

## Performance Measures

# Assessing Chronic Illness Care for Diabetes in Primary Care Clinics

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**M**ore than 97% of adults with diabetes seek their care from family physicians, general internists, or general practitioners, accounting for 76% of all outpatient visits provided to adults with diabetes.<sup>1</sup> Translating theoretically sound strategies that work in research settings into real-world primary care practices has been a challenge.<sup>2,3</sup>

The Chronic Illness Care model suggests that there are six structural dimensions of primary care teams that are important to improve the care delivered to patients with a complex chronic illness such as Type 2 diabetes—organizational support, community linkages, decisions support, self-management support, delivery system design, and clinical information systems.<sup>4,5</sup> The goal of implementing the model is to make care proactive and patient centered rather than episodic and acute care based. Implementing the elements of the Chronic Illness Care model has been shown to improve processes of care for several chronic illnesses, including diabetes.<sup>6,7</sup>

Evaluation of the implementation of the Chronic Illness Care model has been assessed using the Assessment of Chronic Illness Care (ACIC) survey. The ACIC survey consists of 25 questions that constitute the model's six structural dimensions.<sup>8</sup> In a study of organizational characteristics associated with chronic illness care, all six ACIC subscales were responsive to practice improvements made for diabetes and congestive heart failure care.<sup>8</sup> However, this evaluation instrument is typically completed by members of a team of personnel from each clinic who are involved in quality improvement initiatives. Little is known about how staff roles may influence their rating of the Chronic Illness Care

## Article-at-a-Glance

**Background:** The Chronic Illness Care model suggests that six structural dimensions of primary care teams are important in improving the quality of diabetes care. A study was conducted to assess the degree to which these dimensions, as represented in the Assessment of Chronic Illness Care (ACIC) survey, are implemented in primary care practices and to examine their relationship with selected quality of care process measures for Type 2 diabetes.

**Methods:** The survey was completed in 20 primary care clinics (30 patients in each clinic) by caregivers, administrative, staff, and an external observer.

**Results:** Overall, administrative staff were more likely to rate their clinics higher on each structural dimension in the ACIC survey than caregivers or the external observer. The observer's and the caregivers' assessments were more consistently correlated with quality of care measures than were the administrative staff assessments. Decision support, and to a lesser degree delivery system design and self-management, were most frequently correlated with quality of care measures.

**Discussion:** Redesigning primary care practices to improve the quality of diabetes care requires accurate assessment of the structures of care directly related to quality measures. A version of the ACIC tool tailored to diabetes management can be used to examine structural dimensions in primary care clinics but may be more valid if completed by caregivers or an independent observer than by administrative staff.

elements in their clinic environment or how those scores actually correlate with specific process of care measures for a chronic illness such as diabetes.

This study was conducted to assess the degree to which the six structural dimensions of the Chronic Illness Care model are implemented in primary care practices, with comparison of responses given by caregivers, administrative staff, and an independent external observer, and to examine the relationship of these responses with selected quality of care process measures.

## Methods

### Setting

The Direct Observation of Diabetes Care study was begun in 2002, with the primary aim of conducting an in-depth examination of the quality of care delivered to patients with Type 2 diabetes across a wide variety of primary care settings. The study design was observational; no interventions were performed, and participants received their usual care from their primary care physicians. Twenty primary care clinics from the South Texas Ambulatory Research Network, an informal network of approximately 40 primary care clinics, were included. These clinics were recruited in a “snowball” method, with an attempt to identify and recruit primary care settings where people with Type 2 diabetes are mostly likely to seek care—solo practice physicians, group practice settings, and community health centers (CHCs).

### Subjects and Data Collection

A trained observer spent two to four weeks in each practice. Within each clinic site, 30 consecutive patients presenting with an established diagnosis of Type 2 diabetes were recruited to participate in the study. For all 30 patients, information was collected by a survey administered after the physician visit and by abstraction of their medical records. Medical chart abstraction data included numbers and dates of outpatient visits over the past three years, and process quality measures for diabetes.

### Measures

The ACIC Survey (whose components are listed in Appendix 1, page 323) was completed by staff, clinicians in each primary care clinic or practice, and an independent external observer. The wording of each question was

modified slightly to be specific to the care of patients with Type 2 diabetes.

The following six process of care quality indicators were abstracted from each chart by noting whether they had been performed in the past 12 months:

- Glycated hemoglobin (A1C) ordered once
- Lipid profile ordered once
- Urine micro-albumin ordered once
- Blood pressure measured twice
- Referral for dilated-eye exam
- Comprehensive foot exam or referral to podiatrist

These quality standards were based on the 2002 American Diabetes Association clinical practice recommendations.<sup>9</sup> These recommendations were chosen because they represented the most current guidelines for community physicians at that time.<sup>10</sup>

### Analyses

Clinic staff and clinicians were divided into two groups: those who spend the majority of their time in direct patient care (caregivers) and those who spend the majority of their time with administrative tasks in the practice, such as scheduling or billing activities (administrative staff). Means of scores given by the two groups of respondents (caregivers and administrative staff) and the external observer were compared using one-way analysis of variance (ANOVA). To determine which of these assessments were more related to actual quality measures, Spearman correlation coefficients were calculated.

## Results

As shown in Table 1 (page 320), almost all the patients received blood pressure exams twice (98.5%),\* and most of them had had their A1C measured (90.5%) and their lipids measured (81.3%) in the past year. However, fewer than half of the patients (46.3%) had had their urine protein measured, whereas slightly more than half (57.3%) had had eye exams, and approximately two thirds (69.2%) had had foot exams or a podiatry referrals in the past year.

The ACIC survey was completed by 54 caregivers (physicians and nurses), 77 administrative staff (medical assistants, receptionists, office managers, and other

\* The small level of variation in this outcome measure did not allow for detection of any significant correlation; therefore, its measure was dropped from the correlation analyses.

**Table 1. Quality Process Measures\***

Measure	Mean	S.D.	Min.	Max.
% Eye exam	57.3%	25.3	5.0%	94.1%
% Foot exam	69.2%	25.3	20.0%	100.0%
% Blood pressure (measured twice)	98.5%	2.4	93.5%	100.0%
% A1C measured	90.5%	13.8	36.4%	100.0%
% Urine protein measured	46.3%	28.3	0%	83.3%
% Lipid measured	81.3%	21.7	17.6%	100.0%

\* S.D., standard deviation; Min., minimum; Max., maximum; A1C, glycated hemoglobin.

staff), and one external observer in the 20 primary care clinics. The possible values for each subscale and for the total score ranged from zero to 11. Overall, administrative staff were more likely to rate their clinics higher on each structural dimension in the ACIC survey than caregivers or the external observer, with the differences being significant for three main dimensions: delivery system design ( $F = 3.064; p < .05$ ), clinical information systems ( $F = 8.301; p < .05$ ), and overall score that combines all six dimensions ( $F = 5.247; p < .05$ ) (Table 2, below).

The independent observer's assessments, and, to a lesser degree, the caregivers' assessments, were more consistently correlated with quality of care measures than were the administrative staff assessments (Table 3, page 321). The observer's total ACIC score was correlated with three of the six individual quality measures, whereas the caregivers' total ACIC score was correlated with only one quality measures. The administrative staff's total ACIC score was not correlated with any of the quality measures.

For example, the observer's assessments of community linkage, self-management support, decision support, clinical information systems, and total ACIC score were correlated at a statistically significant level with the percentage of patients who had had eye exams within the past 12 months. Only the caregiver's assessment of decision support was correlated with that quality measure; none of the administrative staff assessments were correlated with it.

Similarly, the observer's assessments of self-management support, clinical information systems, and total ACIC score were correlated at a statistically significant level to the percentage of patients who had had their urine protein measured within the past 12 months, while only the caregivers' assessment of decision support was correlated with that same measure. Moreover, the caregivers' assessment of organization, community linkages, decision support, delivery system design, clinical information system, and total ACIC score were correlated at a statistically significant level with the percentage of patients who had had foot exams within the past 12 months. The observer's assessments of self-management support, decision support, delivery system design, clinical information systems, and total ACIC score were also correlated with that measure.

There were few or no correlations between ACIC survey dimensions as assessed by any type of respondents and the percentage of patients for whom A1C or lipid profile had been ordered once. A possible explanation is that these tests are now so routine in most clinic practices that even clinics with fragmented care score fairly high on these measures—90% for A1C and 81% for lipid profile.

For the caregivers and observer, decision support was the subscale most frequently (six times) correlated with an individual quality of care measure. Delivery system design and self-management support were each correlated with individual quality measures four times.

## Discussion

Assessment of the presence of the elements of the Chronic Illness Care model in primary care clinics may

**Table 2. Scores on Assessment of Chronic Illness Care (ACIC) Survey, by Respondent Type**

ACIC Dimension (0–11 scale)	Caregiver	Administrative	Observer	F-Test
Organization	7.1085	7.6020	6.9125	1.070
Community Linkages	7.5679	7.8640	7.5667	0.350
Self-management Support	6.9583	7.7872	7.3000	2.819
Decision Support	6.4052	7.2342	6.9000	1.833
Delivery System Design	6.8267	7.6075	6.5417	3.064*
Clinical Information Systems	5.3478	6.2822	3.8100	8.301*
Total	6.4436	7.4473	6.3420	5.247*

\*  $p < .05$ .

**Table 3. Correlation Coefficients of ACIC Dimensions with Process Quality Measures by Respondent Type\***

Percentage of Patients with Eye Exam			
ACIC Dimension	Caregiver	Administrative	Observer
Organization	0.289	0.340	0.317
Community Linkages	0.392	0.417	0.588 <sup>†</sup>
Self-management Support	0.280	0.187	0.676 <sup>†</sup>
Decision Support	0.459 <sup>†</sup>	-0.156	0.566 <sup>†</sup>
Delivery System Design	0.260	0.166	0.386
Clinical Information Systems	0.223	0.406	0.530 <sup>†</sup>
Total	0.301	0.310	0.626 <sup>†</sup>
Percentage of Patients with Foot Exam			
ACIC Dimension	Caregiver	Administrative	Observer
Organization	0.448 <sup>†</sup>	0.261	0.233
Community Linkages	0.548 <sup>†</sup>	0.376	0.412
Self-management Support	0.370	0.100	0.535 <sup>†</sup>
Decision Support	0.640 <sup>†</sup>	-0.011	0.471 <sup>†</sup>
Delivery System Design	0.483 <sup>†</sup>	0.189	0.749 <sup>†</sup>
Clinical Information Systems	0.599 <sup>†</sup>	0.332	0.605 <sup>†</sup>
Total	0.642 <sup>†</sup>	0.273	0.510 <sup>†</sup>
Percentage of Patients with A1C Measured			
ACIC Dimension	Caregiver	Administrative	Observer
Organization	0.244	0.255	0.378
Community Linkages	0.214	0.237	0.389
Self-management Support	0.322	0.030	0.431
Decision Support	0.261	-0.044	0.468 <sup>†</sup>
Delivery System Design	0.474 <sup>†</sup>	0.224	0.427
Clinical Information Systems	0.362	0.387	0.260
Total	0.316	0.276	0.413
Percentage of Patients with Urine Protein Measured			
ACIC Dimension	Caregiver	Administrative	Observer
Organization	0.290	0.283	0.198
Community Linkages	0.250	0.428	0.417
Self-management Support	0.164	0.307	0.463 <sup>†</sup>
Decision Support	0.481 <sup>†</sup>	0.154	0.416
Delivery System Design	0.280	0.173	0.383
Clinical Information Systems	0.130	0.251	0.488 <sup>†</sup>
Total	0.272	0.342	0.551 <sup>†</sup>
Percentage of Patients with Lipids Measured			
ACIC Dimension	Caregiver	Administrative	Observer
Organization	0.252	0.305	0.148
Community Linkages	0.541 <sup>†</sup>	0.365	0.356
Self-management Support	0.318	0.116	0.429
Decision Support	0.302	-0.148	0.266
Delivery System Design	0.309	0.119	0.457 <sup>†</sup>
Clinical Information Systems	0.299	0.283	0.428
Total	0.295	0.248	0.364

\* ACIC, Assessment of Chronic Illness Care; A1C, glycated hemoglobin.

<sup>†</sup>  $p < .05$ .

be more valid when conducted by an independent external observer and, to a lesser degree, by those involved in daily patient care delivery in the clinic, rather than by the administrative staff in the clinic. The roles and responsibilities of administrative staff may prevent them from observing the characteristics of the practice that are associated with elements in the model. For example, they may be “front desk” staff who have little or no interaction with patients and caregivers in the areas of the clinic where most patient care is delivered. These results suggest that administrative staff may tend to exaggerate the presence of these model elements.

A possible limitation to the use of an external observer is that the single-point estimate of the ACIC scores for each clinic provided by the lone observer may not provide a truly unbiased and valid assessment. However, the scores provided by the single observer in Table 2, with the exception of the clinical information system scores, do not appear to be outliers when compared with the scores provided by caregiver and administrative personnel.

The two quality measures most consistently related to ACIC survey subscales were the percentage of patients referred for a dilated-eye exam and the percentage of patients with comprehensive foot exams. Both of these process measures require a more integrated team and system and therefore may be more sensitive to how primary care clinics are organized for

chronic illness care delivery than are measures related to ordering and obtaining blood tests. Ordering and obtaining blood test results are very important processes of care for episodic acute illness care and thus may be more integrated into clinic routines and less sensitive to Chronic Illness Care model characteristics.

For the ACIC subscale scores from the caregivers and independent observer, decision support was the ACIC subscale most frequently associated with individual quality of care measures. According to the ACIC survey, decision support ensures provider access to evidence-based information that is integrated into patient care through reminders and other systems to change provider behavior.<sup>8</sup> Several intervention trials in primary care settings provide evidence that implementing reminder systems and feedback to providers will improve the quality of care received by patients with diabetes.<sup>11,12</sup> These results are not surprising, given the high level of competing demands faced by primary care providers during visits by patients with complex chronic illnesses.<sup>13</sup> In one recent study, it was estimated that current clinical practice guidelines for 10 of the most common chronic illnesses seen in primary care settings require more time than primary care physicians have available for patient care overall.<sup>14</sup> Thus, any system that would assist clinicians through reminders or prompts might be expected to improve process quality of care measures.

Having said that, it is important to note that for decision support to be effective in improving processes and outcomes of care, it needs to be part of an integrated improvement system. In other words, other aspects of

chronic care management need to be present to support this dimension.<sup>15</sup>

The first step toward redesigning primary care practices to improve the quality of diabetes care is to accurately assess structures that are directly related to quality measures. This study suggests that a version of the ACIC tool that is tailored to diabetes management can be used to examine structural dimensions in primary care clinics but may be more valid if completed by caregivers or an independent observer than by administrative staff. It also suggests that decision support may be one of the most important elements of the Chronic Illness Care model if improvements in process quality of care measures are sought. Future work on implementation of the model is needed to test its capability to improve intermediate clinical outcomes such as A1C, blood pressure, and lipids, as well as more patient-oriented outcomes such as functional status, health-related quality of life, and mortality. **I**

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## Appendix 1. Assessment of Chronic Illness Care (ACIC) Survey Components

### I. Organization of the Practice/Clinic:

1. Organizational commitment for diabetes management
2. Improving strategies for diabetes management
3. Incentives and regulations for diabetes management
4. Senior leaders

### II. Community Linkages

5. Linking primary care clinicians to diabetes specialists and educators
6. Patients' diabetes education resources
7. Coordination of diabetes care guidelines

### III. Self-management Support

8. Assessment and documentation of self-management needs and activities
9. Self-management support
10. Addressing concerns of diabetes patients and families
11. Effective behavior change interventions and peer support

### IV. Decision Support

12. Evidence-based guidelines for diabetes
13. Involvement of diabetes specialists in improving primary care
14. Provider education for diabetes care

### V. Delivery System Design

15. Practice team functioning
16. Practice team leadership
17. Appointment system
18. Follow-up
19. Planned visits for diabetes management
20. Continuity and coordination of care

### VI. Clinical Information Systems

21. A registry (list of patients with diabetes)
22. Reminders to providers
23. Feedback available to team
24. Information about relevant subgroups of patients needing services
25. Patient treatment plans