

Community Care of North Carolina: Improving Care Through Community Health Networks

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ABSTRACT

The United States leads the world in health care costs but ranks far below many developed countries in health outcomes. Finding ways to narrow this gap remains elusive. This article describes the response of one state to establish community health networks to achieve quality, utilization, and cost objectives for the care of its Medicaid recipients. The program, known as Community Care of North Carolina, is an innovative effort organized and operated by practicing community physicians. In partnership with hospitals, health departments, and departments of social services, these community networks have improved quality and reduced cost since their inception a decade ago. The program is now saving the State of North Carolina at least \$160 million annually. A description of this experience and the lessons learned from it can inform others seeking to implement effective systems of care for patients with chronic illness.

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INTRODUCTION

Health spending in the United States topped \$2 trillion for the first time in 2006.¹ Despite these high expenditures, the quality of care remains unsatisfactory. For example, only 27% of patients with hypertension have adequate blood pressure control, and only 17% of patients with coronary artery disease have cholesterol at levels suggested by national guidelines.² The United States ranks last in preventable deaths among 19 Organization for Economic Cooperation and Development (OECD) countries.³ One reason for this quality gap is that, although the prevalence of chronic disease is increasing, our health care delivery system is based on a model that is best suited to episodic care for acute illnesses. Optimal delivery of chronic care and preventive services requires restructuring our health care system. In recent years, much research and discussion have focused on how best to adapt our system to chronic care and prevention. For example, the Chronic Care Model lays out several key elements of high-quality care for chronic diseases, including community resources, health care organization, self-management support, delivery system design, decision support, and clinical information systems.⁴ More recently the concept of the patient-centered medical home has received widespread attention as a model to improve care.⁵ Seven key principles outline the characteristics of the patient-centered medical home: a personal physician, physician-directed medical practice, a whole-person orientation, coordinated care, quality and safety, enhanced access, and a system of payment that reflects the added value of a patient-centered medical home.

Although these models have shown promise in controlled research settings and small demonstration projects, they have been difficult to disseminate widely.⁶ One problem with implementation of models in indi-

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vidual practices is that the current funding structure of health care is based on acute care. When practices are reimbursed on a fee-for-service basis for episodic care, finding the resources to redesign a practice, develop systems of care, and implement the elements of these new models of care can be difficult. Moreover, to improve outcomes for many clinical problems, new resources would need to be devoted to facilitate care outside the office, such as case management.

We describe a program that incorporates components of these models and has been disseminated widely. Community Care of North Carolina (CCNC) built a partnership between a large funder of health care (Medicaid), primary care physicians, and other local health care providers to achieve quality, utilization, and cost objectives in the management of care for Medicaid recipients across North Carolina.⁷ CCNC was not led by health services researchers intent on defining a model for publication. Instead, CCNC was a grassroots response by practicing physicians, community health care leaders, and state policy makers to meet the challenge of providing cost-effective high-quality care for Medicaid patients.

Within the CCNC program, approximately 1,200 primary care practices across North Carolina manage the care of about 750,000 Medicaid patients, roughly 80% of the state Medicaid population, or almost 10% of the North Carolina population. Of those Medicaid patients not currently enrolled in the program, most have both Medicaid and Medicare (dually eligible) or are pregnant women, and the CCNC is currently working on a waiver to be able to enroll the dually eligible in greater numbers. The 1,200 primary care practices enrolled in CCNC represent more than 50% of North Carolina primary care practices. Efforts are underway to engage more effectively the remainder of primary care practices, as well as other medical specialists. We hope that a more detailed description of these efforts can serve as an inspiration for others.

THE STRUCTURE OF CCNC

The CCNC program has created community health networks organized and operated by community physicians, hospitals, health departments, and departments of social services. Each network employs a full-time program director, a part-time medical director, and a team of case managers. Some networks have hired additional staff to help with data analysis and other network initiatives. Each network is guided by a steering committee that consists of physicians and representatives from the local hospitals, health departments, and departments of social services. Medical management committees consisting of physicians from

participating practices meet to develop initiatives and monitor progress. A statewide infrastructure, which helps to coordinate and support the 14 individual networks (Supplemental Figure 1, which can be found online at <http://www.annfammed.org/cgi/content/full/6/4/361/DC1>), provides direct financial assistance in proportion to the number of patients in the network. This money is used primarily for network staff salary, especially for case managers. Support also includes other activities, such as analyzing data, convening meetings, and developing protocols.

CCNC is unique because it has successfully combined the following key features on a large scale: (1) linking patients to a medical home, (2) engaging practices in quality improvement efforts, (3) case managing high-risk patients, (4) planning interventions and measuring success using quality data, and (5) providing a statewide structure but retaining control at a regional level. The following section describes this structure, as well as current challenges, in greater detail.

Linking Patients to a Medical Home

Each CCNC patient is linked to a medical home. Individual CCNC practices do not meet all the functions of the recently defined patient-centered medical home, but the linkage between patients and a primary care practice established during the creation of CCNC represents the early development of this concept. For a management fee (in addition to the usual fee schedule of Medicaid) the practices provide ongoing comprehensive primary care and arrange care with other qualified health care professionals as needed. CCNC practices offer improved access, which includes 24-hour on-call coverage. They also engage in quality improvement projects defined by CCNC. These quality improvement efforts are further defined below.

Community partners, such as local hospitals, health departments, and county health departments and county departments of social services, are integral members of each network, so that the CCNC medical practices are linked more strongly to the community. CCNC case managers are often community based, working with several practices at the same time. Community practices are encouraged to work together as peers. This community connection is emphasized in the Chronic Care Model and has helped CCNC succeed. This community connection has less emphasis in the current definition of the patient-centered medical home.

Challenges That Remain

A full implementation of the patient-centered medical home, as recently defined at a national level, has not occurred. Although many of the features described



above are consistent with the patient-centered medical home, other features, especially those focusing on practice redesign, have not been implemented. CCNC does not currently support registries for its practices, nor does it expect practice redesign, such as open access. Effective electronic communication between practices and referral centers exist only in limited areas. CCNC is beginning to prioritize practice redesign efforts to achieve a hoped for more complete implementation.

Other challenges exist. The per patient management fee may be insufficient to manage more complex medical patients. To achieve further cost savings, the program has intentionally sought to recruit the sicker and more costly Medicaid patients. As a result, the percentage of patients with more complicated chronic illnesses in the program has risen, yet the management fee has increased only slightly since the program was instituted a decade ago.

Engaging Practices in Quality Improvement Efforts

When practices sign on to be part of CCNC, they agree to participate in the quality improvement efforts of CCNC. CCNC as a statewide program defines areas of priority and provides guidelines on how to meet these priorities. Medical directors and network directors from each network share ideas in statewide quarterly meetings to help define initiatives, which currently include management of diabetes, asthma, and congestive heart failure, as well as emergency department and pharmacy utilization.

Quality improvement efforts vary, however, from network to network. The steering committee and medical management committee of each network, using knowledge of the local community, define how to implement the priorities locally. These groups also define additional priorities based on local need. Examples of local initiatives include a focus on chronic obstructive pulmonary disease, gastroenteritis, childhood development, and mental health integration. Local networks have varied widely in their efforts to improve quality in these areas. Some networks have provided practical assistance, such as supplying practices with asthma flow sheets and up-to-date diabetes guidelines.

Because of the regional network structure of CCNC, each region's medical director can encourage participation in a collegial way that would not be possible with a more centralized program. CCNC also provides audit data to practices that allow them to compare their care outcomes with those of other local practices, a benchmarking activity that fosters friendly competition. Physician champions in the individual

practices promote implementation. In one network, high emergency department visit rates prompted physicians to organize an after-hours clinic. More recently some networks have hired quality improvement coaches to work on practice redesign with individual member practices.

Challenges That Remain

Engaging practices with small number of Medicaid patients is difficult because the quality data fed back to these practices are less meaningful when CCNC patients make up only a very small percentage of the practice. As network efforts expand to patients with more complex chronic conditions, CCNC also faces the challenge of more actively involving medical subspecialists. When created, CCNC focused primarily on outpatient primary care. In initiatives that focus on such conditions as congestive heart failure and polypharmacy, it will be important to involve the subspecialists who also see CCNC patients.

Case Managing High-Risk Patients

Optimal care for chronic disease is a complex task, often requiring difficult treatment regimens and major lifestyle changes. Case managers can complement the work of physicians to help patients adhere to treatment recommendations and make needed lifestyle changes. Case management has been shown to improve health outcomes.⁸ Yet small practices are frequently unable to afford their own case manager. By joining a network, the practices gain access to a team of case managers who work with all patients in a given network. A single practice may share a case manager with several other small practices. Although the ratio of case managers to patients is generally high (about 1:4,000), relatively few patients use a disproportionate share of resources, and the case managers work closely with this smaller group.

The group of patients in need of case management is identified primarily through claims data. For example, CCNC patients with multiple emergency department visits, a high number of medication claims, or diagnoses of asthma, diabetes, or congestive heart failure are selected for case management. Clinicians in CCNC practices can also refer patients for case management. The case managers are aided in their work by CCNC-specific management software, which links to Medicaid claims data and thus identifies high-risk patients, allows case managers to see health care utilization of their clients, and allows for documentation of care and communication with other case managers.

What differentiates CCNC case managers from case managers in commercial insurance programs is the managers' relationship with the practices. Because

of the local nature of the networks, each case manager is able to establish a personal relationship with each practice, which fosters more efficient communication between the case managers and the practices.

Challenges That Remain

Physicians in busy practices have little time to meet with case managers, yet case management has been most successful when case managers and clinicians regularly share treatment plans. Networks continue to find creative ways to get case managers and clinicians together. In some networks, Web-based electronic health records have been effective ways to communicate when case managers are not in the practice. One network is piloting an effort to put case managers on the clinician's patient schedule, pay for the visit, and be assured of 10 to 15 minutes of protected time with the physician.

Planning Interventions and Measuring Success

The practice-specific data provided by CCNC has proved crucial in recruiting new practices to the networks, setting priority areas for the networks, and monitoring success. At the statewide level, a small CCNC staff works with the state Medicaid office to extract and sort patient claims data. Claims data generate information, such as the number of patients with diabetes who have had hemoglobin A_{1c} measured in the last year or the number of patients who were seen in the emergency department with a nonemergency diagnosis.

The central office also coordinates statewide audits that generate such patient-specific data as blood pressure readings or lipid levels. These data are aggregated by practice, compared with national and regional benchmarks, and shared with participating practices. Practices successful in one area share strategies for success with other practices. Control of the network remains in the hands of the local physicians, so sharing data fosters a sense of collaboration and desire to learn from each other. Feedback from the practices indicates that data sharing is one of the biggest benefits of belonging to a network. Many practices are too small to be able to create such report cards independently, and they value the efforts of CCNC to generate and share the data. The data are also used to identify patients for case management.

Challenges That Remain

Claims are generated for billing purposes and thus often are inadequate for defining quality in detail. Audit data are more accurate but more expensive to obtain. Data available to CCNC have proved effective

for defining patients in need of case management and identifying outlier practices. These data have been used less successfully to rigorously explore outcomes across the 14 networks or to assess the impact of CCNC on statewide quality measures. CCNC is working more aggressively to collect statewide data for this purpose.

Providing Statewide Structure With Regional Control

Local control has sustained the CCNC networks. Physicians weary of outside interference and bureaucratic hassles feel empowered by a network that can respond quickly to their needs and ideas. Local control fosters creativity and ownership, and each network decides how to prioritize and implement programs. Community physicians decide what is best for their practices based on their knowledge of the community and on trends in collected claims data. The broad medical community actively contributes to the network because local hospitals, departments of social services, and county health departments all belong to the networks.

Yet it is the statewide structure that has led to CCNC's current success and impact. The statewide infrastructure allows collaborative learning among networks. Initiatives piloted in individual networks can be rolled out across the state. As mentioned above, the statewide infrastructure also provides support services, such as analysis of claims data, development of protocols, and recruitment of statewide expertise. Such activities would be difficult to replicate in each of the 14 networks.

Challenges That Remain

Development of statewide protocols and expectations has helped ensure standardization of the program and has facilitated the measurement of statewide outcomes. Such standardization, which takes advantage of statewide expertise and efficiencies of scale, needs to be balanced by the success that has come from tailoring interventions based on the needs of local communities.

FUNDING CCNC

The state Medicaid office has provided the funds for the infrastructure needed to operate the CCNC. It supports the small statewide staff and data collection efforts. In addition to the statewide infrastructure, each of the 14 individual networks has a staff that provides outreach to network practices and case management for high-risk patients. The state Medicaid office provides support for this network infrastructure as

well (\$3 per member in the network per month). Many networks augment this state support with grants from local and national organizations.

Finally the state Medicaid office supports the individual practices in the network. In addition to the usual Medicaid fee schedule, CCNC community practices receives money (an additional \$2.50 per member in the practice per month) to fund practice innovations that improve disease management for CCNC patients.

MEASURING THE SUCCESS OF CCNC

CCNC was implemented to stem the tide of rising Medicaid costs, so any programmatic costs needed to be clearly justified. CCNC was able to provide this justification within the first few years of operation. A management consultant group, The Mercer Group (Atlanta, Georgia),⁹ has provided objective outside assessments of cost savings. They calculated these cost savings by comparing actual costs with projected costs using historical 36 months of data for fiscal years 2000, 2001, and 2002. Using conservative modeling, CCNC saved the State of North Carolina \$60 million in fiscal year 2003. By 2006, savings had increased to \$161 million annually. More liberal modeling puts the cost saving at more than \$300 million annually by 2006. The largest savings were achieved in emergency department utilization (23% less than projected), outpatient care (25% less than projected), and pharmacy (11% less than projected).⁹

Beyond saving money, CCNC has also improved quality of care. Increasing asthma control, one of the first CCNC initiatives, provides the most dramatic illustration of improvements in care. Since initiation of the program, chart audits showed a 21% increase in asthma staging, and a 112% increase in the number of asthma patients who received influenza inoculations. Emergency department visits for CCNC children with asthma decreased by 8% during the first year of the program. Hospitalization rates for the same group during this time decreased by 34%, and rates have been sustained at these lower levels.¹⁰ Because of the rapidly expanding size of CCNC, less rigorous baseline data are available for diabetes, but by 2007 CCNC patients were exceeding National Committee for Quality Assurance benchmarks in most areas (Table 1).¹⁰

In another measure of success, CCNC has created a large cadre of physicians and leaders in health care who support the CCNC model. Because of CCNC's statewide structure, members come from every county in North Carolina and speak up on behalf of CCNC. This powerful voice is difficult for state representatives to ignore when enacting health legislation. In further recognition of its achievements, CCNC was 1 of 7

winners of the Innovations in American Government Awards in 2007.¹¹

THE CREATION OF CCNC: KEY FACTORS

In this final section we highlight key factors that facilitated the creation and expansion of CCNC. These factors were determined from interviews with founding leaders of CCNC. We hope that this brief background will be helpful to readers who wish to re-create such a program elsewhere.

Started Small

In 1988, with the support of the Kate B. Reynolds Charitable Trust, the North Carolina Office of Rural Health conducted a demonstration project of a Primary Care Case Management (PCCM) model in Wilson County, a small rural county in eastern North Carolina. Two large multispecialty groups provided most of the ambulatory care for Medicaid patients in the county. For a small case management fee, in addition to the usual Medicaid fee schedule, these physicians agreed to manage the care of their Medicaid patients. This demonstration project showed some success with reducing unnecessary emergency department and specialty care use. The then Medicaid director, Barbara Matula, was impressed by the model's outcomes and supported the application for a 1915b Medicaid waiver to roll the program out to other counties. Although the PCCM model became less effective in controlling costs after the Emergency Medical Treatment and Active Labor Act passed and public rejected managed care, it established the foundation of linking patients with a primary care physician, a foundation on which CCNC was based a decade later.

Table 1. 2006 Community Care of North Carolina Diabetes Audit (n = 9,012)

Measure	NCQA ^a Threshold %	CCNC Patients %
HbA _{1c} control <7.0%	40	47 ^b
HbA _{1c} control >9.0%	≤15	21
Blood pressure control ≥140/90 mm Hg (SBP ≥140 or DBP ≥90)	≤35	34 ^b
Blood pressure control <130/80 mm Hg (SBP <130 and DBP <80)	25	37 ^b
LDL control ≥130 mg/dL	≤37	19 ^b
LDL control <100 mg/dL	36	5 ^b

CCNC = Community Care of North Carolina; DBP = diastolic blood pressure; DPRP = Diabetes Physician Recognition Program; HbA_{1c} = glycated hemoglobin; LDL = low-density lipoprotein cholesterol; NCQA = National Committee for Quality Assurance; SBP = systolic blood pressure.

^aThreshold from NCQA DPRP 2006 used for comparison purposes only.

^bMeets threshold.

Strong Physician Leadership From Outset

Medicaid has a powerful regulatory function and, as such, is often viewed with mistrust by physicians. The Secretary of Health and Human Services, David Bruton, MD, a well-respected pediatrician, was able to overcome much of this mistrust when CCNC was created as a pilot program in 1998. A passionate supporter of the program, he believed that physicians must be engaged to improve the Medicaid program. He was able to generate legislative support, and physicians have been active in leading the program since its inception.

Strong Office of Rural Health

CCNC is administered out of the Office of Rural Health and Community Care. Jim Bernstein, the office's leader at the time of the creation of CCNC, was legendary in the State of North Carolina. His charisma and skills helped recruit practices and physician leaders, and trust he developed during many years of working with local communities helped overcome their skepticism of working with the state on a new Medicaid initiative. Early successes led to backing from legislative leaders, the Department of Health and Human Services, and the governor's office, which allowed for the expansion of the program statewide. The Office of Rural Health's community orientation has helped sustain the program by recognizing and celebrating regional differences among networks while promoting the program on a statewide level.

Best Practices From Pilot Programs

Initially several structures were tested for organizing practices. A centralized pilot program engaged selected practices across the state that had a large number of Medicaid patients. Other pilot programs centered around and operated out of community health centers, health departments, and academic medical centers. Two pilot programs involving entire communities proved to be the most successful and were expanded statewide (Supplemental Figure 1). This community model used a not-for-profit 501C3 structure and required participation by enough practices to care for at least 70% of Medicaid patients in that community. It also required participation by the local hospitals, the county health departments, and the departments of social services. After testing the initial pilot programs, communities could join CCNC as networks only after those requirements were met.

Created During Crisis

Sometimes a crisis is needed to overcome the inertia of the status quo, and in the mid 1990s talk of funding Medicaid through block grants created a crisis in North Carolina. Emerging managed care systems saw

a business opportunity and lobbied to secure contracts to manage the North Carolina Medicaid program. Threatened by possible severe cuts in reimbursement and loss of independence, physicians saw CCNC as the opportunity to maintain local control. Physicians who might not have otherwise participated did so in the face of this outside threat. As a result, state leadership refused the so-called budget savings promise by commercial insurers.

In conclusion, during the past decade various models have been proposed to improve delivery of chronic care and preventive services, many of which provide an idealized version of care that seems out of reach for practicing physicians. CCNC has not only implemented a model of care that incorporates a number of the elements proposed by these models of care, it has also moved beyond the demonstration phase to prove that this model can be scaled and implemented across an entire state by practicing physicians in busy outpatient practices.

CCNC has created a modified version of the medical home where patients are assigned to a primary care home that provides comprehensive longitudinal care, where case managers provide wrap-around services, where practice-specific data are used to improve care, where practices learn from each other, and where community partners support care. The program supports itself fiscally and has shown important improvements in quality of care. It is a model of care that has moved beyond theory and could be implemented across the country.

To read or post commentaries in response to this article, see it online at <http://www.annfamned.org/cgi/content/full/6/4/361>.

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