M.D. NEWS™ Magazine

Medical Feature

Triangle Edition
May 2001

Diabetes Disease Management:
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The management of diabetes in primary care will continue to be a challenge into the new millennium. Currently, the annual costs associated with diabetes in the United States are approximately $100 billion.[1] Several surveys have examined the quality of care provided to the diabetic patient in representative medical practices in the United States, showing that in both managed care and fee-for-service settings, the care falls far short of ADA standards.[2,3] Overall, there are 30.3 million outpatient visits relating to the management of diabetes in one year, and according to a Roper Starch Worldwide 2000 Survey of the Diabetes Patient Market, the doctors seen most frequently by diabetic patients are their primary care physicians, with a mean of 5.5 office visits per year. Therefore, primary care physicians, with their training in the management of chronic medical conditions, are well suited to lead the efforts to change the way patients with diabetes are managed into the 21st century.

The keys to a successful primary care-driven diabetes disease management program are as follows: first, a patient-centered, team-based approach including physicians, nurse educators, clinical pharmacists, nutritionists and social workers who are committed to improving the quality of care for patients with diabetes must be created; second, technology must be embraced to create an electronic patient registry that will allow for computerized tracking of important clinical variables in the management of diabetes; third, the primary care office visit must be reengineered to allow for disease-specific scheduling and to extend the amount of time patients have to communicate with their health care team; and lastly, the patient must become engaged in the management of their diabetes through a variety of educational efforts to improve their awareness and understanding of their chronic condition.

A pilot project is currently under way to evaluate these ideas in the management of patients with diabetes within Duke Primary Care. A team of primary care physicians, clinical pharmacists, nurse educators and nutritionists has been created to address the quality of diabetes management. The primary care physician continues to be the team leader in the management of their patients, with the nurse educators and nutritionists extending and enhancing the educational component of diabetes management. Topics discussed with patients include counseling on dietary modification and weight loss, the complications of diabetes, a review of exercise programs, and the importance of proper foot care and home blood glucose monitoring.

The clinical pharmacist present in the primary care clinic can schedule diabetic pharmacy appointments and counsel the patient about their medications. The clinical pharmacist may also assist with the management of the patient's medications, and recent changes to state laws help to enhance this process. The state of North Carolina passed new legislation called the Clinical Pharmacist Practitioner Act in the summer of 2000, with the law taking effect April 1, 2001. This legislation received statewide support from the medical and pharmacy societies and associations, and was crafted under the authority of the North Carolina Boards of Medicine and Pharmacy. This law allows a Clinical Pharmacist Practitioner (CPP) to work in collaboration with a physician to help manage patients who have certain medical conditions such as diabetes. The clinical pharmacist can evaluate patients in the pharmacy, clinic, or hospital setting. Communication, both in written or spoken form, will be a key feature of the interactions between the CPP and their physician colleague.

The Clinical Pharmacist Practitioner will have legal authority to write for or adjust prescription medications based on protocols for the manage-

Phil Rodgers, Pharm.D., and Scott Joy, M.D., collaborate on the treatment plan for a patient with diabetes. Photo by Bob Boyd.

On the Cover: A patient-centered approach to diabetes disease management at Duke Primary Care. From left, Mary Pearyer, Phil Rodgers, Pharm.D., Betty West, Scott Joy, M.D., and Frederick Schneider. Photo by Bob Boyd.

Jeff Carter, R.Ph., and Ollie Ellison review a graphic representation of home blood glucose values using the WinGlucofacts software. Photo by Bob Boyd.

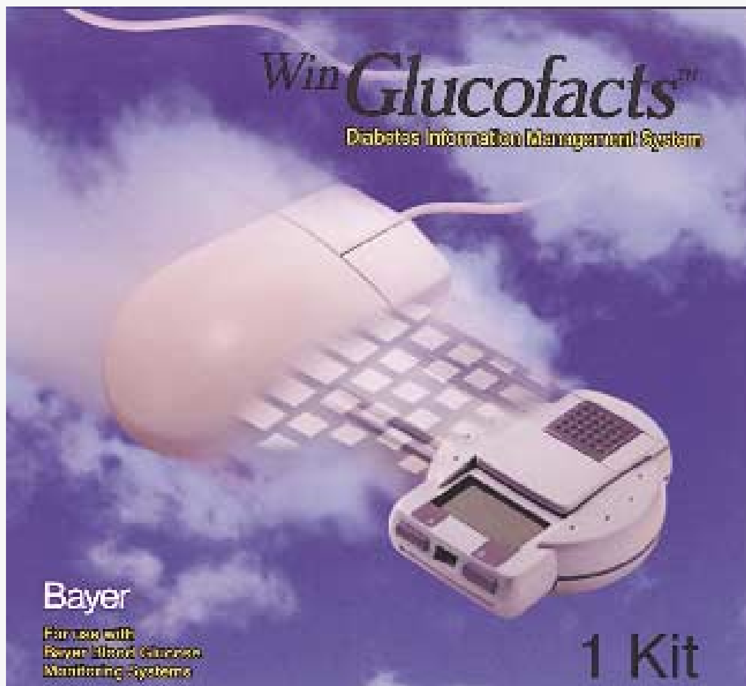
ment of particular medical conditions. These protocols are designed and agreed to mutually by the physician and clinical pharmacist. A pharmacist who wants to be a CPP will have advanced credentials, such as a Doctor of Pharmacy degree, and often will have completed additional training as a pharmacy resident or will have participated in an approved certificate program in a particular area of clinical practice. These credentials, plus supporting documents from the CPP's physician "partner," are presented to the Boards of Pharmacy and Medicine for approval. "I have been happy to have the clinical pharmacists working along with me in my clinic as part of this primary care diabetes management program," says Scott V. Joy, M.D., assistant clinical professor of medicine at Duke University Medical Center, and team leader for the primary care diabetes management program. "As a team, we work to develop and recommend cost-effective, evidence-based strategies for the medical management of our patients with diabetes, and our interactions have been very positive and beneficial for both myself and my patients." Philip Rodgers, Pharm.D., BCPS, CDE, who is the clinical pharmacist at the Duke Internal Medicine clinic with Dr. Joy, states, "having the CPP will enhance the care I can provide for patients, facilitating my ability to get diabetes-related medications to patients without having to bother the physician. The CPP Act will make it easier for many physician-pharmacists teams to form, not just in clinics, but in retail settings, where access is easier than doctors' offices and patients frequently visit anyway."

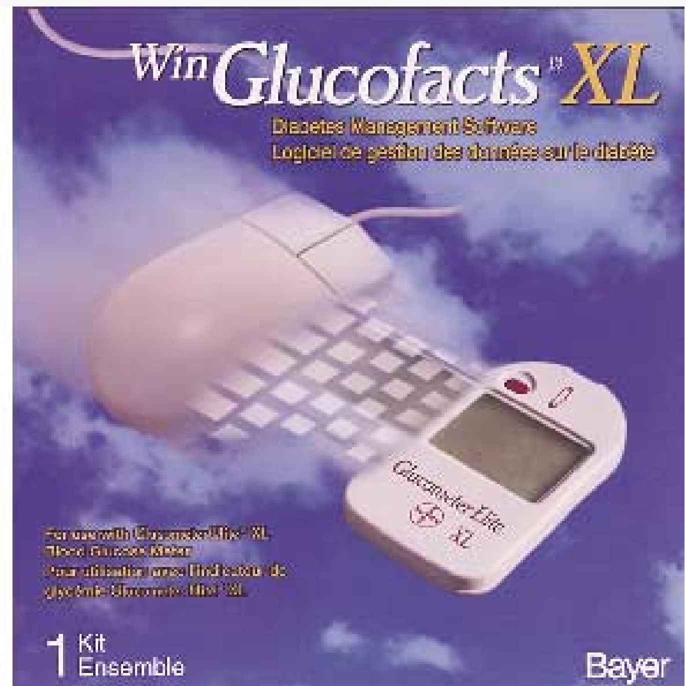
The electronic centerpiece of this approach to primary care, team-based diabetes disease management is an innovative computer program, known as WinGlucofacts™ Diabetes Management Software, available from Bayer Diagnostics. Using this program, the health care team has created an electronic registry of patients who are currently being treated for diabetes within the pilot clinic site at Duke. This registry includes patient demographic information and pertinent lab values such as hemoglobin A_{1C}, LDL cholesterol and serum creatinine. WinGlucofacts software allows for the practicing physician or diabetes care team to query the laboratory or demographic data in this population of diabetic patients. Using this program, individual physician, or entire practice trends that are relevant in the management of diabetes, can be identified by different search techniques and data management options included in the program, to make patient recommendations that improve the measurements of quality in treating patients with diabetes.

This database, or electronic patient registry, can be a benefit in any primary care practice to better manage a population of patients who have diabetes. Follow-up appointments between patients and the diabetes care team can be determined based on hemoglobin A_{1C} values, with poorly controlled patients interacting with the team on a more frequent basis. The percentage of patients who have had their cholesterol checked and have reached National Cholesterol Education Program (NCEP) target values within the last year can be determined from the database, and those who have not can be contacted by the care team to have this important test done. Also, outpatient prescribing trends can be studied to determine the combination of medications that lead to the best outcomes for improved glycemic control.

Patients are also encouraged to bring their Glucometer® DEX® and Glucometer Elite XL® meters into the office for a team-based interpretation and to obtain various graphical representations of their home glucose trends available through the WinGlucofacts software. Regarding the effectiveness of the graphical representations of blood glucose readings, Frederick Schneider, a patient participating in the program, says that the printouts "give me a visual picture rather than a paper full of numbers. This helps me better understand my target sugar values." Patients are also given a companion program that they can use on their home computers that allows them to follow their glucose values over time, using the same graphic representations as discussed with them by the diabetes care team in the clinic. Mary Pearyer, a patient in the program, says that she uses this program to "improve and organize my personal medical records, and it keeps me interested in checking my blood sugar values to improve my diabetes control."

To allow for more time in educating





the patient about the importance of home blood glucose monitoring and the meaning of the values, the clinical practice has been adapted to accommodate the time needed for additional counseling. Patients are encouraged to schedule disease-specific diabetes follow-up appointments held monthly with the primary care physician, when all team members are present and laptop computers are available to download the meter data. At these visits, the focus is on diabetes care, with the physician and other team members reviewing all aspects of diabetes management and individual treatment goals with the patients. Group scheduling of patients with diabetes is an option that the team is developing as well, so that patients not only learn about diabetes from the members of the health care team, but also gain insight and support from others with diabetes.

In addition to the clinic-based pharmacist, pharmacists in the Duke Outpatient Pharmacy are in an ideal position to reinforce established treatment goals and objectives. Each time the patient presents to the pharmacy to fill prescriptions, an opportunity is created for the pharmacists to provide medication counseling and diabetes self-management education.

Jeff Carter, R.Ph., has been piloting an educational project at the Duke Outpatient Pharmacy using the WinGlucofacts software, in a more traditional, pharmacy retail setting. In analyzing the blood glucose values obtained from the patient's meter, Carter has been able to help his patients better understand how to optimize their glycemic control. "WinGlucofacts is a powerful educational tool. It takes raw numbers from the meter and makes them come alive with full-color charts and graphs. Patients really love it. It helps them to understand how changes in their lifestyle or in their medications have measurable benefits to their health, and that is very motivating for them."

Patient satisfaction with this pilot program has been overwhelmingly positive, as 96 percent of participating patients surveyed rated as excellent both the teaching methods of the nurse educator and the information provided regarding personal diabetes management. Betty West, a patient participating in the program, was asked if the program has been beneficial to her. She replied, "In one word, yes. I learned a lot about the little things that you need to know in the treatment of diabetes, like the importance of sticking your finger and recording the sugar values on a daily basis, and the importance of eating well." According to the Roper Starch Worldwide 2000 survey of the Diabetes Patient Market, 62 percent of patients surveyed agreed strongly/somewhat with the statement that "as long as my doctor or nurse says it is OK, I like to try new techniques for managing my diabetes on my own." This Duke Primary Care team approach to diabetes disease management will continue to be innovative in their processes of care and adaptive to the needs of the patients with diabetes. Other primary care physicians are encouraged to experiment with different approaches in their practices to better manage their diabetic patients, and to give their patients new ideas and techniques to empower them in managing this common medical condition.

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[1]American Diabetes Association Web site: http://www.diabetes.org/ada/facts.asp#costs.

[2]Hiss, RG. "Barriers to care in non-insulin-dependent diabetes mellitus. The Michigan Experience." *Ann Intern Med*. 1996; 124 (1 Pt2):146-48.

[3]Peters, AL; Legorreta, AP; Ossorio, RC; Davidson MB. "Quality of outpatient care provided to diabetic patients. A health maintenance organization experience." *Diabetes Care*. 1996; 19(6):601-606.