

Usual medical care is not organized to make for effective and productive interaction between medical providers and their patients. This article highlights this problem by describing a typical office visit from the perspectives of a patient and a primary care physician. It then describes the development of the Chronic Care Model, which provides practical suggestions for how to change several aspects of the organization and delivery of health care to improve this situation.

Constructing a Bridge Across the Quality Chasm: A Practical Way to Get Healthier, Happier Patients, Providers, and Health Care Delivery Systems

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When the Institute of Medicine (IOM) published its landmark report in 2001 describing the gap between current and ideal health care as a veritable chasm,¹ it was compelling but depressing reading. The long list of deficiencies likely made many feel that overcoming such problems is an insurmountable task. It can seem overwhelming to relate to the problems and issues the institute report raised, given the realities of our own daily practices.

In this article, we start by describing a fairly typical health care practice today. We then show what steps can be taken to systematically improve that practice in ways that will go a long way toward bridging the quality chasm so that many more patients with chronic illnesses such as diabetes can live longer, healthier, and happier lives.

Clinical Care: Two Perspectives

First, let us look at a morning in the lives of two key players in the health care system. First, a typical patient:

Jack Johnston is a 56-year-old man. He is the vice president for sales for a company that makes electronic components. His job is stressful and requires frequent business trips all across the United States.

With his two children grown and out of the house, he is having marital problems. He has had some

recent erectile dysfunction, and his wife has told him that he needs to get counseling.

At 5'10" tall and 204 lb., he is concerned that he is too heavy and unfit. He has diabetes, diagnosed 6 years ago. He was told to eat healthier, exercise more, and lose weight, and he was put on metformin with the dose pushed up to 2 g day. Although he was told to check his blood glucose first thing every morning, he has stopped doing this for the past several months. The numbers were always around 200 mg/dl no matter what he did, so it just made him more depressed to keep checking.

After some recent angry conversations with his wife, he developed a nagging ache in his gut. He bought some over-the-counter cimetidine, but his symptoms now seem worse, if anything.

Because he must leave on another business trip tomorrow, he calls his local health care clinic and asks for one of those same-day appointments that they keep advertising.

When Jack arrives at the clinic, the receptionist barely makes eye contact. She is too busy trying to figure out the new appointment system. She asks him to fill out a new registration form because it has been more than 1 year since he was last here. He spends 25 minutes in the waiting room, alternately plowing his way through the

form, aimlessly flicking through out-of-date magazines, and fielding work-related calls on his cell phone.

A medical assistant calls his name, sends him off to produce a urine sample, and orders him to get undressed, take his shoes and socks off, and don a gown that feels like a mini-dress with laces at the back. She then leads him down the hall feeling uncomfortable and embarrassed to get his weight before leading him back to the room to get his blood pressure (143/89 mmHg). She records this information in the chart and asks him about the drugs he is taking. Since he can't remember the name of the over-the-counter stomach medicine he bought she puts down, "?OTC antacid."

The primary care physician bursts into the room 15 minutes later. She is an attractive woman in her early 30s, who looks tired and stressed but is friendly. Jack recalls seeing her about 2 years ago, when his wife made him come in for a physical.

"Hi. I'm Dr. Perkins," she says. "Sorry I'm late. I'm running way behind this morning. So, Mr.... er... Johnston, haven't seen you for a while. Things going okay? Any problems with your diabetes?" Her pager goes off, so she steps outside for a few minutes to answer it.

When she returns, Jack answers, "No, not really. I've just got some major gut-ache recently. Thought it would be better by now. I got some over-the-counter stuff, but it hasn't helped so far. If anything it's worse. Now I've got some diarrhea and nausea, too."

"Oh, it's probably an ulcer or something. I've been traveling a lot and eating out. Big time stress. Actually, things aren't any more relaxed at home these days, either. Got some real issues with my wife, you know?"

While he is saying this, Dr. Perkins is looking through his chart, frowning.

"Hmmm, your weight has gone up since you were last here," she says. "Maybe you're eating the wrong things. I see you are on metformin. That can sometimes cause tummy problems, but you've been on that for ages. You said the gut ache is a new thing, right? Shouldn't be a problem unless your kidney function got worse or you developed liver problems or heart failure. Let's have a feel of your tummy. Pop up here on the exam table for me, okay?"

She asks a few more questions while she pokes Jack's belly. Someone interrupts to ask Dr. Perkins for advice on the patient next door. Dr. Perkins mumbles something that is incomprehensible to Jack, and then yells that she'll be right there.

"Well, Mr. Johnson, your belly feels fine," she says. "There's just a bit too much of it, if you know what I mean. It is hard to say what is going on with you. I think we should check your liver function tests and also do a creatinine and a hemoglobin A_{1c}, since you haven't been in for a while. We should also do some stool cultures, in case you've picked up some weird bug. Also, you should make an appointment to get an eye exam on the way out, and I'm going to make an appointment for you to meet with the dietitian again."

"Let me give you a prescription for an antacid and some loperamide for your diarrhea. Call me and let me know if it is no better in a week. If it's still bothering you, I'll send you to see our gastroenterologist."

She smiles, shakes his hand, and leaves him to get dressed, gather his lab slip, referral forms, and prescriptions, and make his way back to the reception area. The receptionist is deep in conversation with her co-worker, and there are three patients in line ahead of Jack. He decides to leave without making his other appointments.

He is feeling more worried than when he went in. He feels guilty about his apparent poor health, doesn't relish going to get another lecture from the dietitian, and has unpleasant visions about what a gastroenterologist might do to him. He has work piling up and a plane to catch tomorrow, so he puts all the medical trivia out of his mind and dives back into the day-to-day realities of his life.

Now, let's break down Jack's experience:

He is unhappy, and possibly depressed. He is not leading a healthy lifestyle. Diabetes is not high on his list of priorities. He ignores it until there are symptoms. His big concerns at the moment are sexual dysfunction and gut-ache.

On arrival at the clinic, he met an inattentive receptionist and was left waiting with what seemed like an unnecessary form to fill out and out-of-date magazines to read. The disturbing and weighing routine left him

feeling vulnerable and embarrassed. His agenda for the visit (sexual dysfunction and gastrointestinal discomfort) was dealt with hurriedly.

A careful history might have revealed that taking cimetidine on top of metformin can lead to impaired clearance of metformin, higher blood levels that may well explain his worsening nausea and diarrhea. Instead, he was given some additional prescriptions to deal with his symptoms, was sent for a few lab tests he didn't understand, was given two other referrals and the threat of a third one unless he improves.

He tried to bring up his sexual concerns indirectly but was ignored and didn't feel the situation was conducive to pursuing this further. Because time was not allotted for information sharing, he was left with the impression that he might have developed some new serious problems in his liver, kidneys, bowels, or heart.

Jack is unlikely to follow through about calling back and making other appointments, and so he will likely get labeled as a "noncompliant patient."

Clearly the health care system did not serve him well. But before we dump all of our criticism on Dr. Perkins (and the other clinic staff), let's see what her morning has been like:

Polly Perkins is a 34-year-old family practice physician who graduated 5 years ago and finished her residency 3 years after that. This is her first job in the "real world."

She is married with two preschool-age children. She gets up at 6:00 a.m. these days, helps everyone with breakfast and morning chores, then leaves her husband to get the kids to day-care, because she now has to get to her office by 7:15 a.m.

The clinic has a new policy that patients need to be seen the same day. When she gets to the office, she checks her schedule on the computer and sees that she has been double-booked for four of her first six appointments of the morning. Jack Johnston is the double-book at 9:40 a.m.

Polly boots up her computer while she wades through the piles of paperwork on her desk from yesterday. There are lab results to scrutinize, hard copy transcriptions to look over, and a large stack of mail. This includes consultation reports, drug company advertising with free pens and paperweights, and invitations to go to con-

ferences on everything from “New Approaches to Office Efficiency,” to “Physician Burnout and How to Deal With It.” (That one brings Polly a wry smile.)

Her mail also includes two internal memos: one giving her a new laminated set of guidelines, and the other showing her most recent pharmacy profile. This one informs her that she is an outlier and is using more proton-pump inhibitors than her colleagues. She is required to make an appointment to meet with the pharmacy manager at her earliest convenience.

She also finds her paycheck and glances at the corporate newsletter that is included in its envelope. The chief operating officer gives an upbeat report, saying that the new policies of increased panel sizes, starting patient appointments a half hour earlier each day, and double-booking to accommodate same-day appointments have helped improve the company’s financial bottom line in the first quarter of the year. “Well done!” he writes. “Keep working harder!”

She takes her pile of lab results with her to the early morning staff meeting where an earnest psychiatrist is giving a lecture on how to use the new depression screening tool. This annoys her. She doesn’t feel that she needs yet another “helpful tool.” She thinks she is pretty good at recognizing depression when she sees it.

She catches up on her voice mail and e-mail messages between her first few patients, but falls steadily further behind through the morning. It is 10:30 a.m. when she grabs Mr. Johnston’s chart and bursts into the exam room.

She doesn’t remember seeing him before, but quickly flips through the chart while he tells her what the problem is today. Loose pages fall out of the chart, including a diabetes flow sheet, but there is nothing recorded on it anyway.

By the end of the visit she feels pretty good about herself. In addition to giving him something for his stomachache, she has a follow-up plan with the gastroenterologist if his symptoms don’t improve. In addition, she reminded him to eat healthier and lose weight, she checked his A1C, and she made arrangements for him to get an eye exam and see the nutritionist. She feels a little uneasy that there were more things she might have addressed with him. Still, she did manage to catch up a few minutes on her morn-

ing schedule and was less late for her next appointment.

A System-Level Problem

The IOM’s report, “Crossing the Quality Chasm,” suggests that people with chronic illness need to have a “continuous healing relationship” with their health care team. Better outcomes are achieved when patients get regular assessments of how they are doing, receive evidence-based clinical management, and are given information and ongoing support for self-management. This approach helps develop a shared care plan and fosters active sustained follow-up.

Few of those elements were present in Mr. Johnston’s experience. He received fragmented and discontinuous care. He wasn’t given a chance to express his real concerns. The physician reacted to his immediate symptoms and failed to see the bigger picture or detect a possible safety issue with a drug interaction between metformin and cimetidine. His elevated blood pressure was not addressed. His feet were not examined, and there was no discussion about whether aspirin, an angiotensin-converting enzyme (ACE) inhibitor, or a statin might be indicated given his age and comorbid conditions. Not that these needed to be discussed at this particular visit, but there was no attempt to invite him to come back for a more planned review of issues related to his diabetes. Things were not well explained to him. He was never invited to give input into the proposed plan of action. The approach to self-management support was counterproductive. It was left to him to make all the arrangements to make further appointments. Communication among all the members of the health care team about Mr. Johnston’s care was nonexistent.

Unfortunately Mr. Johnston’s experience is all too common. Generally, < 50% of people with major chronic illness receive accepted treatments. Only 27% of hypertensive patients are adequately treated, only 35% of eligible patients with atrial fibrillation receive anticoagulation, barely 25% of people with depression receive adequate treatment, and 50% of patients with congestive heart failure discharged from the hospital are readmitted within 90 days.²

The problem is not unmotivated and noncompliant patients, nor is it lazy and uninformed doctors. Both Jack Johnston and Polly Perkins are

decent hard-working people who could have a much more satisfactory and productive interaction with each other if the health care system was designed to help them better.

There have been many randomized, controlled trials in recent years in which one or more elements of health care systems have been changed. A Cochrane Collaborative Review of 41 such studies³ classified the interventions in four domains; some were provider-oriented, others focused on patients, or on improvements in information systems, or on the overall organization of health care delivery. Interventions that focused on only one of these domains were usually ineffective at showing improvements in desired outcomes. However, the five studies that had interventions in all four domains were able to show a much more positive impact.

The Chronic Care Model

In our efforts to improve care at Group Health Cooperative (GHC) in Seattle, Wash., and to relate our experience to the literature, we tried interventions in a variety of areas—registries, guidelines, patient education—but without an overall vision or where we were headed. We felt the need for more coherent guidance or system change. The chronic disease improvement literature strongly suggested that changing process and outcomes in chronic illness required multi-component interventions that change the prevailing clinical system. We attempted to categorize those system components that had been shown to influence the quality of care, specify the specific interventions within each component associated with better outcomes, and suggest how the components interact to influence patients, providers, and their interactions to produce better care.

The result, the Chronic Care Model (CCM), is a synthesis of evidence-based system changes that we hoped delivery organizations might use to guide quality improvement and disease management activities. It is intended to be flexible and subject to change in the face of new evidence.^{4,5}

The staff at the MacColl Institute for Healthcare Innovation at GHC developed the CCM in the following way. The improvements were based on a careful reading of the literature. In 1996, GHC was funded to bring together international experts in chronic illness care and charged them

with finding the commonalities in the ways they provided good care. This seemed like a useful strategy to continue. The Robert Wood Johnson Foundation funded a planning grant, which had an international advisory committee that did two things: help develop the model and nominate ideal chronic illness care programs. Seventy-two programs were interviewed, and the information was checked against the developing model. Fifteen of the organizations were visited. The elements of the successful programs were captured in the CCM.⁶

The CCM (Figure 1) starts by focusing on what characterizes a **productive interaction**, and then specifies what things need to be improved in order for that productive interaction to occur. In productive interactions, patients are given enough time to explain what concerns them the most. There is an assessment not only of their clinical status, but also of their knowledge and understanding of their medical conditions, their self-management skills, and their confidence about making changes. Clinical management is evidence-based and tailored by a stepped protocol. Treatment goals are set by a collaborative process, broken down into smaller pieces that seem doable to patients. Potential barriers are overcome with problem solving and a shared plan is developed. Finally, the plan for follow-up is explicit and sustained over time, with contact directly from the health care team to the patients at agreed upon intervals.

In order for this to happen, we need **informed, activated patients** and a **prepared practice team**. Patients

who are activated and informed are supported to have the motivation, information, skills, and confidence to effectively make decisions about their health and how to manage it and incorporate it into day-to-day life. Patients are helped to understand enough about the disease process and to realize their central role as daily self-managers. Family and caregivers are engaged in patients' care. To facilitate all of this during visits, the practice team is supported by the system to have the patient information, the decision support, the people, equipment, and time required to deliver evidence-based clinical management and self-management support.

For all of these elements to come together at the time of clinical interaction between patients and health care providers, significant improvements need to be made to the main elements of the health care system (Figure 1). Here are some of the key changes that will have a positive impact:

- **Self-Management Support** empowers and prepares patients to manage their health and health care.
 - ✓ Emphasize patients' central role in managing their health.
 - ✓ Use effective self-management support strategies that include assessment, goal setting, action planning, problem solving, and follow-up.
 - ✓ Organize internal and community resources to provide ongoing self-management support to patients.
- **Delivery System Design** assures the delivery of effective, efficient clinical care and self-management support.

- ✓ Define roles and distribute tasks among team members.
- ✓ Use planned interactions to support evidence-based care.
- ✓ Provide clinical case management services for complex patients.
- ✓ Ensure regular follow-up by the care team.
- ✓ Give care that patients understand and that fits with their cultural background.
- **Decision Support** promotes clinical care that is consistent with scientific evidence and patients' preferences.
 - ✓ Embed evidence-based guidelines into daily clinical practice.
 - ✓ Integrate specialist expertise and primary care.
 - ✓ Use proven provider education methods.
 - ✓ Share evidence-based guidelines and information with patients to encourage their participation.
- **Clinical Information Systems** organize patient and population data to facilitate efficient and effective care.
 - ✓ Provide timely reminders and feedback for providers and patients.
 - ✓ Identify relevant subpopulations for proactive care.
 - ✓ Facilitate individual patient care planning.
 - ✓ Share information with patients and providers to coordinate care.
 - ✓ Monitor performance of practice teams and care system.
- **Health Care Organization** creates a culture, organization, and mechanisms that promote safe, high-quality care.
 - ✓ Visibly support improvement at all levels of the organization, beginning with the senior leader.
 - ✓ Promote effective improvement strategies aimed at comprehensive system change.
 - ✓ Encourage open and systematic handling of errors and quality problems to improve care.
 - ✓ Provide incentives based on quality of care.
 - ✓ Develop agreements that facilitate care coordination within and across organizations.
- **Community resources** are mobilized to meet the needs of patients.
 - ✓ Encourage patients to participate in effective community programs.
 - ✓ Form partnerships with community organizations to support and develop interventions that fill gaps in needed services.

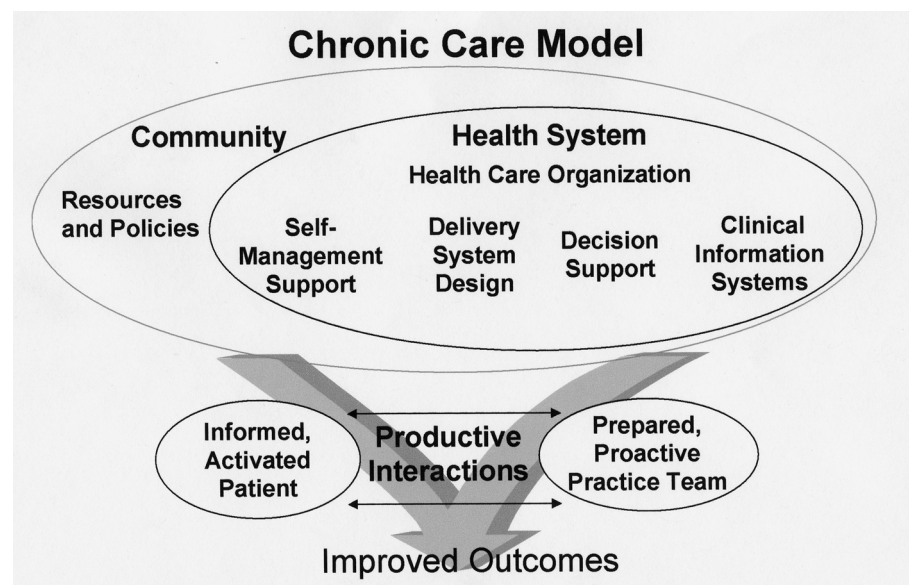


Figure 1. The CCM.

- ✓ Advocate for policies to improve patient care.

The Model Applied

So, let's replay Mr. Johnston's experience had it occurred in an ideal world:

When Jack Johnston calls to make his appointment, he encounters a system that identifies him as having diabetes. It draws upon centralized records to detect that his A1C has not been measured for more than 1 year and that it was well above 7.0% the last time it was measured. It prompts the clinical team that he is overdue for a foot exam and an eye exam and that his blood pressure is above 130/80 mmHg.

Given that he is 56 years old and has diabetes, Mr. Johnston should already have been contacted proactively and invited in for one or more planned visits to discuss his overall care plan for diabetes. At those diabetes-specific visits, the evidence supporting the use of aspirin, ACE inhibitors, and statins in his therapy was explained to him. He was offered self-management support in a variety of formats, perhaps including group visits, one-on-one consultations, hard copy summaries, and online interactive tools.

Today, at his acute care visit, the receptionist greets him pleasantly as a supportive member of the team. A team pharmacist spends a few minutes to assist in figuring out what drugs he is taking (including over-the-counter medicines) to identify possible safety concerns and drug interactions. He used the remainder of his time in the waiting room filling out a questionnaire through which he could express

and prioritize his real concerns, while also being screened for depression, alcohol abuse, and other common health care issues.

The nurse reviews this questionnaire briefly and alerts Dr. Perkins of his specific concerns. By the time Dr. Perkins walks into the room, she has a summary of relevant information about Jack's concerns and the deficits in his clinical care. Even if there is no time to deal with many of them at this particular visit, she can acknowledge them in an empathetic way and make a specific plan to have him come back to go over them in more detail.

Jack leaves in better spirits and is very likely to return for active and effective follow-up.

Perhaps all of this still seems very pie-in-the-sky. How possible is it to get real-world health care organizations to make these kinds of changes in ways that result in sustained improvements in outcomes?

Over the past 8 years, we have worked with more than 1,100 teams representing more than 500 health care organizations around the United States to help them implement the CCM. A synthesis of this work, along with an extensive literature and a variety of helpful tools, can be found at our Web site: www.improvingchroniccare.org.

The Institute for Healthcare Improvement (IHI) has developed an effective method of helping organizations make rapid but sustainable changes in health care delivery. We have worked collaboratively with IHI

and a wide variety of wonderful health care teams who have tackled this problem with energy and enthusiasm. The articles starting on p. 102 and p. 107 will describe the evolution of this work and show what can be accomplished.

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