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Tar Heel Footprints in Health Care

A periodic feature that recognizes individuals whose efforts—often unsung—enhance the health of North Carolinians

Denise Levis Hewson, BSN, RN, MSPH

Because of her experience growing up in England, Denise Levis Hewson was accustomed to a universal health care system in which everyone has equal access to services. After coming to the United States and receiving her nursing degree from the University of North Carolina (UNC)–Chapel Hill, Hewson began working in Duke University Hospital's emergency department, where she saw many patients who had no insurance or were covered by public health plans visiting the emergency department for primary health care. She says she "could not understand why these poorer people could not get proper health care." It was then that she decided to work toward redesigning the health care access and delivery system for underserved individuals.

Hewson began working toward her goal by returning to UNC–Chapel Hill for a master of science in public health degree. While Hewson earned her degree, she researched how to increase primary care access to the Medicaid population. During this time, she also began working for the North Carolina Office of Research, Demonstrations, and Rural Health Development (currently titled the Office of Rural Health and Community Care) as a health and managed care specialist. Torlen Wade, who began working with Hewson during her graduate internship, says that she is "extraordinarily passionate and effective in getting people to work together and tireless. It is a combination of those that makes her a wonderful person to work with."

In 1990, Hewson began working on an innovative new program called Carolina Access. Carolina Access used a medical home model to provide primary health care and care management to the Medicaid population in North Carolina. The program eventually led to the development of Community Care of North Carolina (CCNC), a nationally recognized medical home program for Medicaid beneficiaries in the state.

As the current director of clinical and quality improvement programs at CCNC, Hewson fulfills her goal of providing health care to the underserved. She works with coordinators at all 14 CCNC networks to identify opportunities to improve quality, access, and use of health services. Susan Yaggy, who worked with Hewson during the launch of CCNC in 1998, says that Hewson is successful because she is "incredibly smart, conceptualizes beautifully, and is very balanced and clear about what needs to be a priority." Yaggy also applauds Hewson's wonderful sense of humor, which, as Yaggy notes, "you need in this business."

Hewson's work has been recognized through the honor of serving on many different committees and boards. During 2005-2009, Hewson served with the Agency for Health Care Quality Research to improve quality in Medicaid management and provide expert support and leadership to other states. Other organizations Hewson has worked with include the Centers for Disease Control and Prevention, the Institute of Medicine of the National Academies, the National Association for Community Health Centers, the North Carolina Medical Society, and the North Carolina Institute of Medicine. NCMJ

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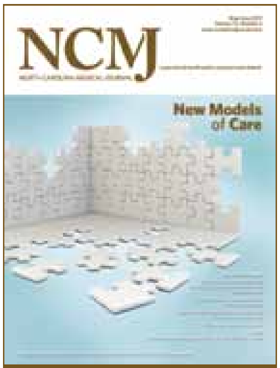

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Notice

Call for Applications and Nominations for Editor in Chief of the NCMJ

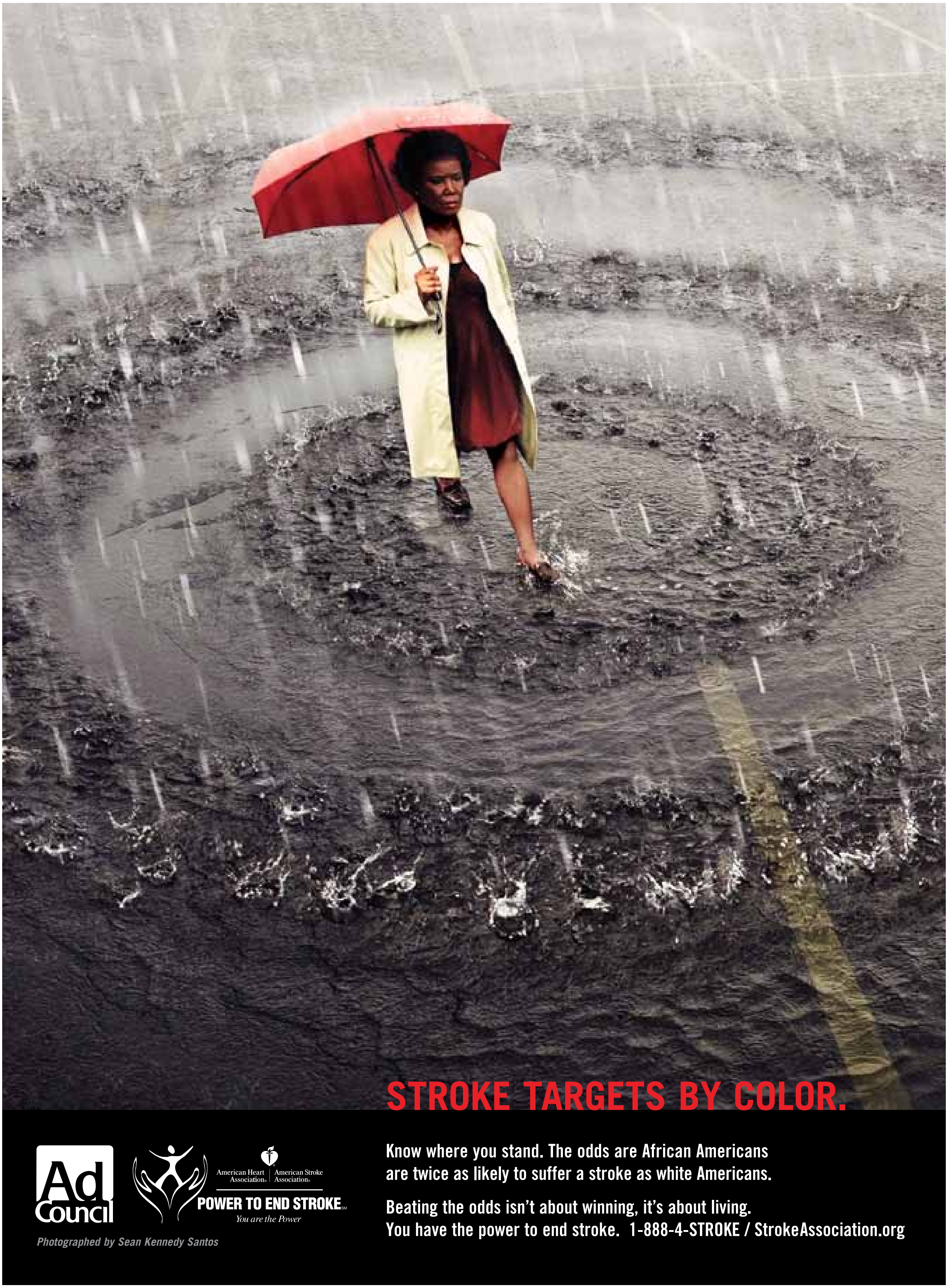
The North Carolina Institute of Medicine and The Duke Endowment seek candidates for the position of editor in chief of the NCMJ. The position is part-time, includes a stipend, and runs for a term of 3 years, beginning in January 2012. Nominations of and applications from qualified candidates will be accepted. The deadline for receipt of nominations is September 30, 2011; the deadline for receipt of applications is October 28, 2011.

The mission of the NCMJ is to disseminate health policy content among North Carolina health professionals, policymakers, and interested lay persons by publishing authoritative commentaries and original research on an array of health-related subjects. The NCMJ was founded as the North Carolina Medical Journal in 1849 by the North Carolina Medical Society. Since 2002, the NCMJ has been published by the North Carolina Institute of Medicine and The Duke Endowment. Six issues are published annually, with a circulation of 30,000.

The editor in chief is responsible for overseeing NCMJ content, including identifying topics for theme issues, recruiting expert contributors, and reviewing contributions for accuracy and quality. The editor in chief plays an important role, along with the publishers and the managing editor, in strategic and operational planning. Candidates must have broad understanding of the North Carolina health system and knowledge of the efforts of leading health care professionals, researchers, and policymakers across the state; candidates should have previous editorial experience with scholarly and/or quasi-scholarly publications and must be able to contribute the time and leadership necessary for timely publication of high-quality content.

Nominations should include a short description of the relevant qualifications of and contact information for the candidate(s). Applications should include a brief summary of the candidate's background, as well as a short discussion of the candidate's perspectives on the current status of the NCMJ, opportunities for the NCMJ's growth and enhancement, and plans for capitalizing on these opportunities. Materials should be saved as a pdf document and should not exceed 2 pages.

Please e-mail materials to Dr. Pam Silberman, president and chief executive officer of the North Carolina Institute of Medicine, at ncmedj@nciom.org.



ORIGINAL ARTICLE

Use of Data by Hospitals in North Carolina to Identify Disparities in the Care and Outcomes of Minority Patients

Donald E. Pathman, Randall Teal

BACKGROUND Hospitals are now called upon to use available data—information on the use of services, patient satisfaction, and core quality measures—to identify disparities in the use and outcomes of services for minority patients. This study assesses whether and in what ways hospitals in North Carolina use data to understand the experiences of minority patients.

METHODS Semistructured telephone interviews were completed with chief executive officers (CEOs) and other administrators from a broad sample of North Carolina hospitals. Participants were asked about their hospitals' use of data to compare experiences of minority and nonminority patients and about any other minority-focused initiatives. Responses were analyzed using a grounded theory approach.

RESULTS A total of 28 CEOs and administrators from 17 (77%) of 22 targeted hospitals participated fully in the interviews. Participating hospitals ranged in size from fewer than 60 beds to more than 700 beds and were equally distributed across the state's 3 geographic regions. Three hospitals (18%) reportedly analyzed data by patient race to assess satisfaction, specific clinical outcomes, adverse events, and/or use of services. Respondents cited barriers to analyzing hospital data by patient race and ethnicity as lack of resources, not knowing how to perform these analyses, and not seeing the need. Respondents for 10 hospitals (59%) reported other types of hospital programs targeting the needs of minority patients, including cultural-sensitivity training for staff and initiatives in local communities.

LIMITATIONS Participating hospitals may not reflect all North Carolina hospitals in their minority-focused efforts, and respondents may not have known about all relevant programs in their hospitals.

CONCLUSIONS Few hospitals in North Carolina are proactively identifying disparities between minority and nonminority patients by use of data.

Racial and ethnic disparities in health and health care in the United States are well recognized, and national goals have been set for their elimination. The need now is to learn how best to meet these goals [1-3]. To date, promising population-level approaches have been found in the forms of health-promoting media campaigns and the enlistment of community health workers [1, 3] and by ensuring good access to health care [3, 4]. For disparities that arise within hospitals, the focus has been to reduce language barriers by hiring bilingual staff and interpreters, to hire for staff diversity, and to train all staff in culturally appropriate care [1, 5-6]. This study looks at another, more recently advocated approach to address disparities within hospital care, which is for hospitals to use on-hand data to identify differences in care and outcomes for their minority and nonminority patients. This study assesses how often this approach is now used by hospitals in North Carolina.

The Institute of Medicine of the National Academies [1]. and others [7-10] have advocated for the use of the concepts and tools from quality improvement to address the problem of racial and ethnic disparities that arise within hospitals. Central in this approach is to have hospitals use available data to identify differences in the care and outcomes of minority and nonminority patients and then intervene to reduce identified disparities [11]. Hospitals might, for instance, look for race-group differences in short- and long-term outcomes from services provided, in process indicators of good quality care, in indicators of the timeliness and appropriateness of services patients receive, and in patient satisfaction. The most practical and useful ways to use data to understand the experiences of minority patients are not yet known. As of 2005, 78% of acute care hospitals nationally gathered information on their patients' race, and 51% gathered information on their patients' ethnicity, but fewer than 1 in 5 then used this information to compare racial and ethnic patient groups in terms of care received and outcomes [12].

A total of 32.8% of North Carolina's population is part of a racial or ethnic minority group, including African Americans (21.6% of the total population), Hispanics/Latinos (7.4%), and Native Americans (1.3%) [13]. There are known race and ethnic group differences in health insurance coverage, in the likelihood of seeing a physician, and in rates of infant death, diabetes, teen pregnancy, and death from heart disease, stroke, and prostate cancer [14]. Differences in hospital service use and outcomes within North Carolina have not been reported, to our knowledge.

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TABLE 1.
Characteristics of 17 Participating Hospitals, Overall and by Region

		Region		
Characteristic	Overall	Coastal (n = 6)	Piedmont (n = 6)	Mountain (n =5)
Size, no. of beds				
Overall, mean	303	315	328	259
1-99	7	2	3	2
100-249	3	1	1	1
≥250	7	3	2	2
Ownership type, no. of hospitals				
Public	4	3	0	1
Nonprofit, non-governmental	11	3	4	4
For profit	2	0	2	0
County population				
Total no. of residents, mean[a]	164,293	129,144	264,336	86,420
Minority residents, % of total[b]	25.5	34.8	27.8	11.7
Residents living below poverty line, % of total[b]	14.8	16.5	12.5	15.6

[a] Data are from 2009.
[b] Data are from 2008 [13].

In 2008, North Carolina joined 22 other states that require all hospitals to collect race and ethnicity information about their patients [8, 15]. But beyond now collecting race information, it is not known how many North Carolina hospitals have begun to combine patient race and ethnicity data with their clinical and administrative data to identify racial and ethnic disparities in care and outcomes. Gathering this information is the principal aim of this study. A secondary aim is to begin to identify the characteristics of hospitals and communities where race and ethnicity group comparisons are being used to identify disparities. We anticipate that the use of data to understand the particular experiences of minority patients is more common in larger hospitals, which have more resources and staff, and in hospitals in counties with greater minority population proportions, where issues involving race and ethnicity are more salient. For perspective, we also identify other minority-focused initiatives (ie, initiatives not based on data) that hospitals participate in. This study was conducted as part of the UNC Health Care System's ERACE (Eliminate Racial and Ethnic) Disparities Initiative, a health system–wide effort to identify and address disparities for minority patients by use of data.

Methods

Surveyed hospitals. Data for this study were gathered through telephone surveys of chief executive officers (CEOs) and other key informants working at a broadly representative sample of North Carolina's 118 general, acute care hospitals. We randomly selected 3 hospitals from each of 6 strata created by geographic region (Coastal, Piedmont, and Mountain) and number of licensed beds (1-99, 100-249, and ≥250). We added 3 of the state's 4 principal academic hospitals (the UNC Health Care System, with which we are affiliated, was excluded) and a fourth hospital, with <99 beds, in the Piedmont region, whose CEO helped confirm for us that other CEOs would likely be able to respond to the interview's questions. The final targeted sample numbered 22 hospitals. The study was approved by the Biomedical Institutional Review Board at the University of North Carolina–Chapel Hill.

Our goal for each hospital was to interview a minimum of 1 individual and, when suggested by initial respondents, other individuals in positions where they should be aware of their institution's efforts to meet the special needs of minority patients. An introductory letter was mailed to CEOs, explaining that survey participation was voluntary and confidential. Some CEOs forwarded the letters to other staff, who were instructed to respond for their hospitals. During interviews, some respondents referred us to other colleagues they felt could provide additional information, whom we then contacted. When CEOs did not respond to several invitations to participate, we contacted other individuals at their hospitals in appropriate positions, such as directors of patient relations and directors of nursing.

Interviews and secondary data. Telephone interviews were scheduled for times convenient to the interviewees. When possible, a list of the interview questions was forwarded in advance to help respondents understand the thrust of the study, to promote trust, and to allow participants to prepare their responses. Interviews were conducted from July through November 2009 by a single member of the research team. Interviews lasted 10-45 minutes, with an average duration of 21 minutes.

A semistructured interview guide was prepared with which to query 2 principal topics reported in this article: (1) whether hospitals offered programs and services and/or had constituted committees and advisory groups to address the special needs of racial and ethnic minority patients and communities, apart from interpreter services, which should be ubiquitous; and (2) whether hospitals examined data to understand the needs and care received by minority patients, with comparisons on 13 specific types of data then queried (Table A1, Appendix, available only in the online edition of the NCMJ). The interviewer took notes of participants' responses during interviews and immediately afterward wrote these out in greater detail. Secondary data on county demographic characteristics were drawn from the US Census [13].

Data coding and analysis. We used a grounded theory approach in analyses, allowing important points and response categories to emerge from the data inductively [16]. On the basis of the first few interviews, we created an initial list of codes and coding rules for responses to each question posed

TABLE 2.
Use and Nonuse of Data on Patient Race and Ethnicity by North Carolina Hospitals

Characteristic	Activity or reason
Use data	
Hospital 1	Data are used to compare Hispanic patients with respect to patient satisfaction, in-hospital infections, falls and injuries, and length of stay.
Hospital 2	Data are stratified by ethnicity as part of management of interpreter services.
Hospital 3	Data on patient demographic characteristics, including race and ethnicity, are used to create semiannual reports on resource use. Data have also been used to examine differences among racial and ethnic groups with respect to hospital infections, adverse outcomes, and readmissions.
Do not use data[a]	
4 hospitals	The hospitals cannot afford the cost or do not have the resources required for added analyses. At one hospital, the "breakout of minorities in data for a critical access hospital...is just not a priority now. No time or resources [are available] to go into such excruciating detail."
3 hospitals	The hospitals do not perceive a need. At one hospital, the goal is to meet all patients' needs, so there is no perceived need to do race and ethnicity analyses. A second hospital believes it is "hitting its targets" with respect to minority patients. A third hospital does not believe there are racial and ethnic differences to warrant separate analyses.
3 hospitals	The hospitals rely on information provided by county health department and the state.
1 hospital	The hospital finds it difficult to gather race and ethnicity information on patients.

[a] Eleven respondents representing 8 hospitals reported, without prompting, information about why their hospitals had not performed race-specific analyses of their data.

to participants. We also coded information interviewees provided on why their hospitals did not offer minority-focused services, although this was not explicitly queried. The interviewer then coded interview responses from all subjects, and the second team member reviewed the codes. Coding differences were settled through discussion and consensus.

We describe respondent hospitals and report simple counts and percentages of the types of minority-focused services that hospitals provide. We include all services mentioned, even in the few instances when not all respondents for a given hospital reported a particular service. Last, we calculate simple group proportions to identify the characteristics of hospitals and their counties where minority-focused services are offered.

Results

Seventeen (77%) of the 22 targeted hospitals participated fully in the interviews. The 5 hospitals that declined participation included 1 academic hospital, 1 or more hospital in each of the 3 regions of the state, and hospitals in the middle- and high-bed-count groups. Reasons given for not participating included (1) a prohibition on survey participation by a parent hospital system, (2) a lack of interest in the study, and (3) a belief that the hospital had too few minority patients to warrant minority-focused services.

A total of 28 interviews were completed with representatives from the 17 participating hospitals. Among the respondents were 7 CEOs and 11 of their designees. After CEO, the next most frequent job titles of respondents were directors of a hospital service area, including director of quality and director of education (n = 8), diversity director or officer (n = 3), hospital vice president (n = 3), director of patient relations or patient-centered care (n = 2), chaplain (n = 2), chief nursing officer (n = 2), and director of community outreach (n = 2). Respondents had served in their current positions for an average of 4.9 years.

The participating hospitals were equally distributed across the 3 regions of the state and varied greatly in their county population sizes, racial compositions, and poverty proportions (Table 1). Hospitals ranged in size from fewer than 60 beds to more than 700 beds.

Use of hospital data to understand the care and outcomes of minority patients. Respondents for only 3 hospitals (18%) reported that their hospitals performed some kind of analysis that used information about patient race (Table 2). One of the 3 hospitals had compared patients of various races and ethnicities with regard to satisfaction, in-hospital infections, falls and injuries, and length of stay. A second hospital had used patient count data and service-use comparisons to plan and budget for interpreters and other services for Hispanic patients. A third hospital used race and ethnicity data to understand and plan for service use and to compare patient groups in terms of in-hospital infections, adverse outcomes, and readmissions.

Although respondents were not asked why their hospitals had not looked at on-hand data separately by patient race, 11 respondents, who represented 8 of the hospitals, volunteered reasons for not doing so (Table 2). Respondents for 4 hospitals volunteered that their hospitals lacked the resources or could not afford the extra work to perform race-specific analyses. Respondents for 3 hospitals stated that their hospitals perceived no need for race-specific analyses because the hospital intended and/or succeeded in meeting all patients' needs. Three hospitals reportedly relied on county and state data from other sources, such as Healthy Carolinians [17] and the Center for Disease Control's Behavioral Risk Factor Surveillance Survey [18], to understand local minority health care needs.

Other minority-focused services provided by hospitals. Apart from efforts to use patient data to identify race-specific issues, respondents for 10 hospitals (59%) reported other initiatives to address the needs of minority patients (Table 3). Five hospitals provided cultural-sensitivity training for all employees, and 5 hospitals addressed the needs of minority patients through initiatives in local communities, often in partnership

TABLE 3.
Non–Data-Based Programs and Services Offered by 17 Participating Hospitals to Minority and/or Poor Patients

Program(s), service(s)	Hospitals, no. (%)	Examples
Programs targeting minorities[a]		
Cultural-sensitivity training for staff	5 (29)	Mandatory cultural diversity training; communication tool kit
Community outreach	5 (29)	HBCU partnership to recruit staff; annual health fair for Hispanic residents
Committees and/or advisory groups specifically addressing needs of minority patients	2 (12)	Diversity committees; interpreter services advisory group to address health issues among Hispanic residents
Programs targeting low-income, uninsured, and at-risk groups (not explicitly minority patients[b])	5 (29)	Cancer-navigation program; health screening for low-literacy patients; hospital-funded clinic in a poor, predominantly Hispanic community

Note. HBCU, Historically black colleges and universities.
[a] Two hospitals offered 2 types of service (ie, cultural-sensitivity training and community outreach).
[b] Although participants were asked about hospital programs that targeted the needs of minority patients, respondents for 5 hospitals reported on programs that targeted local low-income and uninsured individuals, who tended to be minority residents.

with community organizations. The latter included participation in a clinic for migrant farm workers, an organ-donor program for minority residents, an annual health fair for Hispanic residents, and a program to recruit minority health care professionals. Two hospitals had constituted relevant committees: one had a diversity committee to speak for the needs of minority patients and local minority communities and to promote diversity among hospital staff, and the other maintained an advisory group for its interpreter services and to meet its Hispanic patients' needs more broadly.

Respondents for 5 hospitals volunteered information about clinical services their hospitals offered to meet the needs of local low-income and uninsured individuals, who the hospitals recognized were often from minority groups. The clinical services offered were principally primary care, disease detection, and disease prevention services, provided free or at a reduced rate (Table 3).

Features of sampled hospitals that used data to identify health disparities or implemented other minority-focused activities. Sampled hospitals that were larger and either public or nonprofit were more likely than other sampled hospitals to offer some non–data-based program, outreach, or committee to address the needs of racial and ethnic minority groups (Table 4). Only 3 hospitals were using data to understand minority issues, so we could not reliably identify characteristics that distinguished them from the other hospitals in the study. However, of possible importance, 2 of the 3 hospitals were in the group of largest hospitals, 2 were nonprofit/nongovernmental hospitals, and 2 were in the Coastal region. None of the 5 hospitals in the Mountain region of the state—where there are the fewest minority residents and smaller hospitals—used data to understand the experiences of minority patients, but most of the participating hospitals in this region offered other types of minority-focused services. Mean percentages of minority residents were somewhat higher in counties where hospitals used data to identify minority individuals' needs (33.7% vs 23.8%) and in counties where hospitals provided other types of minority-focused initiatives (28.5% vs 21.3%) than in counties that did not perform these activities.

Discussion

Analyzing clinical and administrative data to compare the care and outcomes of minority and nonminority patients is uncommon among North Carolina's hospitals, as it is for hospitals nationwide [12]. On the basis of reports from this study's 17 hospitals, roughly only 1 in 5 North Carolina hospitals compares information on various racial and ethnic patient groups to understand how such patients may differ from other patients in the services they receive and in their outcomes. In comparison, we estimate that approximately 3 in 5 hospitals in the state sponsor some other, non–data-based minority-focused initiatives. According to respondents, barriers to hospitals' use of data to understand the experiences of minority patients include a lack of resources and funding to perform this work and a lack of knowledge about how to do it. Further, some hospitals did not perceive a need for such efforts. Indeed, some hospitals have very few minority patients and, understandably, will give more attention to their many other pressing quality and service issues. But some hospitals in our sample acknowledged sizable minority patient populations but saw no need to perform race-specific analyses because of an organizational goal to meet all patients' needs, regardless of race or ethnicity. The belief that well-intentioned and well-designed but race-blind approaches will meet the access, service, and quality needs of all patient groups and generate equivalent outcomes is unfounded and contrary to the evidence [3, 7]. Numbers are too small to identify firm associations, but as we anticipated, hospitals in our sample that compared patient racial and ethnic groups with relevant data were generally larger and located in counties with greater percentages of minority residents.

Hospitals may soon be asked to report quality performance measures stratified by race and to undertake minority-focused quality improvement efforts, to reduce identified disparities [11]. These initiatives must be data based. By use of data, hospitals can document differences in the care and outcomes of their minority and nonminority patients, they can constitute multidisciplinary care improvement teams to identify reasons for disparities, and they can design and undertake corrective interventions and then document program success. We do not know specifically how the 3 North Carolina hospitals in this study that perform race-specific analyses with data use this information to improve care.

The limitations of this study are several. It may be that hospitals that elected not to participate in the study were less likely than those that did participate to perceive a need for and perform analyses of race-grouped data. Reasons given by some of the hospitals that declined participation indicated that this was the case. Another possible limitation is that, because hospitals are often large, individual respondents in our study may not have known about all race-focused services offered in their institutions. We attempted to mitigate this possibility by interviewing individuals in leadership and other broad roles within their hospitals and, when a first respondent indicated that another individual might provide additional useful information, by interviewing 2 individuals within the hospital. With only a couple of exceptions, multiple respondents for a given hospital identified the same programs. Further, we suspect that programs that went unreported were less visible and, therefore, were likely more modest and less important to hospitals. Last, this study presents data from a 20% sample of North Carolina hospitals, and its numbers are too small to provide more than a general understanding that few hospitals in North Carolina now use data to identify the unique care needs and experiences for minority patients.

Disparities in hospital access, care, and outcomes for racial and ethnic minority groups are ubiquitous. Despite growing expectations for hospitals to proactively identify disparities for their minority patients on the basis of data, most US hospitals are not yet doing so. Hospitals in North Carolina are no different in this regard, even with minority residents making up nearly one-third of the state's population.

Use of data to identify disparities among minority groups is a new notion for hospitals, and widespread implementation of this activity will require a learning curve that lasts years. On the basis of these interviews, we anticipate that experts in the field of racial disparities need to identify best approaches to help hospitals in their efforts. Hospitals will also likely benefit from external technical assistance to initiate these analyses and interventions and will benefit from staff development and, perhaps, access to start-up funds. In the not-too-distant future, hospitals nationwide may be required to report key quality indicators of patient care separately for racial and ethnic groups and to intervene when disparities are identified, which will hasten the adoption of minority-focused data analysis to reduce racial health disparities [9, 11]. NCMJ

TABLE 4.
Characteristics of Hospitals That Use Data and Other Approaches in Minority-Focused Initiatives

Characteristic	Hospitals, no. (%) Offers data-based interventions[a]	Offers non–data-based interventions[b]
Ownership type		
Public (n = 4)	1 (25)	3 (75)
Nonprofit, non-governmental (n = 11)	2 (18)	7 (64)
Private (n = 2)	0	0
Size, no. of beds		
0-99 (n = 7)	1 (14)	2 (29)
100-249 (n = 3)	0	1 (33)
≥250 (n = 7)	2 (29)	7 (100)
Region		
Coastal (n = 6)	2 (33)	4 (67)
Piedmont (n = 6)	1 (17)	2 (33)
Mountain (n = 5)	0	4 (80)

[a] Three hospitals used data to understand differences in care and outcomes for minority patients.
[b] Ten hospitals offered other types of minority-focused programs.

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Knowledge and Perceptions Among Overweight and Obese Employees About Lifestyle-Related Health Benefit Changes

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BACKGROUND We investigated perceptions among overweight and obese state employees about changes to health insurance that were designed to reduce the scope of health benefits for employees who are obese or who smoke.

METHODS Before implementation of health benefit plan changes, 658 state employees who were overweight (ie, those with a body mass index [BMI] of 25-29.9) or obese (ie, those with a BMI of ≥30) enrolled in a weight-loss intervention study were asked about their attitudes and beliefs concerning the new benefit plan changes.

RESULTS Thirty-one percent of employees with a measured BMI of 40 or greater self-reported a BMI of less than 40, suggesting they were unaware that their current BMI would place them in a higher-risk benefit plan. More than half of all respondents reported that the new benefit changes would motivate them to make behavioral changes, but fewer than half felt confident in their ability to make changes. Respondents with a BMI of 40 or greater were more likely than respondents in lower BMI categories to oppose the new changes focused on obesity ($P < .001$). Current smokers were more likely than former smokers and nonsmokers to oppose the new benefit changes focused on tobacco use ($P < .01$).

LIMITATIONS Participants represented a sample of employees enrolled in a weight-loss study, limiting generalizability to the larger population of state employees.

CONCLUSIONS Benefit plan changes that require employees who are obese and smoke to pay more for health care may motivate some, but not all, individuals to change their behaviors. Since confidence to lose weight was lowest among individuals in the highest BMI categories, more-intense intervention options may be needed to achieve desired health behavior changes.

Behavioral risk factors such as smoking and obesity are associated with an increase in many preventable chronic diseases that affect the health of working adults, as well as influence the financial health of employers. For example, obesity is estimated to cost employers $73.1 billion annually [1], and tobacco use is estimated to cost employers $75.5 billion annually [2], both in direct medical costs.

As health care premiums rise, employers are increasingly looking for ways to maintain or reduce costs [3-7]. According to a nationally representative survey of employers conducted in 2009, 21% of respondents reported that, in response to the economic downturn, they reduced the scope of health benefits or increased cost sharing [8]. From the perspective of employers, imposing health insurance surcharges or limiting benefits for employees with risk factors, such as smoking and obesity, associated with leading chronic diseases may be more desirable actions than other forms of cost shifting [3]. Although these surcharges are an additional financial burden to high-risk employees, one possible benefit is that the surcharges may increase motivation in these individuals to quit smoking or to lose weight. However, little is known about employee perceptions about such changes before they are implemented, whether employees are motivated to consider making a behavioral change, and whether employees are confident in their ability to make desired behavioral changes. Consequently, data-driven guidance is lacking for individuals who are constructing health benefit changes.

During 2010 in North Carolina, approximately 661,000 state employees had health insurance as a benefit covered by the State Health Plan for Teachers and State Employees. In April 2009, North Carolina Senate Bill 287 became law, and the Comprehensive Wellness Initiative went into effect [9]. For years, employees were automatically enrolled in an 80/20 health benefit plan, in which 80% of health care costs are covered and 20% are paid by the employee. Beginning in July 2010, all state employees were automatically enrolled in a 70/30 health benefit plan, in which 70% of health care costs are covered and 30% are paid by the employee. The official health benefit policy can be accessed on the State Health Plan Web site (available at: http://www.shpnc.org/

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comp-wellness.html). In general, enrolled employees (or any additional covered dependents) who reported being a nonsmoker were eligible to stay in the more desirable 80/20 plan (Table 1).

Changes in North Carolina State Health Plan benefits related to weight will go into effect in July 2011 (Table 1). As planned, all employees will be automatically enrolled in the 70/30 health benefit plan unless they attest to being a nonsmoker and having a body mass index (BMI; calculated as the weight in kilograms divided by the square of the height in meters) of less than 40. Details can be found on the State Health Plan Web site (available at: http://www.shpnc.org/comp-wellness.html). In 2012, employees will be automatically enrolled in the 70/30 health benefit plan unless they attest to being a nonsmoker and having a BMI of less than 35 (Table 1).

In this study, performed before implementation of the health benefit changes, we assessed the awareness, attitudes, beliefs, and motivation of overweight state employees who were covered by the North Carolina State Health Plan and would be directly affected by the changes. In addition, we examined variations in employee attitudes on the basis of their BMI and smoking status. The following hypotheses were tested: employees' self-reported BMI does not match their actual (measured) BMI; employees in the highest BMI categories are less likely to favor the new benefit plan changes, to believe in their potential for helping employees lose weight, and to report confidence in their ability to lose weight, compared with employees in lower BMI categories; and overweight employees who smoke are less likely to favor the new benefit plan changes or to believe in their potential to help employees quit smoking, compared with former smokers and nonsmokers.

TABLE 1.
Changes in North Carolina State Health Plan (SHP) Benefits, by Effective Date

Effective date	Changes
July 1, 2010	All SHP members will be enrolled in the 70/30 plan. If they self-report as a **nonsmoker** or provide physician certification of tobacco-cessation program participation, they may enroll in the 80/20 plan.
July 1, 2011	All SHP members will be enrolled in the 70/30 plan. SHP members who self-report as nonsmoker with a **BMI of <40**, or who provide physician certification of tobacco-cessation/weight-management program participation or of a medical condition, may enroll in the 80/20 plan.
July 1, 2012	All SHP members will be enrolled in the 70/30 plan. SHP members who self-report as a nonsmoker with a **BMI of <35**, or who provide physician certification of tobacco-cessation/weight-management program participation or of a medical condition, may enroll in the 80/20 plan.

Note. BMI, body mass index (calculated as the weight in kilograms divided by the square of the height in meters).

Methods

Sample. In October and November 2008, 1,020 employees from 12 North Carolina colleges and universities who were 18 years of age or older and had a BMI of 25 or greater were enrolled in the North Carolina WAY (Worksite Activities for You) to Health research study, a group-randomized, controlled trial designed to examine the effectiveness of a Web-based weight-loss program and cash incentives for weight loss. Employees were excluded if they were not a member of the State Health Plan; were not a permanent, full-time employee at a participating campus; had type 1 diabetes; were pregnant or breast-feeding; had lost more than 20 pounds during the previous 6 months; or were taking weight-loss medication. Those who reported having had a malignancy requiring chemotherapy or radiation during the past 5 years, who answered "yes" to any of the Physical Activity Readiness Questionnaire questions [10], or who had a BMI of 42 or greater were required to obtain physician's consent before participating in the study.

In October and November 2009, 690 participating employees (68%) concluded a 12-month WAY to Health follow-up assessment by completing a survey that included questions about the new State Health Plan changes described above. Next, they attended an on-site assessment during which their height and weight were measured (at that time, they received a handout with their BMI calculated on the basis of measured height and weight). This analysis was limited to the 658 employees with a BMI of 25 or greater at the 12-month assessment. Institutional review boards at the University of North Carolina, all participating universities, and Duke–National University of Singapore approved this recruitment protocol and all study procedures.

Measurements. We described the new smoking- and obesity-related benefit changes to participants before asking them questions about the new changes to the State Health Plan benefits (Table 2). Key sociodemographic characteristics were self-reported. The responses to several open-ended questions about smoking- and weight-related benefit changes and preferred intervention options were also summarized.

Smokers were categorized as current smokers, former smokers, or nonsmokers on the basis of responses to the questions "Have you smoked at least 100 cigarettes in your entire life?" and "Do you currently smoke?" Respondents who were cigarette smokers at the time of the survey were categorized as current smokers, those who were not smokers but had smoked 100 cigarettes in their lifetime were categorized as former smokers, and those who were not smokers and had not smoked 100 cigarettes in their lifetime were categorized as nonsmokers.

Trained staff used standardized protocols to measure the height and weight of all participants at baseline, 3-, 6-, 12-, and 18-month assessments. These data were used to calculate the BMI at each assessment. For the purpose of the

TABLE 2.
Key Measures About the North Carolina State Health Plan Benefits

Measure	Sample question	Response option(s)
Attitude toward the new State Health Plan benefits	To what extent do you think these new State Health Plan benefit changes are a good idea?	"Not at all" and "to a little extent" were both coded as "unfavorable" in the analysis, "to some extent" was coded as "neutral," and "to a greater extent" and "to a significant extent" were both coded as "favorable."
Belief about effectiveness of new State Health Plan benefits	To what extent do you think this new State Health Plan benefit will help employees quit smoking (or lose weight)?	"Not at all" and "to a little extent" were both coded as "unfavorable" in the analysis, "to some extent" was coded as "neutral," and "to a greater extent" and "to a significant extent" were both coded as "favorable."
Motivation to try different methods of quitting smoking (or losing weight)	Will the new smoking State Health Plan benefit change motivate you to join a smoking-cessation class or group (or a weight-loss class, group, or online program)?	"Yes" or "no"
Self-confidence about quitting smoking (or losing weight)	To what extent are you confident that you will be able to quit smoking (or lose weight), so that you can stay in the 80/20 plan?	"Not at all" and "to a little extent" were both coded as "unfavorable" in the analysis, "to some extent" was coded as "neutral," and "to a greater extent" and "to a significant extent" were both coded as "favorable."
Suggestions for health promotion programs	What do you think the Employee Wellness Committee can do to help you and/or employees on your campus quit smoking and avoid the use of tobacco products (or achieve and maintain a healthy weight)?	Open-ended
Comments on new State Health Plan benefits	Do you have any other comments about the State Health Plan benefit change?	Open-ended

analysis, the BMI at the 12-month assessment was categorized using the conventional categories for overweight (25-29.9), obese class I (30-34.9), obese class II (35-39.9), and obese class III (40 or greater). Before undergoing each on-site measurement, participants were asked to specify their current BMI. After height and weight were measured during the follow-up visits at 3, 6, and 12 months, participants were given a handout that specified their actual BMI.

Statistical analysis. Because the study was a group-randomized, controlled trial and data were clustered by university or college, respondents and nonrespondents were compared using Rao-Scott χ^2 tests. The self-reported BMI categories and measured BMI categories were compared using the McNemar test. Next, we used Rao-Scott χ^2 tests to compare attitudes and beliefs by BMI category and smoking status, accounting for the clustered nature of the data. An α of 5% was used as the threshold of statistical significance. Characteristics (eg, age, sex, race, education level, household income, marital status, and current health status) are not significant confounders of the relationship between attitudes or beliefs about the health plan changes and smoking status (or BMI category) and, thus, are not included in this analysis. Statistical analyses were performed using SAS, version 9.2.

Results

Participants. Table 3 compares sociodemographic characteristics, smoking status, and BMI category of respondents with those of nonrespondents. There was no significant difference between respondents and nonrespondents, except that respondents were more likely to be staff (72.8% vs. 52.2%; P = .017). Of the 658 respondents, 72.8% were staff (rather than faculty), 80.5% were female, 48.2% were white, 53.8% were married, and 45.4% held an associate's or bachelor's degree (Table 3). The mean age (±standard deviation) of the participants was 46 ± 9.9 years, with a range of 21-76 years. Among respondents, 179 (27.2%) were former smokers, and 38 (5.8%) were current smokers; 245 (37.2%) had a BMI of 35 or greater, and 108 (16.4%) had a BMI of 40 or greater.

Self-reported and measured BMI at 12 months. Thirty-one percent of respondents with a measured BMI of 40 or greater had a self-reported BMI of less than 40, whereas 12.0% of respondents with a measured BMI of less than 40 had a self-reported BMI of 40 or greater (P = .001) (data not shown). Nearly half (47.0%) of respondents with a measured BMI of 35 or greater misclassified themselves as having a BMI of less than 35, while only 10% with a measured BMI of less than 35 self-reported a BMI of 35 or greater (P < .001). These data suggest that a substantial proportion of obese individuals covered by the State Health Plan might not be aware of the potential impact that changes in the benefit plan will have on them.

Attitudes and beliefs about State Health Plan benefit changes focused on obesity. Overall, 47.2% of all respondents opposed the new State Health Plan benefit changes focused on BMI, while 52.8% thought they were a good idea "to some extent," "to a greater extent," or "to a significant extent." When asked whether the health benefit changes would help employees lose weight, 16.1% of all respondents provided favorable responses, while 45.6% did not believe that the

TABLE 3.
Characteristics of Overweight and Obese State Employees Who Did or Did Not Respond to the Survey

Characteristic	Respondents, no. (%) (N = 658)	Nonrespondents, no. (%) (N = 362)	Rao-Scott χ^2	P
Job classification			5.6848	.017
Missing	54 (8.2)	98 (27.1)		
Faculty	125 (19)	75 (20.7)		
Staff	479 (72.8)	189 (52.2)		
Sex			0.6496	.420
Missing	37 (5.6)	102 (28.2)		
Male	91 (13.8)	44 (12.2)		
Female	530 (80.5)	216 (59.7)		
Age, years			1.9536	.377
Missing	2 (0.3)	2 (0.6)		
<35	96 (14.6)	61 (16.9)		
35-54	406 (61.7)	227 (62.7)		
≥55	154 (23.4)	72 (19.9)		
Race			3.3034	.192
Missing	42 (6.4)	108 (29.8)		
White	317 (48.2)	148 (40.9)		
Black or African American	251 (38.1)	87 (24)		
Other	48 (7.4)	19 (5.3)		
Marital status			0.2535	.615
Missing	40 (6.1)	102 (28.2)		
Married	354 (53.8)	153 (42.3)		
Unmarried	264 (40.1)	107 (29.6)		
Education level			4.1479	.246
Missing	37 (5.6)	101 (27.9)		
High school graduate or less	27 (4.1)	13 (3.6)		
Some college or technical school but no degree	93 (14.1)	34 (9.4)		
Associate's or bachelor's degree	299 (45.4)	114 (31.5)		
Postgraduate degree	202 (30.7)	100 (27.6)		
Annual household income			5.1011	.277
Missing	86 (13.1)	119 (32.9)		
$0-$25,000	17 (2.6)	8 (2.2)		
$25,001-$50,000	210 (31.9)	75 (20.7)		
$50,001-$75,000	154 (23.4)	63 (17.4)		
$75,001-$100,000	108 (16.4)	55 (15.2)		
≥$100,001	83 (12.6)	42 (11.6)		
General health			3.9249	.416
Missing	40 (6.1)	105 (29)		
Excellent	26 (4.0)	10 (2.8)		
Very good	160 (24.3)	79 (21.8)		
Good	318 (48.3)	131 (36.2)		
Fair	100 (15.2)	31 (8.6)		
Poor	14 (2.1)	6 (1.7)		
Smoking status[a]			1.5054	.471
Missing	2 (0.3)	99 (27.3)		
Current smoker	38 (5.8)	20 (5.5)		
Former smoker	179 (27.2)	68 (18.8)		
Nonsmoker	439 (66.7)	175 (48.3)		
BMI category[b]			3.2583	.354
Overweight	218 (33.1)	122 (33.7)		
Obese class I	195 (29.6)	111 (30.7)		
Obese class II	137 (20.8)	83 (22.9)		
Obese class III	108 (16.4)	46 (12.7)		

[a] Definitions of each smoking status are specified in the Methods section. The status for respondents was recorded at the 12-month assessment, and the status for nonrespondents was recorded at baseline.

[b] Definitions of each body mass index (BMI; calculated as the weight in kilograms divided by the square of the height in meters) category are specified in the Methods section. Categories for respondents correspond to BMIs calculated at the 12-month assessment, and categories for nonrespondents correspond to BMIs calculated at baseline.

benefit plan changes would help employees lose weight. Respondents with a BMI of 40 or greater were significantly more likely than respondents in other BMI categories to oppose the new health benefit changes (Table 4). Moreover, respondents with a BMI of 40 or greater were more likely than those in lower BMI categories to report that the new health benefit changes would not be effective in helping employees lose weight (Table 4). Respondents with a BMI of 40 or greater were significantly less likely than those in lower BMI categories to feel confident in their ability to lose weight and thereby remain in the 80/20 plan (P < .001) (Table 4).

Among all respondents, 18.5% reported that the new BMI-related health benefit changes would increase their stress and make them gain weight, 32.5% reported that they would maintain their current weight, 66.3% reported that the benefit changes would motivate them to increase physical activity, and 63.5% reported that the benefit changes would help them focus on making healthier food choices and consuming smaller portions of food (Table 5).

Attitudes and beliefs about State Health Plan benefit changes focused on tobacco use. Overall, 43.9% of respondents opposed the new tobacco-related State Health Plan benefit changes, while 56.1% thought they were a good idea "to some extent," "to a greater extent," or "to a significant extent." When asked whether the new health benefit changes would help smokers quit, 18.0% of respondents provided a favorable response, while 51.6% reported that the benefit changes would not be helpful. Current smokers were significantly more likely than former smokers and nonsmokers to oppose the new health benefit changes related to tobacco use (71.% vs 40.4% and 43.1%, respectively; P < .01) (Table 6). Also, current smokers were significantly less likely to believe the new health benefit changes will help smokers quit, compared with former smokers and nonsmokers (5.3% vs 23.6% and 16.5%, respectively; P = .02) (Table 6).

Most current smokers (68.4%) reported that the new smoking-related State Health Plan benefit changes would motivate them to attempt to quit smoking, while 34.2% said the new smoking-related benefit changes would increase their stress and make them smoke more (Table 5). Overall, 38.1% of current smokers felt confident in their ability to quit smoking and thereby remain in the 80/20 plan.

Discussion

At a time when employers and health plan administrators are trying to address rising health care costs, one available option gaining more traction is to shift the costs of high-risk health behaviors (eg, obesity and smoking) to employees. This cost shift may place surcharges on high-risk behaviors within the context of health benefit plan changes, thus alleviating costs to the employer by shifting them to the high-risk employee. Yet there is very little information about what employees think about these initiatives. This study took advantage of a unique opportunity to reveal attitudes and beliefs about health plan changes from overweight and obese employees before the enactment of new lifestyle-related health benefit plan changes that would likely affect many of them directly, given their weight status.

TABLE 4.
Attitudes and Beliefs Among Survey Respondents About North Carolina State Health Plan Changes, by Body Mass Index (BMI) Category

	BMI category,[a] respondents, no. (%)					
Variable, response	Overweight (N = 218)	Obese class I (N = 195)	Obese class II (N = 137)	Obese class III (N = 108)	Rao-Scott χ^2	P
Attitudes toward new State Health Plan benefits					33.31	<.001
Favorable	69 (32.1)	34 (17.6)	19 (13.9)	11 (10.4)		
Neutral	72 (33.5)	65 (33.7)	46 (33.6)	28 (26.4)		
Unfavorable	74 (34.4)	94 (48.7)	72 (52.6)	67 (63.2)		
Belief about effectiveness of new State Health Plan benefits					16.81	.01
Favorable	48 (22.3)	29 (15)	15 (10.9)	13 (12.1)		
Neutral	76 (35.3)	82 (42.5)	57 (41.6)	35 (32.7)		
Unfavorable	91 (42.3)	82 (42.5)	65 (47.4)	59 (55.1)		
Self-confidence about losing weight					59.63	<.001
Favorable	142 (66.7)	89 (46.1)	54 (40.3)	29 (27.1)		
Neutral	46 (21.6)	60 (31.1)	49 (36.6)	37 (34.6)		
Unfavorable	25 (11.7)	44 (22.8)	31 (23.1)	41 (38.3)		

Note. "Not at all" and "to a little extent" were both coded as "unfavorable" in the analysis, "to some extent" was coded as "neutral," and "to a greater extent" and "to a significant extent" were both coded as "favorable."
[a]Definitions of each body mass index (BMI; calculated as the weight in kilograms divided by the square of the height in meters) category are specified in the Methods section and correspond to BMIs calculated at the 12-month assessment.

Our results indicate that many state employees who will likely be affected by health plan changes related to BMI might underestimate their true BMI and, thus, believe that their health benefit plan status will not be affected by such changes. Moreover, among these overweight or obese individuals, current smokers and those in higher BMI categories were less likely to report that the tobacco- and weight-related benefit plan changes were a good idea or would help them quit smoking or lose weight. Fewer than half of the current smokers were confident that they would be able to quit smoking. Reported confidence to lose weight and thereby maintain the desired 80/20 benefit plan status was also lower among individuals in the higher BMI categories. These results have both policy and programmatic implications for employers planning similar health benefit plan changes and for those implementing these changes.

The fact that many respondents were unaware that they are overweight or obese is consistent with the results of the 1999-2004 National Health and Nutrition Examination Survey, in which 38.0% of overweight respondents did not identify themselves to be overweight [11]. Ironically, this lack of awareness occurred even though our participants were enrolled in a weight-loss study and had regular weight measurements as part of their participation, which should have resulted in a level of awareness greater than that for a general sample of overweight or obese employees. Adults also have difficulty understanding the meaning of BMI [12]. In this study, the questionnaire explained what the health plan benefit changes were, as well as how and when they would be implemented. Yet even among study participants who were told about the benefit changes and were being weighed at regular intervals, a proportion of them were unable to categorize their BMI accurately and were therefore unaware of the need to take appropriate steps to avoid additional health care costs. By use of annual cost estimates for overweight individuals [13], we determined that, for obese individuals, the actual mean difference in cost between the 80/20 plan and the 70/30 plan is roughly $315 per year. This figure represents 10% of the incremental per capita medical expenditures attributed to obesity (excluding overweight) among obese employees currently enrolled in the State Health Plan. Thus, it is important for plan administrators to communicate about policies so that individuals understand the potential costs they might face and can accurately determine their weight and BMI before implementation of the plan changes.

Overall, 52.8% of overweight respondents in this study thought weight-related benefit plan changes were a good idea, and 56.1% thought that tobacco-related benefit plan changes were a good idea. To date, employers and insurers have been more willing to penalize smokers by requiring them to pay higher premiums, given that the health risks and costs of smoking are well documented [14, 15] and that evidence-based treatment options exist, even for highly addicted individuals. As norms about obesity change [16] and the literature about the beneficial treatment options and long-terms costs of obesity grows, employers and insurers are likely to have different opinions than employees about

TABLE 5.
Potential Behavioral Actions Motivated by the North Carolina State Health Plan Changes

Behavioral change, potential action	Participants, no. (%)
Lose weight (N = 658)	
Attempt to lose weight on your own	506 (76.9)
Focus on increasing physical activity	436 (66.3)
Focus on making healthier food choices/ choosing smaller portions of food	418 (63.5)
Join a weight-loss class, group, or online program	217 (33.0)
Maintain your current weight	214 (32.5)
Look to join a research study that will help lose weight	208 (31.6)
Increase your stress and make you gain weight	122 (18.5)
Get medication to help lose weight	113 (17.2)
Try hypnosis to help lose weight	67 (10.2)
Consider bariatric surgery	65 (9.9)
Quit smoking (N = 38)	
Attempt to quit smoking altogether	26 (68.4)
Attempt to quit using tobacco products altogether	25 (65.8)
Join a smoking-cessation class or group	13 (34.2)
Increase your stress and make you smoke more	13 (34.2)
Use some kind of nicotine-replacement therapy (gum, patch, or nasal spray)	12 (31.6)
Try hypnosis to quit smoking	11 (28.9)

Note. Only participants who were current smokers answered the question about their response to plan changes focused on smoking.

TABLE 6.
Opinions Among Survey Respondents About the North Carolina State Health Plan Changes, by Smoking Status

	Smoking status, respondents, no. (%)[a]				
Variable, response	**Current smoker**	**Former smoker**	**Nonsmoker**	**Rao-Scott χ^2**	**P**
To what extent do you think the new State Health Plan benefit changes focused on tobacco use is a good idea?				13.96	<.01
Favorable	2 (5.3)	55 (30.9)	132 (30.3)		
Neutral	9 (23.7)	51 (28.7)	116 (26.6)		
Unfavorable	27 (71.1)	72 (40.4)	188 (43.1)		
To what extent do you believe the new State Health Plan benefit changes focused on tobacco use will help smokers quit?				11.70	.02
Favorable	2 (5.3)	42 (23.6)	72 (16.5)		
Neutral	10 (26.3)	51 (28.7)	131 (30.0)		
Unfavorable	26 (68.4)	85 (47.8)	233 (53.4)		

Note. "Not at all" and "to a little extent" were both coded as "unfavorable" in the analysis, "to some extent" was coded as "neutral," and "to a greater extent" and "to a significant extent" were both coded as "favorable."
[a]Definitions of each smoking status are specified in the Methods section and correspond to statuses recorded at the 12-month assessment.

the value of higher premiums for overweight and obese employees. Ongoing research on this topic is warranted.

A majority of respondents believed that the State Health Plan benefit changes would motivate them to lose weight. However, fewer than half of the respondents were confident they would maintain a healthy weight and stay in the 80/20 plan. This suggests that employees recognize that weight loss requires a serious commitment and that, even among those who are motivated to lose weight and have a benefit plan with incentives to encourage weight change, it remains challenging to do so [17]. Some respondents reported that the new State Health Plan benefit changes would increase their stress and make them gain weight. No evidence exists to support that this new policy will make employees gain weight, but another implication of these results is that more-intensive interventions are likely to be required for individuals who have a significant amount of weight to lose or who have difficulty losing weight [18, 19]. Given participants' responses to the open-ended questions about program preferences (data not shown) and effective treatment options, programs that are effective for weight-gain prevention and for modest weight loss or maintenance and programs that assist individuals who have large amounts of weight to lose are desirable. In addition, structural approaches to creating a safe and healthy work environment, such as providing access to healthy, low-calorie food options or sponsoring fitness breaks, are additional supports for people who are making weight-related health changes and are consistent with national recommendations for creating and sustaining a healthy workforce [20, 21].

One strength of this study is that we polled a large sample of employees who were overweight, and thus at higher risk of being affected by these health plan changes, before the implementation of the changes. Yet this is also the principal limitation, since participants were drawn from a sample of employees enrolled in a weight-loss study and, thus, represent a select group of individuals who might not be generalizable to the larger population of state employees. Additionally, our employee sample overrepresented women. Another limitation of the study is that people with a BMI of 42 or greater needed physician consent to enter the study. Because of this requirement, characteristics of these participants might differ from those with a BMI of less than 42.

Health benefit plan changes that require employees who are obese or who smoke to pay more for health care may motivate some individuals to change their behaviors. However, since confidence about one's ability to quit smoking or to lose weight is lowest among individuals in the highest weight categories, more-intensive interventions may be warranted. Communication efforts can assist employees in understanding the new health insurance benefit changes in advance of their implementation, including the potential costs employees might face. Continued monitoring and evaluation of health plan benefit changes and their impact on all employees, including high-risk employees, are desirable. Future studies could assess smoking-, weight-, and cost-related changes that result from the health plan policy, to build the evidence base for the design and implementation of health benefit plan changes that produce desired behavioral outcomes, as well as to clarify for whom these interventions are most and least effective. Although this study explored employee attitudes and beliefs, future research is needed to understand the attitudes and motivations of health insurers and employers about making these policy changes, so that the potential effects of the changes can be fully appreciated. Monitoring changes in attitudes and beliefs over time is also desirable, given the changing norms, political will, and other contextual factors that influence health in our culture. NCMJ

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ORIGINAL ARTICLE

A Qualitative Analysis of Career Transitions Made by Internal Medicine–Pediatrics Residency Training Graduates

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BACKGROUND Physicians who complete combined residency training in internal medicine and pediatrics (med-peds) have a variety of career options after training. Little is known about career transitions among this group or among other broadly trained physicians.

METHODS To better understand these career transitions, we conducted semistructured, in-depth, telephone interviews of graduates of the University of North Carolina–Chapel Hill School of Medicine med-peds program who self-identified as having had a career transition since completing training. We qualitatively analyzed interview transcripts, to develop themes describing their career transitions.

RESULTS Of 106 physicians who graduated during 1980–2007, 20 participated in interviews. Participants identified factors such as personality, work environment, lifestyle, family, and finances as important to career transition. Five other themes emerged from the data; the following 4 were confirmed by follow-up interviews: (1) experiences during residency were not sufficient to predict future job satisfaction; work after the completion of training was necessary to discover career preferences; (2) a major factor motivating job change was a perceived lack of control in the workplace; (3) participants described a sense of regret if they did not continue to see both adult and pediatric patients as a result of their career change; (4) participants appreciated their broad training and, regardless of career path, would choose to pursue combined residency training again.

LIMITATIONS We included only a small number of graduates from a single institution. We did not interview graduates who had no career transitions after training.

CONCLUSIONS There are many professional opportunities for physicians trained in med-peds. Four consistent themes surfaced during interviews about med-peds career transitions. Future research should explore how to use these themes to help physicians make career choices and employers retain physicians.

Combined internal medicine and pediatrics (med-peds) residency training prepares graduates for a variety of career options. The most recent study of career outcomes indicates that approximately 80% of med-peds graduates are board certified in both internal medicine and pediatrics and see both adult and pediatric patients [1]. Providing primary care to patients of all ages continues to be the most frequently chosen career for med-peds graduates, but many also choose subspecialty, academic medicine, and hospitalist positions [2, 3].

Previous research documents that career expectations of med-peds physicians have changed over time. A 1999 study revealed that 73% of medical students who chose med-peds for residency intended to practice primary care [4]. During the same year, a national study demonstrated that, among med-peds graduates in the prior 10 years, 54% described their current practices as community office practices [3]. Trainee intentions and actual med-peds practice trends have shifted. Among recent med-peds interns, 42% anticipated entering a subspecialty fellowship program [5]. Two other studies of graduating med-peds residents showed that, after graduation, 55% initially chose to practice primary care and 18%-22% entered a subspecialty fellowship program [1, 2]. Despite the increased information provided by these studies, little is known about the overall trajectory of individual med-peds careers, specifically with regard to what motivates graduates to make career transitions.

Understanding career transitions for a group of broadly trained physicians has implications for counseling trainees about future career choices, developing policy to attract and retain physicians within certain fields, and controlling the overall costs of training. In particular, given the increasing shortage of primary care physicians in certain areas of North Carolina [6], identifying what motivates this group of physicians (from a North Carolina training program) to seek certain jobs may affect how we address such shortages. For this study, we sought to explore the factors leading to career transitions among med-peds graduates. We used qualitative methods to examine this complex social process and generate hypotheses about career transitions.

Methods

Participants. Potential subjects were identified using a master list of all graduates from the University of North

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Carolina (UNC)–Chapel Hill School of Medicine med-peds program (N = 106). This program, with its earliest participants in the 1960s and its first residents accepted through the National Resident Matching Program in 1980, is one of the oldest med-peds programs in the country [7]. We e-mailed all graduates who had current e-mail addresses on file to identify potential participants; individuals who started med-peds residency at UNC–Chapel Hill but did not complete all 4 years of training were not contacted. Eligibility for participation in the study was determined by asking the question, "Have you been at your practice the entire time since you completed training?" The first 21 respondents who indicated they had made a career transition were contacted by telephone to achieve a sample size of 20 subjects (one was excluded because the individual discussed a planned career change rather than one that had taken place). All 20 subjects successfully completed a semistructured, in-depth telephone interview lasting approximately 30 minutes. No compensation was provided. The UNC–Chapel Hill institutional review board granted approval for this study in December 2008.

Data collection. After telephone consent was obtained, we asked participants 7 questions (Table A1, Appendix, available only in the online edition of the NCMJ). We used a set of open-ended prompts designed to elicit full responses when necessary. All interviews were recorded digitally and subsequently transcribed verbatim. Only the transcribers (L.A., L.E.H.-M., and H.B.) had access to the recordings and transcriptions.

Data analysis. Prior to interviewing candidates, we generated a list of factors we predicted might influence career transition. We included these factors, such as family, finances, and geographic location, a priori because they have previously been identified as influential to career satisfaction [8]. We modified and built upon this list as we reviewed the transcribed interviews. By use of methods based in grounded theory [9], 3 of us (L.E.H.-M., L.A., and H.B.) performed initial coding, focused coding, and consensus coding in the following manner. First, we independently coded randomly selected interviews. Next, we discussed the codes we had generated, defined them, and, through consensus, selected 14 codes we believed would adequately capture both the a priori and emergent factors related to career change (Table A2, Appendix, available only in the online edition of the NCMJ).

We reformatted transcript responses into analyzable units (ie, short paragraphs) and performed a second phase of coding, assigning the 14 focused codes to all representative paragraphs using ATLAS.ti software, version 5.0 (ATLAS.ti Scientific Software Development). Discussion following the second phase led to resolution of all disagreements in the assignment of codes. Once we completed consensus coding, we used ATLAS.ti to examine co-occurrences of codes. Through this examination, we developed a set of themes to describe interview responses. Because of our study size, we did not perform extensive integrative interpretation of the pattern of co-occurences.

Member checking. We contacted 4 of the graduates initially interviewed, to validate these themes by use of a process known as "member checking" [10, 11]. In a second, 30-minute interview, 3 of us (L.A., L.E.H.-M., and H.B.) obtained verbal consent and then shared our key themes with the interviewees. We asked them to comment on the themes and to decide whether the themes applied to their experience. We transcribed the interviews and reviewed responses for supportive and contradictory comments.

Results

Participants. Twenty former med-peds residents were interviewed regarding the career transition they considered to be most significant since completing training. Some described a change of practice location but not of practice type; some described a change or narrowing of practice type but within the same institution; and some described a change of both location and type of practice. No participants made a transition to a field that would be considered outside the realm of med-peds training. The primary difference between the group interviewed and the entire group of graduates was the percentage of graduates seeing only children or adults (60% vs 40%; Table 1).

Emergent themes. Participants touched on all the a priori factors we predicted might influence career transitions. In addition to these factors, our qualitative data analysis yielded 5 emergent themes that help describe interview responses. First, experiences during residency were not sufficient to predict future job satisfaction; work after the completion of training was necessary to discover career preferences. One participant explained, "One thing I have learned over time is that you really don't know what your situation is going to be like until you are actually in it. When you are looking for a job, they are going to woo you and everything is going to seem wonderful, and you don't know what it is going to be like until you get there."

One might predict that the experiences during residency would allow physicians to know which type of work they would most enjoy after training. Most participants, however, explained that they discovered most about what they liked and disliked during their first job or jobs following residency. In general, this process of discovery was viewed as positive; as one participant explained, "[Work after residency] allows people to evolve in ways they might not have predicted but are yet quite valuable."

Second, a major factor motivating career change was a perceived lack of control in the workplace. Most participants did not describe their career transition as stemming from a desire to assume different responsibilities but rather as from wanting more control over their work environment. One participant said, "During my time in primary care, I just became more frustrated by the problems in the medical care system that I really couldn't address on a day-to-day basis...

TABLE 1.
Characteristics of Internal Medicine–Pediatrics (Med-Peds) Residency Training Graduates

Characteristic	Interviewed graduates	All graduates
Female sex	11/20 (55)	54/106 (51)
Time since completing residency, years, mean (range)	11.8 (4-28)	13.6 (2-29)
Had at least 1 career change since completing training[a,b]	20/20 (100)	68/106 (64)
Practice type[a]		
Primary care medicine[c]	9/20 (45)	50/106 (47)
Academic medicine	2/20 (10)	10/106 (9)
Subspecialty	5/20 (25)	29/106 (27)
Hospitalist	3/20 (15)	8/106 (8)
International medicine	1/20 (5)	3/106 (3)
Emergency medicine	0	2/106 (2)
Not practicing medicine	0	4/106 (4)
Patient population[d]		
Adults only	6/20 (30)	23/102 (22)
Children only	6/20 (30)	18/102 (18)
Both adults and children	8/20 (40)	61/102 (60)

Note. Data are no. of graduates with the characteristic/overall no. in the analysis (%). All graduates complete training at the University of North Carolina (UNC)–Chapel Hill School of Medicine med-peds program during 1980-2007.

[a] Data are as of June 2009 and are based on information from the UNC–Chapel Hill med-peds database, interviews and discussion with current and previous program directors, and verification through state licensing boards.

[b] Training includes subspecialty training or a chief resident year, when applicable.

[c] Includes individuals who are associated with a teaching hospital.

[d] Data for all graduates exclude 4 individuals who were not practicing medicine.

and that led me to want to work on sort of the bigger picture rather than the day-to-day care of patients." Participants also desired more control over the patient or work schedule, the administrative system, and their ability to act in leadership roles. One participant summed up this need for control: "I think what I sought in a new job was a lot more control of what I would do day-to-day and control in the overall direction [of the practice]."

Third, participants described a sense of regret if their career change did not allow them to continue to see both adult and pediatric patients. One participant said, "I am perhaps a little regretful that I don't still feel on top of internal medicine." The feeling of regret stemmed from a sense of obligation to their broad training or from a fear of losing skills.

The regret, however, was often accompanied by a sense of relief. The participant who no longer felt "on top" of internal medicine went on to say, "But in general, both in terms of economics and lifestyle, I feel that I am living a much better life than I would have otherwise." In addition to expressing relief, participants generally described being content with their current positions, even if, in this position, they were not caring for both types of patients. One said, "Giving up things is hard, and there is a little grief process along with that, but if you make the right choice then it's worth it."

Fourth, participants appreciated their broad training and, regardless of career path, would choose to do combined residency again. Participants frequently explained that they did not consider the extra training a "waste of time." One said, "It's not wasted training even if you don't end up employing it on a day-to-day basis." Of those who ultimately chose to practice only internal medicine or pediatrics, many felt that training in the discipline they no longer practiced enhanced their skills in the discipline they did continue. One participant who provided only pediatric care said, "I think people, if they are not comfortable in their combined practice…need to just feel okay about narrowing down to one because…I still have a different perspective on pediatrics…because of my adult training—much different. I feel like it enhanced my ability to take care of sick kids immensely" (Table A3, Appendix, available only in the online edition of the NCMJ).

Member checking. Six initially interviewed participants were invited to comment on the emergent themes as part of the member-checking phase meant to validate our findings. Four successfully completed the follow-up interviews; 2 did not respond to the invitation. In their current practice, 2 members saw both children and adults in primary care practices, 1 saw adults as a subspecialist, and 1 saw children as a subspecialist. We asked them to comment on all emergent themes, including a fifth theme (that one major factor in selecting a new position was needing to "fit in") that was omitted from our results on the basis of their comments.

With regard to the need to experience jobs outside of residency to predict career satisfaction, all 6 members generally agreed. One felt this did not apply because of his unique experiences prior to residency, but he had seen this pattern among med-peds colleagues. Others elaborated on what made residency different from jobs after training. One said, "In some ways residency is not the real world. You're not the decision maker; you're a trainee. You're not in the setting as it's really going to be when you're out."

There was also agreement that control was an important factor in career decisions. Members expressed ongoing frustrations with lack of control: "I think that what's happened with medicine over the last 10 years is more a corporatization of it so that…we, doctors [have] sort of lost control over the business management portion of it."

Members responded strongly to the theme of guilt or regret about giving up one aspect of training. Several felt the word "guilt" was too weighty, but could relate to the theme. One used the term "hidden guilt." The 2 members who continue to see both children and adults could imagine how guilt or regret might affect those who did not continue to see both. One said, "We're all type A's. We're all motivated by guilt, and so I'm not at all surprised…I felt a little bad when I gave up doing inpatient." All seemed to conclude that either "regret" over not practicing one discipline or a sense of needing to narrow one's field (or both) were often inevitable during the career of a med-peds graduate.

Members again expressed how much they valued med-peds training and extolled the flexibility and the preparedness it provided, echoing the fourth theme of satisfaction with residency choice. Finally, we asked members to comment on a fifth theme emerging from the initial interviews. We did not include this theme in our results because members felt it did not accurately describe their experiences (Table A4, Appendix, available only in the online edition of the NCMJ).

Discussion

Med-peds training offers graduates many career options at the end of residency and beyond. The primary objective of our study was to understand the factors that motivate med-peds physicians to change jobs. After interviewing former UNC–Chapel Hill med-peds residents about a career transition each had made since the completion of training, 4 themes emerged that helped describe interview responses and allowed us generate hypotheses about career transition. Perhaps the most important discovery is that, though some med-peds graduates may ultimately see only adult or only pediatric patients, they continue to be happy with the combined training and would not have chosen a different route. This, along with other themes centered on work experience, control, and regret provide useful information about how med-peds graduates form particular career paths within a wide range of opportunities.

Prior to our study, only quantitative results for practice patterns were available in the literature. In an older study, Lannon and colleagues [3] surveyed med-peds physicians who graduated between 1986 and 1995, using data obtained from the American Boards of Pediatrics and Internal Medicine. Their findings provide a better idea of ongoing career outcomes: 54% of the med-peds physicians they surveyed were based in a community office practice, 20% were based in hospitals, and 90% saw both children and adult patients. Sixty-eight percent of the respondents, however, completed residency 5 years or less prior to the study [3], compared with a mean interval of 11.8 years prior to our study. Two additional studies surveyed program directors about career outcomes, but, again, the career outcomes are described only for residents who graduated during the 6-year period before the surveys were conducted [1, 12]. In a study that built on the findings by Lannon and colleagues [3], Fortuna and colleagues [14] described survey data from 2000-2006 that showed that 93% of med-peds graduates were in private practice at the time they were surveyed, indicating that the trends may be shifting. Our sample was small and purposive rather than random, but our participants had a different pattern of current practice. The results here, while suggesting different practice patterns, also provide rich context about career outcomes at various stages—important to a career likely to last over 30 years.

In the process of our investigation we discovered a secondary finding that, to our knowledge, has not been described in the literature. After determining the current practices of all UNC–Chapel Hill med-peds graduates from 1980 through 2007, we found that a much higher proportion of graduates from this single institution see only children or only adults in their practices (40%; Table 1), compared with the proportion described in the literature (10%-23%) [1, 3, 12]. Among graduates who have changed jobs, the proportion is even greater (50%; data not shown). While it is possible that this pattern is unique to UNC–Chapel Hill, it could also be related to the fact that we investigated the current practices of physicians who were further along in their careers (ie, 11.8 years for interviewees and 13.6 years for all graduates). Our small sample size precluded us from determining whether length of time since graduation influenced practice pattern.

Given what may be a trend among med-peds graduates of narrowing their practice during their careers, one wonders whether such broad training is necessary or desirable. Additionally, it raises questions about what happens in the career trajectory of other broadly trained physicians. Similar to med-peds graduates, most family physicians in primary care (87%) see both adults and children [13], although when looking at overall patient visits, med-peds physicians actually see more children than do family physicians [14]. These studies provide a sense about the patient population among primary care physicians, but with increasing subfields, fellowship opportunities, and academic roles, one wonders whether and how family physicians are narrowing their scope of practice. Our finding that med-peds graduates are content with their residency training choice supports the concept that broad training is desirable regardless of career outcomes.

Our study also supports findings from the literature about what contributes to physicians' job satisfaction. Other investigators have found that control plays a role in the desire to change jobs [8, 15]. McMurray and colleagues [8] developed a model of physician job satisfaction using qualitative data and described day-to-day practice issues and administrative issues as central to job satisfaction. Landon and colleagues [15p447] examined job satisfaction among a variety of physicians and found that perceived clinical autonomy was "the most consistent and powerful predictor of changes in their levels of job satisfaction over time."

There are several limitations to our study. First, we interviewed a small number of med-peds graduates from a single institution. Our study was intentionally exploratory in nature and, as is true for most qualitative research, sampling was purposive not random. Participants described both minor and more-major career transitions and, because of the small sample size, we could not draw conclusions about different types of career transitions. Second, we relied on potential participants to self-identify as having had a career change and to volunteer to be interviewed. Our results, therefore, may not be generalizable. Third, we were interested in career transition and, therefore, interviewed only med-peds graduates who had changed their practice since training. To fully understand the career paths of med-peds graduates, further research could interview graduates who stay in the same practice or leave medicine altogether. Finally, participants may have been constrained by the fact that the research was conducted at their training site.

Our study was meant to develop hypotheses about career transitions among med-peds graduates that could be confirmed either by further study or by resonance with others' experiences. On the basis of our findings, we believe program directors should emphasize the usefulness of exploring different opportunities after residency and remind residents that their experiences may not predict future career satisfaction. We hypothesize that working to provide more control to physicians would improve retention and attract physicians into areas where there are shortages of physicians. Finally, we believe the usefulness of broad training is as important as ever both to satisfy the needs of the health care community and to satisfy med-peds physicians personally throughout their careers. NCMJ

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POLICY FORUM

New Models of Care

Introduction

Although many of the details of the Affordable Care Act (ACA) are highly controversial, there is broad consensus that the US health care system is in need of repair. Health care costs are rising much faster than most other costs, consuming an ever increasing proportion of the nation's gross domestic product. Too many Americans die or are harmed from preventable medical errors, and only about half of Americans receive all recommended health care. Although the United States spends far more than other countries on health care per capita, our health outcomes are worse than those in most industrialized nations. As Don Berwick, administrator of the Centers for Medicare and Medicaid Services (CMS) and former president and chief executive officer of the Institute for Healthcare Improvement, has promoted, the United States must focus on the "Triple Aim" of improving patients' experience with care (including access, quality, and outcomes), improving population health, and reducing per capita health care expenditures.

Of course, it is much easier to talk about the Triple Aim than to achieve it. We know that increased health care spending does not always lead to better health outcomes. And we have great examples of what has worked in some communities to improve quality and patient outcomes while reducing health care expenditures. Yet what works in some communities will not necessarily work in others. Many of the recognized high-performing systems, including Mayo Clinic and Geisinger Health System, are built on long-standing integrated delivery systems. This model may not work well for solo practitioners or small group practices in rural North Carolina or in the highly competitive health systems found in many of the state's urban environments.

It is for this reason that the ACA included provisions to test novel payment and delivery models. The ACA created the Center for Medicare and Medicaid Innovations (CMMI) within the CMS to test and evaluate new models of care. The CMMI, with the support of $10 billion in funding for fiscal years 2011-2019, was directed to test and evaluate a wide array of new payment and delivery models that range from broad-scale activities to reform payment and delivery systems to comparatively narrow models intended to improve care and reduce costs for a specific population or type of health service.

North Carolina is a national leader in some of the new models envisioned under the ACA. A notable example involves Community Care of North Carolina (CCNC), whose leadership with respect to patient-centered medical homes has long been recognized. North Carolina is also home to many other regional and system-level innovations that have yielded promising results. The efforts of CCNC and many of these new programs are highlighted in the policy forum of this issue.

Our state should take advantage of the new opportunities offered within the ACA to test new delivery and payment models. We must learn what works and, of equal importance, what does not work within specific North Carolina communities. We have a strong base on which to build, yet we must continue to explore other options that can help us improve health care quality and outcomes, population health, and access to care, while reducing unnecessary expenditures.

Pam Silberman
President and Chief Executive Officer
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New Models of Health Care Payment and Delivery

Thomas C. Ricketts III

Health care delivery in the United States will have to change substantially to avoid disrupting the overall economy and meet goals of providing optimal quality and safety for patients. While overall system reform has been called for and partially attempted, change is actually being accomplished through the development of a series of "new models" of health care. This article describes 6 types of new models: entrepreneur-driven activities, management innovations, applications of technology, changes in financing, market approaches, and structures that see changes in how health care professionals work. Because no single type of model will dominate, we will need to draw on all of these options for the health care system to move forward.

Today we see innovation and change as imperatives in how health care is delivered [1]. Costs are becoming burdensome in ways we could not anticipate a few years ago, and our expectations for quality are not being met by our health care "nonsystem" [2]. Since the 2008 election, health reform, including the adoption of new models of health care, has been either at or near the top of the political agenda. The agents of change are both conscious and circumstantial [3]. The conscious efforts to change the system often refer to some "model" to guide how we will restructure health care delivery. The circumstantial factors are the hard realities of the economy, politics, human behavior, and the environment. Any new models that we propose will have to fit into the circumstances if the models are to do what they promise.

Given the national scale of our health care delivery problems, we often look to other countries for guidance on how to change the system [4]. "Lessons" from these countries are often seen as not applicable to the United States because of our "exceptional" conditions and cultures—political, economic, and social. Still, it can be instructive to stand back and look at the possibilities that other nations offer and determine which can be adapted to the American context. In reviewing reforms across the globe, experts have found that there are specific templates for change that can be fitted into one of the following categories: financing, payment, organization, regulation, and behavior [5]. The models that are often suggested to improve health care use 1 or more of these "control knobs" to change the system. In 2011, we also see that to reform health care we must develop models that make use of technology and data systems; these are additional control elements that are viewed as necessary parts of the tool kit for new models of care [6].

The policy forum of this issue of the NCMJ identifies a number of specific potential models, but it might be useful to look at them in a more general way to see how they might fit together with other approaches. These comparisons may help us understand how the models might work when they are deployed simultaneously. To that end, I have categorized the drivers of change and the creators of models into 6 groups: entrepreneurs, managers, technology, financing, markets, and professionals.

There are entrepreneurs who see a chance to add value to health care. These people are not always seeking profit; some are policy entrepreneurs looking to have their ideas adopted [7]. However, the more commonly encountered entrepreneur is seeking personal profit by creating a new and better product or process. The health care system hosts many entrepreneurial enterprises, but they are largely in commercial areas that focus on technology or specific products. Less often do we see individuals or companies selling new organizational forms, and we may not be allowing the power of entrepreneurship to drive change as much as we should [8]. All of the articles in the policy forum describe some degree of entrepreneurial effort to make changes to the system. This suggests that we ought to promote the kind of thinking behind entrepreneurial efforts and cultivate the development of individuals willing to push change. We need more people who are willing to take risks to promote new approaches, such as the authors in the policy forum.

In business and manufacturing sectors, we often see that improvements in productivity and quality are achieved by applying what might be called "engineering" solutions [2, 9]. These are innovations that focus on process and the application of ideas. Prominent examples include the Toyota "lean" production process [10], the use of checklists [11], and the carefully monitored integrated delivery sys-

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tem [12]. These engineering solutions are diffusing through health care, but at an agonizingly slow pace. The struggle to reach "high-reliability" levels can be overcome through a combination of leadership, a culture of safety, and improvement in process, all of which are keys to well-engineered systems [13]. The articles in the policy forum do not specifically focus on any one of these process strategies, but they include elements.

For as long as management has existed, managers have been challenged to improve outcomes and make systems more efficient. The failures of the health care system are sometimes seen as the fault of failed management. Management fails when managers do not base their decisions on evidence [14], do not recognize the very interactive ecology of the organizations they manage, do not understand the values and goals of the professionals they work with, and fail to communicate the goals and objectives of the work they organize [15]. The role of management is often unstated when new models are promoted in health care; that is, we assume that the new ideas can be implemented rationally and effectively. In the policy forum, there are some very useful discussions of how management interacts with clinical care to improve quality, but these processes seem to be accepted as "natural" events rather than as difficult transformations of roles and structures in organizations. This suggests that management of new models is "organic" to their development and, perhaps, not replicable. We need to know much more about how, by working together, managers and clinicians have generated improvements, and the case studies included here are good guides. Three of the articles speak to how care can be better managed by using better coordination across disciplines and within practices: Wroth [16] writes about how adult care homes can benefit from a partnership between community health centers and the Community Care of North Carolina (CCNC) network, Crane [17] describes how the Flat Rock Advanced Primary Care practice model and the Bridges to Health pilot can serve as models to improve care structures, and Gray [18] outlines how a pregnancy "medical home" can work. The clinical lessons in these pieces are important, but the management lessons are equally salient to the problem of quality and efficiency gains.

Technology solutions for our health care costs, access, and quality problems are abundant and form a very active sector for innovation. The emphasis in health reform and new models for care has been on the application of information technology (IT), usually in the form of electronic medical records. However, these approaches have not lived up to their promises of quantum leaps in solving any of the major problems in these 3 areas, despite a steady flow of positive findings from case studies of discrete applications [19]. Still, the future systems of care will increasingly adopt IT. The question is whether we will bend the system to adapt to IT or whether we make IT work for us to solve our problems. The examples of IT applications in this issue of the NCMJ offer descriptions of the latter: Schwartz and Britton [20] show how telehealth can fit the relatively low-tech needs of the Roanoke Chowan Community Health Center, whereas Pilkington [21] has made health IT work in the Southern Piedmont Beacon Community. Saeed and colleagues [22] show how telepsychiatry can provide very personalized and effective care. Technology must be applied by people functioning as managers and practitioners, and Cykert and Lefebvre [23] describe how regional extension coordinators promote the use of electronic medical records and support activities to enhance quality and efficiency in a North Carolina Area Health Education Center–based program.

We have depended for a long time on various financial incentives to promote change. Medicare and Medicaid waivers, case- and care-management incentives, and pay-for-performance schemes have and are being tried in North Carolina and across the nation, but their effect is relatively small compared to the size of the overall reimbursement structure used to pay for the bulk of health care services. The system is still primarily a fee-for-service structure, in which we pay for discrete clinical acts in an insurance context that includes a very strong cost-sharing element [3]. We have only glancingly thought about centralized, single-payer financing and, with one exception (in Vermont), have consistently rejected it. We experimented with "prepaid" practice and then attempted to find an intermediate solution in managed care, but we rejected both options. Now we are slowly seeing some benefit to managed incentives and are testing "bundling" as a way to produce, through models of integrated patient care, some sense of accountability for outcomes [24]. North Carolina has led the way with the use of some modified financial approaches that follow these trends to make care more efficient and effective; in their contribution to the policy forum, Wade and colleagues [25] describe how CCNC is combining Medicare and Medicaid populations, as well as the rules and payment systems distinctive of each program, into a coordinated system. Other articles describe programs that are embedded in or interact with CCNC.

Allowing markets and individual decisions to guide change has been a position of conservatives, libertarians, and their associated think tanks (eg, the National Center for Policy Analysis and the Cato Institute), but the role of markets in health care is also generally accepted by liberals as they design new models and strategies such as health insurance exchanges and value-based purchasing [26]. The benefits of the market are often promoted by individuals who press for "consumer-driven" health care [27]. But time and again, we find best intentions thwarted by the failure of patients (as consumers) to do what is best for themselves and the economy of health care [28, 29]. Market structures and systems will, however, have to be considered in any new models of care simply because we live in a market-driven environment and because people value choice independent of other things. Taylor's [30] description of the Choosing Health Plans All Together program, which makes patients better choosers, is an example of how choice can yield collective and individual benefits.

Professionals have an obligation to do what is best for their patients. This professional principle promotes a responsibility for the individual practitioner to change their practice if such change can benefit their patients. We see professional- and practitioner-driven changes all the time, and many are adopted as best or normal practice. Examples include the innovations led at the Geisinger system by a surgeon leader [31] and Don Berwick's (himself a pediatrician) emphasis on quality and innovations at the Institute for Healthcare Improvement and the Centers for Medicare and Medicaid Services. The challenge here comes with the fact that an action that, in the considered and evidence-based judgment of a practitioner, is deemed best for any single individual may, when done in aggregate, harm society. It is a common view that these practitioner-driven decisions are causing the system to become too costly [32-34], but it may be that we are actually ignoring the very practical and effective role that professionals can play in benefitting the system as a whole if they are given that general responsibility. Practitioner-driven improvement fits awkwardly in the context of markets, management, and even technology because it depends on subjective elements associated with decision making and the "art" of health care. Professionals are responding with a resurgence of the old idea of working in "teams" to help promote better clinical decision making that balances the benefits to patients with those to society and the economy. Levine and colleagues [35] describe a community-level, value-based care organization in Gastonia that uses team approaches and coordination, Lyn and Johnson [36] write about their experiences with community-based teams for the care of elderly individuals in Durham, and Fretwell and Old [37] explain how they use interdisciplinary teams in the PACE program for frail elderly people to make care more effective and efficient. These combinations of professionals organized into more-efficient and -effective structures will need to be a cornerstone of any new model that works.

The Idea of Making Innovation Normal

It may be that we need to avoid the idea that we are creating new things and instead change how we think about what is normal. After all, almost all of the innovations we describe in health care are essentially old ideas that have been given new names. Today, the phrase "the new normal" is used to described the shifts in our behavior that come subtly but are later diffused throughout our lives. For example, squinting into the screens of smart telephones to see what we need to get at the store on the way home from work or snapping photographs on the same device and sending them to distant relatives are now common events that were unthinkable a few years ago. There is a name for this unconscious transformation of behaviors when it involves restructuring health care delivery: "normalization process theory" [38]. Normalization is not the same as adoption of innovations, which is how many of us have thought about change. In normalization processes, changes are accepted and used because they are embedded in everyday activities from the very start. If changes do not quickly become part of routines, they are likely to fail; this is the unfortunate fate of many attempts to improve care or generate higher quality—they were simply too innovative. The innovation process is seen by those who must change as alien to the normal structures and processes, and, before long, the innovation is rejected or ignored. Making changes "normal" is a more lasting process and one that we understand less.

Occupational roles in health care are very important to successful outcomes, and we have begun to structure health care as a complex technical activity in which processes, often called protocols in this context, take precedence over individuals' discretionary choices. There is a sense that there should be more uniformity. The phenomenon of practice variation bumps up against this belief and generates questions over why the variation exists and prompts resolutions to eliminate or minimize this variation. Nevertheless, health care is a "high-touch" enterprise, and any new model will require combining the demands and structures of the occupational aspects with the care and precision of quality. The models described in this issue of the NCMJ depend on "new" occupational roles, which will create cultures of their own.

It would be remiss not to comment on the effects of macrorestructuring in the health care system that is happening at a level that defies being called a "model." This is the shift in the way physicians and other practitioners structure their practices [39]. Increasingly, these individuals are moving into employment arrangements, and their employers are more often hospitals that are part of integrated, regionalized systems of multiple institutions. Hospitals are, with greater frequency, becoming more integrated with the other levels of health care, and systems are now more common than independent institutions. These "clusters" of caregivers are also beginning to align themselves with nongovernmental insurers. An example of this form of alignment is provided by Bradley and Rubinow [40] and their experience in developing a medical center–insurer collaborative around the patient-centered medical home. These combinations, if they can stand the legal tests of our antitrust and competition laws, may overcome many of the barriers to the implementation of effective new models.

The Affordable Care Act created a new program that supports shared saving efforts in the form of accountable care organizations (ACOs) [41]. ACOs anticipate that we can identify structures that can be held accountable for improving quality, but such structures are the witches brew of management efficiency, professional obligations, occupational imperatives, and patient expectations—all buffered by a pervasive impulse to compete and to extract profit at all these levels. We can say that the process of change for improvement is dominated by circumstance, but there is evidence in the articles included here that conscious change that builds on models of caregiving can work with the powerful external forces that have made improvement in health care hard to achieve. NCMJ

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INVITED COMMENTARY

Use of the Triple Aim to Improve Population Health

Jerome F. Levine, Betty Herbert, Jan Mathews, Andrea Serra, Valinda Rutledge

CaroMont Health has embraced the Triple Aim initiative to implement its core vision and competencies of delivering health care, promoting individual wellness, and creating vibrant communities. An imperative to achieve success has been aligning the corporate goals with the processes and outcomes that foster the Triple Aim.

> *The country needs and, unless I mistake its temper, the country demands bold, persistent experimentation. It is common sense to take a method and try it: if it fails, admit it frankly and try another. But above all, try something.*
>
> Franklin D. Roosevelt [1]

The passage of the Affordable Care Act (ACA), in March 2010, began a new era in the efforts to improve the health of Americans and to reform the US health care system. The need to control the ever-increasing spiral of health care costs, to reduce the fragmentation of the delivery of care in this country, to focus on prevention and wellness, and to improve the quality of care a certainly not a new concept and has been discussed in detail in a previous issue of the NCMJ [2]. However, the ACA has ushered in the opportunity to achieve these goals by using new models of delivery, such as accountable care organizations, bundled payments for acute care episodes, chronic disease management, and patient-centered medical homes. The Triple Aim concept was propelled onto the health care community by Berwick and colleagues [3] in 2008. The Triple Aim focuses on simultaneous, integrated work over time to improve the patient's experience with care, improve the health of a defined population, and contain the per capita cost of health care.

CaroMont Health is a not-for-profit, multisite, community-based health care system located in Gastonia, North Carolina. Our vision is to be a nationally recognized leader and a valued partner in promoting individual health and vibrant communities. We have embraced the Triple Aim framework, building on past quality initiatives that originally focused on improving care and reducing harm in the hospital and moving these initiatives into the community. By improving the health of our population, enhancing the patient's experience of care, and reducing or, at minimum, controlling the costs of care, major benefits will be realized by our patients, our patients' families, and our employees. At CaroMont Health, we are focused on moving from a volume-based business model to one that is value based. To achieve this transformation, we must examine our organizational structure and processes and focus on 3 core competencies: a redesign of the care system, with enhanced coordination; clinical integration with health care professionals; and an understanding of the community needs as they relate to population health. The primary drivers of success must include the following activities: institute transparent measurements; foster public health interventions by collaborating with community groups that can influence change in a defined population; design and coordinate care at the patient level, including clear identification of the provider; execute a shared treatment plan; and incorporate the family and the patient in care planning. Our journey started with our own employees as the defined population.

CaroMont Health's commitment to enhancing the health of its employees was initially demonstrated in early 2010, when the board of trustees revised the corporate vision to read, "We are a nationally recognized leader and valued partner in promoting individual health and vibrant communities." This commitment generated the motivation to pursue the Triple Aim for CaroMont Health's employee population. CaroMont Health's wellness strategy included incorporating employee-wellness goals into corporate goals for fiscal year 2011, establishing incentives for healthy behaviors, redesigning the health benefit structure, offering clinical health risk assessments (CHRAs) to employees, and changing the philosophy of food service management from one of sales to one of health. To further align these goals on an enterprise level, the 2011 corporate goals included increasing the number of employees who completed the CHRA by 10% and decreasing the proportion of employees who never exercised by 2%.

The organizational infrastructure to support a wellness focus included the creation of 2 positions: a vice president

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of research and wellness development, as well as a wellness director. The employee health department offerings were enhanced and structurally aligned with the cardiac health and fitness center in the wellness arena. An employee-focused, on-site integrative medicine practice recently opened. To understand the needs of our population, we reviewed year 2009 claims. CaroMont Health's top 4 conditions associated with episodes of care included coronary artery disease, hypertension, and diabetes. The completion of a CHRA is required for employees to remain in the least-expensive health plan. On the basis of claims data and CHRA results, we placed a focus on slowing the continual increase in the incidence of chronic disease among employees by means of nutrition, exercise/activity, smoking cessation, and stress reduction initiatives.

From a nutritional standpoint, Weight Watchers @ Work is conveniently available to employees at CaroMont Health. Weight Watchers recipes are used in retail meal preparation; nutritional values are conveniently provided for all items sold in The Terrace Cafe, an on-site dining facility at CaroMont Health; and a color-coded system is used to easily identify the healthiness of meals. Ovens have replaced deep fryers in The Terrace Cafe, and all items that were typically fried are now baked. The price of healthy food has decreased, and the price of unhealthy food has increased. There has been a decrease in the unhealthy food offerings. Farmers' markets are held in The Terrace Cafe, and each item for sale includes a healthy recipe. A chef and a dietician are available during the market, and they engage staff in conversation about healthy eating and teach healthy cooking techniques. All food catered by CaroMont Health is healthy, and 60% of items in vending machines are healthy options.

On the exercise and activity front, the employee health and fitness center has been enhanced to include cardiovascular training, strength training, and 30 group exercise classes per week. Clinical monitoring is provided before, during, and after exercise, as needed. Access to the center is free to employees and is offered for a nominal fee to families; it is also open to community members. Smoking-cessation initiatives include smoke-free buildings, smoke-free campuses, and smoking-cessation support for staff. Stress-reduction efforts include yoga classes, guided walks during breaks, and free stress-management workshops.

Other wellness and health plan incentives include the metabolic and circulatory disorder self-management programs, tobacco-cessation and tobacco-free incentives, nutrition and exercise consultations, and exercise and body mass index incentives. The accomplishment of corporate and Triple Aim goals during the past year can be seen in Table 1. The goals for 2011-2012 are currently under discussion.

Gaston County ranks 75th in health status among the 100 counties in North Carolina [4]. Development of a collaborative commitment from other Gaston County organizations is crucial to addressing this major health problem. The Gaston County Health Coalition has recently been formed, and it comprises a robust variety of community groups (Table 2). The mission of the coalition is to use employer-based strategies to spread the success we have achieved with our own

TABLE 1.
Corporate and Triple Aim Wellness Goals for CaroMont Health Employees

Goal	Employees, proportion (%) March 2010	Employees, proportion (%) January 2011	Goal accomplished
Corporate			
Increase CHRA participation by 10%	1,722/2,763 (64)	2,645/2,812 (94)	Yes
Decrease proportion of employees who never exercise	606/1,722 (35)	845/2,645 (32)	Yes
Establish comprehensive care models for employees who have metabolic and circulatory disorders; enroll 50 employees in each model[a]	...	...	Yes
Triple Aim			
Increase proportion of employees who have a healthy weight	508/1,732 (29)	756/2,645 (29)	No
Increase proportion of employees who participate in moderate exercise	1,116/1,722 (65)	1,800/2,645 (68)	Yes
Decrease proportion of employees who smoke	157/1,732 (9)	255/2,647 (10)	No

Note. Baseline values were recorded during March 2010, and January 2011 was the end point for achieving the goal. The cost of care per enrollee was $7,574 in March 2010 and $8,824 January 2011. CHRA, clinical health risk assessment.

[a] As of May 2011, 79 employees with metabolic disorders and 71 employees with circulatory disorders were enrolled.

TABLE 2.
Members of the Gaston County Health Coalition

Member
Gaston County Health Department
Gaston Family Health Services
Gaston Community Healthcare Commission
CaroMont Health
Gaston County Department of Social Services
Pathways
YMCA
Gaston County School System
American & Efird
Holy Angels
Wix
Pharr Yarns
Goodwill Publishing
United Way
Alliance for Children & Youth
Bessemer City Chamber of Commerce
Gaston College

employees into the community. Our Voice of the Community initiative enables us to reach out to Gaston County residents and let them tell us what health care looks like from their perspective. On the basis of essay submissions, local residents will be selected for the CaroMont Healthcare Leadership Forum. This forum will meet regularly to discuss and make suggestions about a host of important issues, including how to improve processes and support underserved communities.

By engaging the community on a regular basis, we can enhance the patient experience in accordance with Triple Aim goals. The valuable anecdotal data we gather from the CaroMont Healthcare Leadership Forum meetings will also let us know how internal innovations and community outreach efforts are being perceived. Since perception influences adoption, we will know whether there are mitigating factors that could potentially impact efforts to improve health outcomes and control costs.

We have clearly recognized the important role that primary care physicians play in the new models of health care delivery. They will be responsible—and ultimately accountable—for the integration of care to their patients. This accountability will include the areas of quality, efficiency, and costs. The foundations for this transition have been put into place at CaroMont Health. Physician-led councils have been developed that cross the boundaries of the classic hospital-centric service lines. The councils are multidisciplinary teams that are chaired by physicians and charged with developing strategies to coordinate and improve care while understanding the importance of bending the health care cost curve. Every month, they review multiple metrics that include a variety of quality performance indicators, market share data, costs, and other information. To address the apparent need for physician education, we have partnered with Sg2 to provide on-site classes that cover the full array of tools that will be needed as health care reform moves forward. These sessions have been extremely well received by the medical staff.

As approximately half of the physicians on staff are employed by CaroMont Health, a new governance structure is currently under development. The new model places the physicians at the lead in making decisions about the care of the population. The physicians work closely with the chief executive officer and senior leadership of CaroMont Health to transition effective and high-quality health care from the hospital to the community. Other current initiatives include implementation of a robust electronic medical record system in all of the employed primary care physicians' practices. This will provide the foundation for data gathering and communication among providers. The patient-centered medical home (PCMH) is another crucial arm of our clinical integration. All of our primary care clinics that have an electronic medical record have received National Committee for Quality Assurance Level III designation as a PCMH [5]. We anticipate that all of the clinics will receive level III approval by December 2011. Again, the physicians have had a major voice in the development and organization of the patient-centered medical home.

As we have traveled on our journey to implementing the Triple Aim goals, it has become clear that achieving those goals will set the stage for us to be successful in the next decade. As hospitals move from a volume-based, competitive model to a value-based model, different competencies are needed to be successful. The ability to collaborate with various stakeholders, such as primary care physicians, public health departments, and federal qualified health departments, will be key for the future. To be able to bend the cost curve, we must redesign the entire continuum of care, beginning with prevention and ending with return to health. To efficiently deliver care and move our communities to optimum health, we need to work in tandem with our community partners. This will facilitate the discovery of new ways to provide care together, rather than in silos and with potential duplication of expensive services. Use of the Triple Aim as the framework for this change provides a structure for all health care leaders in a community to lead this transformation to optimum health, thereby bending the cost curve on a permanent basis. NCMJ

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INVITED COMMENTARY

Just for Us:
In-Home Care for Frail Elderly and Disabled Individuals With Low Incomes

Michelle J. Lyn, Frederick S. Johnson

(See the commentary by Wroth on pages 207-208 and the commentary by Fretwell and Old on pages 209-211.)

In response to increasing concerns about health care access, cost, and quality, Duke University Medical Center began a community-engaged, iterative, data-driven process in 1998 to develop innovative models to provide care earlier, more effectively, and at a lower cost. This commentary reviews Just for Us, an in-home care program launched in 2002 for low-income, frail elderly and disabled individuals.

In 1998, in response to increasing concerns about health care access, cost, and quality, Duke University Medical Center began a community-engaged, iterative, data-driven process to develop innovative models to provide care earlier, more effectively, and at a lower cost. The models that emerged use teams of traditional and nontraditional providers; stratify populations according to medical, social, and environmental risk factors; and use information technology to coordinate community, primary, and specialty care for some of the community's most vulnerable populations around Durham County, North Carolina [1]. One such model, Just for Us, was launched in 2002 [2]. Just for Us is an in-home care program for low-income, frail elderly and disabled individuals that was created through a collaboration between Duke University Medical Center; Lincoln Community Health Center; the City of Durham Department of Social Services, the local area mental health entity; and the Durham Housing Authority [1].

Through Just for Us, an interdisciplinary team of providers offers medical care, manages chronic illnesses, and provides case management in the homes of participating clients. Each participant receives a home visit every 5 weeks, unless there is an acute episode or a hospital discharge for which a visit is scheduled immediately. Activities performed during visits include medication reconciliation, discussion of social issues, referral to support services, management of chronic disease, and posthospitalization care. The health care team consists of a clinical provider (ie, a physician assistant, nurse practitioner, or physician), an occupational therapist, a registered dietitian, a social worker, a phlebotomist, and a community health worker.

Among participants, annual enrollment averages 350 individuals, and the mean age is 71 years. Sixty-three percent of Just for Us participants are women, 81% are African American, and the average annual income of participants is less than $7,000 [2]. Most participants rely on personal care assistance, public transportation, and food assistance. The typical participant has multiple comorbidities, the most common of which are diabetes, heart disease, and chronic obstructive pulmonary disease. Forty-four percent of participants have a mental health or substance abuse diagnosis [2]. Quarterly surveys of participants reveal that provision of medications and provision of diet and nutritional information are considered to be the most important services provided through the program.

A review of clinical and health care utilization data for a 1-year period found that, by the end of the study period, ambulance, emergency department, and inpatient costs each decreased by almost half among participants, while prescription and home health costs increased by 25% and 52%, respectively. In addition, 79% of participants who were hypertensive at baseline had this condition under control (defined as a systolic blood pressure of <140 mm Hg and a diastolic blood pressure of <90 mm Hg) at the end of the study period, and 84% of participants with both hypertension and diabetes at baseline had both conditions under control by the end of the study period [2].

Changes in the utilization of care and in health outcomes are reflected in the substantial shift from hospital utilization to increased use pharmacy services, increased use of outpatient care, and increased use of community in-home services, which enable participants to remain independent and thereby avoid nursing home placement. The sentinel diseases for evaluative purposes are diabetes and hypertension. Every participant receives a blood pressure check at every visit; 76% of Just for Us patients with diabetes have had their hemoglobin A_{1c} level measured; of these, 84% had a value of less than 9.5% of the total hemoglobin level [2]. A recent analysis found that, for the 225 individuals with

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hypertension at baseline/entry, the average systolic pressure decreased by 7.73 mm Hg and the average diastolic pressure decreased by 4.41 mm Hg. The average blood pressure decreased across all subgroups studied, with African Americans experiencing the greatest absolute reduction [3].

The model is flexible: participants do not have to participate in an entire package of services under a single capitated amount. The model also relies solely on the fee-for-service reimbursement system.

The most challenging aspect of Just for Us is also what makes it feasible under current reimbursement mechanisms: the integrated care team is composed of providers from partner organizations, each drawing on the reimbursement mechanisms available to them through their owning entities. The partners have to respond to the program's needs, expectations, and regulatory process, as well as to those of their respective agencies. Staff report to 2 different organizations, which is a daunting administrative task when working hours, time off, reporting and training requirements, and daily accountability must be addressed. Commitment to the Just for Us participants and to providing quality service form the glue that keeps everyone communicating and working from the same page [2]. Currently, intensive care management, which most participants require, is performed by a combination of the Just for Us Department of Social Services social worker, the local Community Alternatives for Disabled Adults social worker, the local mental health agency, the Just for Us community health worker, and the Medicaid Carolina Access case manager. Other than new models for delivering integrated clinical care, the geriatric disabled patient requires intensive ongoing psychosocial support from a seamless, coordinated system of care. However, clinical providers and social workers are not reimbursed for time spent conducting joint case reviews and implementing integrated care plans.

A successful in-home model for aging and disabled individuals requires a financial mechanism that covers the cost of direct care and the time for providers to plan and work together. It also requires the medical provider to accept and adopt the paradigms of the mental health and social services systems. The capacity and ability of aging and disabled persons to perform activities of daily living and instrumental activities of daily living should be every provider's first and foremost concern. With this focus, we can design effective transitional care strategies.

In the fall of 2011, Just for Us will celebrate its 10th year of service in Durham County. With the development of electronic medical records and health information exchanges, home visits by integrated teams will become more accessible in more communities. With future payment structures, such as bundled payments, payers and hospital systems will be reaching out to integrate these programs into their transitional care systems. The future success of in-home clinical care will depend on how well these entities effectively and efficiently integrate palliative care into their clinical and behavioral teams and how well they can impact their local health systems' transitional care outcomes. NCMJ

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Linking Primary Care With Adult Care Homes

Tom Wroth

(See the commentary by Lyn and Johnson on pages 205-206 and the commentary by Fretwell and Old on pages 209-211.)

This commentary describes a pilot program wherein a community health center is partnering with Community Care of North Carolina to create a system of integrated care management and "treatment-in-place" visits for aged residents and disabled residents of adult care homes, with the goal of improving the quality of care and reducing unnecessary visits to emergency departments.

Adult care homes are assisted-living residences for aged adults and disabled adults who require 24-hour supervision and assistance with personal care needs. In North Carolina's 1,400 adult care homes, frail elderly residents are frequently co-located with younger residents who have a mental illness or intellectual and developmental disabilities. Residents often have several chronic medical conditions and are taking multiple medications from different prescribers. Adult care homes are staffed by caregivers who assist with personal care needs and dispense medication but have no formal medical training and are not able to assess or treat medical or mental health problems. Adult care homes are under pressure to keep beds full and need to make admission decisions quickly, and often they do not have adequate information to make appropriate decisions about admission [1]. If routine medical issues arise, such as hyperglycemia, cold symptoms, or dizziness, residents often are taken directly to an emergency department for care, instead of accessing care at the medical home.

For North Carolina to control health care costs while improving the quality of care and reducing health disparities, new models of care must be developed that will defragment the health care system for high-risk patients. Residents of adult care homes who are dually eligible for Medicare and Medicaid have poor continuity with primary care, visit the emergency department more frequently, and lack coordinated care [2]. Often, these patients fall through the cracks between multiple care providers, including primary care physicians, specialist physicians, mental health professionals, home care providers, and pharmacies. In this commentary, I describe a pilot program wherein a community health center, Piedmont Health, is partnering with Community Care of North Carolina (available at: http://www.communitycarenc.com) to create a system of integrated care management and "treatment-in-place" visits for residents of adult care homes, with the goal of improving the quality of care and reducing unnecessary visits to emergency departments.

The Reaching Out to Enhance Lives of Adults in Area Care Homes (REACH) Program

In 2009, we partnered with our local Community Care of North Carolina network (AccessCare) to develop a care management system to improve health care quality and the use of health care services for dually eligible residents in the adult care homes linked to our 6 health centers. A registry of 107 individuals residing in 28 adult care homes was created by accessing the North Carolina Medicaid Provider Portal [3], querying our electronic medical record, and obtaining referrals from providers. The registry enabled the care managers to easily identify gaps in care that needed to be addressed and to develop a care plan for each resident. The adult care homes were contacted, and with colleagues from the Department of Family Medicine at the University of North Carolina–Chapel Hill School of Medicine, we performed 3 structured interviews to assess the barriers encountered by administrators at the adult care homes. Consistently, the administrators reported poor communication with our health centers and with local hospitals, as well as barriers to appropriate medical and mental health services for their residents. They especially struggled with patients in transition from hospitals or other care homes. They asked for a "point of contact" with our health centers, so that problems could be solved in a timely manner and that communication could be improved between adult care homes and medical providers.

At the beginning of the REACH program, 2 registered nurse (RN) care managers were assigned to the adult care homes and were available during daytime hours, via cellular telephone, to problem-solve and ensure timely access to care. If a resident became ill or if questions arose about the care plan, the RN care manager communicated directly with the primary care provider, so that problems could be solved expeditiously. RN care managers performed home visits for each resident, during which they conducted a

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comprehensive health assessment and reconciled medications with data in the resident's electronic medical record. Patients with gaps in care or poor follow-up were scheduled for appointments with their primary care provider.

Soon after initiation of the pilot program, adult care home residents with mental health, behavioral, or mobility problems still had difficulty accessing care at our health centers. Residents often waited for long periods before they received care, and because adult care home staff were not always available during the visit, the provider struggled to obtain an adequate history and synthesize an effective treatment plan. In 2010, we began sending a physician and an RN care manager to 2 rural adult care homes, where they provided care in the residents' home environments, using laptops with Wi-Fi cards and our Web-based electronic medical record. After the visits, the physician, the RN care manager, and the pharmacist met in a multidisciplinary team meeting to ensure that patient-care plans were followed.

Preliminary Results of the Pilot Program

Administrators reported that the program improved continuity of care, decreased wait time for appointments, improved communication regarding test results, and decreased the likelihood of medication errors. Administrators noted several examples in which they were able to solve acute problems because of timely assessment and treatment. The adult care home visits seemed to reduce anxiety and behavioral problems for residents with mental illness and made visits less burdensome for elderly residents with mobility problems.

Adult care home administrators provided several anecdotes about situations in which they were able to defer emergency department visits for acute care issues because they had access to the RN care manager or the primary care physician. Although an evaluation of claims data has been planned, we have not been able to access both Medicare and Medicaid claims, to measure rates of use and costs before and after the intervention.

Conclusions

Improvements in clinical support to and communication with adult care homes and performance of treatment-in-place home visits improved care for frail elderly and disabled residents. Adult care homes benefitted from care management that was integrated into the medical home, where members of primary care and other health care services work as a team. This model may be most effective in rural areas, where mobile technology can be used to synchronize information from the electronic medical record with information collected during the adult care home visit, to improve patient safety and the efficiency of communication. Although this model has great promise in our local environment, policymakers will need to further develop reimbursement models, such as accountable care organizations, to sustain such programs. NCMJ

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INVITED COMMENTARY

The PACE Program:
Home-Based Care for Nursing Home–Eligible Individuals

Marsha D. Fretwell, Jane S. Old

(See the commentary by Lyn and Johnson on pages 205-206 and the commentary by Wroth on pages 207-208.)

The Program for All-Inclusive Care of the Elderly (PACE) is a Medicare/Medicaid managed care benefit for frail adults aged 55 years and older who, although certified by the state as nursing home eligible, choose to live in the community. The PACE model features comprehensive medical and social services coordinated by an interdisciplinary team whose goal is to promote independence and quality of life.

More than 30 years ago, On Lok, a community-based organization in San Francisco, California, developed the Program for All-Inclusive Care of the Elderly (PACE) as an alternative to nursing home care. PACE is a Medicare/Medicaid managed care benefit for frail adults aged 55 years and older who, although certified by the state as nursing home eligible, choose to live in the community. Enrollees (ie, participants) must be able to live safely at home within a PACE site's geographic area. PACE became a Medicare benefit and a state Medicaid option under the Balanced Budget Act of 1997. Monthly capitation payments from Medicare and Medicaid provide revenue for PACE. At the end of 2010, there were 75 approved PACE sites in 29 states, covering 23,000 participants. The goal of these programs is to extend participant independence in the community and to enhance the quality of their lives.

The North Carolina PACE Model

In 2004, the North Carolina legislature mandated the creation of 2 pilot PACE programs. This legislation provided the funds to the Division of Medical Assistance at the North Carolina Department of Health and Human Services to secure actuarial analysis for the Medicaid capitation rate for North Carolina, to add PACE to the North Carolina Medicaid State Plan (in 2007), and to work with the 2 pilot sites, Elderhaus PACE and Piedmont Health SeniorCare, to complete applications to the Centers for Medicare and Medicaid Services and allow them to provide Medicare benefits. Elderhaus PACE first enrolled participants in April 2008; Piedmont Health SeniorCare opened in September 2008. LIFE St. Joseph of the Pines (Fayetteville) and PACE of the Triad (Greensboro) will open in 2011. Sites in the process of applying are in Durham, Hickory, Statesville, Asheville, and Greenville. These PACE sites are sponsored by a variety of existing community health care providers, including a day care program, a community clinic, a national religious organization, hospital systems, hospices, and a national housing organization.

TABLE 1.
Characteristics of Elderhaus PACE Participants

Variable	Participants (N = 70)
Living arrangement	
Home alone	13 (18.6)
Home with caregiver	53 (75.7)
Skilled nursing facility	3 (4.3)
Assisted-living facility	0 (0)
Group home	1 (1.4)
Demographic characteristic	
Age, years, mean	79.9
Sex	
Female	44 (62.9)
Male	26 (37.1)
Dual eligibility payer	66 (94.3)
Most frequent diagnosis	
Dementia	51 (72.9)
Diabetes	27 (38.6)
Chronic renal failure	19 (27.1)
Cerebrovascular accident	19 (27.1)
Vascular disease	19 (27.1)
Congestive heart failure	18 (25.7)
COPD	13 (18.6)

Note. Data are no. (%) of participants, unless otherwise indicated. COPD, chronic obstructive pulmonary disease; PACE, Program for All-Inclusive Care of the Elderly.

Elderhaus PACE developed from an existing day care center that has operated in Wilmington for 25 years. Early

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enrollment focused on participants from the existing day care center, on recruitment from the practices of 2 local geriatricians, and on establishing referral relationships with hospital and skilled nursing home discharge planners. Within 2 years after opening, we had outgrown space in the day care center. Elderhaus PACE now operates in a separate, larger space. To date, Elderhaus PACE has enrolled 90 individuals and has a current census of 70 individuals. Table 1 is a description of our participants' characteristics.

PACE as a Health Care Intervention

The heart and soul of PACE is the interdisciplinary team. The interdisciplinary team includes a primary care physician, a nurse, a social worker, a physical therapist, an occupational therapist, a recreational therapist or activity coordinator, a dietitian, a PACE center supervisor, nursing aids, and drivers.

Through a process of integrating all discipline-specific assessments and interventions and acknowledging each participant's preferences for care, the interdisciplinary team is responsible for determining care needs, allocating resources, coordinating all services, and evaluating outcomes for participants, whether their care is based in the home, hospital, long-term care facility, or hospice. The product of this process is a comprehensive care plan.

This care plan addresses a standard set of biopsychosocial/functional issues or domains that are relevant to the health of frail older adults: diagnoses and medications, nutrition, bowel and bladder function, cognition, emotion, social activity, mobility, activities of daily living, and cooperation with the care plan. In addition to generating the care plan, the interdisciplinary team meets daily to maintain continuity of care and every 6 months to evaluate and revise the care plan.

All decisions about resource allocation for services, consultation, durable medical equipment, and home care are made during the daily interdisciplinary team meetings. On average, participants at Elderhaus PACE attend the day center 3.9 days per week. All participants receive primary care at the day center from the Elderhaus PACE physician or nurse practitioner. The PACE center transport team provides most transportation required by PACE participants, whether to and from the center or to medical services. The rehabilitation program offers individual assessments and treatments, balance and strengthening groups, and supervision of the daily use of a seated exercise bike by all participants. There are a variety of recreational and social events presented daily in the center, as well as a hot lunch and a snack. Our behavioral health program provides one-on-one or group therapy by our social workers, primary care nurses, and a consultant counselor from the community. Our nutritionist also provides counseling to participants and their caregivers, as well as oversees meal preparation and service and our restorative dining program for very frail individuals. She works closely with our speech therapist, for individuals with dysphagia. Also provided are daily personal care at the participant's home, as well as in the day center; on-call coverage; emergency department visits; acute in-hospital and skilled nursing care; and long-term and hospice care in the individual's home or at the nursing facility.

Outcomes and Observations of Patients at Elderhaus PACE

Table 2 contains a description of participants' outcomes. During our 3 years of providing care for these 90 frail individuals, we have accumulated 14 hospital stays, with a mean length of stay of less than 3 days, and 19 emergency department visits. We have had no hospital admissions for ambulatory care–sensitive admissions and no readmissions for the same cause. We have had 15 deaths (16.7% of the baseline population), with more than 50% occurring in the participant's home. Three of the 5 deaths in the skilled nursing facility were within 7 days of acute massive cerebrovascular accidents. Participants have been able to continue coming to the day center up to 10 days prior to their death, indicating a

TABLE 2.
Outcomes of 70 Elderhaus PACE Participants

Outcome	Value
Hospitalization	
Events, no. of participants	14
Duration, no. of days, mean	2.9
Readmission for same cause, no. of participants	0
Admission for ambulatory care–sensitive condition, no. of participants[a]	0
ED visit, no. of participants	19
Death, by location, proportion (%) of participants	
Home	8/15 (53)
Skilled nursing facility, by stay duration	
Short term	4/15 (27)
Long term	1/15 (7)
Hospital	1/15 (7)
Day center	1/15 (7)
Falls	
Rate, no.	
Per member-month	0.132
Per 1,000 days	4.35
Injury score, proportion (%) of falls[b]	
1 (no injury)	41/82 (50)
2 (minor: abrasions/bruises)	38/82 (46)
3 (moderate: fractures)	2/82 (2)
4 (major: surgery required)	1/82 (1)
5 (death)	0 (0)

Note. Data are for 1,328 member-months of observation. PACE, Program for All-Inclusive Care of the Elderly.
[a] Defined as congestive heart failure, chronic obstructive pulmonary disease, diabetes mellitus, pneumonia, and urinary tract infection.
[b] Mean injury score, 1.5.

compression of time spent in a bed-bound state. While falls are frequent (we discourage the use of wheelchairs), 96% of falls resulted in no or minor injuries. Several aspects of our program may underlie the ability of Elderhaus PACE and other PACE programs to offer quality long-term care in the community at a cost lower than that of the fee-for-service system. Central to our success is the financial incentive to develop a system of care that involves shared decision making with the participants and their families. Specific features are (1) building primary care relationships of trust, (2) maintaining our exhaustive efforts to obtain advance directives early in the enrollment, (3) creating a loving and stimulating environment in the day center, and (4) evolving, during the 3 years, a "culture of exercise" in the day center. All participants enthusiastically embrace this culture of exercise, which makes the day center a popular place where our participants come to help themselves.

The Future of PACE in North Carolina

One of the most exciting changes during the past 3 years has been the rapid spread of PACE sites across the state of North Carolina. This group of 11 sites has formed the North Carolina State Alliance. Contacting the Alliance, at pacenc@google.com, is the first step for a potential PACE program. The National PACE Association (available at: http://www.npaonline.org) advocates for all PACE sites in the United States.

In the recent debates on health care reform, the PACE model has been identified as an example of the "new" proposed models of care: accountable care organizations, which accept capitation as the financing structure, and medical and health homes, which provide comprehensive primary care to groups of medically and behaviorally complex individuals. Evaluation studies of PACE have demonstrated that the model can reduce the number of emergency department visits and hospital admissions and readmissions, while providing a longer mean survival duration among participants with high mortality risk at enrollment [2-7]. By creating an organized system of care with primary care and shared decision making, PACE has provided a high quality of care while reducing costs to Medicaid and Medicare.

Given PACE's outcomes of increased value at a lower cost, what is the limiting factor for PACE's expansion from the 23,000 currently served to the millions who will require and desire community-based long-term care during the next 20 years? How can we scale up the numbers served without losing the trusting relationships so crucial to the lower rate of emergency department and hospital visits? The National PACE Association, supported by the SCAN Foundation, recently held a PACE Policy Summit (available at: http://www.thescanfoundation.org) to review the challenges and opportunities for the expansion of the PACE model.

In North Carolina, we have a unique opportunity to increase the value of long-term care services while restraining costs. We have the existing statewide network of Community Care of North Carolina (available at: http://www.communitycarenc.com), with its primary care physicians and case managers, which, like the statewide network of PACE sites, is serving individuals with both Medicaid and Medicare. PACE, by assuming financial risk for all health care expenses, shifts the financial incentives for care to the improvement of health and function, rather than to the increased provision of services. Linking these small and rather intense PACE providers with the larger primary care network of Community Care of North Carolina would allow the sharing of this expertise and the development of common assessment tools and resources, which could hopefully maintain these complexly ill individuals in community care for as long as possible. Providing good value in health care at a reduced cost is the ultimate challenge for the federal and state governments during the next 10 years. PACE is clearly part of the solution. NCMJ

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

Steven Crane

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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INVITED COMMENTARY

Use of Telehealth to Improve Chronic Disease Management

Kim A. Schwartz, Bonnie Britton

(See the commentary by Saeed and colleagues on pages 219-222.)

Remote patient monitoring that tracks vital signs of patients with chronic diseases is offering more-frequent contact between the patient and the primary care provider, providing earlier detection of potential problems, and allowing real-time alerts, resulting in a proactive, affordable option for best-practice health care.

"I have my life back," Tamara J. says as she clutches her twin 7-year-old boys wriggling out of her lap. Tamara received a diagnosis of diabetes as a young girl, congestive heart failure and cardiomyopathy in 2000, and ventricular tachycardia requiring implantation of defibrillator in 2001, and after complications due to the premature delivery of her boys resulted in kidney failure, she received a kidney transplant in 2005. Her recovery from the transplantation was slow, and she was ricocheting around the medical spectrum, from one specialist to another, in and out of the hospital, with frequent trips to the emergency department (ED). She was homebound, restricted in her activities, and having trouble caring for her young boys. Before their birth, she had been a foster mother for a number of children and had been active in her church and community. In July 2008, Tamara was referred to the Patient Provider Telehealth Network (PPTN) by her primary care provider.

The use of telehealth remote patient monitoring, rather than broadband or other networks, in patients' homes, community centers, assisted living facilities, and even the workplace to track vital signs of patients with chronic diseases is a fairly new development for the primary care setting. Remote monitoring can detect health problems sooner, reduce hospitalizations, improve life quality, and save money [1]. By enabling more-frequent contact between the patient and the primary care provider, the use of remote monitoring can result in earlier detection of potential problems and allow real-time alerts when a patient's data are abnormal, resulting in a proactive solution.

Characteristics of the PPTN Model

Heart disease, stroke, and diabetes hit the people in Roanoke Chowan Community Health Center's (RCCHC's) very rural and poor service area hard [2]. Factors such as provider shortages, time constraints among available primary care providers, aging populations, transportation barriers, and limited financial resources are common in the primary care setting. By using traditional strategies, as well as the innovative and affordable strategies of telehealth remote patient monitoring, to manage the effects of chronic disease, RCCHC has been able to deliver a solution not only for the patients, but for the providers and the overall health care delivery system.

Telehealth evidence-based data, guidelines, and standards are being embraced by a myriad of health care services. The outcomes are dramatic and compelling. In 2006, RCCHC developed the PPTN on the basis of a telehealth conceptual model. The North Carolina Health and Wellness Trust Fund provided funds to conduct a 3-year feasibility study of the network in order to determine clinical and financial outcomes for RCCHC's patients with cardiovascular disease, diabetes, and hypertension. The model is driven by the patient and their primary care provider.

The PPTN expands current telehealth models in 4 ways. First, new technology allows multiple users to use one telehealth kiosk, producing a strong return on investment, cost-efficiency, and increased access to care. Second, this model is driven by the patient and the primary care physician. Providers determine the need for and the frequency of health education and monitoring, the type of technology needed, and the patient-specific critical indicators and parameters, allowing providers to manage patients beyond the confines of 15-minute office visits. Third, RCCHC telehealth nurses have access to the patients' electronic medical records and communicate with the primary care physician via the electronic medical record. Finally, when critical indicators do not meet established individualized parameters, the provider and nurse respond, achieving early detection and intervention.

The primary care physician identifies patients, completes a 1-page plan of care, and faxes the plan to the telehealth reg-

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istered nurses. The registered nurses customize the technology software, notify the patient, and visit the patient's home to install the telehealth equipment, educate the patient about use of the equipment, and validate the patient's competency about its use. On a daily basis, the patient self-monitors their blood pressure, pulse, body weight, blood sugar level, and oxygen saturation and answers questions about their health. These data are transmitted to a secure server and are accessed by the registered nurses. Monday through Friday, the nurses monitor the data for abnormal indicators, as prescribed by the primary care physician. When a patient's data are abnormal, the nurses call the patient, conduct a nursing assessment, and provide education. If the nurse, on the basis of their professional judgment, determines that the patient may need medical intervention, the nurse contacts the primary care physician via the electronic medical record. Every 2 weeks, the data are compiled and put into the patient's electronic medical record.

Outcomes of the PPTN Study

The total sample size for the 3-year feasibility study was 198 patients. Fifty-nine percent were female, 72% were African American, and 65% were older than 70 years. A total of 74% had cardiovascular disease, and 23% had cardiovascular disease and diabetes.

Financial data were obtained for 64 patients. The majority of these patients (83%) received funding through Medicare only or from both Medicaid and Medicare, with fewer receiving funding through Medicaid only (4%) or self-paying (7%). The total charges for hospital care among these patients decreased from $1.34 million during the 6 months before implementation of the telehealth model to an average of $121,000 per 6-month period after discharge from telehealth. This represents a reduction in hospital charges of more than $1.2 million every 6 months.

The telehealth program was associated with decreased hospital use and ED visits. The total number of hospital-bed days was 199 during the 6 months before implementation of the telehealth model, 99 during the 6 months of telehealth activity, and 70 during the 24 months after discharge from telehealth. The average total number of hospital-bed days per 6-month period after discharge from telehealth was 18 days. The total number of ED visits was 27 during the 6 months before implementation of the telehealth model, 5 during the 6 months of telehealth activity, and 23 during the 24 months after discharge from telehealth. The average total number of ED visits per 6-month period after discharge from telehealth was 6 visits.

Discussion

Since 2006, RCCHC has evolved into the PPTN "hub," providing daily remote monitoring for patients with cardiovascular disease, diabetes, hypertension, and pulmonary disease in 28 North Carolina counties. In addition, RCCHC has consulted with and implemented follow up after hospital discharge for Roanoke Chowan Hospital (Ahoskie, NC) and Chowan Hospital (Edenton, NC). We also consulted with and implemented remote monitoring and chronic care management with Gaston Community Care (Gastonia, NC). Currently, RCCHC funds the PPTN through multiple state grants (via the North Carolina Health and Wellness Trust Fund), federal grants (from the Health Resources and Services Administration Office for the Advancement of Telehealth), private grants, and various partnerships with grants and programs of other organizations (Beacon Community, PACE, Community Care of North Carolina, and University Health Systems) (Figure 1).

FIGURE 1.
Expansion of Telehealth in North Carolina

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

Note. HRSA, Health Resources and Services Administration; HWTF, North Carolina Health and Wellness Trust Fund; RCCHC, Roanoke Chowan Community Health Center.

Today, Tamara is preparing a room for her newest foster child, leading the children's ministry and music at her church, and homeschooling her sons, Jonathan and Brandon. Her hemoglobin A_{1c} level has decreased by 20%, her low-density lipoprotein level has decreased by 53%, her blood pressure has decreased by 34%, and her weight has decreased by nearly 5%. Tamara has had no ED visits or hospitalizations since beginning the program in July 2008. She continues to use the remote patient monitoring program, and her patient data are transmitted not only to her primary care physician, but also, as needed, to her renal and cardiology specialists, in Greenville, North Carolina.

Success in translating the savings and positive patient outcomes RCCHC has seen depends largely on public policy decisions that accelerate the acceptance and use of telehealth remote patient monitoring. The realignment of reimbursement policies for telehealth is critical. For example, Medicare, Medicaid, and insurance reimbursement policies that recognize the value of investments in telehealth equipment and expertise can spread the use of remote monitoring by reducing out-of-pocket costs and encouraging buy-in among practitioners [3]. We can expect to see telehealth and remote monitoring play significant roles in the health care delivery system of the future. NCMJ

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INVITED COMMENTARY

Use of Telepsychiatry to Improve Care for People With Mental Illness in Rural North Carolina

Sy Atezaz Saeed, John Diamond, Richard M. Bloch

(See the commentary by Schwartz and Britton on pages 216-218.)

Telehealth improves access to medical services, especially for people living in rural areas. In North Carolina, the advantages of telepsychiatry also go beyond improving access. This article describes a diverse program of telehealth and telepsychiatric service delivery and discusses its advantages and disadvantages.

Many states have extreme disparities in population density and resource distribution, with substantial health and human service resources in urban centers and a relative scarcity of services in rural areas. Such disparities are particularly apparent in the area of mental health services [1]. North Carolina is no exception. Telepsychiatry (also known as "e-mental health"), one of the largest medical specialties available through telehealth technology [2, 3], can be employed to overcome these problems. Indeed, a growing body of literature now suggests that the use of telepsychiatry to provide mental health services has the potential to mitigate workforce shortages in remote and underserved areas [4].

While the term "telemedicine" has been variously defined [5], live, interactive, 2-way audio-video communication known as "videoconferencing" is the modality most applicable to medicine and has become synonymous with telemedicine and telepsychiatry. The East Carolina University (ECU) telemedicine program has been in operation since 1992, making it one of the longest-running clinical telemedicine operations in the world. The ECU Telemedicine Center provides clinical telehealth services and support, conducts telehealth research, consults and oversees new and existing statewide telehealth networks, and educates mental health professionals and the public on the usefulness of telehealth. Currently, ECU's telemedicine network links to various sites across the state, delivering direct patient care from physicians on the ECU medical campus. The Telemedicine Center provides support for clinical telemedicine transactions, including scheduling, network operations, troubleshooting, training, and administrative assistance, to sites receiving medical services from ECU physicians and other local health care professionals.

The support services of the Telemedicine Center allowed the development and expansion of a network of telepsychiatric services. The most recent additions to our telepsychiatry network include sites in 13 eastern North Carolina counties (ie, Northampton, Gates, Hertford, Bertie, Edgecombe, Nash, Wilson, Pitt, Greene, Beaufort, Craven, Pamlico, and Jones counties). For this project, 3 full-time–equivalent psychiatrists provide services to patients, coordination of mobile crisis teams, and consultation to other clinical professionals through videoconferencing and face-to-face services (Figure 1, available only in the online edition of the NCMJ).

Telepsychiatry sites include pediatric practices, private mental health service professionals, mental health agencies, developmental disability service professionals, local management entities, a state psychiatric hospital, private family medicine professionals, and residential schools for hearing or visually impaired students. These services and programs originate from the ECU Psychiatry Outpatient Clinic, the ECU Telemedicine Center, The Brody School of Medicine (BSOM), and University Health Systems.

The Promise of Telepsychiatry

Direct benefits. Telepsychiatry can make a significant impact on the delivery of mental health services, particularly to individuals with less access (Table 1). Services pro-

FIGURE 1.
East Carolina University (ECU) Network of Clinical Psychiatric Sites in Eastern North Carolina

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

Note. AHEC, Area Health Education Centers; BSOM, Brody School of Medicine; EC BH, East Carolina Behavioral Health; UHS, University Health Systems.

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TABLE 1.
Benefits and Outcomes of Teleconsultation Services at East Carolina University

Benefit or outcome
High patient satisfaction
Improved patient convenience
Reduced travel
Less time away from work and school
Decreased waiting time for specialist referrals
Improved patient compliance with therapy
Higher attendance rates for telehealth visits
Lower frequency of missed appointments for telehealth visits (7%-10% of scheduled appointments), compared with traditional outpatient clinic (35%-42%)
Improved continuity of care
Referring physician remains informed of the patient's condition
Faster receipt of consultant's findings

vided via telepsychiatry have been shown to be comparably effective to those delivered in person [4]. Patient access is improved and satisfaction is high with telepsychiatric services and telemedicine in general [6, 7]. Other benefits include reduction of stigma associated with mental health services [8]; reduced professional isolation and improved recruiting and retention of mental health professionals in underserved or rural areas [9-12]; reduced geographic and socioeconomic health disparities, through improved access to mental health services; improved convenience and, consequently, greater likelihood of compliance with therapy, through reduced traveling; improved education of mental health professionals; and improved coordination of care across the mental health system.

Indirect benefits. Telehealth has several indirect benefits. First, telehealth technologies can streamline the implementation of training efforts. Training can originate from a variety of locations, inside or outside the state, and can eliminate the need for trainers to travel to multiple sites or to concentrate trainees in a single location. Telehealth-facilitated training would allow broad access by the staff from mental health agencies, local management entities, hospitals, and private mental health professionals while minimizing travel costs. The subject matter is conveyed consistently from site to site, and questions and comments from the participants can be shared simultaneously with all connected sites.

Second, the service needs of inpatients with mental health conditions, developmental disabilities, and/or substance abuse issues are usually met by facility staff. However, inpatients often have comorbidities or other health conditions. It is often problematic, costly, and inefficient to provide other clinical services in a timely manner, either on-site or by transport. Specialty consultation services can be provided via telemedicine. For example, the ECU BSOM currently provides specialty medical services for 2 state facilities. In addition, ECU psychiatrists use these connections to consult with inpatient treatment teams regarding selected patients.

Third, other state institutions, such as correctional facilities and special needs schools, require mental health and other health services. The ECU BSOM has provided telehealth services for the Eastern North Carolina School for the Deaf for nearly 5 years, offering consultation and primary care delivery via a connection to the school's infirmary during normal office hours. Other clinical services have included child and adolescent psychiatry and dermatology. This has proven to be cost-effective and educationally beneficial because it allowed students who otherwise would have returned home to remain at the school and spend more time in the classroom. Although this type of service is geared toward a special population, it could be extended to many other institutions.

Fourth, public health departments and private mental health professionals serving rural areas could improve access to their services by using telepsychiatry as a vehicle to extend services to underserved locales. Telehealth networks could also provide clinical coverage or oversight by psychiatrists from major academic medical centers or other sites.

Fifth, law enforcement officials are commonly responsible for the safety and care of individuals in crisis, who are often transported to distant emergency departments where clinicians have little or no information on the individuals en route. Similarly, law enforcement officials must transport individuals in custody who have developed medical or psychiatric symptoms. Telepsychiatry could help clinicians in emergency departments better prepare for patients en route and could give law enforcement personnel access to information that could help them provide secure transportation. Information related to changing mental status, attitudes, and cultural beliefs, as well as to potential drug and alcohol involvement, could also help improve safety and efficiency among emergency department staff and law enforcement officials.

Sixth, students in K-12 schools, community colleges, and universities could benefit from telepsychiatric services. Fortunately, much of the high-speed networking and videoconferencing infrastructure is already in place in many states and could be used to provide student access to mental health services. However, these capabilities use a platform accessible by the public (ie, the Internet), and additional security measures would need to be implemented.

Seventh, there is a great need to improve the quality of and access to mental health services in nursing homes, hospice, and other extended care facilities. The mental health conditions of residents in these settings are often misdiagnosed or underdiagnosed. Nursing staff are increasingly overburdened and inadequately trained to deal with mental health issues. Telepsychiatric services could improve the quality and efficiency of mental health services in these settings.

Eighth, many of the patients seen in primary care settings have mental disorders. Although primary care physicians are the principal gatekeepers for accessing the health care system, they often have limited mental health training and difficulty referring patients for mental health services [13]. To improve access to child and adolescent psychiatric care, improve the quality of mental health care, reduce wait times for the initial psychiatric visit, and keep the child and family served within the pediatric practice, we began providing telepsychiatric consultations to a large pediatric practice. After 3.5 years and 185 telepsychiatric consultations, less than 3% of the consultations were problematic and required management in the ECU psychiatry clinic because of an acute crisis. In addition, preschool assessments have to be limited because they often require a clinician [14]. Despite these unusual problems, we have generally observed an enhanced ability to facilitate appropriate primary care diagnosis and care of mental health disorders, as well as referral to specialists, when appropriate. Additional primary care applications for telepsychiatry include training, mentoring, consultation, and care coordination.

Recommendations

We offer the following recommendations for the long-term development of telepsychiatry in rural and underserved regions of North Carolina. First, the state should foster telepsychiatry demonstration projects showing innovations that improve service delivery, costs, efficiency, efficacy, and effectiveness and maximize the possibilities of new technologies.

Second, the state should aggressively pursue teletraining, leveraging existing resources to the greatest practical extent. Extensive high-speed networking and videoconferencing resources may already be in place. Additional videoconferencing resources may be available through public and private institutions of higher education, Area Health Education Centers offices, and public health systems.

Third, agencies providing care to people with mental illness should consider forming regional consortia, to pool resources and expertise, and working with professional societies and telepsychiatry programs, to develop guidelines and best practices. These consortia should identify technology infrastructure needs and then implement a plan to meet these needs. There are many federal programs that can assist with infrastructure, including the Federal Communications Commission Universal Services Fund (for communications subsidies) and the US Department of Agriculture/Rural Utility Service's Telemedicine and Distance Learning grant and loan program (for equipment purchases).

Fourth, the North Carolina Division of Mental Health, Developmental Disabilities and Substance Abuse Services (DMHDDSAS) should develop a plan to mitigate barriers to using telepsychiatry, starting with those that have been identified [15, 16]. Professional societies and other North Carolina–based and national telepsychiatric programs can be of help in developing guidelines and best practices for telepsychiatry.

Fifth, because grant applications that include multi-institutional collaboration have advantages in today's increasingly competitive research funding environment, the DMHDDSAS and other agencies should promote research projects that include collaboration between research and clinical settings, bringing together researchers from different institutions to develop a set of key data elements to build a telepsychiatric research database for studies on health care use and health outcomes.

Finally, because awareness of and attitudes about telepsychiatry are influential factors in the success of these programs, the DMHDDSAS should reach out to potential constituencies, including users and consumers, to promote telepsychiatric concepts, technologies, and practices.

Conclusion

Although empirical evidence on the effectiveness of telepsychiatry has some methodological limitations, findings suggest that telepsychiatric services are comparable to those delivered face to face, and there are no data to suggest that these services are harmful to psychiatric patients, whether they are children or adults. Services provided via telepsychiatry are acceptable and, sometimes, even preferable to individuals in both outpatient and facility-based settings. Telepsychiatry appears to be a viable option for providing psychiatric care to groups that are currently underserved. The evolution of the future care system must begin with the existing system of service delivery and with recognition of what telepsychiatry can achieve. The purpose and fit of telepsychiatric services in the wider care system—not the technology—should drive its introduction. This will require a better evaluation of telepsychiatry's impact at the system-wide level. NCMJ

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INVITED COMMENTARY

UNC Health Systems and Blue Cross and Blue Shield of North Carolina Patient-Centered Medical Home Collaborative

Don Bradley, David R. Rubinow

UNC Health Systems and Blue Cross and Blue Shield of North Carolina have entered into a joint venture that is designed to improve patient outcomes and experience and to control medical costs for patients with chronic conditions. This commentary reviews the impetus for, and the anticipated outcomes of, the model practice.

UNC Health Systems and Blue Cross and Blue Shield of North Carolina (BCBSNC) announced a new model primary care joint venture in January 2011, with the promise of innovations in health care delivery, improved patient experience and health outcomes, and lower overall costs for patients with chronic medical conditions. The model practice, which is based on the patient-centered medical home (PCMH) concept, will offer care for up to 5,000 BCBSNC members in the area of Durham and Orange counties, with a particular focus on patients with multiple chronic conditions, including diabetes, hypertension, cardiovascular disease, asthma, hyperlipidemia, and obesity.

The impetus for this new approach is 3-fold. First is the recognition by UNC Health Systems and BCBSNC that the current primary care models are neither as effective as they need to be nor financially sustainable. At the same time, the health care reform legislation assumes that primary care—and, in particular, PCMHs and accountable care organizations (ACOs)—will improve the results and efficiency of the US health care system. The key disconnect is that the current primary care workforce is aging, and medical students (with their average educational debt of $150,000 and their desire for a reasonable work-life balance) are avoiding primary care like the plague. Even with the infusion of new osteopathic and allopathic medical schools, as well as midlevel practitioner programs, it is unlikely that graduating students will choose primary care unless the prospects for clinical and economic success improve.

The second rationale for establishing a model primary care practice is that pilot studies performed by BCBSNC and others have demonstrated that PCMHs are effective at improving key health care results (eg, hemoglobin A_{1c} levels in patients with diabetes) and reducing overall medical costs. That said, PCMH models are highly variable in their care processes, technologies, and resources, and it is not clear which of these drives the improved results of PCMHs. The model practice, which will serve only BCBSNC members, will have access to robust clinical and payer data regarding the treatment, cost, and outcomes for the practice population and will allow for controlled evaluations of newly introduced interventions, communication methods, patient incentives, primary care practitioner reimbursement, and technologies. Those that work will be retained; those that do not work can be discarded or revised.

Finally, the model practice introduces a dramatically different relationship between provider and payer. The parties will equally contribute to the operating costs and the administrative costs of the practice and will establish quality-of-care and patient-satisfaction targets. It behooves the payer to reduce the administrative burden on the practice, and it will be important for the practice to pay attention to quality and cost metrics for services provided to members across the full spectrum of the health care system. For the pilot to be successful, the level of trust and transparency for operations, finances, patient experience, and health outcomes will need to far exceed that for typical contractual relationships.

The practice, which is scheduled to open in December 2011, will offer typical primary care services, including physician and midlevel practitioner visits and laboratory testing, but will explore alternative methods to delivering those services. Group visits, televisits, e-visits, and Web-based home monitoring are among a number of ways primary care providers will interact with patients. In addition, the practice will offer on-site nutritional counseling, behavioral health services, pharmacy services, and a health coach/case manager. The focus will be on the patient's health and all that contributes to it, rather than on illness events.

Patients will have access to an online patient portal that will allow them to make appointments and view laboratory,

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diagnostic study, and consultation results, as well as to view critical health information. Before a visit, patients will be asked to provide secure online information regarding symptoms, medication adherence or issues, key self-monitored data, and current questions or symptoms, so that the practice health care team can review it before the visit and prepare for a more productive encounter.

Providers, besides having patient-entered information, a claims-based clinical history, and the electronic medical record at their disposal, will also have an imbedded decision-support system to guide them in developing a care plan with the patient. The electronic medical record will help integrate care within the UNC Health Systems, and the addition of payer claims–based information will provide a window into care delivered outside the health system. Perhaps as important, some of the necessary (under the current health care reimbursement paradigm) but burdensome and administratively costly health-plan medical-management requirements will be automated, reduced, or eliminated.

While the concept is not unique on the surface, practitioners in the practice will be salaried, with incentives based on improvements in patients' health results and patients' experiences. In other words, the practitioner will be incentivized only on the quality of outcomes and patient satisfaction, not on the volume of patients seen. The parent organizations will track services provided, with cash flow being managed as a fee-for-service reimbursement, but the ultimate financial success for the practice will be based on the total cost of the patient population's care, compared with that of a comparable group of patients. What will be unique is the joint capability to model financial outcomes under alternative reimbursement models (eg, management fees, capitation, health benefit plans, and patient incentives). By use of predictive models, the practice can also model anticipated behavior changes of patients and providers under various financial systems.

The model practice will need to be operational for at least 3 years for an evaluation of its impact to be conducted, and even longer as interventions and technologies are added and evaluated. Both UNC Health Systems and BCBSNC have committed to maintaining the pilot for at least that long, recognizing that, although care within the practice may be more costly, the overall cost should be lower as care is better integrated and redundancy, inefficiency, and waste are reduced.

Ultimately, both organizations intend to replicate the successful portions of the pilot and avoid activities or processes that do not provide value to patients, providers, and/or payers. The final lesson learned will be whether 2 large organizations with well-meaning but disparate cultures and perspectives can launch and oversee an effective and sustainable patient-focused primary care practice that may well serve as the nidus for the elusive and yet-to-be-defined ACO and for health system reform.

Stay tuned. Learn with us. And remember, it's all about the patient! NCMJ

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An Update on Community Care of North Carolina's Medicare Demonstrations

Torlen Wade, Eileen Ciesco, Angela Floyd

To enhance the impact of Community Care of North Carolina (CCNC)'s population health initiatives, CCNC partnered with the US Centers for Medicare and Medicaid Services to bring persons who are dually eligible for both Medicaid and Medicare, as well as Medicare beneficiaries, into CCNC's system of medical homes and community-based care management supports.

Community Care of North Carolina (CCNC) was established in 1998 to improve the quality, use, and cost-effectiveness of care for Medicaid recipients in North Carolina. CCNC's 14 networks and 1,400 primary care medical homes now serve more than 1 million Medicaid recipients. In 2006, the decision was made to add new populations to CCNC's system of medical homes and community-based care management supports. The primary reason for the expansion was simple: if CCNC could achieve measureable improvements in care for Medicaid recipients, how much greater impact was possible if the CCNC population-management system was adopted by other payers?

Physicians and other health care providers typically deal with myriad insurance and health plans, each with their own set of guidelines, utilization management requirements, incentives, supports, and reports. Rarely does a plan have a sufficient number of a practice's patients to achieve the impact intended or even to capture the physician's attention. On the other hand, if a majority of a practice's patients could come under a common set of guidelines, expectations, incentives, and supports, better attention would be paid and, potentially, greater improvements in care could be achieved.

To begin to test this enhancement approach, CCNC sought to partner with the US Centers for Medicare and Medicaid Services (CMS) to bring North Carolina individuals who are dually eligible for Medicare and Medicaid (hereafter, "dual-eligible individuals") and North Carolina Medicare beneficiaries into CCNC. An initial partnership began in 2006, with the Medicare Health Care Quality Demonstration, commonly known as the 646 Demonstration; a second began in 2010, with the Multi-payer Advanced Primary Care Practice (MAPCP) Demonstration; and a third began in 2011, with the Affordable Care Act Initiative–State Demonstration to Integrate Care for Dual Eligible Individuals. What follows is a brief update on these 3 initiatives.

646 Demonstration

The 646 Demonstration, which takes its common name from the section of the Medicare Prescription Drug, Improvement, and Modernization Act from which it derived its statutory authority, was designed to improve the quality and efficiency of care for Medicare beneficiaries by means of health care system redesign. Because the CMS required that the organizations participating in the demonstration be nongovernmental, the 14 community care networks of CCNC established a new nonprofit entity, North Carolina Community Care Network, to represent them in the application process. North Carolina Community Care Network applied in the second round of requests for proposals issued by the CMS on September 29, 2006. North Carolina Community Care Network received final approval of its demonstration agreement and protocol in November 2009. On January 1, 2010, North Carolina Community Care Network began participation in the 5-year demonstration.

During years 1 and 2 of the demonstration, CCNC is to manage approximately 42,000 dual-eligible beneficiaries who receive care at 196 CCNC practices in 26 counties. It is estimated that 170,000 Medicare-only beneficiaries who receive care from the 196 practices will be added to the demonstration at the beginning of year 3. During years 3-5, CCNC will manage approximately 212,000 Medicare-only and dual-eligible beneficiaries. The exempt, intervention, and holdout counties are shown in Figure 1. Exempt counties were excluded from participation in the 646 Demonstration because they were part of another demonstration. Counties that were not in the demonstration nor exempt from participation were labeled "holdout" counties.

The demonstration has an out-of-state comparison group composed of beneficiaries receiving a qualifying service from a primary care practice in a comparison county. For comparison purposes, 78 counties, in the following 5 states, that matched the characteristics of North Carolina's 26 intervention counties were selected: Georgia (18 coun-

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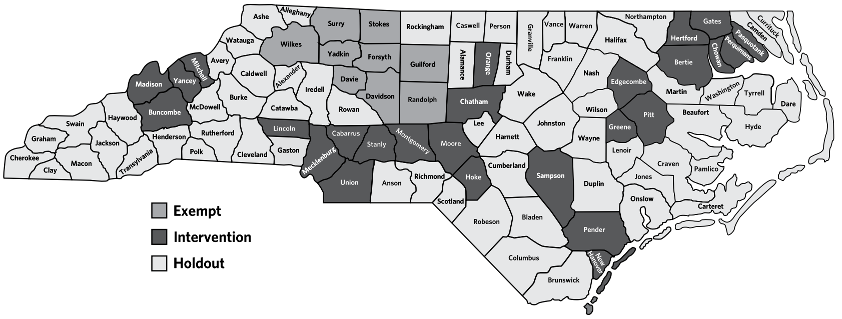
FIGURE 1.
Participation in the Medicare Health Care Quality Demonstration Among North Carolina Counties



Note. Exempt, counties excluded from participation because of involvement in another demonstration; holdout, counties other than exempt or intervention counties; intervention, counties participating in the demonstration.

ties), Kentucky (19 counties), South Carolina (12 counties), Tennessee (19 counties), and Virginia (20 counties).

The size and complexity of the dual-eligible population, in terms of physical health, mental health, and socioeconomic needs, necessitate special mechanisms for identifying patients most appropriate for care management interventions. The use of historical claims data to screen patients for care management intervention can greatly improve the efficiency of the care team. North Carolina Community Care Network received the first Medicare A and B data files from the CMS in November 2010. These data are being used to identify the dual-eligible individuals managed in the 646 Demonstration, to track claims-derived performance measures, and to determine quality improvement outcomes. We are also able to identify patients who meet specified criteria for further screening by a care manager, according to patterns of service use (such as multiple emergency department and in-patient visits, multiple medications, lack of primary care physician contact, target medical conditions, and high cost) during the previous 12 months. Approximately 8% of the target population was identified as highest priority for care management (as of March 1, 2011).

Quality measures are aligned with CCNC's Chronic Care Program, such as measures for diabetes, hypertension, and congestive heart failure. In year 1, 50% of the savings are contingent on meeting quality-of-care objectives. Each subsequent year, the percentage of savings contingent on meeting quality-of-care objectives increases by 10%, until year 4, when it caps at 80%.

The quality improvement performance measures for years 1 and 2 of the demonstration are shown in Table 1. Some performance measures are collected from claims data, whereas others are collected through on-site annual chart reviews. In 2010, North Carolina Community Care Network contracted with North Carolina Area Health Education Centers to perform chart reviews on a sample of the individuals managed in the 646 Demonstration, and chart reviews will continue to be performed for samples of individuals in subsequent years of the demonstration.

We have already seen several best-practice models emerge from the network's early work with the demonstration population. The first model involves home visits to patients by care managers. Many of the care managers perform home visits after a patient is discharged from the hospital, to promote self-management skills, such as assisting patients in making needed follow-up medical appointments, as well as performing medication reconciliation in consultation with the network pharmacist. Consultations with the primary care provider, hospital, and network pharmacist take place when potential medication errors are identified.

The second model addresses care management in adult care homes. One large, multisite federally qualified health center has developed an integrated care management service to help manage the dual-eligible individuals in the 646 Demonstration and the chronic care populations residing in adult care homes. The program is designed to facilitate, in partnership with the participating adult care homes, improved care management for these patients through better assessment, communication, and follow-up in the homes.

In a third model, some large-volume 646 Demonstration practices are performing group medical visits for selected chronic care patients.

A fourth model consists of a nursing home initiative. Five percent of the dual-eligible individuals in the 646 Demonstration reside in nursing homes. One network has embedded care managers in nursing homes. These managers review hospital admission data and work with the nursing homes to reduce preventable readmissions (eg, for falls and dehydration).

A fifth model involves training in palliative care. Along with symptom management, palliative care emphasizes open communication and emotional and spiritual support for the patient and their family. In this way, palliative care offers patients increased autonomy and the best-possible quality of life during serious illness. CCNC is providing palliative care training to the providers and care managers identified in all networks.

TABLE 1.
Quality Improvement Performance Measures for Years 1 and 2 of the Medicare Health Care Quality Demonstration

Source, variable/condition, measure	Year 1 measure	Year 2 measure
Claims data		
Diabetes care		
Hemoglobin A_{1C} testing	Yes	Yes
Lipid profile	Yes	Yes
Retinal examination[a]	Yes	Yes
Foot examination	Yes	Yes
Smoking status	Yes	Yes
CHF		
Left-ventricular failure assessment	Yes	Yes
ACE inhibitor and/or ARB therapy[b]	Yes	Yes
Beta-blocker therapy	Yes	Yes
Smoking status	Yes	Yes
Blood pressure control	Yes	Yes
Ischemic vascular disease		
Lipid measurement	Yes	Yes
Blood pressure control	Yes	Yes
Aspirin use	Yes	Yes
Smoking status	Yes	Yes
Hypertension		
Blood pressure control	Yes	Yes
Smoking status	Yes	Yes
Onsite annual chart review		
Transitional care		
Readmission rate	Yes	Yes
Percentage of patients hospitalized for CHF who have an outpatient visit ≤30 days after discharge	Yes	Yes
Patient safety		
Medication reconciliation[c]	No	Yes
Percentage of discharged patients receiving transitional care	No	Yes
Congestive heart failure		
Body weight during most recent clinic visit	No	Yes
Diabetes care		
Nephropathy status	No	Yes
Hemoglobin A_{1C} level <8%	No	Yes
Diabetes and hypertension		
ACE inhibitor and/or ARB therapy	No	Yes
Chronic obstructive pulmonary disease		
Smoking-cessation counseling	No	Yes
Total measures, no.	18	25

Note. ACE, angiotensin converting enzyme; ARB, angiotensin receptor blockers; CHF, congestive heart failure.
[a] Including dilation of the eyes.
[b] The measure evaluates the percentage of patients with an ejection fraction of <40% who are prescribed ACE inhibitors or ARBs.
[c] Formally referred as "pharmaceutical therapy management improvement, noninstitutional."

Since the implementation of the demonstration and the receipt of the Medicare data, CCNC has had the opportunity to learn more about the health status of dual-eligible individuals and to test different improvement strategies. CCNC expects to receive preliminary quality and cost-savings findings from the CMS by the end of 2011.

MAPCP Demonstration

The Division of Medical Assistance of the North Carolina Department of Health and Human Services, in partnership with Blue Cross and Blue Shield of North Carolina (BCBSNC), the State Health Plan for Teachers and State Employees, and CCNC, has been selected to participate in the CMS-sponsored MAPCP Demonstration. North Carolina is one of 8 states selected to receive this competitive award. The duration of the MAPCP Demonstration is 3 years. North Carolina will launch the demonstration in October 2011. This initiative provides an opportunity to bring the CCNC primary care medical homes and community-based care management system to Medicare recipients and individuals in 7 rural counties across North Carolina (ie, Ashe, Avery, Bladen, Columbus, Granville, Transylvania, and Watauga) who are privately insured by BCBSNC and the State Health Plan.

The primary goals of the demonstration are to improve quality and bend the cost curve by reducing the growth of spending and decreasing costs, through effective care management and coordination, while supporting a robust health information system. This demonstration will also provide an opportunity to examine the drivers of practice transformation necessary to successfully achieve a patient-centric system of care management delivery to improve population health. Emphasis is being placed on participating practices achieving National Committee for Quality Assurance patient-centered medical home (PCMH) recognition. Each of the payers in the demonstration has agreed to infuse resources to participating practices and networks, to expand and build the required capacity, and to develop a shared set of expectations. In exchange for the additional payer resources, participating practices and networks are expected to ensure that every patient has a primary care physician who assumes responsibility for the patient's care; to provide services for high-risk patients, such as care coordination, transitional support, disease management, and medication reconciliation; to work with key community partners, such as hospitals, who can provide data on admissions and emergency department visits and can collaborate in patient management to reduce emergency department visits and prevent inappropriate admissions and readmissions; to work together with physicians and other health providers to develop quality and care improvement initiatives, monitor performance, and measure goal attainment; to review performance from claims analysis and other available data sources to drive practice improvement; to apply for National Committee for Quality Assurance PCMH recognition; and to participate in surveys, interviews, and focus groups for the purpose of evaluating the demonstration.

The CMS will contract with an outside evaluator to measure outcomes across all 8 of the participating states. The CMS evaluation will focus only on the public payers (ie, Medicare and Medicaid). The participating payers in the North Carolina demonstration will perform a joint program evaluation that addresses outcomes across all of the payers (ie, BCBSNC, the State Health Plan for Teachers and State Employees, Medicaid, and Medicare). The focus of the evaluation is to determine whether the medical home, when supported by Medicare, Medicaid, and private health plans, will (1) reduce unjustified variation in health care use and expenditures; (2) improve the safety, effectiveness, timeliness, and efficiency of health care; (3) increase the ability of beneficiaries to participate in decisions concerning their care; and (4) increase the availability and delivery of care that is consistent with evidenced-based guidelines.

State Demonstration to Integrate Care for Dually Eligible Individuals

On April 14, 2011, the CMS announced that 15 states would receive federal funding to "develop better ways to coordinate care for people with Medicare and Medicaid coverage, also known as dual eligibles, who often have complex and costly health care needs" [1]. North Carolina (through the North Carolina Division of Medicaid Assistance) is 1 of the 15 states. Under this demonstration, which will be administered by the new Federal Coordinated Health Care Office, participating states are expected to develop new ways to meet the complex and costly medical needs of dual-eligible individuals. The goal of this initiative is to eliminate duplication of care through improved coordination of Medicare and Medicaid services and to expand access to needed services while lowering costs. North Carolina's approach during the 12-month planning process is to build on the CCNC statewide infrastructure by partnering with long-term care providers, home and community-based providers, area agencies on aging, and other stakeholders to design, in concert with dual-eligible individuals and their families, health care delivery systems for dual-eligible individuals that can provide the right care at the right time; improve the health of the dual-eligible population; improve the quality, access, and reliability of care; and reduce the costs of care.

The complexity of the dual-eligible population, combined with the variety of living arrangements, requires targeted approaches to achieve lasting improvements in care and outcomes. North Carolina will build its integration strategy around the dual-eligible individuals' living arrangements—the home, the nursing home, and the adult care home. While there will be common approaches that cross living arrangements, particularly in the identification and management of chronic illnesses, each setting will have unique challenges requiring special strategies and partnerships. Subject to the availability of funds, successful planning efforts will be eligible for implementation funds. NCMJ

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Palliative Care and the Search for Value in Health Reform

Donald H. Taylor Jr.

Improving value in health care is of paramount importance, and doing so will require focus on both the costs and benefits of care. Palliative care addresses symptoms of disease regardless of prognosis, helps patients clarify their goals of care, and is key in improving value in the health care system.

The need to address health care costs was an oft-repeated rationale during the health reform discussion that culminated with the passage of the Affordable Care Act in March 2010. The pace of health care cost inflation in general and in the Medicare program in particular makes addressing program costs a key priority, since such costs are a major driver of the long-term federal budget deficit. And since it is well-known that the cost of care increases before death because of the burden of illness, and since 8 in 10 deaths annually involve Medicare beneficiaries, focusing policy efforts on addressing the cost of care for Medicare beneficiaries at the end of life seems like an obvious strategy [1].

While health care cost inflation represents a fiscal burden for the nation, focusing on cost alone, absent any information about quality or outcome, provides an incomplete picture. What is really needed is an increased focus on purchasing value in health care. Such a focus would be beneficial throughout the health care system, but the Medicare program is an obvious place to focus or begin such efforts, since it represents a large public expenditure of resources.

Any conception of value must consider the costs of health care alongside the benefits of health care. Benefits could be denominated in a variety of ways, but a simple approach would be to expect that health care should show benefits in terms of life extension and/or improvements in quality of life. Health care that does neither of these could be said to have no value to the patient and should not be performed. Of course, there are many uncertainties in the simple formulation I have stated. In a population, there would be an average effect, and some would receive high value from care, whereas others would receive little or even negative value (eg, a shortened life span or a worse quality of life), so any focus on value would have to allow for such uncertainty, as well as include mechanisms that allow updating in response to changes in the science. Leaving the difficulties in predicting the outcome of care provision aside, I pose the following propositions, which I find to be uncontroversial: (1) health care that does not improve life span or enhance quality of life should not be performed, (2) health care that provides value makes patients better off, (3) there are finite resources with which to purchase value, (4) health care that provides more value per cost should be prioritized, and (5) individuals should be able to spend their own resources at their discretion.

Patient preferences are also key in assessing the value of health care because of both the uncertainty of the outcome achieved by receiving care and the cultural importance placed on autonomy and choice in our society. Of course, the current Medicare program elevates choice to the highest level by allowing patients to receive virtually any treatment so long as a provider (ie, physician or hospital) is willing to provide it, regardless of whether there is evidence of effectiveness or efficacy of the treatment for a given patient. At some point, it could become necessary to lessen or bracket the heretofore unlimited choice and autonomy that patients have in Medicare, as a way to address the program's fiscal imbalance. However, an intermediate step would be to provide patients with better information about the value of health care, with both benefits and costs as inputs to their care choices.

The Role of Palliative Care in Increasing Value

Palliative care is care that addresses the symptoms of disease regardless of patient prognosis, although palliative care is typically thought of as being relevant for persons facing advanced, life-limiting illness. Hospice is a subset of palliative care that is designed for persons who are believed to have a life expectancy of 6 months or less and focuses on relieving the burden of disease and improving the quality of life for such patients via an interdisciplinary, team-based approach. Past work has consistently demonstrated that hospice provides benefits to patients, with some work

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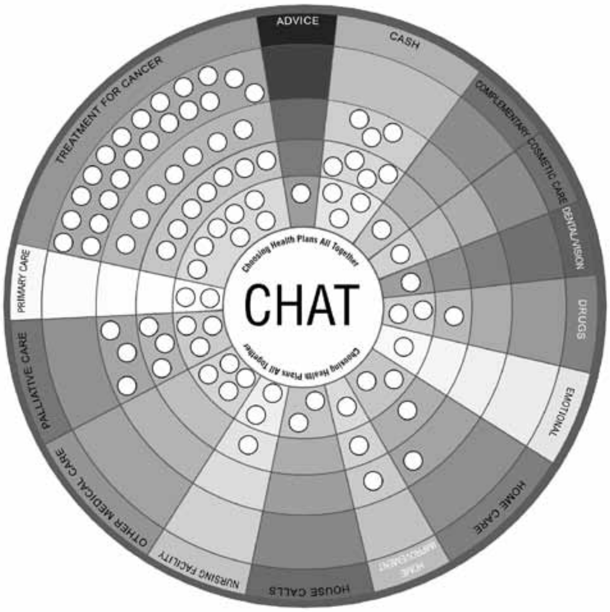
showing that it also reduces the cost of care to the Medicare program [2]. Increased access to palliative care among the Medicare population could be key for improving the value of care received by patients, since such care focuses on the goals of care and addressing symptoms among patients. In fact, recent work has shown that palliative care does indeed improve life span, improve quality of life, and reduce costs, at least in the case of individuals with stage IV lung cancer [3]. This makes increasing the "upstream" access to palliative care among Medicare beneficiaries a high priority. Such concurrent care has been shown in a sample of non-Medicare beneficiaries (ie, younger patients) to improve quality of life and reduce costs [4], and expanded access to palliative care in the Medicare program, signified by increased payment for such care, seems to be a high priority from a value perspective.

FIGURE 1.
Choosing Health Plans All Together (CHAT) Wheel



Note. The CHAT wheel is co-owned by the National Institutes of Health and the US Public Health Service. ©2000 University of Michigan Board of Regents.

Choosing Health Plans All Together (CHAT)

In the fall of 2010, Duke University began collecting data as part of the CHAT study. CHAT is a participatory, decision-making approach to developing consensus on topics, and it has been applied in a variety of health-related contexts [5, 6]. The goal of CHAT is to provide rational, patient-defined, evidence-based recommendations to inform a redesign of the Medicare benefit package for care at the end of life, as well as to inform the transition from the current hospice benefit to a more patient-centered palliative care model. The CHAT approach provides information to participants in a format that allows them to meaningfully provide their opinions and perspectives, in this case related to the types of care that should be a part of the Medicare benefit package. It also allows patients to interact with other patients and nonexperts in a way that encourages dialogue involving diverse perspectives.

The study is enrolling patients being treated at Duke University Medical Center and Duke Raleigh Hospital who have cancer that has been treated in the past year and are age-eligible Medicare beneficiaries. In addition, family caregivers (typically a spouse or an adult child) are also eligible for the study, regardless of the patient's disease status or age. Initial attempts to enroll patients who had not only cancer but also a life expectancy of 6 months or less proved to be impractical for a variety of reasons.

Study participants attend CHAT sessions lasting 2-2.5 hours, during which they make decisions about what types of care should be covered by the Medicare program for patients with advanced cancer. Note that patients are not asked to answer what types of care they would prefer but, instead, are serving as informants for what type of care Medicare should cover for patients who are believed to be facing the final 6 months of life. Participants must identify benefits that represent what they believe to be most beneficial, given the constraint that they cannot choose everything (Figure 1). There are different types of care that are relevant for caring for patients with advanced cancer, and these were taken from the literature. The cost of items of care currently covered by Medicare were estimated, from Medicare sources, for patients who died of cancer, and the costs represent the mean costs for the final 6 months of life. Other types of care that are or could be used by patients in such a situation were identified from other sources, including items that are not presently covered by Medicare. Thus, the choices that are provided to patients are based on plausible economic costs.

The essence of the CHAT exercise is decision making under a resource constraint. Patients could choose from only a limited number of units of care (50 of 92 possible units, denoted by pegs in the CHAT wheel), so they could not choose everything. In that way, the goal of the exercise is to identify care that is viewed as being most important for persons with advanced cancer, as judged by persons with cancer (though not necessarily advanced) and their family caregivers.

The CHAT exercises were conducted as follows. Participants complete a prequestionnaire and then, 4 separate times, make decisions about care covered by Medicare. First, they make choices individually, without discussion with other members of the CHAT group (ideal size, 10-12 persons). Second, they make choices in small groups, in which they work to develop 1 consensus choice about what care to cover. Third, they make a full group consensus choice. Finally, they make another individual choice, without discussion with other CHAT members.

At different points in the CHAT exercise, respondents are provided with information about what could happen to a patient with advanced cancer. The participants then look at the choice they made and decide whether this outcome is acceptable. This new information either confirms or helps change the perspective of participants with regard to the choices they have made. Participants conclude with a post-CHAT questionnaire that focuses on how hard the exercise was for them and whether they would be willing, on the basis of their membership in the group that made the decision, to abide by the choices of the large group even if they disagreed with the group's choices.

Policy Importance

There are a variety of ways in which the Medicare benefit package could, and probably should, be updated. Alteration of the hospice benefit, which has been largely unchanged since its inception in 1983, is one of the primary areas that is ripe for change. A movement toward a concurrent model of palliative care—whereby patients are provided earlier access to palliative care services, which are reimbursed in a manner to incentivize this care—is a change that would be consistent with moving toward a value focus in the program. One of the primary goals of the CHAT study is to look at the preferences of Medicare beneficiaries who have some experience with cancer, as well as those of their family and caregivers, as a way to inform discussions of altering Medicare policy in this manner. By identifying patient preferences under a resource constraint, the study will help to provide some insight into how a new palliative care benefit might be structured. This is a small step toward improving the degree to which the Medicare program focuses on purchasing value for its beneficiaries. **NCMJ**

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INVITED COMMENTARY

The Pregnancy Medical Home:
Use of the Power of the Medicaid Program to Improve the Standard of Care Across North Carolina

Craigan L. Gray

The Pregnancy Medical Home (PMH) is a value-added, quality metrics–driven clinical program to improve the perinatal outcomes for pregnant women across the state of North Carolina. The PMH uses modest financial incentives to improve access to care, in a team approach led by obstetricians and supported by integrated aggressive care and case management.

North Carolina Medicaid is a major payer for obstetrical services in the state. In 2009, there were 126,785 live births in North Carolina [1]. The state Medicaid program covered the cost of 71,067 (56%) of these births. More than 11% of deliveries covered by North Carolina Medicaid involve infants with a low birth weight (ie, <2,500 g), which puts these newborn citizens at increased risk for complications throughout life [2]. The social and financial burden on the families of these children and on the state Medicaid program, for neonatal intensive care, social support, and rehabilitative services, is astronomical (according to unpublished data from the North Carolina Division of Medical Assistance, the total cost for neonatal intensive care stays in 2009 was more than $223 million for approximately 21,000 claims). Medicaid's Pregnancy Medical Home (PMH) initiative builds off the work of many other concerned clinical providers, to bring useful change and clinical improvement to the pregnant women and their newborn children across the state.

The PMH model is a value-added clinical program that applies the work of the Perinatal Quality Collaborative of North Carolina (PQCNC), in combination with the ideas of other thoughtful clinicians, to address the concerns about the state's increasing cesarean section (C-section) frequency and stubbornly high perinatal mortality rate, both of which are greater than those of other states [1]. The PQCNC's work with hospitals across North Carolina to reduce the number of elective inductions before 39 weeks and their data-driven encouragement to use 17 alpha hydroxyprogesterone caproate (17P) to reduce the incidence of prematurity are important elements of the PMH model. The PQCNC work to address the overuse of C-section deliveries is also complementary to what the PMH initiative expects to accomplish in the program [3]. The PMH program operationalizes these important clinical initiatives at the practice level, through outcome-driven metrics and financial incentives.

A value-added clinical program uses outcomes as the primary measure of success. PMH members receive a financial incentive to produce specific clinical outcomes. The quality outcome–driven metrics for clinical care are as follows: completion and integration of an obstetrical high-risk tool, reduction in the primary C-section rate to 20% or less, full clinical application of 17P in the treatment of premature labor and prematurity, and no elective induction of labor before the 39th week of gestation. Additionally, obstetricians are expected to integrate care/case managers as clinical partners in managing complicated cases. This concept turns case management right side up by expanding simple telephonic case management to a more clinically aggressive, in-the-home/on-the-street style of patient support. PMH providers will also receive some relief from prior authorization for obstetrical ultrasonography; however, the clinical imaging study will still require online registration to facilitate payment.

Each PMH is locally managed through joint agreements between the local provider, Community Care of North Carolina (CCNC), and the local health department care/case management group. Payment for the obstetrical provider is managed through an enhanced fee-for-service arrangement, with incentives based on full cooperation in the coordinated care program and outcome-driven metrics.

Care/case managers are paid on a per-member per-month arrangement, with the population of childbearing women as the denominator of the equation. The objective of using this population base is to have the care/case management group proactively seek out pregnant women in the community population to be enrolled early with an obstetrical provider. Local health departments have outcome met-

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rics that measure their effectiveness at the local level. Care/case managers also have accountability measures, which include increasing the number of pregnant women with positive risk-screen findings (ie, risk factors associated with adverse pregnancy outcomes) who enter the case management system by 3% annually, until a rate of 95% is achieved; increasing the number of pregnant women meeting CCNC priority criteria who undergo risk screening by 3% annually, until a rate of 95% is achieved; increasing the postpartum visit rate by 3% annually for patients who receive pregnancy care management services or whose infant was admitted to the neonatal intensive care unit; increasing the percentage of women who receive the 17P injections they are eligible to receive by 5% annually, until a rate of 90% is achieved; and increasing the percentage of PMH patients who receive pregnancy care management services, are referred for a family planning waiver, or receive full Medicaid coverage, until a rate of 95% is achieved. All of the selected quality metrics are tracked by the local provider, using claims data and chart surveillance. The local Area Health Education Center program provides annual in-office/clinic chart reviews to confirm the quality standards for each provider.

The PMH concept is a financially neutral program for the state. There is no new money in the program, and any enhanced payment to obstetrical providers is derived from the savings created by providing a higher standard of obstetrical care, by reducing any unnecessary care, and by converting obstetrical care into a clinically driven team process. There is no consideration in the PMH financial model of the subsequent future savings generated by reducing obstetrical complications and prematurity, or that created by delivering healthier newborn infants. This collateral benefit will eventually be seen in the reduced clinical damage to fewer premature children and the reduced subsequent health care costs that they would potentially incur.

The PMH model leverages the well-proven medical-home concept developed by CCNC during the past 15 years. The CCNC partnership with local primary care providers, local hospitals, and community-based health departments sets the pattern for the local management of obstetrical care through the PMH process. The introduction of the PMH is designed to bring more qualified obstetrical providers into this clinically driven medical-home system, as well as to improve obstetrical care standards across the state, as it moves the Medicaid program closer to its stated goal of being a value-added organization.

Porter and Teisberg [4p155] consider value as "health outcomes achieved per dollar of cost compared to peers." Just being competent is not enough. Value is delivering superior clinical results in a transparent environment where clinical data are shared and are mutually considered. Success can no longer be measured by income or by the volume of patients processed. In fact, there is sufficient evidence to suggest that patient value "can only be measured at the level of medical conditions" [4p155], as it is "assessed relative to peers" [4p156]. Balance in health care delivery is not achieved by comparing one competent, high-quality provider with a mediocre provider. Philosophically and practically, balance is achieved when all providers in a system of care achieve a high level of performance, generally in the 95th percentile [4].

The value-added PMH model does not ignore the financial impact on the provider or the state. In fact, the program demonstrates that Medicaid can pay the obstetrical providers a higher rate for obstetrical services because the outcome-driven metrics "pull" clinical improvements along. Limiting C-section costs, reducing neonatal intensive care expenses, and capturing savings by restraining collateral damage from poorly managed pregnancies will more than cover the modestly increased rate (unpublished financial projections from the North Carolina Division of Medical Assistance estimate $1.5 millions in savings for fiscal year 2012 and $9.9 million in saving for fiscal year 2013). More importantly, every thoughtful practitioner knows that, by keeping a pregnancy closer to normal, the newborn will be better off now and in the future. It then becomes clearer how, by using the power of the Medicaid program, we will improve the standard of care across North Carolina. NCMJ

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INVITED COMMENTARY

Use of Health Information to Improve Care:
The Southern Piedmont Beacon Community Grant

William F. Pilkington

In 2009, the Office of the National Coordinator for Health Information Technology solicited proposals to participate in the Beacon Community Program. The program is designed to support communities with established reputations for adopting health information technology solutions. This commentary reviews Community Care of Southern Piedmont, a Beacon Community Program in North Carolina.

The nation is rapidly moving toward health information technology (IT) as the foundation for improving the health of its citizens. A major initiative of the Office of the National Coordinator for Health Information Technology (ONC) of the US Department of Health and Human Services is to improve this foundation. The ONC established the Beacon Community Program to guide the way to a transformed health care system by supporting efforts to make breakthrough advancements in health care quality, safety, and efficiency, as well as in public health at the community level, and to demonstrate that these gains are sustainable.

The Beacon Community Program seeks to accelerate the adoption of electronic health records (EHRs) and health information exchanges (HIEs) while supporting the "meaningful use" of EHRs and the innovative use of powerful health IT solutions. In May 2010, the Beacon Community Program initially awarded $220 million in funding to support 15 communities, which were expected to have rates of EHR adoption significantly higher than published national estimates. (Two additional grants, totaling $30 million, were awarded in September 2010.) The project period of each cooperative agreement awarded is 36 months.

Community Care of Southern Piedmont (CCSP)

CCSP's proposal. CCSP, located in the south-central North Carolina counties of Cabarrus, Rowan, and Stanly, responded to the ONC's request for Beacon proposals by organizing a contingent of health care providers to participate in the development and submission of a proposal to the ONC. CCSP offers a locally based, private-sector approach to improve health care and contain costs and is an integral component of Community Care of North Carolina (CCNC), an innovative statewide partnership dedicated to improving quality and expanding access to care. CCSP is an independent, nonprofit organization that combines the expertise of primary care physicians, specialists, pharmacists, and other health care professionals to create "medical homes" for Medicaid beneficiaries in Cabarrus, Rowan, and Stanly counties. CCSP is 1 of 14 local networks that compose CCNC.

The core Beacon work group assembled by CCSP included the 3 counties' public health departments; Carolinas Medical Center NorthEast, Rowan Regional Medical Center, and Stanly Regional Medical Center; and, from outside the 3 counties, participants from Duke University Health System, the University of North Carolina (UNC)–Chapel Hill Gillings School of Global Public Health, and the North Carolina Department of Health and Human Services. The point of view taken in the development of the CCSP's proposal was that, to be optimally useful, a Beacon Community Program must be integrated within a broad, statewide program to implement and sustain successful health IT uses beyond the CCSP. The CCSP Beacon project was designed to support a complete process of learning and diffusion of health IT use that repeats the following steps: (1) gather and prioritize candidate models of health IT use; (2) test and validate the models, with involvement from professional providers, patients, lay providers, public health departments, medical researchers, payers, and other stakeholders; (3) deliver high-quality evaluations, supportive intellectual property, and enduring materials in a way that supports sustained replication of successful models and avoidance or refinement of unsuccessful models; and (4) quickly employ the deliverables mentioned above in a broad, statewide diffusion program that leverages the missions of health-centric North Carolina public and private institutions.

Data gathered during the development process for the Beacon grant indicated that Cabarrus and Stanly counties had impressive EHR penetration levels of greater than 80%. The data for Rowan County were not immediately available, so the assumption was that EHR penetration there was close to nil. On the basis of 2008 data, the overall EHR penetration

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level for the CCSP was probably greater than 60% [1].

Initially, the ONC suggested that each Beacon project should focus on implementing and validating a new generation of health priorities identified by recent community health assessments—notably, hypertension, diabetes, congestive heart failure (CHF), ischemic vascular disease/postmyocardial infarction, and asthma—and to improve preventive care. Related cost-efficiency goals focus on reducing the number of preventable hospital readmissions, duplicate imaging tests, and unnecessary emergency department visits. While the specifics of each goal vary, the overall improvement theme is to electronically collect, share, and use the right data in a timely way across the community of providers, patients, and public health entities. The CCSP Beacon project expanded this theme into the community, which already had a high rate of EHR penetration (greater than 60%), to include free clinics, community clinics (including federally qualified health centers), small medical practices, public health departments, school nurses, and parish nurses. This strategy will be implemented in partnership with North Carolina's Regional Extension Center program for "priority providers" and with direct project funding to those who are not incentivized by the meaningful use of an EHR incentive program. The project also seeks to involve patients and consumers and their lay caregivers in seeking these health improvements and cost-efficiencies in multimodal ways. Health IT–supported program elements are planned, to give patients timely electronic access to their health information, tools to make use of this information, and tools to provide new information in cooperation with their care providers. Sharing the right data in a timely way depends critically on having a general electronic HIE mechanism that connects providers, patients, and public health departments. This resulting community HIE will leverage the North Carolina Health Information Exchange services under development and will implement community HIE services where needed.

During the past several months, the project team at CCSP Beacon Community has been laying the groundwork for clinical interventions that will impact hospital readmissions, emergency department visits, and care for diabetes, CHF, and pediatric asthma. This groundwork includes understanding and defining the necessary data requirements for both measurement and proactive health IT interventions. The Beacon requirements for data will increase over time, as interventions and population sets broaden. As such, the project is separated into 4 phases. This project is intended to define, at a high level, the requirements for data and/or a more formal HIE within each of the 4 phases.

During phase 1, CCSP is focused on transitional care and interventions to decrease unnecessary emergency department visits. Data needed for these interventions are limited to hospital data. Currently underway is an admission/discharge/transfer Medicaid feed from the 3 hospitals involved in the Beacon project. This will allow CCSP to alert care managers to an admission or discharge event and will enhance patient-centered medical home (PCMH) follow-up along the care continuum, with a specific focus on the transitional period between acute care stay and discharge back to ambulatory care.

During phase 2, CCSP will focus on PCMH panel management and use ambulatory practice–embedded and office-based care managers. To facilitate success for the PCMH team, these care managers will need access to robust data on patients. Of significance to the Beacon project are the 15 objectives and associated measures, described below, that CCSP is committed to achieve. Currently, the CCSP care managers are limited to claims data, which are not real-time and lack clinical elements that are necessary for chronic disease (ie, diabetes, CHF, and asthma) management and public health interventions. During phase 2, CCSP will also add a complete set of hospital data, which will include a discharge summary, problem list, medication list, and laboratory results. These data will be required for the PCMH team to aid in care coordination, medication reconciliation, and medication adherence.

During phase 3, CCSP will continue to refine the interventions from phase 1 and phase 2, as well as add public health interventions. The 3 public health departments in the participating counties will benefit from viewing available patient data and will contribute to the larger patient health record. In addition, patient data will be deidentified and used for syndromic surveillance and for coordinating larger public health interventions that support the entire population. One feature of the HIE that CCSP will be leveraging is the ability to trigger alerts to public health officials when laboratory results positive for specific conditions are indicated.

During phase 4, CCSP will be refining its processes and will begin to focus on translating its data into knowledge, to effectively demonstrate the project's outcomes and share best practices.

CCSP's Beacon Community Program objectives. Of significance to the Beacon project are the 15 objectives and associated measures that CCSP is committed to improve. Applicable meaningful-use language and detailed definitions for each objective have been developed and can be obtained from the CCSP on request. Broad descriptions of these objectives follow.

Three objectives address hospital admissions and emergency department visits: (1) by June 2011, reduce preventable readmissions, as a percentage of total admissions, among patients enrolled in Medicaid but ineligible for Medicare to 9.4% and maintain that range through the first quarter of 2013; (2) by the third quarter of 2012, decrease nonemergent visits to the emergency department among patients enrolled in Medicaid by 10%; and (3) by the fourth quarter of 2012, decrease the number of asthma-related visits to emergency departments among patients aged 5-17 years to 7.3 visits per 1,000 all-cause visits.

Diabetic patients are associated with 5 objectives: by the fourth quarter of 2011, (1) ensure that 15% or fewer patients have a hemoglobin A_{1c} level of greater than 9%, (2) ensure that 80% of patients aged 18 years and older with hypertension have evidence of filling an angiotensin converting enzyme inhibitor or angiotensin receptor blocker prescription during the previous year, and (3) achieve a relative increase of 10% in the number of patients aged 60 years and older who have received pneumococcal vaccine; (4) by the first quarter of 2012, achieve a relative increase of 10% in the number of patients aged 50 years and older who have received seasonal influenza vaccine; and (5) by the fourth quarter of 2012, ensure that 80% of patients have undergone an annual retinal examination.

Six objectives focus on CHF patients: ensure that (1) 80% of patients aged 18-85 years have a blood pressure of less than 140/90 mm Hg, (2) 90% of patients aged 18 years and older have had a left ventricular function assessment, (3) 80% of patients have evidence of filling an angiotensin converting enzyme inhibitor prescription during the previous year, and (4) 80% of patients with an ejection fraction of less than 40% have evidence of filling a beta blocker prescription during the previous year; (5) by the fourth quarter of 2011, achieve a relative increase of 10% in the number of patients aged 60 years and older who have received pneumococcal vaccine; and (6) by the first quarter of 2012, achieve a relative increase of 10% in the number of patients aged 50 years and older who have received seasonal influenza vaccine.

Conclusion

The CCSP Beacon project has completed its first year. With nearly 2 years left to achieve these 15 significant health improvements, the project is rapidly shifting into the implementation phases (ie, phases 2 and 3) outlined in the project description. Most contractual issues have been settled, baseline measures are in place, telehealth proposals have been solicited, and physician engagement has commenced. Year 2 will demonstrate that powerful health IT solutions can reduce unnecessary hospital use, improve diabetes management, and decrease rates of premature deaths caused by CHF.

The Beacon project has afforded CCSP the unique opportunity to apply technological innovation to longstanding problems associated with population health. The relative success of this and other Beacon projects around the country will become the capstone for determining new ways of coordinating care, improving patient health, and reducing health care costs. NCMJ

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Regional Extension Coordinators:
Use of Practice Support and Electronic Health Records to Improve Quality and Efficiency

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Sam Cykert, Ann Lefebvre

The North Carolina Regional Extension Center for Health Information Technology provides onsite consultation to primary care practices to help them implement electronic health records then use these systems to optimize care through measurement, rapid cycle quality improvement, and application of medical home functionalities. Services are available from all 9 regional North Carolina Area Health Education Centers.

The North Carolina Area Health Education Centers (AHEC) program has established a comprehensive health information technology regional extension center (REC) to support primary care providers and other health practitioners in adopting electronic health records and using this technology effectively. Since the North Carolina AHEC's inception, one of its core missions has been to produce educational programs and other tools that help North Carolina health professionals enhance quality of care and improve health care outcomes. Residency training, continuing education programs, Web-based training, and digital library resources for physicians and other health professionals have all contributed, and continue to contribute, to this mission. Two additional programs have been developed in recent years that have broadened North Carolina AHEC services beyond the training environment and have strengthened its capacity to support health professionals in the delivery of high-quality care to their patients.

Six years ago, the North Carolina AHEC, in partnership with the North Carolina governor's office, Community Care of North Carolina (CCNC), the North Carolina Medical Society, the North Carolina Academy of Family Physicians, The Carolinas Center for Medical Excellence, the North Carolina Division of Public Health, major insurers in the state, and other state agencies, developed a national model to improve care in primary care practices by providing hands-on, ground-level, quality improvement consulting and support in primary care practices throughout the state. North Carolina was chosen to pilot the Robert Wood Johnson–funded Improving Performance in Practice (IPIP) project, which was led by the American Board of Medical Specialties and cosponsored by the certifying American Board of Internal Medicine, American Board of Family Medicine, and American Board of Pediatrics. The intervention supported by the IPIP project involved training quality improvement consultants employed by the North Carolina AHEC program at each of its 9 regional centers to work within individual practices to help them measure accepted indicators of chronic care and identify possible changes in practice work patterns, to optimize this care, and then to rapidly test and fine-tune these changes, to keep improving care.

The IPIP project was initially implemented in 18 practices, and in the ensuing 4 years, it was expanded to more than 150 practices throughout the state. The project demonstrated that real-time electronic tools that provide reminders and track important elements of care, whether disease registries or electronic health records, were needed to improve important outcome measures. However, we also learned that access to data was not enough—even more essential was the presence of a quality improvement consultant to help the practice use the data, build a team approach, maximize work flow, and apply rapid-cycle quality improvement techniques to the organization and the execution of care. As a result, part of the processes of work flow assessment, practice redesign, and implementation of quality improvement strategies was to help practices use electronic health records more effectively, to improve chronic care and the outcomes of the patients they serve. This experience of on-the-ground, practice-by-practice education, combined with work on electronic health records, medical-home concepts, and rapid-cycle quality improvement, prepared the North Carolina AHEC to incorporate this model as the structural architecture for the North Carolina approach to regional extension centers for health information technology, as described in the HITECH portion of the American Recovery and Reinvestment Act. Fortunately, Governor Perdue's office agreed and asked the North Carolina AHEC to lead a partnership with the Carolinas Center for Medical Excellence,

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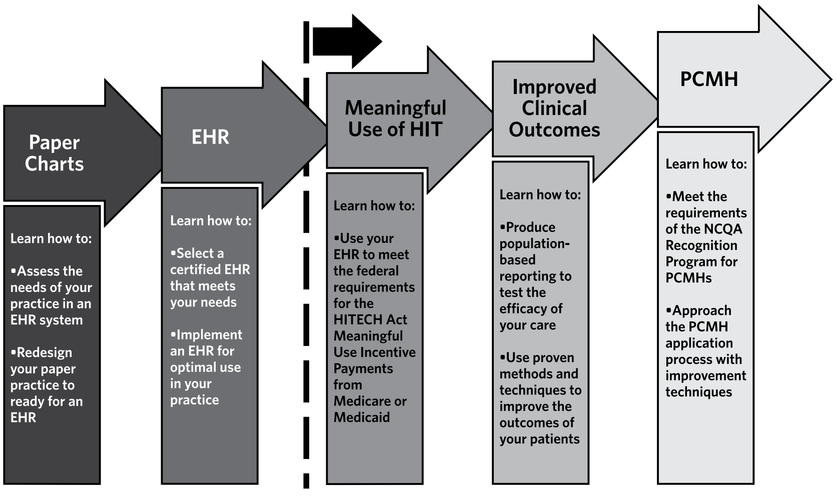
the North Carolina Medical Society Foundation, the North Carolina Institute for Public Health, and others to submit the North Carolina REC application on the basis of the concepts that electronic health records are powerful tools and that the North Carolina REC should be built on a foundation that helps health professionals not only choose these tools but implement them in a manner that achieves the best possible value and health outcomes for North Carolinians.

The North Carolina REC was funded in the first round of HITECH REC awards through the Office of the National Coordinator for Health Information Technology, in February 2010. Our program was designed to leverage the infrastructure of the 9 regional AHECs across the state; the community relationships derived from the North Carolina AHEC health professional training and continuing education programs, now in their fourth decade; and the practice-based model already used by the IPIP project in all the regional AHECs.

Practices are eligible to sign up for REC services at no cost through an online application that can be accessed at our Web site (available at: http://www.ahecqualitysource.com). Currently, priority is given to primary care practices in rural areas, those in urban underserved areas, and those with 10 or fewer health professionals. Figure 1 shows the continuum of services available to each practice participating in the North Carolina REC program. Each regional AHEC has an REC team with 1 or more of the following personnel: (1) a practice support coordinator, who functions as the project manager responsible for the entire electronic health record selection/implementation process within a practice, beginning with a readiness assessment and ending with achievement of meaningful use, as defined by the Centers for Medicare and Medicaid Services; (2) a technical assistance specialist, who serves as a product expert and has the technical knowledge to integrate important electronic health record functions, such as laboratory receipt, e-prescribing, and quality reporting; and (3) the quality improvement consultant, who, as always, works with the physicians and practice staff to use their newly minted electronic tools to measure care parameters, institute quality improvement teams, and help the practice function as a recognized, patient-centered medical home, with the goals of achieving optimal care and health outcomes. Services especially applicable to the adoption of health information technology include help with vendor selection, planning and implementing the electronic health record, analyzing and redesigning practice work flow, instituting best privacy and security practices, resolving postimplementation barriers to achieving meaningful use, and, when a health information exchange is available, establishing functional interoperability and participation in the health information exchange. Note that priority practices that already use an electronic health record are also eligible to join the North Carolina REC program, so that they can upgrade to a certified system then participate in all phases of REC services beyond vendor selection.

We are early in the implementation process and are many months away from being able to demonstrate improved outcomes and cost-efficiencies directly derived from the North Carolina REC program. However, we have learned from our earlier work in the first 150 practices that real-time electronic tools, complemented by the work flow analysis, practice redesign, and quality improvement concepts described above, lead to substantial clinical improvements. For example, when considering the 113,000 diabetes patients cared for by these 150 practices, the number of patients who achieved important outcomes, such as a hemoglobin A_{1c} level of less than 7%, a low-density lipoprotein cholesterol

FIGURE 1.
Continuum of Onsite Educational Services Provided by Practice-Based Consultants From the North Carolina Area Health Education Centers



Note. EHR, electronic health record; HIT, health information technology; NCQA, National Committee for Quality Assurance; PCMH, patient-centered medical home.

level of less than 130 mg/dL, and a blood pressure of less than 140/90 mm Hg, has doubled, while the most-advanced practices have reached levels of care superior to national benchmarks. By extrapolating the "average" results by use of data from the United Kingdom Prospective Diabetes Study, we estimate that 1,000-2,000 lives will be saved in this cohort during the next 10 years [1] and that, additionally, a similar number of microvascular complications, especially the development of nephropathy, will be prevented [1, 2].

As of May 1, 2011, a total of 2,800 health professionals from more than 750 practices, covering more than 3 million patients, have signed up for these services. In the next year, we anticipate these numbers will grow to 4,000 primary care professionals from more than 900 practices, covering more than 4 million patients. North Carolina prevalence statistics suggest that close to 1 million hypertensive patients [3], 400,000 diabetic patients, 320,000 asthmatic patients, and 800,000 smokers [4] will be treated in these practices. With the implementation of electronic health records and the use of simple features such as clinical decision support and point-of-care reminders, the effect on quality of care should be significant [5, 6]. Recent data suggest that incorporation of the quality improvement and medical-home aspects of North Carolina AHEC's services into the culture of practice systems will add to the benefits of electronic health records and will translate into large improvements in preventive and chronic care, while substantially lowering costs [7-9].

As use of health information technology spreads and North Carolina develops its health information exchange capabilities, the combination of clinical and administrative data will more fully define the value of North Carolina REC services to primary care professionals and the patients they serve. However, at this time, we already know that, to achieve the vision of new models of care, the diffusion of electronic health records that can meet the parameters of "meaningful use" is one of the necessary legs on which the "new models" stool must stand. The other 2 legs are the use of real-time data attached to rapid-cycle quality improvement and the incorporation of the principles of a truly systematic medical home. CCNC is working diligently to further enhance its successful medical-home and enhanced care management approach. The North Carolina AHEC program and its partners are delighted to complement these important efforts by developing new and leveraging old practice relationships, combined with on-the-ground educational tools to add an ingredient or two, to help transform traditional practices into these patient-centered health systems that are designed to produce the care coordination, benchmark outcomes, and cost-efficiency that current care systems have yet to accomplish. NCMJ

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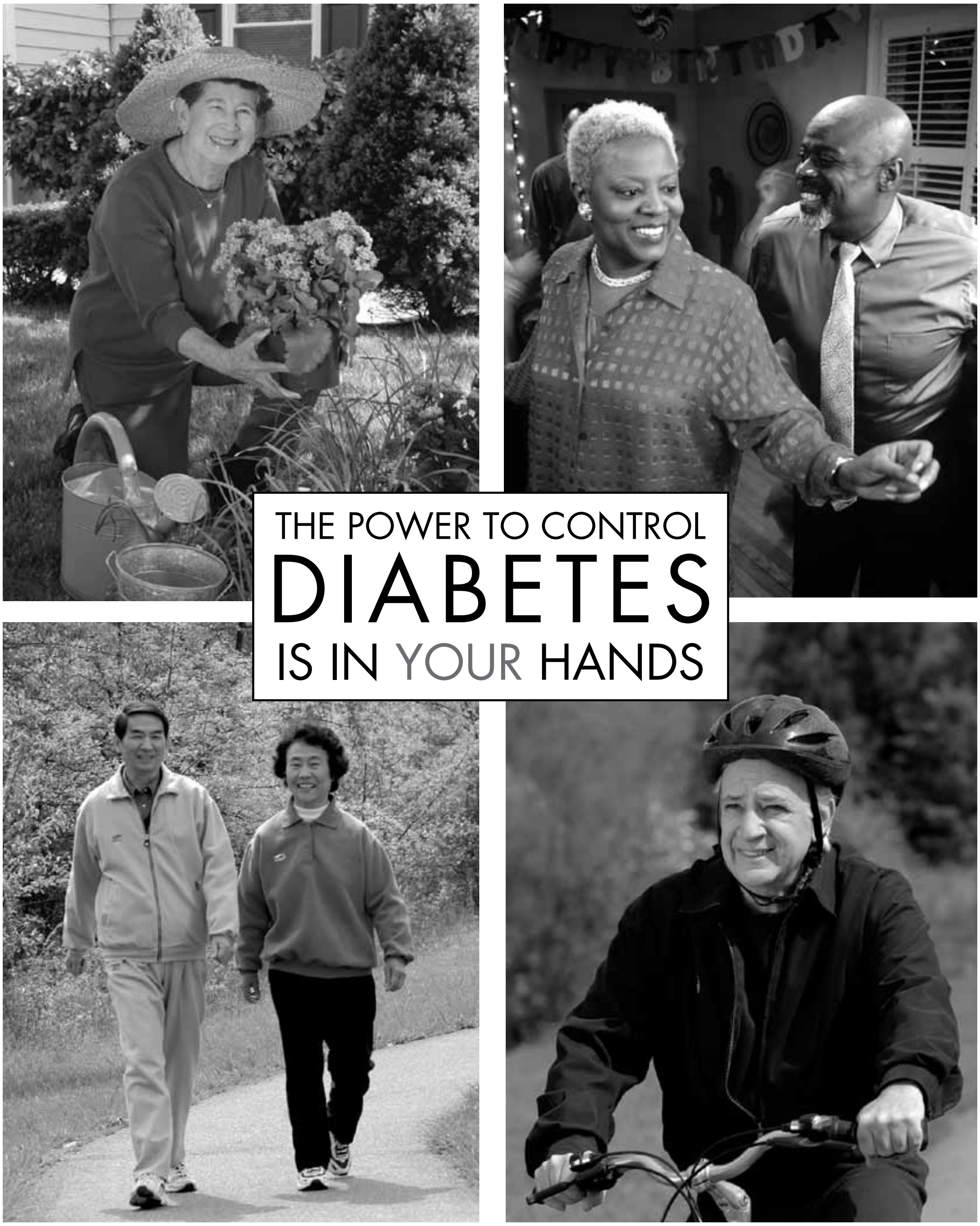
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Running the Numbers

A Periodic Feature to Inform North Carolina Health Care Professionals About Current Topics in Health Statistics

Proximity to National Committee for Quality Assurance Diabetes Recognition Programs Among North Carolinians With Diabetes

Diabetes is a chronic condition affecting approximately 636,000 North Carolinians [1]. With effective management, diabetes can be better controlled and lead to a reduced incidence of poor health outcomes, lower health care costs, and a higher quality of life. [2]. Regular access to a clinician who, with proper training, is delivering care for chronic conditions on the basis of new, innovative models may be limited, however, depending on the circumstances of the patient and the community. The National Committee for Quality Assurance (NCQA) offers a Diabetes Recognition Program (DRP), which recognizes practices achieving certain standards in diabetes care. This article reviews the number of North Carolina residents who live within 20 miles of an NCQA DRP practice.

At the time of writing, there were 739 NCQA DRP practices in North Carolina. The name and address of each practice were accessed from the NCQA Web site [3] and then linked with zip code–level data. Because no reliable small-area estimates of diabetes prevalence appear to have been published, a model of self-reported diabetes prevalence was estimated using data from the 2008 Behavioral Risk Factor Surveillance System survey in North Carolina [1]. Prevalence was modeled on the basis of age, sex, race/ethnicity, income, education level, and residential setting (ie, metropolitan or nonmetropolitan area); all of the factors except residential setting predicted diabetes prevalence. Claritas Pop-Facts 2009 (Nielsen) was used to predict, at the zip code level, the number of individuals with diabetes. These data were compared with the number of NCQA DRP practices in each North Carolina zip code to determine the proximity of diabetic North Carolinians to an NCQA DRP practice. Research previously published in this section of the NCMJ used similar methods to generate small-area estimates of prevalence [4].

Of the 630,000 North Carolinians estimated to have received a diagnosis of diabetes, roughly 192,000 (30%) do not live within 20 miles of an NCQA DRP practice (Table 1, Figure 1). Another 37,000 North Carolinians with diabetes (6%) live within 20 miles of only 1 practice. Vast differences exist across the state, however, and disparities are evident when the population is disaggregated by zip code. Residence in a zip code in a nonmetropolitan setting rather than a metropolitan setting (57% vs 16%), in one with a high rather than low percentage of African American residents (39% vs 20%), in one with a low rather than high average income (42% vs 13%), and in one with a high rather than low percentage of elderly residents (40% vs 17%) were each associated with a greater likelihood of having no NCQA DRP practices within 20 miles ($P < .001$ for each comparison) (Table 1).

The proximity measure used here is a crude indicator of access to practices that provide high-quality diabetes care. Although there are certainly innovative, high-quality practices that are not recognized by the NCQA, the gap in access revealed in this report suggests that there may be gaps in access to high-

FIGURE 1.
National Committee for Quality Assurance Diabetes Recognition Program Practices Within 20 Miles of North Carolina Zip Codes, 2011

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

Note. Data are from [3]. The map was created at the North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina–Chapel Hill.

TABLE 1.
National Committee for Quality Assurance Diabetes Recognition Program Practices Within 20 Miles of Diabetic Residents' Zip Codes, by Zip Code Characteristic

Characteristic	0 practices	1 practice	>1 practice	Total
Overall	192,000 (30)	37,000 (6)	408,000 (64)	636,000 (100)
Residential setting				
Nonmetropolitan	125,000 (57)	5,000 (2)	89,000 (41)	218,000 (100)
Metropolitan	67,000 (16)	32,000 (8)	320,000 (76)	418,000 (100)
Percentage of African Americans				
Low	58,000 (20)	27,000 (9)	205,000 (71)	290,000 (100)
High	134,000 (39)	10,000 (3)	203,000 (59)	347,000 (100)
Income level				
Middle or high	36,000 (13)	18,000 (7)	215,000 (80)	269,000 (100)
Low	156,000 (42)	19,000 (5)	193,000 (53)	368,000 (100)
Percentage of elderly individuals				
Low	46,000 (17)	12,000 (4)	216,000 (79)	274,000 (100)
High	146,000 (40)	24,000 (7)	192,000 (53)	362,000 (100)

Note. Values are no. (%) of diabetic North Carolinians and are rounded to the nearest 1,000. Values were calculated by the author on the basis of data from [1, 3].

quality diabetes care across North Carolina. Furthermore, the gap may understate access, as it considers only the proximity of the practice and does not account for the size of the practice or other factors such as transportation opportunities. For example, practices located outside of metropolitan areas are likely to be smaller and, thus, able to manage a smaller patient panel.

Policy efforts are underway to encourage the deployment of health care practices that are delivering high-quality, innovative, new models of care with the promise of reducing costs and improving outcomes and quality of life. It is important for such policies to consider the distribution of these practices, as well as their total number, to ensure that the promise of innovative solutions can be realized by all populations. **NCMJ**

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Philanthropy Profile

Integrating Substance Abuse Treatment Into the Medical Home

Changes in reimbursement have dramatically altered most outpatient behavioral health care. Today, 50% of all outpatient behavioral health care in the United States is provided in primary care offices, and 67% of all psychoactive medications are prescribed by primary care professionals [1]. Forty percent of patients in primary care present with complaints, such as insomnia and backache, that may have their origin in psychosocial issues [2]. Untreated behavioral health conditions are a crushing burden for patients and families and are costly to both the health care system and the economy.

Recent national studies show that life expectancy for patients with serious mental illness is 25 years less than that for the general US population [3]. Patients with a co-occurring substance abuse condition or alcohol or drug dependency or abuse make up a large subset of patients with mental illness. A 2009 report by the North Carolina Institute of Medicine revealed that "there are more than 250,000 people aged 12 years or older who report illicit drug dependence and more than twice as many...who report alcohol dependence or abuse" [4p15]. Of these, less than 10% and less than 5%, respectively, receive treatment from health care professionals funded through the North Carolina Division of Mental Health, Developmental Disabilities, and Substance Abuse Services. Overall, alcohol and drug abuse cost the North Carolina economy $12.4 billion during 2004 [4].

The growing number of patients with a previously unidentified and/or treated behavioral health, developmental, and substance abuse disorder has both operational and cost implications for health care institutions. In North Carolina emergency departments alone, the number visits by patients with a diagnosis of a behavioral health condition, developmental disability, or substance use disorder increased 11.3% in fiscal year 2007-2008 and 12.4% in fiscal year 2008-2009 [5]. Nationally, up to 60% of trauma patients tested positive for 1 or more intoxicants. Of these, 1 in 4 had a second drug- or alcohol-related injury in the same year [6].

Increasingly, clinical trials of integrated care have resulted in recommendations to "reconnect the mind and the body" to improve patients' health and well-being. In integrated care, medical and behavioral health professionals serve side by side to detect, treat, and manage patients with both medical and behavioral health conditions. The artificial separation of physical health and behavioral health is a result of reimbursement policies and practices that carved out behavioral health from third-party reimbursement and constrained access to substance abuse and behavioral health services. Yet research has repeatedly shown that integrated care is effective in identifying and treating patients with mild-to-moderate psychiatric issues, as well as in helping stable patients with chronic or severe behavioral health issues. Likewise, there is robust evidence that screening, brief intervention, and referral to treatment (SBIRT) is effective in the identification of patients with substance use disorders, the treatment of patients whose use puts them at risk, and the linking of patients with more-problematic use or dependence to specialized substance abuse services. Integrated care recognizes the interdependency between emotion and health behavior, symptoms, and chronic disease. Integrated care is also cost-effective. A 1999 meta-analysis of 91 studies of integrated care showed an average offset of 20% in medical costs when behavioral health was provided with medical treatment [7]. Randomized clinical trials found that integrated care produces improved medication management, reduced severity of depression, improved health status, decreased disability, better occupational function, improved patient satisfaction, and cost-effectiveness [8]. The Massachusetts Department of Public Health reported that implementation of the SBIRT tool, a simple tool for early identification of risky drinking, yielded savings of $4.30 for every $1 spent on emergency department care [9]. Similarly, there are robust cost savings resulting from SBIRT services in other primary care settings.

In 2006, a broad coalition of more than 20 statewide medical and behavioral health associations, state agencies, health care associations, and patient advocacy groups formed the ICARE partnership, under the leadership of the North Carolina Foundation for Advanced Health Programs (NCFAHP). ICARE was funded concurrently by the Kate B. Reynolds Charitable Trust (hereafter, “the Trust”), The Duke Endowment, and AstraZeneca and had the following objectives: prepare primary care practitioners, behavioral health and substance abuse professionals, and their practices to undertake integrated care; fund and support pilot primary care practices testing integrated care; and pursue policies that reduced barriers to integrated care. The pilots were based in multiple primary care settings (ie, pediatric, family practice, and federally qualified health centers) serving diverse patient populations. At the same time, the North Carolina Office of Rural Health and Community Care, with funding from the North Carolina General Assembly, funded 64 grants to Community Care of North Carolina practices to co-locate medical and behavioral health services and 5 reverse co-location grants. At the end of the grant period, the North Carolina Division of Medical Assistance made modifications to allow same-day billing and created access to codes that allow health care professionals to receive payment for evidence-based screenings, SBIRT, and other behavioral health interventions.

During the next 4 years, ICARE created 15 training courses for online and Webinar access, conducted 1,500 training sessions, trained more than 7,000 health professionals, supported 17 pilot programs, provided technical assistance to 54 practices, and successfully lobbied to change policies that impeded integrated care. ICARE adopted or created evidence-based clinical protocols and trainings, algorithms, and patient tools for health care professionals; built a county-level online behavioral health and substance abuse resource listing; and amassed relevant research. Details about these efforts are accessible at the ICARE Web site (available at: http://www.icarenc.org). In 2010, the NCFAHP received a contract from the Division of Medical Assistance to extend ICARE’s work further across the health system, transforming ICARE into the North Carolina Center of Excellence for Integrated Care.

TABLE 1.
Kate B. Reynolds Charitable Trust Substance Abuse Integration–Funded Cohort, May 2010

Organization	County	Tier 1[a]	Type of model
CenterPoint Human Services	Forsyth	Yes[b]	Co-location
BAART Community HealthCare	Durham	No	Integration
Community Clinic of Rutherford County	Rutherford	Yes	Co-location
Bakersville Community Medical Clinic	Mitchell	Yes	Integration
Duke University	Durham	No	Co-location
Gaston County Health Department	Gaston	No	Integration
Johnston County Mental Health Center	Johnston	No	Co-location
Guilford Adult Health	Guilford	No	Integration
SouthLight	Wake	No	Co-location
Rural Health Group	Halifax	Yes	Integration
Wilkes County Health Department	Wilkes	Yes	Co-location
Wilmington Health Access for Teens	New Hanover	No	Integration
Dare County Health Department	Dare	No	Co-location/reverse integration
Coastal Horizons Center	New Hanover	No	Reverse integration

Note. See the end of the body text for a description of the types of models.
[a] Thrive in North Carolina (available at: http://www.thrivenc.org) defines tier 1 counties as counties with the poorest economic well-being and tier 3 counties as those with the greatest economic well-being.
[b] Project is in tier 1 (Rockingham) and tier 2 (Stokes) counties.

On the basis of the early success of ICARE, the Trust further expanded its behavioral health agenda to include the integration of substance abuse care. In 2008, the Trust, the Governor's Institute on Alcohol and Substance Abuse, and the Division of Mental Health, Developmental Disabilities, and Substance Abuse Services funded the NCFAHP to perform a pilot study of the integration of substance abuse services into primary care. The pilots tested the efficacy of the SBIRT model for patients with substance abuse issues in eastern North Carolina through 2 federally qualified health centers, the East Carolina University Family Medicine Clinic and the Brody School of Medicine. Year 1 results were highly promising: clinics introduced screening tools, secured staff buy-in, and changed office policies and procedures. Clinics learned to identify patients with substance abuse conditions, to intervene effectively for most patients at the clinic, and to refer patients with more severe conditions to specialty substance abuse services.

To extend the number of primary care and behavioral health clinics integrating substance abuse and primary care services, the Trust approved a request for applications in 2010 for substance abuse integration projects conducted within or in affiliation with a medical home. The Trust sought projects that would demonstrate best practices, as identified in the 2009 North Carolina Institute of Medicine report [4], and that assured innovation, cross-sector collaboration, and/or potential for replication. Response to the request for applications was strong, with broad representation across the state. Applications featured various models, including co-location, in which the behavioral health practice is located in but remains separate from the primary care practice; reverse co-location, in which primary care services are co-located in a behavioral health practice, a model particularly effective for patients with severe and persistent mental illness; integration, in which the behavioral health professional is integrated into the staff of the primary care practice; and reverse integration, in which the primary care professional is integrated into the staff of the behavioral health practice.

The Trust funded 14 proposals, totaling $1,657,925, in June 2010. Thirteen projects focus on treatment, and the other project focuses on prevention (Table 1). The Trust has formed this new cohort of grantees into a learning collaborative, to share strategies and successes and to better advance our knowledge about effective integrated practice. The Trust looks forward to sharing the results of its newest endeavor to advance the goal of reconnecting the mind and the body. **NCMJ**

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SPECIAL REPORT

North Carolina Surgical Workforce Trends

Stephanie T. Poley, Elizabeth K. Walker, Jessica C. Lyons, Vann R. Newkirk, Kristie Thompson

Between 1997 and 2008, the number of general surgeons in North Carolina increased and shifted demographically, geographically, and by specialty. However, surgeon numbers—overall and by specialty—do not appear to have increased as quickly or to have shifted in the same ways as North Carolina's general population.

Surgical Workforce and Population Growth

In 2008, there were approximately 4,000 active, in-state, nonfederally employed surgeons licensed to practice in North Carolina. Growth of the state's surgical workforce lagged behind growth of the general population between 1997 and 2008. Consequently, the overall ratio of the 2 groups decreased from 45.7 surgeons per 100,000 population in 1997 to 44.2 surgeons per 100,000 population in 2008. The decreasing ratio of surgeons to general population is a national phenomenon, and the ratio in North Carolina was on par with the national value in 2008 [1, 2].

Although the ratio of surgeons to population decreased during 1997-2008 in North Carolina, the absolute number of surgeons grew in most surgical specialties. Thoracic surgeons and orthopedic surgeons showed the greatest absolute increases. A relative increase in general surgeons was also observed in the state, with 9.5 practitioners per 100,000 population in 2008, compared with 6.4 per 100,000 in 1997. The latter finding differed from the national trend during the same period, which reflected a decreased ratio of general surgeons per population [1, 2].

Geographic Distribution of the Surgical Workforce

The geographic distribution of surgeons shifted considerably during 1997-2008, leaving many North Carolina counties with no surgeons. More than half of all counties in North Carolina experienced a decrease in the surgeon-to-population ratio between 1997 and 2008, and 19 of 100 counties lacked a surgeon by 2008 (Figure 1). Fifty-seven counties had fewer surgeons per capita in 2008 than in 1997, including 5 rural counties (Anson, Hoke, Swain, Warren, and Washington) that lost all of their surgeons. In total, 81 of North Carolina's 100 counties had at least 1 surgeon in 2008, although general surgeons were practicing in only 75 counties.

Although the ratio of surgeons to population decreased in both urban and rural North Carolina counties, the ratio in rural areas decreased disproportionately to the ratio in urban areas (Table 1). In 2008, only 20% of North Carolina surgeons practiced in one of the state's 65 rural counties, whereas 31% of the state's population resided in rural counties.

Twenty-three urban counties and 34 rural counties had fewer surgeons per capita in 2008 than in 1997. Of the 19 counties with no surgeons by 2008, 16 were rural, whereas 2 other rural counties that had no surgeons in 1997 acquired at least 1 by 2008 (Figure 2). During this shift, 27 counties experienced gains in the surgeon-to-population ratio, of which 18 were rural.

Changes in the Number of Surgeons, by Specialty

Between 1997 and 2008, 10 of the 11 surgical specialty groups [5] experienced growth in their workforce; the only specialty that did not experience growth—otolaryngologic surgery—decreased by 6%, from 255 to 241 surgeons. Although the number of surgeons in each of the 3 largest surgical specialties (ie, general surgery, orthopedic surgery, and obstetric and gynecologic surgery) expanded considerably during 1997-2008, the number of general surgeons grew at a smaller percentage than that for the other 2 specialties. Specifically, the number of general surgeons grew by 14%, from 746 to 853 practitioners; the number of obstetric and gynecologic surgeons grew by 17%, from 946 to 1,108; and the number of orthopedic surgeons grew considerably, by 32%, from 513 to 679.

Large percentage increases were observed for several specialties during 1997-2008, although many continue to have a small number of practitioners (ie, <100). For example, the number of thoracic surgeons expanded by 39%, the largest percentage growth across all specialties, yet only 16 more thoracic surgeons were practicing in 2008 than in 1997.

Demographic Characteristics of the Surgical Workforce

As the number of surgeons grew between 1997 and 2008, the demographic characteristics of the surgical workforce underwent significant changes. The proportion of

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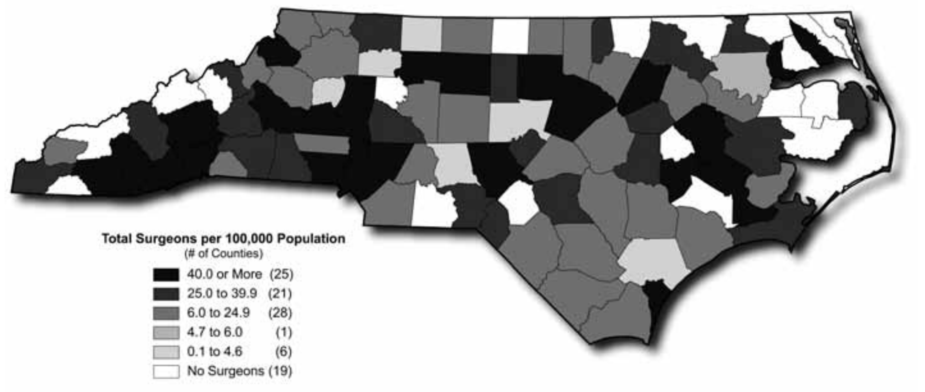
0029-2559/2011/72322

FIGURE 1.
Total Surgeons per 100,000 Population, North Carolina, 2008



Note. Data are from the North Carolina Health Professions Data System [3], derived from the North Carolina Medical Board, 1997 and 2008; and from the Area Resource File [4], 2010. Data are for licensed physicians practicing in North Carolina as of October 31, 2008, who are younger than 70 years and have a self-reported primary specialty or surgical subspecialty. The map was produced on August 3, 2010, by the American College of Surgeons Health Policy Research Institute, Cecil G. Sheps Center for Health Services Research, University of North Carolina–Chapel Hill.

female surgeons increased from 10.3% to 18.9%. Whereas the female surgical workforce experienced steady growth during the study period, the minority surgical workforce underwent its greatest increase between 1997 and 1999, with slower growth afterward. The mean age of the surgical workforce remained fairly steady, ranging from 46-48 years, during the study period.

Training Characteristics of the Surgical Workforce

The number of surgeons in North Carolina who trained at in-state medical schools decreased slightly during the study period. In 1997, 29.3% of surgeons licensed in North Carolina had attended medical school in the state. By 2008, the proportion had decreased to 27.3%. Conversely, the percentage of surgeons who completed residency training in North Carolina increased slightly, from 26.6% in 1997 to 27.4% in 2008, peaking at 29.5% in 2006.

Surgical residency programs in North Carolina are located in 7 North Carolina hospitals. In 2008, there were 660 residents in residency programs for surgical specialties, up from 592 in 1997. More than half of surgical residents were trained at the state's 2 largest academic medical centers, Duke University School of Medicine and the University of North Carolina–Chapel Hill School of Medicine, and data showed very little change in the location of residents over time.

TABLE 1.
Surgeons per 100,000 Population, by Specialty and Rural-Urban Status, North Carolina, 1997 and 2008

	Rural		Urban	
Surgical specialty	**1997**	**2008**	**1997**	**2008**
General	6.75	5.27	8.85	7.85
Nongeneral	16.6	16.5	30.4	29.4
Overall	23.4	21.8	39.3	37.8

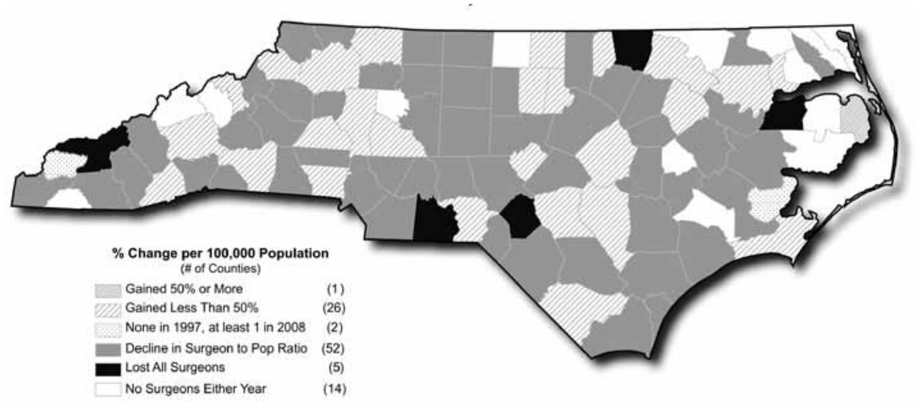
Note. Data are from the North Carolina Health Professions Data System [3], derived from the North Carolina Medical Board, 1997 and 2008; and from the Area Resource File [4], 2010.

Implications

North Carolina's supply of surgeons has grown in the past decade, but it has not kept pace with the growth in the state's general population. Additionally, the growth rate in the number of general surgeons lags behind that for several other surgical specialties, a trend that has implications for access to basic surgical services, particularly in rural areas, which often rely on general surgeons.

The demographic characteristics of surgeons practicing in North Carolina reflect demographic shifts taking place among surgeons across the country, with higher numbers of women and minorities entering the surgical workforce. Although North Carolina's teaching hospitals increased the number of surgeons in residency training between 1997 and 2008, this growth was smaller than the expansion of the state's surgeon supply and the state's overall population during the same period. Research by Charles and colleagues [6] highlighted the need to expand capacity within the national residency training system, to produce more surgeons and alleviate the shortage in the general surgery workforce. However, it is important for state policymakers to carefully assess the value of additional residency training slots at state-supported training sites. Our data suggest that a decreasing percentage of surgeons practicing in North Carolina trained at a North Carolina medical school or residency program. However, it is unclear whether this is due to the departure of surgeons trained in North Carolina or to an influx of surgeons trained elsewhere.

FIGURE 2.
Percentage Changes in Surgeons per 100,000 Population, North Carolina, 1997-2008



Note. Data are from the North Carolina Health Professions Data System [3], derived from the North Carolina Medical Board, 1997 and 2008; and from the Area Resource File [4], 2010. Data are for licensed physicians practicing in North Carolina as of October 31, 2008, who are younger than 70 years and have a self-reported primary specialty or surgical subspecialty. The map was produced on August 3, 2010, by the American College of Surgeons Health Policy Research Institute, Cecil G. Sheps Center for Health Services Research, University of North Carolina–Chapel Hill.

Data and Methods

Physician data from 1997-2008 were obtained from the North Carolina Health Professions Data System (HPDS) for analysis [3]. Physician data in the HPDS are derived from the North Carolina Medical Board's licensure files. Included in this analysis were practicing, licensed physicians younger than 70 years with a self-reported primary specialty in a recognized surgical specialty; individual surgical specialties were clustered into specialty groups. Data on surgeons in postgraduate medical training programs were analyzed separately from data on all other licensed surgeons. Descriptions of surgical specialty categories and additional methods used in this analysis are available elsewhere [5]. Population data from 1997-2008 were obtained from the Area Resource File, which is produced by the US Department of Health and Human Services Health Resources and Services Administration [4]. NCMJ

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Acknowledgments

Potential conflicts of interest. All authors have no relevant conflicts of interest.

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ERRATUM

An error appeared in an article published in the January/February 2011 issue of the NCMJ (Silbajoris C. Behavioral health services, projects, and programs available to North Carolina military personnel and their families. N C Med J. 2011;72(1):61-65). On page 64, the telephone number for United for Health should read "252-808-5878" (not "252-808-5978"). The author regrets this error.

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