

# Primary Care Physicians' Perceptions of Diabetes Management

## A Balancing Act

Lynn D. Helseth, BA; Jeffrey L. Susman, MD; Benjamin F. Crabtree, PhD; and Patrick J. O'Connor, MD  
Omaha, Nebraska, and Minneapolis, Minnesota

**BACKGROUND.** Studies demonstrate significant shortfalls in the quality of care for diabetes. Primary care physicians' views of the management of diabetes have been inadequately explored. The objective of our study was to describe primary care physicians' attitudes toward diabetes, patients with diabetes, and diabetes care.

**METHODS.** In-depth interviews were conducted by a trained research interviewer with a sample of 10 family physicians and 9 internists in Connecticut. Interviews lasted an average of 60 minutes and were audiotaped and transcribed. Data were interpreted by a multidisciplinary team using a standard qualitative text analysis methodology. Themes from each interview were used to identify and develop overall themes related to the areas of inquiry.

**RESULTS.** Physicians' goals were congruent with current guidelines emphasizing the importance of good glycemic control and prevention of complications. However, physicians noted the challenge of balancing the multiple goals of ideal diabetes care and the realities of patient adherence, expectations, and circumstances. The majority of physicians described a patient-centered management style, but a substantial minority described a more paternalistic approach. Physicians did not identify or describe office systems for facilitating diabetes management. Differences between family physicians and internists did not emerge.

**CONCLUSIONS.** The complexity of diabetes care recommendations coupled with the need to tailor recommendations to individual patients produces wide variation in diabetes care. Improvement in care may depend on (1) prioritizing diabetes care recommendations for patients as individuals, (2) improving physicians' motivational counseling skills and enhancing their ability to deal with challenging patients, and (3) developing office systems and performance enhancement efforts that support cost-effective practice and patient adherence.

**KEY WORDS.** Diabetes mellitus; research; attitude; patient compliance. (*J Fam Pract* 1999; 48:37-42).

Growing evidence suggests that better glycemic control is related to improved clinical outcomes in both type 1 and type 2 diabetes<sup>1,2</sup>; however, more than half of the adults with diabetes have glycosylated hemoglobin (Hb A<sub>1c</sub>) levels greater than 9.5% (upper limit of normal = 7.5%).<sup>3</sup> Other measures of diabetes quality of care also show significant deficits.<sup>4</sup> There have been 4 popular explanations for this shortfall: (1) physicians are ignorant of current diabetes care recommendations,<sup>4,7</sup> (2) physicians disagree with these recommendations,<sup>4,7,8</sup> (3) patients are noncompliant,<sup>9,11</sup> and (4) office systems are poorly organized.<sup>5,12-14</sup>

Outcomes of diabetes care may also be particularly sensitive to characteristics of the doctor-patient relation-

ship and physicians' approach to management.<sup>15-18</sup> Unfortunately, little is known about the physician beliefs underlying diabetes management. From parallel work in assessing the management of depression<sup>19</sup> and the provision of preventive services,<sup>20,21</sup> we hypothesize that primary care physicians actively balance the need to provide comprehensive diabetes care against the preferences and circumstances of individual patients. By better understanding primary care physicians' perceptions of their diabetes management, improved interventions to support primary care physicians and their patients may be developed.<sup>22-24</sup> Thus, we conducted an exploratory qualitative study designed to increase understanding of how primary care physicians view diabetes management and explore differences in approach between family medicine physicians and general internal medicine physicians.

## METHODS

The primary data were individual semi-structured interviews.<sup>25,26</sup> The interviews were 30 to 60 minutes long, and the respondents were asked open-ended questions designed to elicit long, in-depth responses. The depth

Submitted, revised, October 8, 1998.

From the University of Nebraska Medical Center, Department of Preventive and Societal Medicine (L.D.H.) and Department of Family Medicine (J.L.S., B.F.C.) and the Group Health Foundation, Minneapolis (P.J.O.). All requests for reprints should be addressed to Jeffrey L. Susman, MD, University of Nebraska Medical Center, Department of Family Medicine, 600 South 42nd Street, Omaha, NE 68198-3075. E-mail: jsusman@mail.unmc.edu

interview is a powerful data-collection tool when (1) the focus of inquiry is narrow, (2) the respondents represent a homogeneous group and are familiar and comfortable with the interview as a means of communication, and (3) the goal is to generate dominant themes and narratives.<sup>26</sup>

An interview guide, consisting of an initial series of biographical questions and 6 open-ended "grand tour" questions, was designed using information from the relevant literature, experience of the investigators, and pilot interviews. The interview questions are shown in the Table. Open-ended planned and unplanned follow-up probes were available to the interviewer to keep the interview on the topic and to ensure that additional insights would be elicited. The goal of the interview was to elicit explanations of the respondents' management of patients with diabetes. The same interview guide was used with both the family medicine physicians and general internal medicine physicians.

**SAMPLING**

The long interview method emphasizes gathering comprehensive data from relatively few respondents.<sup>25</sup> Purposeful samples<sup>27</sup> of 10 family physicians and 9 internal medicine physicians were drawn to represent men and women of different age groups (age range: 32 to 71 years) from solo and group private practices in Connecticut. Institutional review board approval was obtained from the University of Connecticut, and informed consent was obtained from all physicians before the interviews. Interviews were conducted by a medical student trained in in-depth interviewing techniques. All interviews were conducted in the physicians' offices during July and August of 1991.

**DATA ANALYSIS**

Interviews were audiotaped, transcribed and analyzed by an "editing style." Transcribed interviews ranged in length from 7 to 15 single-spaced pages. Data analysis followed the strategy suggested by McCracken<sup>25</sup> and Crabtree and Miller.<sup>28</sup> This editing approach is a commonly used text analysis technique and has many variations based on the specific fieldwork method employed.<sup>29</sup>

Because qualitative research relies heavily on the investigator for interpretation, a multidisciplinary team was assembled for the analysis. This team consisted of a family physician (J.L.S), a medical anthropologist (B.F.C), and a graduate student in an MD/PhD program (L.D.H). The multiple perspectives ensured that the

analysis would not be unduly influenced by any single point of view. This team was independent from the group who collected the data.

The editing style data analysis process entailed several steps. Two research team members (the family physician and the graduate student) individually highlighted text they believed to be relevant and made interpretive notes or observations in the margins. They discussed each interview transcript line by line, with the goal of reaching consensus about what was important and how it should be interpreted. They then developed themes for each transcript, and compared those of the different interviews to develop overall themes. This was done with the 2 analysts blinded to whether the interviews had been with family medicine physicians or internal medicine physicians. During the last analysis stage of generating overall themes, the medical anthropologist joined the analysis sessions.

Practitioners were grouped according to their expressed management style, or patterns of management, which emerged in the analysis. Two major categories resulted: paternalistic—a more traditional management style—and patient-centered. The patient-centered management style included the physicians who viewed themselves as primarily a consultant or who emphasized a participatory or collegial/partnership relationship with the patient. All but 3 of the interview respondents could be

**TABLE**

**Questions Used by Interviewers to Elicit Explanations of the Physicians' Management of Patients with Diabetes**

- When and where were you born?
- Where did you go for your schooling (high school onwards), residency, any fellowships?
- Do you have any outside interests/hobbies?
- Tell me about your parents; are they in good health?
- Are you married? Have any kids? All in good health?
- Do you consider yourself a member of any particular religion? Are you active?

**Grand Tour questions:**

1. Would you share with me a memorable experience that you've had with a patient with diabetes?
2. What kind of different responses do you find that patients have toward their diabetes? How do you deal with these?
3. What are some of the impacts that diabetes has on a patient's everyday life? Probes: What concerns do they have? What complications do you see?
4. Would you tell me about the approach you take to patients with diabetes?

**Probes: about education, involving other health professionals**

5. How serious a disease is diabetes?
6. How have your views about diabetes changed?

classified using this scheme; the remaining 3 did not express a clear management style. After this process was completed and the individual and overall themes had been developed, the practice specialties of the interview physicians were revealed. We then looked for any associations between specialty and management style. Themes were further developed with repeated reference to the primary text, and all transcripts were searched for confirming and dissuading evidence.

## RESULTS

The primary theme to emerge was that the management of diabetes was a balancing act, with physicians tempering ideal management with the realities of patient adherence, preferences, and circumstances. The theme of balance emerged in multiple ways. First, physicians consistently described the management of patients with diabetes as a compromise between what would be ideal medical management and what they perceive to be realistic goals for the patient. Most physicians commented on the serious nature of diabetes. Patient responses to the disease were described as fitting a bell-shaped curve, with denial and noncompliance on one end and acceptance and motivated compliance on the other.

"I've learned to be a little flexible; you roll with the punches and you do the best you can with what you've got."  
—interviewed physician

Physicians described the overall objective of "keeping the patient as well as possible," and acknowledged that their management fell short of the ideal.

"You're not going to accomplish your goals for them. . . . Rather, the goals have to be read somewhere in-between. . . . given their background and motivation, their acceptance of the disease."  
—interviewed physician

The physicians' perceptions of which aspects of the patients' lives they considered part of their domain of influence varied from primarily biomedical aspects, such as medication and diet, to more psychosocial issues. Most physicians believed that patient education was important, but varied in their approaches from informal office sessions to structured outside programs.

"When somebody isn't well controlled, I keep trying and working and sending them back to Susan [the nurse educator] and trying to see if we can make it better. . . . Without an educated patient, you're nowhere."  
—interviewed physician

"I think [education is] very important. . . . I tend not to send them to a special class. Many hospitals have a 3-day program and . . . that's overkill for a lot of patients. . . . So I think the physician has to do a lot of the education himself. Also our nurse. . . . A lot of education is necessary."  
—interviewed physician

Physicians discussed giving the patient primary responsibility to enact behavioral change and felt largely ineffective in supporting these efforts.

"I try to realize that it's not my responsibility. . . . they come to me for my best advice, and it's up to them whether they want to follow it or not."  
—interviewed physician

"In the beginning you tend to feel sort of guilty, you say, 'What am I doing wrong, how come I can't control this and do a better job with this person?' But I guess the final response is 'Well, it's not totally my responsibility.'"  
—interviewed physician

Thus, these doctors noted the importance of good diabetes care, but felt hindered in achieving this goal because of varying levels of patient adherence. Interestingly, none of the physicians discussed office systems to support diabetes care.

Physicians also acknowledged the importance of patient preference.

"I think every time I battle with saying 'You know, you just—I can't be your doctor unless you listen to me.' . . . I think you have to hold back from that and realize that people are basically gonna do what they want in terms of their understanding and abilities."  
—interviewed physician

"I don't want anyone to upset their whole lifestyle to treat a disease. It's not worth that, okay? If they feel miserable because of all the rules that I set for them to follow, then I'm not helping them at all. . . . They're miserable, totally miserable doing that, then . . . you're probably not treating them the right way. You gotta realize that life is to be enjoyed, too. It's not just to do, you know, little tasks for your doctor."  
—interviewed physician

Finally, physicians discussed the importance of modifying the goals of diabetes care to fit individual patient circumstances.

"I think it [a person's blood sugar goal] varies greatly from person to person. You need to find out their situation and what their goals are, and adjust to them."  
—interviewed physician

"[Glycemic] control is a definition that's not easy to give you. It takes into account the patient's lifestyles, it takes into account his age."  
—interviewed physician

Although there was an intellectual acknowledgment of the compromises necessary to strike balance, physicians still expressed frustration.

"I just try to support them and try to get them to do what they can do, and try to help them through when they have a problem. Underlying, it's frustration, but the

way I cope with that is by not putting excess energy into trying to fix the problem that can't be fixed without their attending to the primary process."

—interviewed physician

Thus, diabetes management was viewed as a process of compromise born of a discrepancy between ideal care and the pragmatic reality of patient adherence, preferences, and circumstances.

A range of physician management styles was found, with some physicians practicing in a paternalistic model of care,<sup>30</sup> and others in a patient-oriented approach.<sup>31</sup> For example, one physician noted, "They [some patients] just don't cooperate . . . [Patients] know that if they don't follow what the doctor tells them with respect to their insulin and their diet that they're gonna end up in the hospital. . . . Just take care of it, just like you have your breakfast." Another remarked, "I try to allow them [patients] to establish the, you know, physician-patient relationship as much as I do." Physicians who were identified as being more patient-centered acknowledged a broader impact of diabetes on their patients' lives that went beyond the basics of medications, diet, and exercise. There did not appear to be any relationship between the physician's age, medical specialty, and management style. No pattern was discovered that differentiated between the family medicine physicians and general internal medicine physicians with regard to management style.

## DISCUSSION

This study highlights the challenges physicians face between managing diabetes ideally and coping with the realities of patient adherence, expectations, and circumstances. Physicians, whether internists or family practitioners, all viewed diabetes as a serious problem and largely agreed with the goals of good glycemic control and preventing complications. Nonetheless, they were quick to note that while some patients faithfully follow the myriad management recommendations, the vast majority do not. Whether paternalistic or patient-centered, internist or family physician, these doctors expressed frustration in achieving ideal management against a backdrop of non-compliance, varied patient expectations, and specific patient circumstances. They also expressed little confidence in helping patients change behaviors over the long haul or dealing with more challenging patients. Office systems were not mentioned as part of an overall approach to care.

What do these findings suggest for improving diabetes care? First, the development of diabetes guidelines and related performance review criteria may increase physicians' frustration with the gap between ideal and attainable care. Although noncompliance with guidelines is traditionally thought to stem from a lack of awareness or disagreement,<sup>43</sup> the physicians in our study agreed with the overall goals of good glycemic control and prevention of complications. What they lacked were tools to accom-

plish the goals of these guidelines. One solution to this dilemma might be to better prioritize recommendations and acknowledge the need to individualize therapy. Developers of diabetes guidelines might emphasize ways to tailor strategies, emphasizing different approaches to diet, exercise, and medication for selected individuals.

Moreover, physicians continue to need training and support for interventions that enhance behavioral change in patients.<sup>32-34</sup> Improved patient counseling strategies could be used by all physicians. While physicians articulately discussed differences in patient adherence, preferences, and circumstances, they spoke of patient behavior as following stereotypes, often attributed to their personalities. None of the doctors mentioned strategies to periodically assess a patient's "stage of change"<sup>35</sup> or capitalize on a window of opportunity.<sup>36</sup> A recent qualitative study of patients' responses to diabetes care interventions suggests that clinicians need to monitor patients for changes in their diabetes-related attitudes over time, regardless of whether the physician is actively trying to effect changes.<sup>37</sup> Therefore, physicians might be given new tools to actively assist patient behavioral change and maximize timely interventions.

Efforts are being made to help physicians manage diabetes care. Guidelines, for example, outline a large number of procedures that can be done with patients.<sup>38</sup> But it is unrealistic to expect physicians to follow all of these recommendations without the aid of office systems, which were absent in these physicians' discussions of their approach to diabetes management. An "office system" refers to a series of routines that includes a set of tools (eg, flow sheets, reminder notices, and chart stickers) and specified roles for office staff and physicians that consistently address each step in performing a patient management service, such as prevention.<sup>39</sup> The existence of office systems was not mentioned by the physicians during our interviews. This does not necessarily mean that physicians do not use them, but it suggests that they are not an important factor in these physicians' management approaches. Some quality-of-care studies have proposed that low compliance with management guidelines is due to lack of adequate feedback to physicians about how they are doing and what has been done for each patient.<sup>13,14</sup> Office systems incorporating monitoring with feedback have been shown to improve care.<sup>40</sup> Practices have been found to make lasting changes after an "office system intervention," although not all the tools offered may be adopted by every practice.<sup>41</sup> Individualizing office systems may increase the likelihood of success.

Finally, it is possible that consultation and referral for diabetes may be an appropriate management strategy. Recent work has suggested that for some patients, referral to a diabetes specialist for management or at least for patient education may improve patient outcomes.<sup>42-44</sup> Given the difficulties of managing patients with multiple chronic and acute illnesses<sup>45</sup> and the complexity<sup>46</sup> and competing demands<sup>47</sup> of the primary care practice environment, a team approach may assist the primary care provider by

augmenting the resources available for management of this complex disease.

This study has significant limitations. As a qualitative, exploratory study it was designed to generate ideas and hypotheses, not to test them, and was based on physicians' subjective perceptions. Interviews with patients and other office personnel might generate different themes about diabetes management. Also, these interviews were conducted in 1991, before publication of some of the strongest evidence<sup>1,2</sup> supporting tight glycemic control as a management strategy and before much of the office systems literature emerged. Nevertheless, physicians discuss a more active management approach to diabetes, but one that is limited by the challenges of changing multiple behaviors with few tools in a busy office setting. We believe this theme is transferable to other settings and offers significant insights into the enhancement of diabetes care.

## CONCLUSIONS

The physicians in our study describe diabetes care as an ongoing balancing act. Further research exploring methods to enhance physician counseling, improve patient adherence, and recognize windows of opportunity are likely to have more success than the dissemination of further diabetes care guidelines.

## ACKNOWLEDGMENTS

This work was supported in part by the University of Nebraska Medical Center MD/PhD Scholars Program.

## REFERENCES

1. Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993; 329:977-86.
2. UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. *BMJ* 1998; 317:703-13.
3. Greenfield S, Rogers W, Mangotich M, Carney MF, Tarlov AR. Outcomes of patients with hypertension and non-insulin-dependent diabetes mellitus treated by different systems and specialties: results from the Medical Outcomes Study. *JAMA* 1995; 274:1436-44.
4. Weiner JP, Parente ST, Garnick DW, Fowles J, Lawthers AG, Palmer H. Variation in office-based quality: a claims-based profile of care provided to Medicare patients with diabetes. *JAMA* 1995; 273:1503-8.
5. Stolar MW, Endocrine Fellows Foundation Study Group. Clinical management of the NIDDM patient. *Diabetes Care* 1995; 18:701-7.
6. Miller KL, Hirsch IB. Physicians' practices in screening for the development of diabetic nephropathy and the use of glycosylated hemoglobin levels. *Diabetes Care* 1994; 17:1495-7.
7. Kenny SJ, Smith PJ, Goldschmid MG, Newman JM, Herman WH. Survey of physician practice behaviors related to diabetes mellitus in the U.S. *Diabetes Care* 1993; 16:1507-10.
8. Kerr CP. Improving outcomes in diabetes: a review of the outpatient care of NIDDM patients. *J Fam Pract* 1995; 40:63-75.
9. King DE, Peragallo-Dittko V, Polonsky WH, Prochaska JO, Vinicor F, O'Connor DL. Strategies for improving self-care. *Patient Care* 1998; 15:91-111.
10. Anderson RM, Donnelly MB, Davis WK. Controversial beliefs about diabetes and its care. *Diabetes Care* 1992; 15:859-63.
11. O'Connor PJ. From blame to understanding: moving diabetes care forward. *J Fam Pract* 1998; 46:205-6.
12. O'Connor PJ, Rush WA, Peterson J, et al. Continuous quality improvement can improve glycemic control for HMO patients with diabetes. *Arch Fam Med* 1996; 5:502-6.
13. Gohdes D, Rith-Najarian S, Acton K, Shields R. Improving diabetes care in the primary health setting: the Indian Health Service experience. *Ann Int Med* 1996; 124:149-52.
14. Wylie-Rosett J, Basch C, Walker EA, et al. Ophthalmic referral rates for patients with diabetes in primary-care clinics located in disadvantaged urban communities. *J Diab Comp* 1995; 9:49-54.
15. Greenfield S, Kaplan SH, Ware JE, Yano EM, Frank HJL. Patients' participation in medical care: effects on blood sugar control and quality of life in diabetes. *J Gen Intern Med* 1988; 3:448-57.
16. Boyle RG, O'Connor PJ, Pronk NP, Tan A. Stages of change for physical activity, diet, and smoking among HMO members with chronic conditions. *Am J Health Promotion* 1998; 12:170-5.
17. O'Connor PJ, Desai J, Rush WA, Cherney LM, Solberg LI, Bishop DB. Is having a regular provider of diabetes care related to intensity of care and glycemic control? *J Fam Pract* 1998; 47:290-7.
18. Golin CE, DiMatteo MR, Gelberg L. The role of patient participation in the doctor visit: implications for adherence to diabetes care. *Diabetes Care* 1996; 19:1153-64.
19. Susman JL, Crabtree BF, Essink G. Depression in rural family practice. *Arch Fam Med* 1995; 4:427-31.
20. Crabtree BF, Miller WL, Aita V, Flocke S, Stange K. Primary care practice organization and preventive services delivery: a qualitative analysis. *J Fam Pract* 1998; 46:403-9.
21. McIlvain HE, Crabtree BF, Gilbert C, Havranek R, Backer EL. Current trends in tobacco prevention and cessation in Nebraska physicians' offices. *J Fam Pract* 1997; 44:193-202.
22. Bertakis KD, Callahan EJ, Helms LJ, Azari R, Robbins JA, Miller J. Physician practice styles and patient outcomes: differences between family practice and general internal medicine. *Med Care* 1998; 36:879-91.
23. Tuttleman M, Lipsett L, Harris MI. Attitudes and behaviors of primary care physicians regarding tight control of blood glucose in IDDM patients. *Diabetes Care* 1993; 16:765-72.
24. Weinberger M, Cohen SJ, Mazzuca SA. The role of physicians' knowledge and attitudes in effective diabetes management. *Soc Sci Med* 1984; 19:965-9.
25. McCracken G. The long interview. In: Miller ML, Van Maanen J, Manning PK, eds. *Qualitative research methods series*. Vol. 13. Newbury Park, Calif: Sage Publications, 1988:88.
26. Miller WL, Crabtree BF. Depth interviewing: the long interview approach. In: Stewart M, Tudiver F, Bass MJ, Dunn EV, Norton PG, eds. *Tools for primary care research*. Vol. 2. Newbury Park, Calif: Sage Publications, 1992:194-208.
27. Kuzel AJ. Sampling in qualitative inquiry. In: Crabtree BF, Miller WL, eds. *Doing qualitative research*. Vol. 3. Newbury Park, Calif: Sage Publications, 1992:31-44.
28. Crabtree BF, Miller WL. The analysis of narratives from a long interview. In: Stewart M, Tudiver F, Bass MJ, Dunn EV, Norton PG, eds. *Tools for primary care research*. Vol. 2. Newbury Park, Calif: Sage Publications, 1992:209-20.
29. Miller WL, Crabtree BF. Qualitative analysis: how to begin making sense. *Fam Pract Res J* 1994; 14:289-97.
30. Emanuel EJ, Emanuel LL. Four models of the physician-patient relationship. *JAMA* 1992; 267:2221-26.
31. McWhinney IR. *A textbook of family medicine*. Oxford, England: Oxford University Press, 1997:448.

32. Russell NK, Roter DL. Health promotion counseling of chronic-disease patients during primary care visits. *Am J Public Health* 1993; 83:979-82.
33. Lorenz RA, Bubb J, Davis D, et al. Changing behavior: practical lessons from the diabetes control and complications trial. *Diabetes Care* 1996; 19:648-52.
34. Larme AC, Pugh JA. Attitudes of primary care providers toward diabetes. *Diabetes Care* 1998; 21:1391-6.
35. Prochaska JO, DiClemente CC. Stages of change in the modification of problem behaviors. In: Hersen M, Eisler RM, Miller PM, eds. *Progress in behavior modification*. Newbury Park, Calif: Sage Publications, 1992:184-218.
36. Branch WT, Malik TK. Using 'windows of opportunities' in brief interviews to understand patients' concerns. *JAMA* 1993; 269:1667-8.
37. O'Connor PJ, Crabtree BF, Yanoshik K. Differences between diabetic patients who do and do not respond to a diabetes care intervention: a qualitative analysis. *Fam Med* 1997; 29:424-8.
38. American Diabetes Association. Standards of medical care for patients with diabetes mellitus. *Diabetes Care* 1998; 21:S23-31.
39. Leininger LS, Finn L, Dickey L, et al. An office system for organizing preventive services: a report by the American Cancer Society Advisory Group on preventive health care reminder systems. *Arch Fam Med* 1996; 5:108-15.
40. Mandelblatt J, Kanetsky PA. Effectiveness of interventions to enhance physician screening for breast cancer. *J Fam Pract* 1995; 40:162-71.
41. Carney PA, Dietrich AJ, Keller A, Landgraf J, O'Connor GT. Tools, teamwork and tenacity: an office system for cancer prevention. *J Fam Pract* 1992; 35:388-94.
42. Levitan CS, Salas JR, Wilens IF, Zumoff B. Impact of endocrine and diabetes team consultation on hospital length of stay for patients with diabetes. *Am J Med* 1995; 99:22-8.
43. Ho M, Marger M, Beart J, Yip I, Shekelle P. Is the quality of diabetes care better in a diabetes clinic or in a general medicine clinic? *Diabetes Care* 1997; 20:472-5.
44. Campbell EM, Redman S, Moffitt PS, Sanson-Fisher RW. The relative effectiveness of educational and behavioral instruction programs for patients with NIDDM: a randomized trial. *Diabetes Educator* 1996; 22:379-86.
45. Redelmeier DA, Tan SH, Booth GL. The treatment of unrelated disorders in patients with chronic medical diseases. *N Engl J Med* 1998; 338:1516-20.
46. Miller WL, Crabtree BF, McDaniel R, Stange KC. Understanding change in primary care practice using complexity theory. *J Fam Pract* 1998; 46:369-76.