: making lemonade out of depression. *Gen Hosp Psychiatry*. 2006;28:101–107.
38. McQueen L, Mittman BS, Demakis JG. Overview of the Veterans Health Administration (VHA) Quality Enhancement Research Initiative (QUERI). *J Am Med Inform Assoc*. 2004;11:339–343.
39. Korsen N, Scott P, Dietrich AJ, Oxman T. Implementing an office system to improve primary care management of depression. *Psychiatr Q*. 2003;74:45–60.
40. Stewart WF, Ricci JA, Chee E, Hahn SR, Morganstein D. Cost of lost productive work time among US workers with depression. *JAMA*. 2003;289:3135–3144.
41. Burton WN, Chen CY, Conti DJ, Schultz AB, Edington DW. The association of antidepressant medication adherence with employee disability absences. *Am J Manag Care*. 2007;13:105–112.
42. Center for Prevention and Health Services. *Employer's Guide to Behavioral Health Services*. Washington, DC: National Business Group on Health; 2005:20–21.
43. Spinelli RJ, Fromknecht JM. Pay for performance: improving quality care. *Health Care Manag (Frederick)*. 2007;26:128–137.
44. President's New Freedom Commission on Mental Health. Achieving the promise: transforming mental health care in America. Final Report. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2003. DHHS Publication No. SMA-03-3832.