Improving Primary Care for Patients With Chronic Illness

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Mr Sugarman, a 64-year-old patient with diabetes, comes for his 15-minute visit with Dr Madden. After evaluating Mr Sugarman’s acutely painful knee and treating his gastroesophageal reflux disease, Dr Madden has 3 minutes left to assess diabetic control. Having fruitlessly searched through Mr Sugarman’s medical records to find the last eye examination results and hemoglobin A1c (HbA1c) and lipid levels, Dr Madden has 3 minutes left to search for Dr Madden—deliver system redesign, decision support, health care organization, and community resources—can produce system reform in which informed, activated patients interact with prepared, proactive practice teams. Case studies are provided describing how components of the chronic care model have been implemented in the primary care practices of 4 health care organizations.

One hundred million persons in the United States have at least 1 chronic condition. Half of these individuals have more than 1 chronic illness. Eighty-eight percent of people aged 65 years or older have 1 or more chronic illnesses, and one quarter of these have 4 or more conditions. Chronic illness accounts for three quarters of total national health care expenditures.

This article is the second in the series Innovations in Primary Care. The initial article summarized disturbing data on chronic illness care. The majority of patients with hypertension, diabetes, tobacco addiction, hyperlipidemia, congestive heart failure, chronic atrial fibrillation, asthma, and depression are inadequately treated. Redesign of primary care has been proposed to close the quality chasm between current practices and optimal standards. How such a redesign might be accomplished is the subject of this 2-part article.

Tyranny of the Urgent
What is behind the deficiencies in chronic disease care? Frequently, the acute symptoms and concerns of the patient crowd out the less urgent need to bring chronic illness under optimal management. Clinicians—as in the vignette describing Dr Madden—routinely experience this tyranny of the urgent.

Under a system designed for acute rather than chronic care, patients are not adequately taught to care for their own illnesses. Visits are brief and little planning takes place to ensure that acute and chronic needs are addressed. Lacking is a division of labor that would allow non-physician personnel to take greater responsibility in chronic care management. Too often, caring for chronic illness features an uninformed passive patient interacting with an unprepared practice team, resulting in frustrating, inadequate encounters.

Chronic Care Model
One of us (E.H.W.) has developed a model for primary care of patients with chronic illness—a guide to be used in

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developing effective chronic care. The chronic care model was derived from efforts to improve chronic illness management at Group Health Cooperative of Puget Sound in Washington, from literature reviews, and from suggestions of an advisory panel to Group Health’s MacColl Institute for Healthcare Innovation. The model does not offer a quick and easy fix; it is a multidimensional solution to a complex problem.

Because the majority of chronic illness care is performed within the primary care setting and because primary care physicians spend a considerable amount of their time treating chronic illness, the chronic care model constitutes a major rethinking of primary care practice, as pictured in the opening vignette about Dr Newman.

Chronic care takes place within 3 overlapping galaxies: (1) the entire community, with its myriad resources and numerous public and private policies; (2) the health care system, including its payment structures; and (3) the provider organization, whether an integrated delivery system, a small clinic, or a loose network of physician practices.

Within this tragalactic universe, the workings of which may help or hinder optimal chronic care, the chronic care model identifies 6 essential elements: community resources and policies, health care organization, self-management support, delivery system design, decision support, and clinical information systems. What are these 6 pillars of the chronic care edifice?

Community Resources and Policies
To improve chronic care, provider organizations need linkages with community-based resources, eg, exercise programs, senior centers, and self-help groups. Community linkages—for example, with hospitals offering patient education classes or home care agencies providing case managers—are especially helpful for small physician offices with limited resources.

Health Care Organization
The structure, goals, and values of a provider organization and its relationships with purchasers, insurers, and other providers form the foundation upon which the remaining 4 components of the chronic care model rest. If an organization’s goals and leaders do not view chronic care as a priority, innovation will not take place. The reimbursement environment of a provider organization has a major impact on chronic care improvements, which are more likely to survive throughout the long term if they increase revenues or reduce expenses. If purchasers and insurers fail to reward chronic care quality, improvements are difficult to sustain.

Self-management Support
For chronic conditions, patients themselves become the principal caregivers. People live with chronic illness for many years; management of these illnesses can be taught to most patients, and substantial segments of that management—diet, exercise, self-measurement (eg, using glucometers or bathroom scales), and medication use—are under the direct control of the patient. Self-management support involves collaboratively helping patients and their families acquire the skills and confidence to manage their chronic illness, providing self-management tools (eg, blood pressure cuffs, glucometers, diets, and referrals to community resources), and routinely assessing problems and accomplishments.

Delivery System Design
The structure of medical practice must be altered, creating practice teams with a clear division of labor and separating acute care from the planned management of chronic conditions. Physicians treat patients with acute problems, intervene in stubbornly difficult chronic cases, and train team members. Nonphysician personnel are trained to support patient self-management, arrange for routine periodic tasks (eg, laboratory tests for diabetic patients, eye examinations, and foot examinations), and ensure appropriate follow-up. Planned visits are an important feature of practice redesign.

Decision Support
Evidence-based clinical practice guidelines provide standards for optimal chronic care and should be integrated into daily practice through reminders. Ideally, specialist expertise is a mere telephone call away and does not always require full specialty referral. Guidelines are reinforced by physician “champions” leading educational sessions for practice teams.

Clinical Information Systems
Computerized information has 3 important roles: (1) as reminder systems that help primary care teams comply with practice guidelines; (2) as feedback to physicians, showing how each is performing on chronic illness measures such as HbA1c and lipid levels; and (3) as registries for planning individual patient care and conducting population-based care.

Registries, a central feature of the chronic care model, are lists of all patients with a particular chronic condition on an organization’s or physician’s panel. Take diabetes, for example. Data for patients with a diabetes-related International Classification of Diseases, Ninth Revision (ICD-9) code, diabetic prescription, or laboratory test result indicating diabetes are entered electronically into the diabetic registry. Laboratory values—HbA1c, LDL-C, and urine microalbumin—automatically flow to the registry. Ideally, eye and foot examinations and blood pressure measurements are also entered. The registry may feed into a reminder pop-up message on the electronic medical record, which flags laboratory work or examinations not performed according to schedule. With paper charts, reminder sheets can be printed for each visit by the diabetic patient. As a population tool, registry data can be electronically sorted to identify and contact patients with elevated HbA1c levels or those lacking up-to-date eye examination results.

The 6 components of the chronic care model are interdependent, building upon one another. Community resources—for example, exercise pro-
grams and peer support groups—help patients acquire self-management skills. Delivery system redesign, the formation of primary care teams with a division of labor, is essential to teach self-management because physicians do not have the time and may not be properly trained for this activity. For chronic disease registries to be successful, redesigning delivery systems is necessary so that 1 member of a primary care team is responsible for working the registry. Clinical practice guidelines, a key decision-support tool, provide the evidence upon which physician feedback data and reminder systems are based. Chronic care model elements are unlikely to be introduced or maintained without an organizational environment featuring innovative leadership and favorable finances.

As its ultimate goal, the chronic care model envisions an informed, activated patient interacting with a prepared, proactive practice team, resulting in high-quality, satisfying encounters and improved outcomes.17

Is the model a utopian concept, impossible to implement in the rough-and-tumble world of primary care? A number of organizations have attempted to introduce the chronic care model. Some have enjoyed success. Others succeeded but were unable to sustain the improvements. The chronic care model began at a handful of integrated delivery systems, most notably Lovelace Health Systems in Albuquerque and Group Health Cooperative of Puget Sound in Seattle.18-20 Projects to spread the model to other provider organizations are under way, with the support of the Robert Wood Johnson Foundation’s project Improving Chronic Illness Care (ICIC)21 and the Institute for Healthcare Improvement (IHI).

### Implementing the Chronic Care Model

The chronic care model is not an abstract theory but a concrete guide to improving practice. The case studies presented here were chosen because they involve private medical practices, 2 integrated delivery systems, and a community health center and because each organization has implemented a mixture of chronic care model elements (Table). In each case, the organization’s own evaluation suggests that implementation of the model improved patient care. Although these internal measurements do not meet rigorous standards of evidence, part 2 of this article describes published evidence on the effectiveness of chronic care model components.

#### Premier Health Partners

In 1998, Premier Health Partners joined the diabetes collaborative, a joint effort of ICIC and the IHI. Located in Dayton, Ohio, Premier Health Partners is a health system based on the traditional private practice model. One hundred physicians working in 36 private offices make up Premier’s primary physician network. Starting with one physician and gradually adding all primary care practices, Premier used the chronic care model to improve diabetes care. By 2001, for the entire primary care network, the proportion of diabetic patients with HbA1c levels below 7% had risen from 42% to 70%. Similar improvements were recorded for foot examination results, urine microalbumin levels, and use of angiotensin-converting enzyme inhibitors.

Decision support is provided through practice guidelines, academic detailing, and a toolkit of printed materials that incorporate practice guidelines into the day-to-day care of diabetic patients. Self-management support includes individual and group classes and flowcharts on which patients record their own laboratory test results. Delivery-system redesign began with the development of practice teams in which physicians and nurses work together to monitor diabetes flow sheets. Premier Health Partners has achieved its improved diabetes care with a rudimentary but effective information system: medical-record reviews in each primary care practice generate physician-specific data on diabetes measures that are circulated unblinded to all physicians. Over time, these data have stimulated physicians with poor performance to improve. The information system will soon be generating physician and patient reminders.

The diabetes program is financially supported by Premier Health Partners. One insurer has agreed to reimburse office-based diabetes education, and another is making a yearly bonus payment if diabetes performance exceeds an agreed-upon benchmark. Premier is planning to extend its chronic illness improvement program to cardiac disease and asthma and to develop an active chronic disease registry.

#### HealthPartners Medical Group

Like Premier Health Partners, HealthPartners Medical Group (HPMG) joined the ICIC-IHI diabetes collaborative in 1998. An integrated delivery system based in Minneapolis, HPMG implemented 4 components of the chronic care model. Patient self-management training is performed by diabetes resource nurses at each clinic. Decision support includes practice guidelines, diabetes update conferences, and a diabetes support team. The information sys-
tended ICIC-IHI coordinators and a team from each of 5 geographic clusters, and 1 community health center from each cluster was picked as the lead organization. The bureau funded a full-time coordinator in each clinic to input data (ICIC and IHI), while management programs targeting diabetes, coronary artery disease, hyperlipidemia, asthma, and congestive heart failure. Kaiser-Permanente Northern California invested millions of dollars in these programs, hoping to improve health outcomes and thereby create savings through fewer hospitalizations and emergency department visits.

Clinica Campesina provides care to a largely uninsured Hispanic population around Denver, Colo. Assisted by the diabetes collaborative, Clinica Campesina implemented most components of the chronic care model, including primary care teams with a division of labor, a diabetes registry (using a rudimentary information system requiring clinic staff to input data), physician reminders, diabetes group visits (delivery system redesign), and activation of patients to manage their illness through diabetes education and collaborative setting of diabetes treatment goals during each clinic visit. Patients are provided with self-management plans allowing them to choose self-improvement goals such as walking a mile each day or stopping tobacco use. Monthly printouts of the registry are distributed to all physicians, and, to relieve physicians' workload, medical assistants read patients' flow sheets and make appropriate preparations for needed examinations or tests. Outreach is provided to patients on the registry who have poorly controlled illness or difficulty coming to the clinic.

Clinica Campesina's self-reported data show that the average HbA1c level of its diabetic population dropped from 10.5% in October 1998 to 8.6% in March 2000. The percentage of diabetic patients with at least 2 HbA1c tests within a year rose from 11% in October 1998 to 71% in June 2000. The percentage of diabetic patients with self-management goals jumped from 3% in February 1999 to 65% in March 2000. The percentage of those having eye examinations climbed from 7% to 51%, and the percentage having foot examinations rose from 15% to 76% in the same period.

Kaiser-Permanente Northern California
Kaiser Health Plan and the associated Permanente Medical Group serve 3 million people in the northern California region. Within Kaiser-Permanente Northern California (KP-NC), 22% of adult enrollees, mainly those with chronic conditions, generate 47% of adult ambulatory visits and 74% of non-obstetric hospital days. By 1999, KP-NC had launched Chronic Care Management programs targeting diabetes, coronary artery disease, hyperlipidemia, asthma, and congestive heart failure.

Kaiser-Permanente Northern California invested millions of dollars in these programs, hoping to improve health outcomes and thereby create savings through fewer hospitalizations and emergency department visits.

Chronic Care Management divides KP-NC's chronic condition population of 400,000 into 3 levels. Patients at level 1 have their chronic condition under reasonable control and receive care through their primary care team. Patients at level 2 have poorly controlled conditions; for example, diabetic patients with HbA1c levels above 10% qualify for level 2. Level 3 is composed of patients with complex multidiagnoses, high-use patients, or both who receive case management by registered nurses or medical social workers within the primary care team; because patients have multiple diagnoses, level 3 case management is not disease-specific.

The most far-reaching delivery system redesign involves level 2 patients, who are referred to disease-specific case managers who may be attached to a primary care team. Care managers—nurses, health educators, pharmacists, respiratory therapists, or dietitians—exist for management of diabetes, hyperlipidemia, asthma, and congestive heart failure. They are responsible for a list of patients with whom they work intensively for a 6- to 15-month period, after which, if the illness is better controlled, the patient returns to level 1. Care managers, who attend training programs, update seminars, and peer group meetings, are mentored by disease-specific physician champions.

Adult asthma provides an example of how KP-NC's Chronic Care Management programs operate. Data for asth-
matic adults are electronically entered into the asthma registry according to diagnosis code or use of asthma medications. Patients with an asthma-related emergency department visit, hospitalization, or pharmacy data revealing 2 prednisone bursts or an excess of asthma inhalers are designated as level 2 or high risk and referred to an asthma care manager. Care managers—nurses, respiratory therapists, or pharmacists—arrange a personal visit, including patient self-management support with training on use of inhalers, spacers, and peak flow meters. Care managers can change medications according to clinical protocols. Patients are taught about triggers and environmental controls and how to stage the severity of their illness. Care managers help patients set specific monthly goals; for example, regular use of stereoid inhalers or keeping the cat off the bed at night. Smokers are referred to smoking cessation classes.

Chronic Care Management leaders are concerned about level 1, which handles 85% to 90% of KP-NC’s chronic care patients (only 12% of asthmatic patients are in level 2 at any given time). Even if level 2 is working well, failure to improve level 1 care threatens population-wide improvement in performance measures. To remedy this problem, the asthma program is planning training sessions for health educators on primary care teams, physician-specific feedback, and prompts reminding physicians to check peak flows, assess asthma symptoms, review self-management care plans, and improve medication use.

The clinical information system tracks the asthma inhale medication ratio (anti-inflammatory canisters divided by anti-inflammatory plus bronchodilator canisters). The long-term goal (benchmark) for this ratio is for 95% of primary care physicians to have a ratio higher than 0.3. From 1998 to early 2001, according to KP-NC’s own data, the percentage exceeding 0.3 increased from 52% to 79% (32% have a ratio >0.5).

The information system also tracks the percentage of asthma patients at high risk of an acute event (those with a recent emergency department visit, hospitalization, or high volume of asthma-related prescriptions). This measure dropped from 13.5% in 1998 to 9.1% in early 2001, with the best medical center reporting a rate of 6.5%. The long-term benchmark is 8%.

CONCLUSION
These case studies illustrate how a broad variety of practice organizations have implemented the chronic care model at the primary care level. In each case, the organizations are attempting to transform primary care practice from the untenable situation faced by Dr Madden in the opening vignette to the idealized world inhabited by Dr Newman. None of the organizations has achieved full implementation of the chronic care model, but all have made important strides toward that goal.

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