# Exemplars in the Use of Technology for Management of Depression in Primary Care

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## ABSTRACT

**Purpose:** Depression care management as part of larger efforts to integrate behavioral health care into primary care has been shown to be effective in helping patients and primary care clinicians achieve improved outcomes within the primary care environment. Central to care management systems is the use of registries which enable effective clinic population management. The aim of this article is to detail the methods and utility of technology in depression care management processes while also highlighting the real-world variations and barriers that exist in different clinical environments, namely a federally qualified health center and a Veterans Administration clinic.

**Methods:** We analyzed descriptive data from the registries of Access Community Health Centers and the William S. Middleton Veterans Administration clinics along with historical reviews of their respective care management processes.

**Results:** Both registry reviews showed trend data indicating improvement in scores of depression and provided baseline data on important system variables, such as the number of patients who are not making progress, the percentage of patients who are unreachable by phone, and the kind of actions needed to ensure evidence-based and efficient care. Both sites also highlighted systemic technical barriers to more complete implementation of care management processes.

**Conclusions:** Care management processes are an effective and efficient part of population-based care for depression in primary care. Implementation depends on available resources including hardware, software, and clinical personnel. Additionally, care management processes and technology have evolved over time based on local needs and are part of an integrated method to support the work of primary care clinicians in providing care for patients with depression.

## INTRODUCTION

Depression is a common condition often managed solely in the primary care setting because of poor access to mental health specialists, poor referral completion rates to specialty mental

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health, and patient preference in maintaining care with their primary care clinic.[1] Many patients initially seek attention for their symptoms in a primary care clinic, rather than with a mental health specialist.[2] This model is not ideal for the chronic and complex nature of mental health problems routinely seen by primary care physicians. In response, care management models have been created and adopted as a way to treat chronic mental health issues such as depression in the primary care setting.[1]

Care management is an inherent element of the chronic-disease model and commonly is used by primary care practices for chronic illnesses such as asthma, diabetes, and hypertension.[3] The care management framework works well within the primary care model because it allows for a substantial portion of chronic care, including patient self-management, delivery system design (including information systems and delivery support), and connection to community resources, to take place outside of the physician visit.[4] Care management programs function to improve coordination of care and wellness while providing cost-effective, efficient services.[5]

Key elements of care management models include population identification processes; evidence-based practice guidelines; collaborative practice models; patient self-management education; process and outcomes measurement; and routine reporting/feedback involving patients, physicians, plan, and care team.[2]

While earlier studies focused on the effectiveness of integrated care models, recent research has focused on methods of clinical implementation. In the last decade, several large trials have investigated the implementation of care management models, such as the Primary Care Research in Substance Abuse

and Mental Health for the Elderly (PRISM–E) project,[6] the Improving Mood: Promoting Access to Collaborative Treatment (IMPACT) project,[7] and others.[8-10] These studies demonstrate a variety of ways in which care management can be delivered; for instance, via a central telephone resource serving multiple practices, or directly, within a practice, using internal or shared personnel.[4] These studies demonstrate significantly improved outcomes compared to usual care and improved patient engagement compared to specialty referral alone. As chronic care management continues to gain momentum, the need for continued refinement of the structure and implementation of such models is needed, particularly related to the use of clinical information systems that undergird these processes.

This report details the ways in which care management processes for depression have been implemented and evolved in 2 high-needs populations in Wisconsin: a federally qualified health center and a US department of Veterans Affairs (VA) clinic system.

## ACCESS COMMUNITY HEALTH CENTERS BEHAVIORAL HEALTH CONSULTATION MODEL

Access Community Health Centers (ACHC) is a federally qualified health center that serves approximately 80,000 medical patient visits annually and 10,000 patient visits as part of its integrated Behavioral Health Consultant (BHC) program in Madison, Wisconsin. The behavioral consultant model is a model of care in which a mental health generalist provider works alongside the primary care clinician allowing for same-day, same visit access to all patients the primary care clinician chooses to refer for a variety of mental health and behavioral (eg, chronic disease management, medication adherence) concerns.[11,12] This population-based care model is further supported by a consulting psychiatry service and a care management system whose chief purpose is to ensure that individual patients in a population-based care approach are monitored and receiving care that follows evidence-based pathways. The system also provides for feedback in a clinical quality improvement process.

### The Care Management Protocol

Patients identified as having depressive symptoms across a range of medical and psychiatric diagnoses are routinely administered a 9-question depression inventory designed for use in primary care called the Patient Health Questionnaire (PHQ9). Patients who score 15 or higher on the instrument and/or 11 or higher on a companion instrument called the Generalized Anxiety Disorder Questionnaire (GAD7) are added to a care management list. Patients on this list receive quarterly chart reviews by the care manager to examine the nature of the care they have been provided and their response to that care. This ensures that patients who are experiencing severe symptoms are not allowed

to "fall through the cracks" of primary care processes.

Each time a patient completes a PHQ9/GAD7 screener, the scores are entered into a section of the patient's electronic medical record called "questionnaires." Each quarter, the PHQ9/GAD7 scores are extracted from patient charts, exported into a spreadsheet, and imported to a database application called Bento (Filemaker; Santa Clara, California) on an iMac desktop computer and an iPad tablet computer. The Bento application assists in keeping the care management process organized.

The information assessed during chart reviews includes the following questions:

1. When was the patient last seen by the primary care clinician or the BHC team?
2. Does the patient have an upcoming appointment scheduled with the primary care clinician or the BHC team?
3. Is the patient prescribed any psychotropic medications?
4. When was the last time any changes were made to psychotropic medications?
5. What was the plan for follow-up with the primary care clinician or the BHC team?

The electronic medical record also is used to document care management phone calls made to patients.

From the chart review of the electronic record, several decisions are possible based on factors such as when the patient was last seen in the clinic and what the chart note indicates is the current plan for care and follow-up. If the patient was seen recently and documentation indicates that the patient is stable, it may mean no action needs to be taken. If the patient was seen recently in the clinic and medications were added or changed, the patient is called to assess efficacy and tolerability. If a patient has not followed up as recommended, the patient is called to assess current needs and to recommend follow-up with his or her primary care clinician and/or the BHC team and/or administer phone-based cognitive-behavioral interventions.

In addition to patient-level data, the information collected provides a global view of what is happening with this portion of the clinic population. For example, if in reviewing the aggregate care management data for an entire year it was discovered that a subset of patients kept reappearing on the care management lists, then further investigation into this subset of the population would be warranted. Investigation could result in a change of approach within the clinic systems to work with these patients more productively. This feedback loop is a crucial component of the chronic care management model that has shown effectiveness in sensitizing systems to improved clinical pathways.[13]

### The Technology behind Care Management Processes

Several components make up the infrastructure of this care

**Table 1.** Access Community Health Centers Depression Average Score Changes From Baseline[a]

| Quarter | N | PHQ9 Differential | STD | GAD7 Differential | STD | Day Differential | STD |
|---------|-----|-----|-----|------|------|--------|-----|
| 3rd 2010 | 15 | 3 | 6.7 | -1.2 | 3.7 | 254 | 111 |
| 4th 2010 | 32 | 4.1 | 5.6 | 2.3 | 5.1 | 173 | 74 |
| 1st 2011 | 54 | 3.3 | 6.7 | 2.3 | 5.0 | 135 | 82 |
| 2nd 2011 | 38 | 4.3 | 6.2 | 3 | 5.2 | 103 | 73 |
| Totals (AVG) | 139 | 3.675 | 6.3 | 1.6 | 4.75 | 166.25 | 85 |

Abbreviations = PHQ9, Patient Health Questionnaire; GAD7, Generalized Anxiety Disorder Questionnaire; STD, Standard Deviation.
[a]Positive numbers reflect drops in scores, negative numbers reflect increases. Data represents samples consisting of 20% of patients reviewed per quarter. All patients in care management reflect patients with PHQ9 scores of 15 or greater and/or GAD7 scores of 11 or greater.

**Table 2.** Access Community Health Centers Care Management Patient Review Data, 2010 to 2011

| Quarter | Number of Reviews | No Action | Provider/BHC/ Patient Contact | Unreachable | Average Baseline PHQ9 | Average Baseline GAD7 |
|---------|------|-----|-----|-----|------|------|
| 3rd 2010 | 76 | 37 | 20 | 19 | 20 | 15.8 |
| 4th 2010 | 152 | 93 | 28 | 31 | 19.8 | 16.1 |
| 1st 2011 | 265 | 119 | 61 | 85 | 19.8 | 16.3 |
| 2nd 2011 | 166 | 68 | 83 | 15 | 19.7 | 16 |
| Totals | 659 | 317 | 192 | 150 | 19.825 | 16.05 |

Abbreviations: PHQ9, Patient Health Questionnaire; GAD7, Generalized Anxiety Disorder Questionnaire.
Average PHQ9 score of 19.8 = severe depressive symptoms; Average GAD7 score of 16 = severe anxiety symptoms.

management process, including Epic's electronic health record system (Epic; Verona, Wisconsin) which stores the screening data and care management-related documentation, the data extraction methods for mining the database, and the care management database housed in the Bento application. From a hardware standpoint, because the care manager works at all 3 clinics, a mobile solution was required. Therefore, an iPad (Apple; Cupertino, California) and wireless network became necessary. An iMac (Apple; Cupertino, California) desktop computer was purchased to allow ease of synchronization and secure backup with the iPad, since most of the computers in the clinic context were Citrix-based terminals. In total, the hardware and software expenditures, not including the electronic health record (EHR) already in place, were approximately $2000.

### History of the Development of the Technology Infrastructure

Technology can limit the scope and efficacy of any care process, as exemplified by the history of revisions of the ACHC care management protocols from 2006 to 2011. In the first iteration between 2007 and 2008, depression inventory scores were housed in a spreadsheet on a single computer. The lack of a "questionnaires" section in the electronic health record at the time resulted in a much less efficient process because clinicians often would forget to populate the spreadsheet outside of their normal note documentation.

By 2009 the process included documentation of depression

inventory scores and other patient care data in portable hand-held devices (iPods [Apple; Cupertino, California]) which all clinicians carried and periodically synchronized with 1 desktop machine. This improved the documentation of scores, but still proved inefficient. The synchronization lag made the databases on each device incomplete until synchronization occurred, leading to decreased utility of the database for clinicians. The synchronization process also was cumbersome and fraught with error.

The current iteration, developed in 2010, is a significant improvement; however, it too has its drawbacks. Ideally, each clinician would have access to the care management data. However, because the EHR does not allow for ease of data management and extraction except through specialized processes, and because the Bento database is a separate software package, clinicians do not have direct access to the data. So, for example, they could not review all patients they have seen for the last 2 weeks sorted by PHQ9 score. Future changes must add this capability, which would increase a clinician's management of his or her own patient panels, further improving the feedback loop. In addition, there are cumbersome synchronization processes that are necessary to import data into the Bento database. Ideally, any EHR should have the functionality to allow it to serve as a care management system.
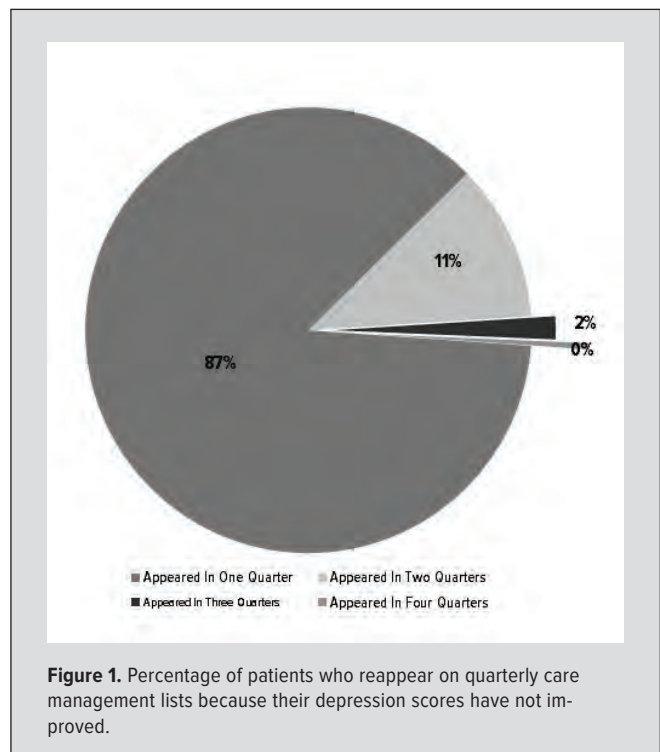
### Care Management Findings

Data from the 3rd quarter of 2010 through the 2nd quarter of 2011 (Table 1) reveal trend data showing consistent decreases

in PHQ9 scores across the population in the range of 4 points in a population with significant symptomatology (Table 2). This is trend data; it is not the product of an experimental study. For example, because of the lack of stringent inclusion criteria (by design), patients in the database have a range of diagnoses, including severe psychotic disorders with affective components. This is also one of the reasons why care management data will often have skewed and/or less robust findings when compared to experimental studies that have strict inclusion criteria and control groups. Of the 659 chart reviews completed, 13.5% represent repeat patients or patients who appeared in more than 1 quarter (Figure 1). This kind of data is important to the care management process because it establishes a baseline of patients who are consistently symptomatic and for whom extra care of resources may be needed.

Unsuccessful patient contacts resulted from 22.8% of the chart reviews. While some of this may be due to uncontrollable factors such as homelessness, the data may inform changes to clinical processes (eg, shortening of patient follow-up visit algorithms for certain patients) and/or administrative procedures (eg, more aggressive alternative contact information collection by registrars). Forty-eight percent of the chart reviews resulted in no action needed, indicating that at least half of the cases in the registry needed some between-office visit action (Table 2). Increases to the percentage of patients needing some contact and/or unreachable patients could be an indicator of a need for review of clinic processes or individual provider skill/educational development.

### Patient Exemplar

After reviewing the chart of a 54-year-old man suffering from depression with psychotic features, chronic pain, and hepatitis C, a behavioral health consultant called to inquire regarding his ongoing symptoms and medication adherence, and to encourage follow-up (the patient had missed his scheduled follow-up appointment). The patient indicated that he had discontinued his medication due to side effects and listed a number of bothersome symptoms that were contributing to severe functional impairment. The behavioral health consultant also learned that the patient was experiencing psychotic symptoms and was no longer leaving his house. The patient was pleasantly surprised to receive a call from the clinic, stating his appreciation and reporting that he had given up on the treatment of his mental health needs. Utilizing motivational interviewing skills and empathy, the consultant was able to schedule the patient for a follow-up visit and instill hope that further treatment options were available and that his providers at the clinic would work collaboratively to improve his functioning.



**Figure 1.** Percentage of patients who reappear on quarterly care management lists because their depression scores have not improved.

## MADISON VETERANS ADMINISTRATION PRIMARY CARE – MENTAL HEALTH INTEGRATION MODEL

The William S. Middleton Memorial Veterans Hospital in Madison, Wisconsin (Madison VA) and associated rural Community Based Outpatient Clinics (CBOCs) serve approximately 36,000 primary care patients. Primary care clinic sites include 2 main clinics in Madison; a large CBOC in Rockford, Illinois; and 4 smaller CBOCs in Janesville, Beaver Dam, and Baraboo, Wisconsin and Freeport, Illinois. All Madison VA primary care patients, including those served at rural CBOC sites, have access to the Primary Care-Mental Health Integration program. From its inception, the model has included both co-located mental health providers working collaboratively with the primary care team and a care management program for depression. Compared to the national VA average of 5.3%, 12.8% of Madison VA primary care patients have had an integrated care visit. In the fiscal year 2011, the Madison VA's integrated care program completed 6240 patient encounters; 2016 of which were new assessments.

Integrated care staffing includes mental health workers, psychiatrists, and neuropsychologists who work collaboratively with primary care physicians and other staff to provide evidence-based interventions for mental health problems. At the larger primary care sites, these providers are colocated within the primary care clinic. At the smaller sites, consultation and treatment are done via telemental health services and phone.

Patients are referred for a same-day, open-access evaluation in primary care in a number of different ways, including verbal

**Table 3.** Madison VA Clinics Care Management Data, February 2010 to August 2011

| | |
|---|---|
| Number Enrolled in Depression Care Management (DCM) | 412 |
| Average Baseline PHQ9 | 12.8 |
| Average Number follow-up DCM Contacts | 2.5 |
| Number Completed ≥ 1 DCM Contacts | 369 (89%) |
| Number Completed ≥ 2 DCM Contacts | 287 (70%) |
| Average Final PHQ9 if had 2 or More Contacts | 4.64 |
| For Those Who Completed ≥ 2 DCM Contacts, Number with ≥ 50% Reduction in PHQ9 | 212 (74%) |

or electronic request from their primary care physician, from a specialty service, or via self-referral. After an initial brief problem-focused assessment,[14,15] the mental health provider will triage a patient to the appropriate level of care which may include continued treatment in primary care or referral to a specialty mental health clinic. Patients who continue treatment in primary care work with the colocated mental health clinician and their primary care physician to develop a treatment plan that might include care management, psychiatric consultation, brief therapy, and/or referral to other VA resources such as the Pain Coping class or the Wellness Program (tai chi, yoga, mindfulness).

## Care Management Protocol

Currently, care management is done only for depression, though plans are in place to add similar programs for anxiety and alcohol misuse in the coming year. The basic protocol for depression care management is largely based on the protocol used in the IMPACT Trial:[16]

1. Initial brief problem-focused assessment with a baseline depression scale (PHQ9), psychoeducation, and development of a shared treatment plan between patient, primary care physician, and integrated care staff. The treatment plan commonly includes an antidepressant medication and a behavioral activation plan.

2. A care manager (usually a social worker) will then contact the patient by phone at 2 weeks, 4 weeks, 8 weeks, and 12 weeks. In these phone contacts, the care manager follows a structured protocol that includes the PHQ9 and an assessment of compliance and tolerance (with both medication and the behavioral activation plan).

3. Based on information gathered in the phone contact, the care manager will encourage continued compliance with the treatment plan and perhaps set new behavioral activation goals, or will consult with the primary care physician and/or integrated care psychiatrist if the treatment plan needs to be changed (eg, medication not tolerated, or PHQ9 not improving).

Approximately 75% of patients are referred directly from their primary care appointment for a same-day baseline evalu-

ation and enrollment in depression care management. The primary care physician also has the option to enter an electronic request for enrollment in depression care management after which the patient will be contacted by phone.

## The Technology Behind Care Management Processes

Care managers use a program called The Behavioral Health Lab (BHL) to track patients enrolled in depression care management. The BHL software was initially developed and implemented out of the Philadelphia VA Medical Center.[17,18] BHL has specific protocols for care management of depression, alcohol, and anxiety disorders, in addition to a "Watchful Waiting" module for milder problems for which no specific intervention is being implemented. Currently, the Madison VA is using only the depression care management and "Watchful Waiting" modules, but it will implement the anxiety and alcohol care management modules in the coming year.

The BHL database is separate from the VA electronic medical record (though it is expected to be linked in 2012). All the data from the baseline and follow-up care management calls are entered into BHL and a brief note is copied into the electronic medical record. BHL software is set up to alert care managers when a patient is due for a phone contact, track changes in a patient's PHQ9 over time, and/or make changes in a treatment plan (eg, addition of brief therapy to medication). It also has a number of important administrative functions that allow tracking and reporting on the patient population as a whole (eg, number of patients enrolled in care management, rate of completed contacts, population outcomes).

## History of the Development of the Technology Infrastructure

Nationally, the VA has sponsored different tools for care management, including *Translating Initiatives for Depression into Effective Solutions* (TIDES), and the Behavioral Health Lab (BHL). Both TIDES and BHL include software and structured scripted protocols, and both were designed to be utilized by health technicians. Initially, there was wide variation in the software being used at different VA sites across the country; however, it appears likely that BHL will become the standard across sites.

While the BHL is deemed superior for clinical and administrative tracking, it has not been as easy to readily implement given the necessary administrative steps to have the BHL software loaded on VA computer hard drives. Fortunately, the developers of the BHL software at the Philadelphia VA have a well-organized network of technical support and are available for both troubleshooting and implementation issues. They also offer a monthly BHL conference call for continued consultation on technical and administrative issues.

**Table 4.** Comparison of Care Management Models

| Program Elements | Access Community Health Centers | Madison VA Clinics |
|---|---|---|
| Population assessed by care management process | Patients with PHQ9 scores of 15 or more and/or GAD7 scores of 11 or higher | All patients with depression as assessed with PHQ-9 |
| Frequency of care management reviews | Quarterly | Ongoing |
| Database | Bento software, housed on a single computer and iPad | Behavioral Health Lab software, housed on a server |
| Integration with EHR | Not planned | Not currently, but planned |
| Care manager strategies | Chart review, as needed phone-based intervention, team care coordination | Phone-based intervention at regular intervals (2, 4, 8, 12 week post-identification), team care coordination |
| **Staffing and Responsibilities** | | |
| Care Manager | Update, review database and contact patients and providers as needed to review progress, team care coordination | Contact all patients at set intervals (2, 4, 8, 12 weeks), re-administer PHQ-9, update database, team care coordination |
| Behavioral Health Consultant or Mental Health Specialist | Provide support for primary care clinicians via curbside consultations and same-day visits with patients in exam rooms as well as ongoing collaborative follow-up | Can provide same-day visits with patients when available and appointments by clinician or self-referral |
| Consulting Psychiatrist | Provide oversight of physician-prescribed psychotropic medications in addition to one-time evaluations | Provide oversight of physician-prescribed psychotropic medications, also may develop and prescribe for own caseload of patients |

Abbreviations = EHR, Electronic health record; PHQ9, Patient Health Questionnaire; GAD7, Generalized Anxiety Disorder Questionnaire.

### Care Management Findings

Care management contacts from February 2010 through August 2011 were reviewed to assess utilization and outcome data (Table 3). In approximately 20 months, a total of 412 patients were enrolled in the program with an average baseline PHQ9 of 12.8. Eighty-nine percent of the patients had at least the baseline contact plus 1 follow-up care management contact; 70% completed 2 or more follow-up care management contacts. For those who had 1 or more care management contacts, the average number of contacts was 2.5. For those veterans who completed 2 or more care management contacts, 74% had at least a 50% improvement in their PHQ9, and the average final PHQ9 measured for this group was 4.7. Some patients enrolled in the care management program eventually were referred out of primary care to the specialty mental health clinic either at baseline assessment or after some number of contacts. Thirty-one of the patients enrolled in the depression care management program were referred to specialty mental health over this period, 6 were referred right after their baseline assessment, and 25 were referred after 1 or more contacts.

### Patient Exemplar

A 62-year-old Vietnam veteran was referred by his primary care physician for evaluation of depression and possible post traumatic stress disorder (PTSD). He had been referred in the past; however, integrated care staff had been unable to reach him for an initial assessment. On this occasion, the patient was introduced directly to an integrated care social worker at the time of his primary care appointment. The veteran's PHQ9 was 15 and he reported a remote history of combat PTSD symptoms, but these symptoms had largely resolved and he viewed depression related to increasing medical problems as his primary concern. The patient received psychoeducation regarding depression and the following treatment plan was agreed upon: an antidepressant trial, an activation plan that included walking 1 mile 4 days per week, and having breakfast with a friend weekly. Over the course of 4 care management contacts, the patient's medication was titrated, the behavioral activation plan was modified, and progress toward treatment goals were monitored with the outcome of improving his PHQ9 score from 15 to 1.

### LESSONS LEARNED

Clinical information systems hold great promise for improving the quality and consistency of care delivered to patients for chronic diseases as varied as diabetes and depression. However, as shown by these 2 exemplars, implementation of population-based strategies for managing patients with depressive symptomatology will vary based on factors such as setting characteristics, technical limitations, and clinical resources (Table 4).

### Resources Dictate Whether Care Management Processes Are Sustainable

In the community health center, care management reviews are done on a quarterly basis as a result of personnel limitations and the requisite data extraction process. The VA, by contrast, has a rolling review process because personnel are available to manage the registry on a full-time basis. Care management processes also require intensive monitoring and management including

developing and fine-tuning the patient registry, which further taxes staff resources. These activities usually are not reimbursable by third-party payers. While community health centers and VA clinics have built-in incentives related to federal mandates to pursue this kind of activity, there is no direct reimbursement for these activities in these systems, either. Some studies have suggested cost savings related to integrated care programs which may pave the way for payers to recognize care management services as one of the core components of cost-effective care.[19,20]

## Data and Processes Will Differ Based on Population Characteristics

The community health center reported less robust score differentials, in part because its care management scheme covers only the most symptomatic patients (average baseline PHQ-9: 19.8) and includes patients with a variety of diagnoses including severe and persistent mental illness, whereas the VA includes the entire range of patients with depression (average baseline PHQ-9: 12.8). These differences in protocols are directly attributable to population characteristics. For example, patients at the VA necessarily have access to certain resources such as psychiatry, whereas the community health center population often lacks such access by virtue of being uninsured or underinsured. The protocol at the community health center reflects the need to manage those most vulnerable as a matter of first priority.

## Clinical Information Systems Evolve in Context

Clinical information systems are evolving entities requiring constant attention to help them meet the local needs of practices and end-users, a point highlighted in the community health center exemplar where various iterations of care management processes and technologies were needed. In the end, the measure of the efficacy of a clinical information system is not only whether it performs the tasks of a registry in evidence-based practice, but whether it is also widely used by clinicians in day-to-day practice. This evolutionary nature of development should encourage practices to get started even with rudimentary systems.

Finally, these protocols must exist in a care delivery context that makes sense for the primary care team and the patient. In other words, registries cannot exist in isolation. In these exemplars, we see the registries work well because they exist in the context of a generalist model of integrated care that supports the primary care provider in more than just the one disease category. In the community health center exemplar, for example, the care management occurs in the context of a BHC program that provides same-day access to mental/behavioral care and that also includes a consulting psychiatry service. In the VA example, the registry exists in the context of a step-wise model that includes immediate evaluation and treatment planning as well as ready access to behavioral health specialists. This creates an environment where care management has a rationale

and purpose that is reinforced naturally by day-to-day clinic processes. Otherwise, population-based care management can become a good idea with no home.

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