Redesigning the Rural Health Center:
High Tech, High Touch, and Low Overhead

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To attract new physicians to rural primary care, new models of care are needed that are more effective, more sustainable, and replicable in smaller communities. This commentary provides a brief description of preliminary findings associated with a radically redesigned, low-overhead patient-centered medical-home practice model in North Carolina.

Although North Carolina enjoys lower per capita health care expenditures than the United States, the state's rate of increase for these costs is higher than that for the nation (7.2% vs 6.3%) [1]. There is extensive evidence that health systems with a strong base of primary care produce better health outcomes at lower cost [2]. But not enough primary care physicians are being produced or practicing in underserved and rural areas, despite sustained efforts to reverse these trends [3]. To attract new physicians to rural primary care, new models of care are needed that are more effective and sustainable and that can be replicated in smaller communities [4].

In this commentary, I briefly describe the preliminary findings associated with a radically redesigned, low-overhead patient-centered medical-home (PCMH) practice model. The project was initiated as 1 of 14 US family medicine residency programs selected to participate in the P4 (Preparing the Personal Physician for Practice) project, a 5-year national collaborative that tests educational interventions with new models of primary care [5].

Flat Rock Advanced PCMH Model

My colleagues and I designed and opened a new, idealized outpatient practice adjacent to an underserved, rural part of Henderson County, North Carolina, in October 2009, incorporating most of the design features that had been proposed for the PCMH model (Table 1) [6]. The practice was also designed to have very low start-up costs and operational overhead (<35% of the overhead for a standard primary care practice), to allow the model to serve small communities with less favorable payer mixes and still be financially successful.

At the core of our practice is a secure Web-based care portal directly connected to an integrated electronic health record and practice management system that allows patients to complete a number of tasks on their own. For instance, new patients can register online; all patients can schedule appointments, enter personal information in the record, pay bills, conduct e-visits with and send messages directly to clinicians, request prescription refills, and view the practice's health-related blogs online; and all patients can check in for their visit onsite, using a kiosk. This information system was provided through a remotely hosted system that is maintained by our local county hospital, as described elsewhere [7].

The practice operates with a single cross-trained medical assistant, who performs all necessary clerical and clinical duties. This is possible because, as described above, patients complete many administrative tasks and routine requests themselves online. Elimination of routine telephone calls and of task handoffs between staff allows the medical assistant to be more efficient. We rent unused clinical space from our local free clinic for the time we are open (ie, 4 hours daily, 5 days per week). Start-up costs were held to $5,000. The low-overhead structure produces an operating surplus, assuming treatment of fewer than 7 patients per half day and a payer mix typical of rural communities.

Patients are encouraged to prepare for their visits by going online and filling out a brief description of their goals for the visit, and at least once per year they complete a more comprehensive health risk and values tool [8]. Patients make their own appointments online and are encouraged to walk in for any medical problems. Routine messages are handled directly by the clinician through the care portal, and for urgent problems, patients are given a cellular telephone number with direct access to the physician during usual business hours. We screen each patient for health barriers, including low self-confidence to self-manage their health and low health literacy, at their first visit, and then we try to individualize the patient's care plan with their health goals, risks, and barriers in mind.

To test the value of team-based care and group medical visits, we piloted a drop-in group medical visit that targets low-income, uninsured patients who had used the emer-

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TABLE 1.
Features of the Flat Rock Advanced Patient-Centered Medical Home (PCMH) Model

Feature	Findings
Advanced access	
Patients make own appointments online	70% of patients schedule appointment ≤24 hours before visit
Walk-ins encouraged	15% walk in without an appointment; no-show proportion nearly 0%
Advanced communication	
Secure messaging	Highly valued by patient
Direct physician telephone line	Rarely used (average of 3 calls per week)
Health care blogs	Limited use by patients, to date
Advisory panel	Unexpected insights into what patients truly value
New models of care	
E-visits	Less popular than expected (approximately 2 visits per month)
Telephone visits	None requested in 18 months
Group medical visits	Valuable for patients enrolled; see discussion of Bridges to Health in the text
Fully integrated behavioral health care	Limited experience, to date
Team-based care	See discussion of Bridges to Health in the text
Proactive care	
Preparing for visit	Highly valuable for clinicians and patients when used
Screening for barriers	10% have low self-confidence; 5% have health-literacy issues
Joint health-goal setting	Highly valuable for clinicians and patients when used
Systematic care reminders	Improved chronic care measures
Panel management	Highly valuable for clinicians to identify patients in need of care
Financial model	
Low overhead	Positive operating margin at lower volumes and payers
Cash discount for employed uninsured	95% pay full discounted amount at time of service

gency department at least 6 times during the previous year. The project, called Bridges to Health, is funded by a grant from North Carolina's HealthNet initiative. To date, we have enrolled 32 patients, who have access to a registered nurse care manager by cellular telephone Monday through Friday from 8 AM to 5 PM and who can access 1-hour group visits, held twice a week, that are staffed by a physician, behavioral health professional, and the case manager. There is no charge to patients for the service, and if they attend a group visit, they receive a $5 voucher for our local food co-op. Laboratory tests and radiography are performed without charge through the hospital charity care program, and medications are free through the free clinics. Approximately 75% of the patients enrolled have both complex medical and behavioral health needs, and many are socially isolated.

The teaching practice at Flat Rock is designed to accommodate medical students and family medicine residents, who participate in approximately 33% of the clinic sessions and 10% of the Bridges to Health group visits. We survey the residents quarterly about their attitudes toward rural practices, and students are asked to write a short reflective essay as part of their experience.

Findings

The practice had more than 1,200 office visits during the first year of operation, adding approximately 35 new patients per month; 70% of the patients were new to our hospital system, with 40% reporting no previous primary care physician in the area. The payer mix is 43% Medicare, 23% commercial or managed care, 22% self-pay, 7% Medicaid, and 6% charity care. Patient ages range from 5 to 93 years, with a significant portion having chronic illnesses such as depression (15%), diabetes (14%), and chronic pain (10%). The practice covered nearly all start-up and operating expenses during the first year of operation.

Findings associated with the specific PCMH features are listed in Table 1. The vast majority of patients (70%) make their appointment within 24 hours of their desired visit; 15% walk in without an appointment. We expected that working self-paying patients would take advantage of e-visits (cost, $25) or telephone consults (cost, $35 for a 10-minute consult), but we found that most preferred a direct, face-to-face visit, even though it was significantly more expensive (cost, $55). E-visits were used mostly for routine follow-up care and almost exclusively by self-paying patients, even though certain payers, such as Blue Cross and Blue Shield of North Carolina, reimburse for e-visits.

Access to the Internet and use of the care portal have not proven to be significant barriers. Patients who do not have ready home Internet access have either found another location to access the care portal, arranged "Internet by proxy" through a friend or relative, or accessed the care portal through a smart telephone.

Occasionally, patients, pharmacy staff, or other physicians will call our main residency site to contact us, because we do not have a published telephone number. We addressed that problem by purchasing a second cellular telephone, which the medical assistant carries during business hours. Redirection of most of the practice's communication from telephones to an online format has greatly enhanced office efficiency and improved documentation.

FIGURE 1.
Monthly Rate of Emergency Department (ED) Visits Before and After Enrollment

This figure is available in its entirety in the online edition of the NCMJ.

The Bridges to Health program has reduced per-member per-month emergency department use by 72% during the first 9 months of the program, and it is expected to reduce hospital charges among participating patients by more than $340,000 during the first year, at a cost of approximately $66,000 (Figure 1). Approximately 80% of the patients have measurable clinical improvement in their underlying conditions, and many report significant functional improvement. At enrollment, only 2 of the 32 patients were employed; at present, 10 of 32 are employed at least part-time. Patients tell us repeatedly that the group provides critical social support, which they credit for playing an important role in their efforts to address many health and personal challenges in their lives.

We established a patient advisory panel to help guide our efforts to design a truly patient-centered health care experience. Patients have expressed positive feedback in the areas of physician access, use of the care portal, and direction of their care. Representative comments on some of the particular features of the practice are specified in Table 2.

We have been collecting feedback quarterly from family practice residents about their experience in this redesigned practice setting. Findings from a focus group involving all of our residents, which was created to compare their experience in this rural clinic to those in more traditional models, have been very positive. Reflective learning essays written by medical students about their experience with the Bridges to Health group visit have been uniformly positive. As one student wrote, "Maybe what these patients needed wasn't a pill or test they always got in the emergency room, but a sympathetic ear to share some of their burden with. I hope I can be that spark one day."

TABLE 2.
Representative Feedback From Patients About the Flat Rock Patient-Centered Medical Home Model

Topic	Feedback
Access	"I really like that I can go online the night before, or on the weekend, and get an appointment the next day."
	"I was very surprised the doctor gave me his cell phone number on the first visit; I can't imagine I will use it very often, but it is very comforting to know I can get a hold of him directly if I need him, instead of having to fight an automated telephone system."
Use of the care portal	"It was a little confusing at first, but once I got familiar with it, I love it. I can't believe it took so long to introduce this into medical practice. It's so much better."
Self-directed care	"Usually, I forget all the things I want to talk to the doctor about. Writing things down online is nice because I make sure I've listed everything I'd like to discuss. I like that the doctor knows what I need before he comes into the room and can prepare, too."
Setting a health goal	"I've never had a doctor ask me to do that before. It really got me thinking about what I really DO want for my health goal."

Discussion

Early findings associated with this model practice suggest that it is feasible and could be replicated. Information technology appears capable of improving communication between patients and their physicians, while allowing more efficient use of staff time. The lower overhead needed to support the clinical practice, in turn, appears to support office visits that are longer and more productive and access that is more open, which we believe will ultimately demonstrate improved health outcomes. Although our practice built upon an existing information technology hub and billing infrastructure, the specific tools we used are available on a per-patient basis through remote-hosting arrangements with several software vendors. This would allow for wider application of our model, without significantly adding to overhead. Our rental of underused clinical space at the free clinic was fortuitous but not unique—there were a number of options for renting unused space on a per-use basis, a situation common in many other communities.

The Bridges to Health program relies on an existing infrastructure of charity care in the community to cover the cost of medications and laboratory studies. However, given the significant reductions in emergency department visits, we believe hospitals may have the incentive to provide many of these services. This program appears to be a less costly, more effective model of care for patients with complicated medical and behavioral health issues. For this model to be more widely adopted, we believe that some additional training would be ideal for the clinicians, care managers, and behavioral health professionals who would be leading these care teams. The drop-in group medical visit model of care is quite different from that of traditional care, and this population can present some unique challenges that could overwhelm an untrained, ill-prepared care team.

Residents and students appear to view the Flat Rock practice model and Bridges to Health pilot quite favorably. It is too early to tell, however, whether this positive experience will influence future practice decisions.

In summary, the PCMH can be successfully applied to a low-overhead practice model and may be ideally suited to rural or targeted isolated communities. Information technology plays a crucial role in the success of these practices. If implemented well, this technology can be a means for more-personalized care. The flexibility of the model may be well suited to the next generation of family physicians, who still desire meaningful relationships with patients but are less interested in a traditional full-time practice. NCMJ

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