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## Improving Outpatient Diabetes Care

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# Improving Outpatient Diabetes Care

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## Abstract

More than 20% of patients in the Veterans Health Administration (VHA) have diabetes; therefore, disseminating “best practices” in outpatient diabetes care is paramount. The authors’ goal was to identify such practices and the factors associated with their development. First, a national VHA diabetes registry with 2008 data identified clinical performance based on the percentage of patients with an A1c >9%. Facilities (n = 140) and community-based outpatient clinics (n = 582) were included and stratified into high, mid, and low performers. Semistructured telephone interviews (31) and site visits (5) were conducted. Low performers cited lack of teamwork between physicians and nurses and inadequate time to prepare. Better performing sites reported supportive clinical teams sharing work, time for non-face-to-face care, and innovative practices to address local needs. A knowledge management model informed our process. Notable differences between performance levels exist. “Best practices” will be disseminated across the VHA as the VHA Patient-Centered Medical Home model is implemented.

## Keywords

best practices, diabetes, disease management, quality

The care of patients with chronic disease presents many challenges to health care systems and those who provide care within those systems. The Veterans Health Administration (VHA) currently serves a population with a high prevalence of chronic disease. Diabetes is among the most common chronic diseases and affects more than 20% of its patients. VHA is also a large integrated health care system that currently offers primary care services at more than 750 sites; however, quality (as measured by intermediate outcomes of care) varies widely.<sup>1–3</sup> VHA has great interest in identifying best practices that can be shared across the system. Although the term *best practices* generally is used, as will be the case in this article, we recognize that how such a practice is operationalized is heavily context dependent and a more appropriate term is *potentially better practices*.<sup>4–7</sup> This project was conceptualized and informed by a model of knowledge management that has been defined as “an active process involving the creation of knowledge, the intentional elicitation of knowledge, and the ability to share knowledge across the organization.”<sup>8,9</sup> Knowledge may be generated both in research and in practice.<sup>10</sup> In this program evaluation, we sought not only to elicit innovative or “best” practices that had been created in the “field” but also to identify some of the factors that promoted or hindered their development, with the intention of sharing knowledge across the organization (one of the

transformational initiatives for VHA). This evaluation was disseminated to VHA Central Office. This article describes the design and conduct of the program evaluation.

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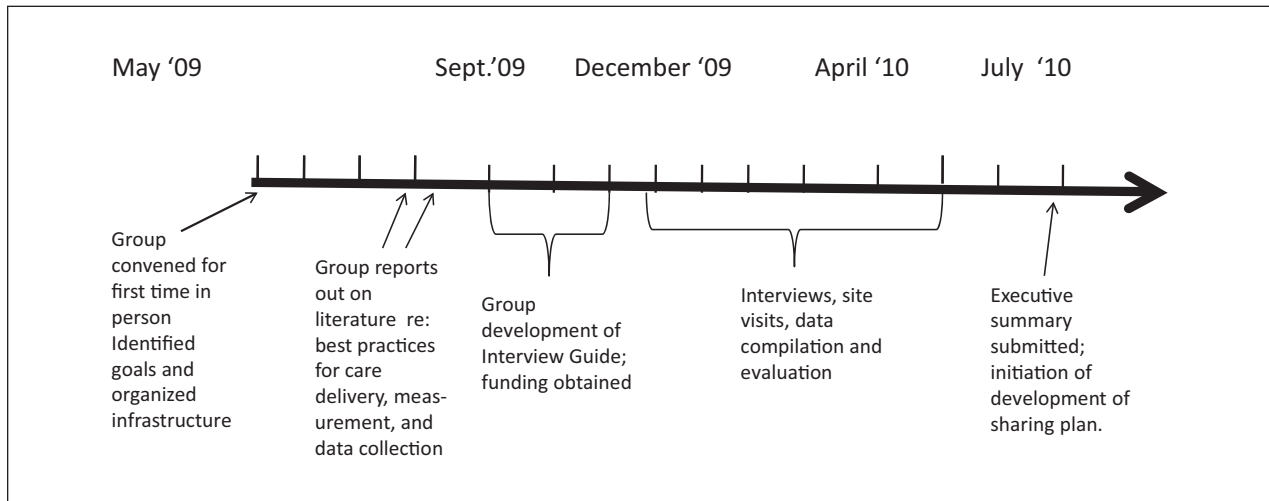
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**Figure 1.** Timeline for the project

## Methods

### Overview

This program evaluation used a mixed-methods approach to identify and evaluate best practices for diabetes care.<sup>11</sup> Facilities and community-based outpatient clinics were stratified into high-, mid-, and low-performing sites based on the criterion of the percentage of patients with a glycosylated hemoglobin (A1c) >9%. The timeline for the project is shown in Figure 1.

### Conceptual Framework

The Chronic Care Model constitutes an excellent framework within which to identify structural and process components of care that result in high quality.<sup>12,13</sup> The degree of implementation can be assessed by the Assessment of Chronic Illness Care instrument only in a general sense (eg, to compare site-specific trends in care delivery).<sup>14</sup> Similarly, organizational surveys can identify general factors associated with better performance.<sup>15</sup> However, if individual practice sites are going to learn from each other, more specific information is needed and a more granular evaluation is necessary.

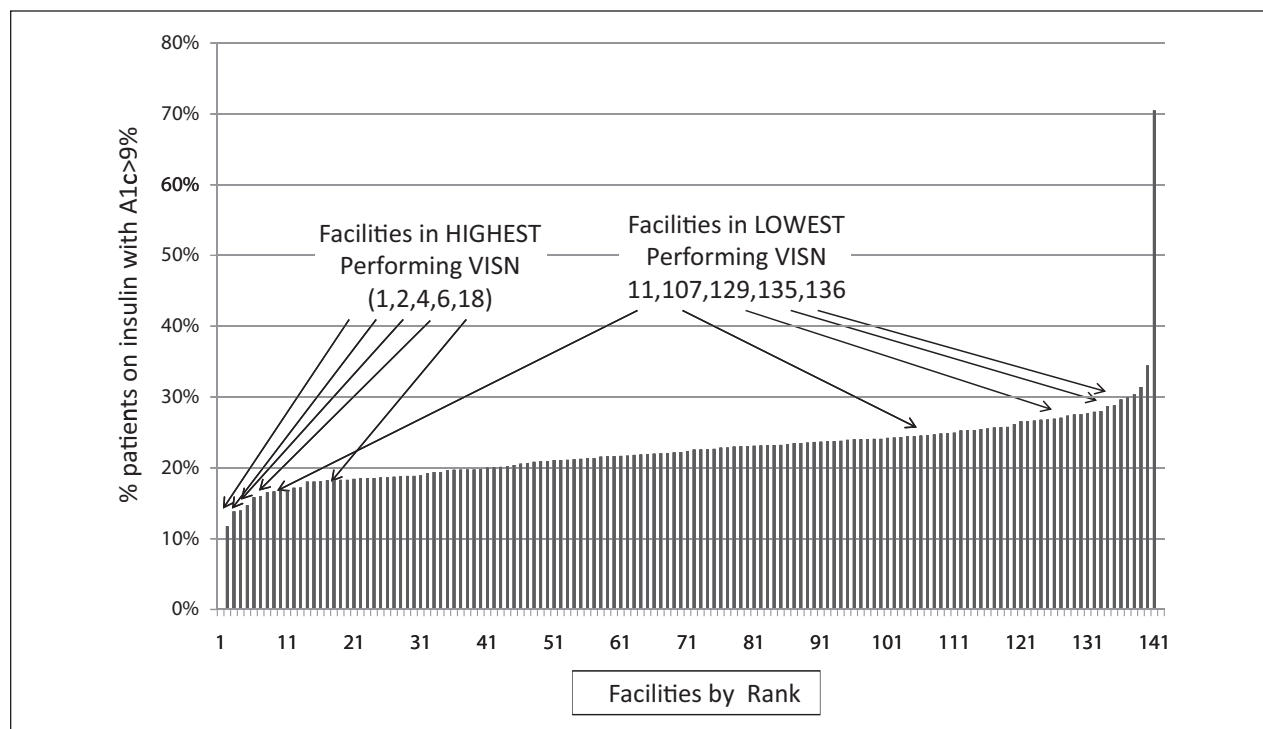
### Identification of Sources for New Knowledge

This effort recognized the transformation in care delivery in VHA with not only increasing numbers of patients but also a higher proportion of primary care delivery occurring in community-based outpatient clinics (CBOCs).<sup>16</sup> The majority of veterans receive preventive services and

diabetes care in primary care settings, either adjacent to a hospital or in a CBOC. Because of the governance structure that involves Veteran Integrated Service Networks (VISNs) that consist of a number of facilities to which CBOCs were linked, it was important to identify variation at the 3 different levels (VISN, facility, and CBOC) and then to identify best practices. This included a more in-depth evaluation at the primary care clinic level, where the actual care for diabetes is delivered.

### Identification of Variation in Care Across Sites

Fiscal year 2008 data (the most recent available) from the VHA Patient Care Services Diabetes Data Cube were used to rank sites by the percentage of patients with A1c >9%. The Diabetes Cube is a national VHA database that includes patient-level demographics, intermediate outcome measures and other laboratory values, as well as medications. Analyses were limited to sites with more than 100 patients with diabetes: 140 facilities and 582 CBOCs, each of which was included. Analyses were stratified by size (facility vs CBOC) and location (rural vs urban). Analyses included the population of patients with definite diabetes (as defined by blood glucose greater than 126 mg/dL more than once and an *International Classification of Diseases, Ninth Revision*, code of diabetes—250), subpopulations of patients with serious mental illness, and patients who were receiving a prescription for insulin of any type. Given recognized disparities in chronic disease measures for patients with serious mental illness (ie, schizophrenia, bipolar disorder, schizoaffective disorder), subpopulation analysis was evaluated for



**Figure 2.** Variation in performance measures for diabetes (A1c >9%) at the facility level. Lowest rank is best performance. Note that 1 facility in the lowest performing network is among the highest performers.

this group of veterans. Because insulin use is a marker of disease severity and duration of disease, this subpopulation also was evaluated.

### Choice of Sites for Interviews and Site Visits

A purposive sample was used. High-, middle-, and low-performing sites were identified for each of the strata. A representative sample was chosen that included sites from the majority of networks (VISNs). Specific attention also was paid to sites that were positive deviants<sup>17</sup> (see Figure 2), meaning a facility that was a high-performing site in a low-performing VISN. This sample was supplemented with a convenience sample of sites that were represented in the VHA Patient Care Services Primary Care System Redesign Diabetes Workgroup. A total of 31 sites were identified. Sites chosen were heterogeneous in terms of location (urban, suburban, and rural) and geography (South, Northeast, Midwest, Southwest, and Northwest). In all, 67% of the 21 VISNs were represented in the sample.

### Elicitation of Knowledge

Key informant interviews were conducted with primary care clinic directors and/or primary care leaders (physician

managers and nurse clinic managers) at sites to identify contextual factors that might account for performance variation and the degree to which sites had elements of the Chronic Care Model and attributes of the Patient-Centered Medical Home (denoted in VA as Patient Aligned Care Team), a major initiative both in the private sector and VHA. A semistructured 39-item interview guide (available from the authors on request) was developed with the assistance of the VA Patient Care Services Primary Care System Redesign Diabetes Workgroup and informed by the conceptual frameworks of clinical microsystems, the Chronic Care Model, and the Patient-Centered Medical Home. Interviews were conducted over the telephone by a clinician (SK, DA, or SW); an additional individual was present to take notes. One or more informants from each site participated on the same call. Interviewees included primary care clinic directors in combination with other primary care physicians, and occasionally nurse practitioners, nurse managers, and clinical pharmacists. At the conclusion of an interview, the interviewer and note taker reviewed the notes to ensure accuracy. Then a series of site visits were conducted for more in-depth interviews and an assessment of the facilities at a representative sample. These site visits were conducted by a clinician (SK or DA). One or more informants were present during these interviews at any given time. Notes were entered onto the interview guides and then entered into a database.

**Table 1.** Variation in Performance Measures at Regional (VISN), Facility, and CBOC Levels for Diabetes (Percentage of Patients With A1c <9%) for Total Population, Patients With SMI, and Those Taking Insulin

	VISN	VISN Average	Facility	Facility Average	CBOC	CBOC Average
Overall	7.92% to 13.26%	11%	4.57% to 65.63%	11%	1.73% to 72.25%	10%
SMI	11.54% to 15.66%	14%	8.5% to 60.19%	14%	4.86% to 22.48%	13%
Patients on insulin	17.12% to 26.18%	23%	11.73% to 70.47%	23%	3.7% to 78.57%	22%

Abbreviations: VISN, Veteran Integrated Service Network; CBOC, community-based outpatient clinic; SMI, serious mental illness.

## Evaluation Methods

**Quantitative.** Univariate and bivariate statistics were analyzed using SPSS 18 (IBM, Chicago, IL).

**Qualitative.** The database containing information derived from the notes was compared with notes taken during the interviews themselves. In the case of discrepancy or uncertainty, sites were recontacted for resolution. Content analysis was performed by thematic coding. Analysis was carried out to identify key themes. Initial themes were related to the elements of the Chronic Care Model and Patient-Centered Medical Home model. We classified practices based on 4 elements of the Chronic Care Model: clinical information systems, decision support, delivery system design, and self-management. A yes code for clinical information system indicated site use of local or national data registries or data dashboard and/or use of electronic notes in the electronic medical record. Decision support was coded yes for a site if it included use of the VA/Department of Defense or American Diabetes Association guidelines in practice (eg, embedded into electronic notes, training on guidelines, guidelines put into local clinical reminders). Delivery system design was coded yes if sites had group visits for patients with diabetes or had a multidisciplinary approach to starting insulin or adjusting medications for diabetes. Self-management was coded yes if sites had a formal diabetes self-management education program for patients.

## Results

### Quantitative

The total population was 2 727 795; women accounted for 3.0%. The age distribution was as follows: <25 years, 0.01%; 25 to 34 years, 0.03%; 35 to 44 years, 1.8%; 45 to 54 years, 8.8%; 55 to 64 years, 33.4%; 55 to 64 years, 25.3%; 65 to 74 years, 24.2%; 75 to 84 years, 6.2%; and 85 years and older, 3.0%. Data from facilities/CBOCs with more than 100 patients with diabetes were used. Overall frequency of A1c >9% was stratified by VISN, facility, and CBOC.

Overall, from 5% to >30% of patients with a diagnosis of diabetes in facilities and CBOCs had A1c >9%. Results

for patients with diabetes who have concomitant serious mental illness and those who use insulin are displayed in Table 1. Sites that performed well with regard to overall diabetes care also performed well with these 2 populations. Sites that were bottom performers also performed poorly with these 2 populations of patients. Variation increased as the size of the unit of analysis decreased from VISN to facility to CBOC. There was a high correlation between performance in the 2 subpopulations at the VISN ( $r = .70$ ,  $P < .001$ ) and facility ( $r = .86$ ,  $P < .001$ ) levels as well.

We also tried to identify positive deviants. Again, these are high-performing facilities within low-performing VISNs. In the highest performing network, 5 of the facilities ranked in the top 10. A positive deviant was identified in the lowest performing network. This facility was ranked 11th overall (Figure 2).

### Qualitative

**Response rate.** All but 2 sites that were contacted participated in an interview (93.5%); the 2 nonparticipants were low-performing sites. Site visits were conducted at 5 sites (2 high and 3 low performers). Key informants included 4 primary care physicians, 1 nurse practitioner, and 24 primary care physician clinic leaders. Five sites had additional nursing representation, and 4 sites had pharmacists on the call. At site visits, the interviewer met with a similar mix of individuals. Site visits confirmed the results of the interviews.

**Staff variation.** Differences were found related to organization of health services and the personnel (eg, interdisciplinary teams of physicians, nurses, clinical pharmacists, optometrists, podiatrists) who deliver them. Sites varied in allocated resources for diabetes care (eg, staffing numbers and types as well as ratio of health care professionals to patients).

**Characteristics of low-performing sites.** A major issue cited by physicians and other primary care providers at lower-performing sites was insufficient support staff (nurses and pharmacists) to perform the often needed planned visits for diabetes care between visits to the primary care provider (eg, medication titration), such that this type of care



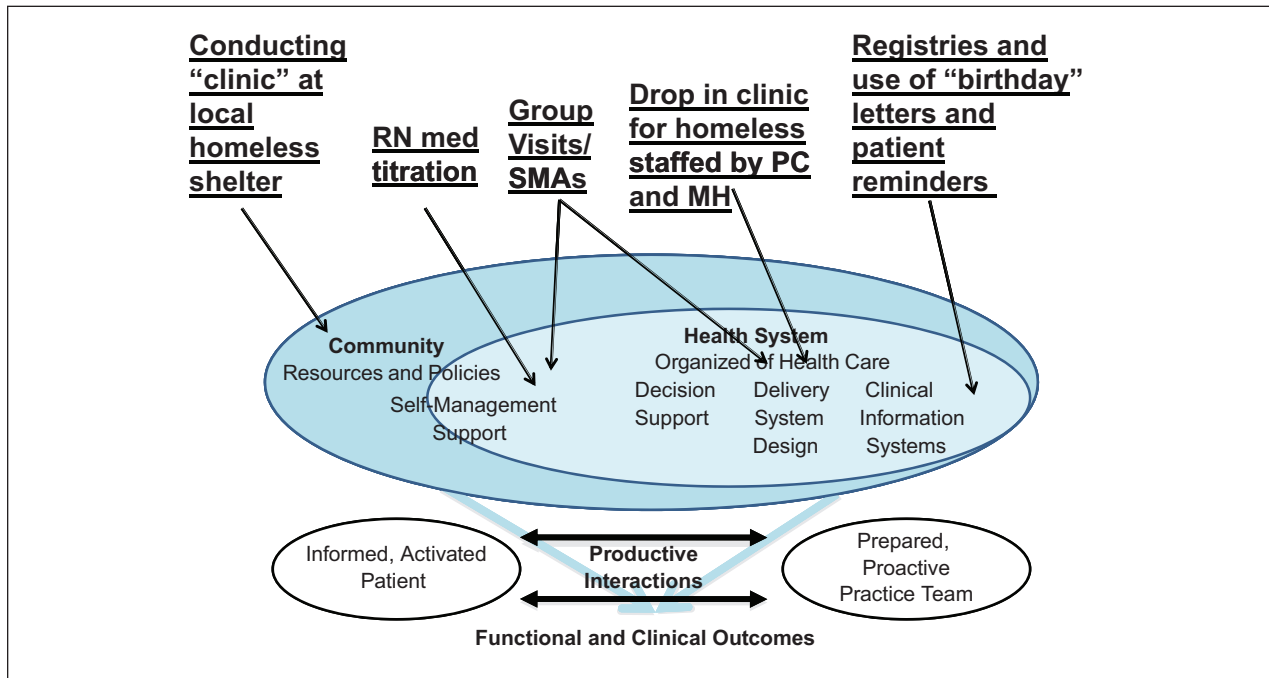
often did not take place. This was a particular issue at high-volume sites; physicians felt overwhelmed with their panel of patients in general and felt that they were unable to spend appropriate time with patients to provide thorough diabetes care. At lower-performing sites, there was no team to provide education and care, including teaching patients how to initiate insulin therapy. Also at lower-performing sites, local policies prevented nurses from following protocols for initiation and titration of insulin and other medications. In addition, at 2 sites, individuals highly skilled at diabetes care (nurse certified diabetes educators) were assigned to other duties (unrelated to diabetes). Lower-performing sites tended to be urban and to have higher numbers of patients with serious mental illness and homeless patients. Although organizational barriers to care were cited frequently, overcoming barriers of extreme poverty also was cited as a major problem for patients at lower-performing sites. Cultural issues related to diabetes also were raised, especially concerning Native Americans, African Americans, and Hispanics.

*Characteristics of high-performing sites.* High performers put into practice multiple components of the Chronic Care Model such as registries, delivery system design, and the use of a team that was prepared for the patient visit. Higher-performing sites had 3 or 4 elements of the Chronic Care Model, whereas low-performing sites had 1 to 3 elements.<sup>18</sup> This count does not include the fact that all VA facilities use a single electronic medical record system. Registry use facilitated identification of specific patient populations in addition to serving as the basis for provider audit and feedback. Multidisciplinary teams were set up, consisting of the primary care physician or provider (nurse practitioner or physician assistant) with nurses and clinical pharmacists. In contrast to low-performing sites where physicians taught insulin administration, at high-performing sites this task was carried out by nursing or pharmacy staff. Higher-performing sites reported strong structural, organizational, and personnel support, leading to better diabetes care. Some sites had strong collaboration with health psychology in primary care. This collaboration was cited as being “key in sharing responsibilities” to provide thorough patient care. This sense of multidisciplinary team collaboration was particularly evident during visits to high-performing sites and absent at low-performing sites. In addition, high performers used forms of care design involving simultaneous presence of individuals from multiple disciplines (eg, shared or group medical appointments) more frequently.<sup>19</sup> Planned care occurred more regularly and included support for non-face-to-face encounters. Top-performing sites also reported using innovative practices, taking advantage of interprofessional teams, system redesign, and population health approaches. Groups of patients who were not performing well would be identified and asked to participate

in enhanced diabetes care. Providers in the mid-to-high performing sites used telehealth (teleconsultation and Care Coordination Home Telehealth) more effectively by linking care to an additional health care provider, other than the primary care provider, who could change medications. Perhaps most important, care at higher-performing sites appeared to be more patient-centered, involving and engaging patients to promote investment in their health; patients received reminder letters between appointments and were taught self-management skills for their diabetes (including dietary changes such as carbohydrate counting and foot exams). Because VHA is a relatively self-contained system, few sites used additional community resources. Finally, high-performing sites reported strong support from organizational leadership that promoted the above-mentioned practices. When asked to describe barriers to good diabetes care, high-performing sites identified issues related to patients’ lack of ambition, interest, and engagement; lower socioeconomic status was a secondary concern.

*Middle performers and other findings.* Middle-performing sites included characteristics from both the low- and high-performing sites. They reported increased support staff (nurses and clinical pharmacists) when compared with low-performing sites. Efforts focused on overcoming patient and some system barriers. In fact, middle performers tended to focus on individual patient barriers rather than system redesign. Both low and middle performers cited “silos” existing between health care professionals as a problem more frequently. Access to specialist expertise varied by geographic location, with more rural sites using telehealth to access endocrinology. Better access to endocrine subspecialty care did not seem to be associated with better-performing sites. All sites were aware of practice guidelines; however, most cited the guidelines of the American Diabetes Association and few cited the Veterans Affairs/Department of Defense guidelines. Interestingly, regardless of performance level, sites rewarded only physicians for meeting diabetes performance measures as opposed to the team. There appeared to be little difference in the availability of test strips for self-monitoring of blood glucose among sites. This evaluation occurred prior to the national rollout of the VA Patient Portal (MyHealthVet), but some of the high-performing sites were piloting secure text messaging.

*Potentially better and innovative practices.* Many of the quality improvement efforts focused on implementation of relatively well-known practices.<sup>20-26</sup> Some are shown in Figure 3 along with some very innovative practices that were identified related to management of diabetes care for homeless veterans. One site had primary care providers go to a local homeless shelter with a laptop that was connected wirelessly to the VHA electronic medical record. Another site had a drop-in clinic for the homeless that offered a free



**Figure 3.** Innovative practices aligned with the elements of the Chronic Care Model of Wagner et al<sup>18</sup>

meal and was staffed by a multidisciplinary team that included primary care, mental health, and social work.

## Discussion

Our study shows that variability exists among low- to high-performing sites that likely contributes to the differences in percentage of patients with A1c >9% and diabetes care more generally.

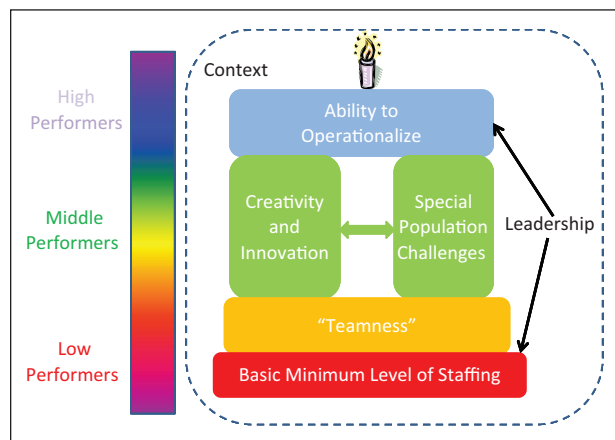
We have used a knowledge management approach to identify potentially better practices that could be shared systemwide within VHA and possibly elsewhere.<sup>8</sup> These locally innovative practices were consistent with the Chronic Care Model. In a systematic review, Bodenheimer et al evaluated elements of the Chronic Care Model used in primary care for patients with chronic illness, including diabetes, and found that improvement in outcome measures and cost was associated with implementing a higher number of elements.<sup>27</sup> Other studies have had similar findings.<sup>20-28</sup> Our evaluation also found this to be true in a system with a mature electronic medical record, a characteristic that distinguishes VA from most US health care systems. Our knowledge management approach identified best practices and illustrated some of the factors associated with their development and high performance in general.

A variety of models have been proposed for high-performing primary care clinics.<sup>23</sup> Most of these models have been based on clinics/providers in private practice. Carpiano et al described 3 major factors in family practice

offices that influenced the delivery of preventive services: tools, teamwork, and tenacity.<sup>29</sup> They concluded that teamwork and tenacity are essential and necessary for tools to be effectively employed. Feifer et al described 3 top-performing practice site archetypes (Technophiles, the Motivated Team, and the Care Enterprise)<sup>30</sup> based on work in the Practice Partner Research Network.<sup>30</sup> However, the presence of a single electronic medical record makes this model less applicable. Interestingly, although the VHA is a hierarchical bureaucratic model with many policies that apply to all sites of care, there is still marked variation in implementation of the elements of the Chronic Care Model and in the degree to which individual sites exhibit creativity and flexibility. We also found that leadership support, particularly at the facility level, is most crucial for obtaining resources for low-performing sites to facilitate planned care and at mid- and higher-performing sites to support innovative ways to address a site's unique needs.

Some sites were located in areas with high homelessness and poverty. In general, these sites had lower performance than those in more demographically favorable areas. However, sites with greater creativity were able to develop and implement innovative solutions.<sup>31,32</sup> The highest performers overcame barriers to developing and implementing best practices. This required greater involvement by leadership (eg, the strong support of primary care clinic directors and ambulatory chiefs of staff in providing resources—staff, space, and time). Figure 4 depicts a model of primary care system performance. Diabetes care





**Figure 4.** Conceptual model illustrating factors associated with increasing performance

Successive factors build on each other. Leadership is critical at the level of providing the basic minimum of resources as well as in operationalizing innovative and potentially better practices.

was identified as a priority by many sites; these sites also identified the need for further process improvement skills, education for all health care professionals, and sharing of best practices across sites. Finally, many sites expressed an interest in sharing what they have done well with other VA sites and in being given an opportunity to learn from other sites that have developed in areas that they have not.

### Limitations

This study was performed in a single health care system with a unique population of patients. The results may not be generalizable to other health care systems or other populations of patients. Nevertheless, VHA is a very large system that cares for more than 2 million patients with diabetes. Moreover, although a relatively closed system, it still is susceptible to other influences as evidenced by the widespread use of American Diabetes Association rather than VHA/Department of Defense Diabetes clinical practice guidelines. Because the 2008 data were not current, some sites may have been misclassified. Alternative and more current data were available from the External Peer Review Program, but the sample size of charts reviewed was too small to have power to identify variations at the CBOC level. Interviews were not tape-recorded, but care was taken to have an observer present in addition to the interviewer to assure accuracy.

### Conclusion

In a large health care system with a mature electronic medical record system, the presence of practice variation not only identifies areas for improvement but also illustrates how known practices conduct clinical work in VA

contexts and provides a source for innovative practices. The importance of leadership and organizational support in improvement cannot be overemphasized. Knowledge management efforts to share these potentially better practices and to facilitate their implementation where they make sense locally will be the next step.

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