Use of an Electronic Diabetes Registry Augmented with Low-Cost Device Connectivity

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Abstract: An Internet-based patient registry for diabetes management called MediCompass® was piloted for 9 months. The system allows physicians to capture and track relevant data, display it graphically, and screen patient populations for individuals who would benefit from an intervention. A unique feature of the system is automated capture of point-of-care monitoring data, including blood glucose. To date, the principal value of the system has been the capture and graphic display of patient data for individual patient care. As more data is captured over time, the population case management value of the system will come to the forefront, enabling better identification of patients who need care interventions. The system enables the evaluation of patients' adherence to their regimens, a critical but difficult metric to obtain from populations with chronic diseases. Evidence-based quality measures can be tracked and reported. Finally, the system facilitates report generation for payers and others who request population data on patients using a unique ethical, private, and secure framework.

Key Words: diabetes, chronic disease, device connectivity, case management, registry

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Monitoring of capillary glucose at the point of care is a key enabler of the modern management of diabetes mellitus. It allows the patient and those caring for him to have a more precise basis for adjusting therapy. However, it also results in a greater volume of data to review with the health care team. The traditional record-keeping tool for patients with diabetes has been the glucose logbook. This manual transcription of device results from the patient is labor-intensive to produce, suffers from legibility and data quality issues, and is difficult for the health care team to interpret. In the precious minutes that the patient shares with his or her physician, there is little chance for efficient communication with such manual records. Manufacturers of glucose meters added memory and developed interfaces and software to allow better access to the data many years ago. However, not more than a small fraction of patients or physicians make use of these capabilities. Barriers include interfacing complexity, incompatible data transfer protocols, difficult-to-use software, and lack of a computer.

An estimated 17.0 million people (6.2% of the population) in the United States have diabetes.[1] With an estimated annual incidence of 1 million newly diagnosed patients, better data management tools specially designed to handle the health of individuals and populations are needed. This article presents the initial experience with one such tool.

MATERIALS AND METHODS

In early 2002, the MediCompass® data registry (iMetrikus Inc., Carlsbad CA) was deployed as a pilot study to a 2-physician, 2-site endocrinology practice in southern California. Every patient presenting with diabetes for a period of 9 months was eligible for entry into the registry. The MediCompass system serves as a patient registry for diabetes management, allowing the physicians to capture and track the relevant data, display it graphically, and screen their patient population for individuals who would benefit from an intervention. A unique feature of the system is automated capture of patient monitoring data. Patient-measured glucose levels are downloaded from the patient's blood glucose meter to the iMetrikus system. Depending on the device and frequency of blood glucose checks, patients can store and download from 1 to 6 months' data at a time. Initially, downloading was done when the patient arrives at clinic, but patients were encouraged to submit data from home, using an inexpensive (<$100) portable device (MetrikLink®) that sends the data to the MediCompass system by secure dial-up connection. MetrikLink can connect to multiple point-of-care devices, including glucose monitors and features a user-friendly, single-button push interface (Fig. 1).

Patients' diabetes type, pulse, blood pressure, height, weight, and diabetes medications were hand entered by administrative staff using a specially designed optical character recognition form (MetrikScan™). Patients could view their data and enter medications online using iMetrikus' MediCompass

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FIGURE 1. MetrikLink remote monitoring system connects to multiple point-of-care devices.

patient portal. Attempts were made to obtain a complete data set for each patient including HbA1c measurement, downloaded glucose monitoring data, and diabetes medications. Dates and results of last retinal examination, foot examination, and urine microalbumin tests were also entered into the system. Reports were provided to physicians listing patients with HbA1c values above the desired range, grouped by current medications. Additionally, an exception report listing all patients that had not downloaded their meters with a MetrikLink home in the past 30 days was prepared.

RESULTS

A review of billing records found that a total of 680 distinct patients with diabetes had an office visit during the observation period, during which time 647 patients (95%) were added to the registry. Of these patients, 562 (87%) had at least 1 clinical measurement from a visit entered into the MediCompass system. Overall, 404 (62%) patients had a HbA1c value documented in the registry done within the prior 6 months; 553 (85%) had a HbA1c within the prior 12 months. A total of 252 patients (39%) had a retinal examination, 294 (46%) had a microalbumin, and 308 (48%) had a foot examination documented within a 1 year time frame. A total of 288 patients (45%) had glucose meter downloads, and 254 (39%) had data on medication use, HbA1c values, and downloaded glucose data. All of these percentages increased during the observation period as experience with the system grew.

A further benefit observed was the enhancement of care between visits. Patients were instructed to transmit their most recent glucose testing results via MetrikLink prior to calling for advice regarding therapy adjustments. This allowed the physicians caring for them to view tabular and graphic summary of the most recent point-of-care data for the highest-quality advice (Fig. 2).

DISCUSSION

This initial experience with the MediCompass system demonstrates the feasibility of using an Internet-based registry to help manage diabetes in a subspecialty medical practice. It further demonstrates the opportunity to integrate remote point of care glucose testing into the registry and daily clinical practice.

Use of the scanning tool for data entry produced an error rate that was higher than anticipated. This appeared to decrease the number of HbA1c, microalbumin, foot, and retinal examinations that were added to the registry. Although this improved with refinements introduced during the observation period, a conversion to on-line data entry using quick-entry "wizards" is planned. The registry will provide the ability to produce HEDIS (Health Plan Employer Data and Information Set) compliance reports on demand without performing costly chart reviews.

As more data is captured over time, the outreach value of the system will come to the forefront, enabling better identification of patients who need care interventions. The exception reports listing the patients with data out of range and patients with insufficient data are expected to support this strategy. The downloaded data from the glucose measuring devices enabled the physicians to easily evaluate patients' adherence to their monitoring regimens. The coupling of this data with an incentive program that provides rewards for patients that adhere to their regimens is expected to produce further benefits.

Finally, the system was able to generate reports suitable for insurers and others who might request population data on patients using a unique ethical, private, and secure framework. With the HIPAA (Health Insurance Portability and Accountability Act of 1996) regulations, concern for the security and privacy of personal health information will dominate the evaluation of any new system. MediCompass is fully compliant with the HIPAA statute as it is currently written. Encrypting the data from the point of transmission up to and including the field level in the database provides security. Privacy is ensured with the use of a "privacy key," which links the patient's data to the health care professional(s) by mutual consent. The privacy key enables the patient to share his identifiable personal health information with his or her health care professional and to revoke this privilege at any time.

CONCLUSION

The care of patients with diabetes is complex. Health care professionals can meet the challenges of this increasingly common condition by thoughtfully adopting new technology. The principal initial value of the system was the capture and graphic display of patient data for use during the clinic visit. The system's ability to capture data from essentially all current

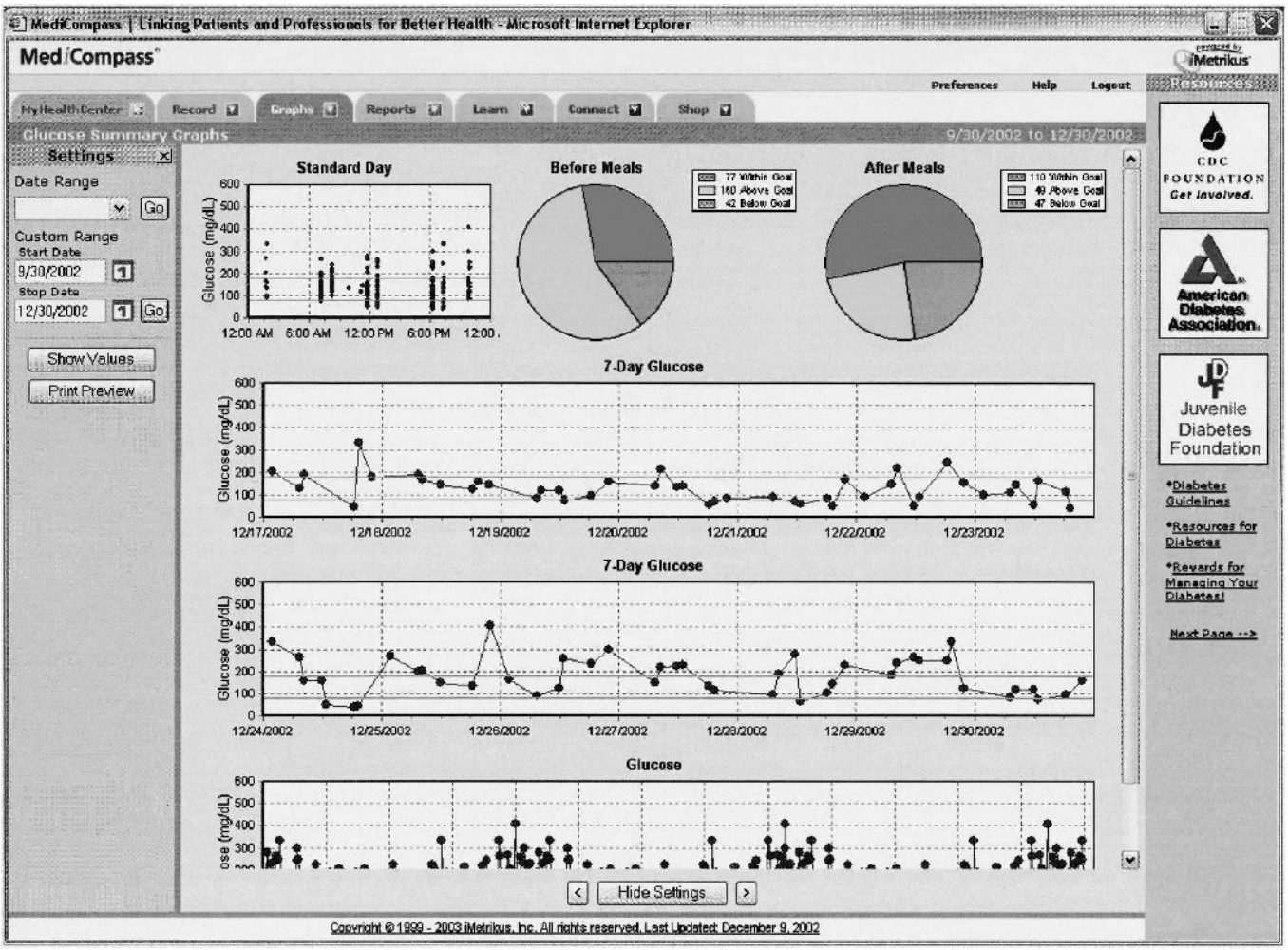

FIGURE 2. Medicompass Pro Health Management System charts point-of-care data.

point-of-care glucose meters in either the home or clinic setting is a unique feature that simplifies the health care team's task of data management.

In standard medical practice, health care is delivered episodically, based on office and hospital encounters, to patients with chronic illness. Between encounters is there is low data and information exchange and less-than-optimal clinical productivity. This study demonstrates that a system to bridge this gap in care coupled with appropriate point-of-care testing is now feasible and helpful to both health care professionals and patients.

Finally, the MediCompass system shows promise as a population case management tool, enabling better identification of patients who need care interventions. With an architecture designed with a priority on security and privacy, it can generate reports that will help health care professionals, insurers, and industry collaborate to promote better health for patients with chronic diseases.

REFERENCES

1. National Estimates of the Prevalence of Diabetes. March 27, 2002. Available at: http://www.cdc.gov/diabetes/pubs/estimates.htm. Accessed November 30, 2002.