July/August 2013
Volume 74, Number 4
www.ncmedicaljournal.com

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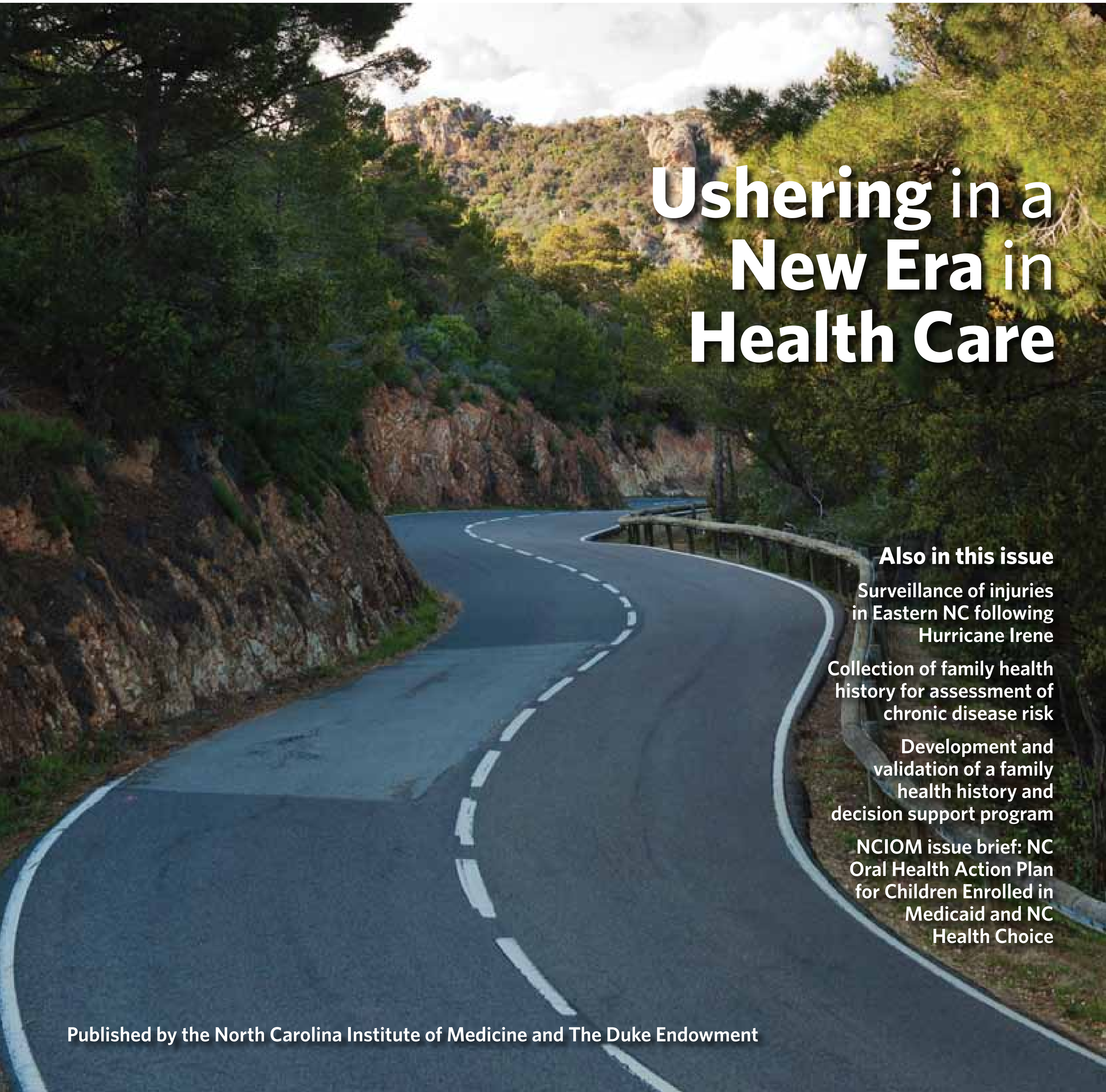
NORTH CAROLINA MEDICAL JOURNAL

a journal of health policy analysis and debate



Ushering in a New Era in Health Care

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Collection of family health history for assessment of chronic disease risk

Development and validation of a family health history and decision support program

NCIOM issue brief: NC Oral Health Action Plan for Children Enrolled in Medicaid and NC Health Choice

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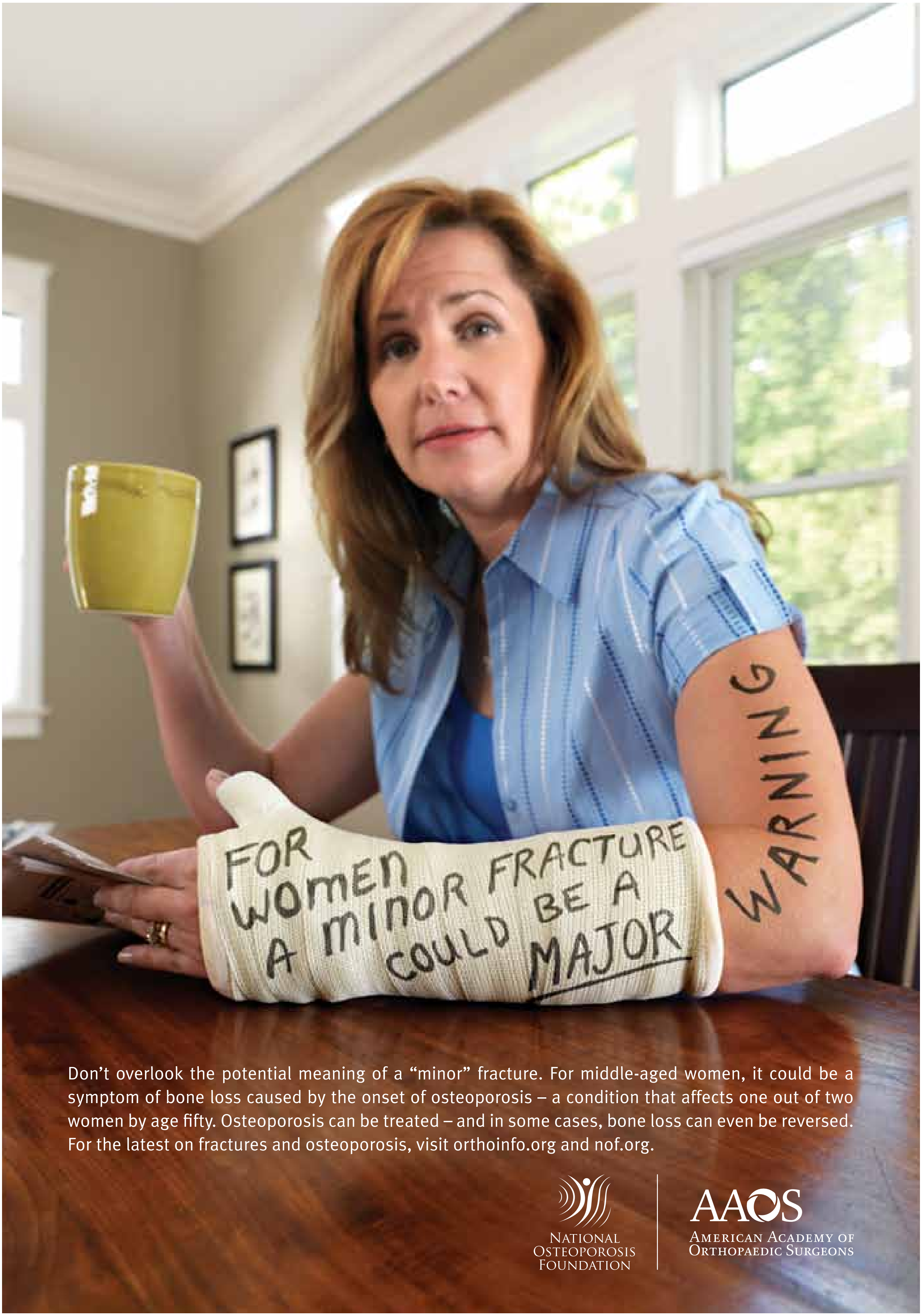
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A minor FRACTURE
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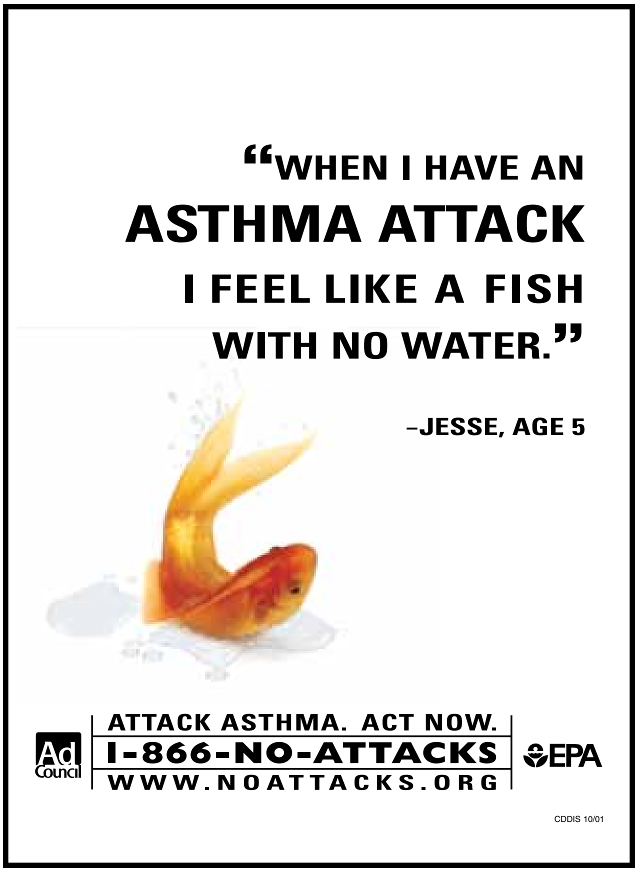

Publishers of the *North Carolina Medical Journal*

The North Carolina Institute of Medicine

In 1983 the North Carolina General Assembly chartered the North Carolina Institute of Medicine as an independent, quasi-state agency to serve as a nonpolitical source of analysis and advice on issues of relevance to the health of North Carolina's population. The Institute is a convenor of persons and organizations with health-relevant expertise, a provider of carefully conducted studies of complex and often controversial health and health care issues, and a source of advice regarding available options for problem solution. The principal mode of addressing such issues is through the convening of task forces consisting of some of the state's leading professionals, policymakers, and interest group representatives to undertake detailed analyses of the various dimensions of such issues and to identify a range of possible options for addressing them.

The Duke Endowment

The Duke Endowment, headquartered in Charlotte, NC, is one of the nation's largest private foundations. Established in 1924 by industrialist James B. Duke, its mission is to serve the people of North Carolina and South Carolina by supporting programs of higher education, health care, children's welfare and spiritual life. The Endowment's health care grants provide assistance to not-for-profit hospitals and other related health care organizations in the Carolinas. Major focus areas include improving access to health care for all individuals, improving the quality and safety of the delivery of health care, and expanding preventative and early intervention programs. Since its inception, the Endowment has awarded $2.9 billion to organizations in North Carolina and South Carolina, including more than $1 billion in the area of health care.

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The *North Carolina Medical Journal* is published in January/February, March/April, May/June, July/August, September/October, and November/December. Periodicals postage paid at Morrisville, NC 27560 and at additional mailing offices. **POSTMASTER:** Send address changes to the *North Carolina Medical Journal*, 630 Davis Drive, Suite 100, Morrisville, NC 27560. **Canada Agreement Number:** PM40063731. Return undeliverable Canadian addresses to: Station A, PO Box 54, Windsor, ON N9A 6J5, e-mail: returnsil@imex.pb.com.

Cosponsors of the *North Carolina Medical Journal* are The Carolinas Center for Medical Excellence / North Carolina Dental Society / North Carolina Health Care Facilities Association / North Carolina Hospital Association / North Carolina Medical Society
Members of these organizations receive the *North Carolina Medical Journal* as part of their membership fees. Additional major funding support comes from **The Duke Endowment.**

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Published by the North Carolina Institute of Medicine and The Duke Endowment

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ISSUE BRIEF

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FROM THE NCIOM

Reader Services

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Official Message from the U.S. Department of Health and Human Services

Win or lose, what matters is being part of the team.

Health insurance gets them in the game.

Your state has a free or low-cost health insurance program for kids. Your child will be able to get doctor and dentist visits, vision and hearing care, hospital care, mental health services, regular check-ups and shots and needed treatment, including prescription drugs.

Generally, a family of four with an income up to $45,000 a year can get their kids covered. Even if you've been turned down in the past, you may be able to get health coverage for your child now.

Call or go online today for information to get your kids covered and get them in the game.

Get Covered.
Get in the Game.

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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

Grace Emerson Terrell, MD, MMM

As a physician and the president and chief executive officer of Cornerstone Health Care, Grace Terrell is acutely aware of the problems plaguing the US health care system—high costs, low quality, and poor outcomes. Although Cornerstone operated successfully under a fee-for-service model for many years, the system left much to be desired; rather than being free to care for patients, Terrell felt that she and other health care providers were being undermined by a broken system. By 2010, she and the other physician-leaders of Cornerstone recognized that a crisis point had been reached, and they resolved to transform Cornerstone into an accountable care organization (ACO).

With Terrell at the helm, Cornerstone charted a course to transition from a fee-for-service payment model to a value-based system; as an ACO, Cornerstone's reimbursement would be based not on the number of treatments performed but on both the quality and the cost of the services provided. While most would agree that this goal is laudable, navigating such a transition is an upstream struggle against the currents of health care markets that are resistant to change.

Successfully undertaking this transition required getting everyone at Cornerstone rowing in the same direction—no easy task for a practice with more than 370 providers. As Terrell noted, "Everyone knows this is where we need to go, but you have substantial execution risk: How do you survive and thrive during the transition period? You have to change quickly to get to the other side with a sustainable model." To win the support of the practice's physicians, Terrell employed a strategy of focusing on the patient. "When you focus on what is good for patients and make it about the patients," Terrell explained, "then you are also getting at what is best for doctors." [Editor's note: For more details about how Cornerstone transformed itself into an ACO, see the commentary by Terrell on pages 334-337.]

Today, 100% of Cornerstone's commercial and governmental contracts have value-based reimbursement. With Cornerstone's low costs per patient, the practice is outperforming benchmarks and its peers in the Medicare Shared Savings program, and in 2012 Cornerstone won the *Success Story Award* from Press Ganey for its outstanding levels of patient satisfaction. Cornerstone was also named a *2013 Best Employer in North Carolina* by Business North Carolina, the Society for Human Resource Management (SHRM) – NC State Council and Best Companies Group.

Members of the state's medical community have taken notice of Terrell's efforts. Melanie Phelps of the North Carolina Medical Society explains that throughout Cornerstone's transformation, Terrell "motivated, challenged, and inspired her fellow physicians and other health care professionals within and outside of her practice to see the benefits of working together to be the agents of positive change, to eliminate waste from the system, and to improve the health and health care experience of patients everywhere."

While transitioning from a fee-for-service model to a value-based system remains an uncertain and risky challenge, Terrell and Cornerstone Health Care have mapped a course that others in North Carolina can follow. Thanks to her leadership, North Carolinians are already beginning to reap the rewards of better health outcomes from low-cost, high-quality care. **NCMJ**

Andrew Olson, North Carolina Institute of Medicine, 630 Davis Dr, Ste 100, Morrisville, NC 27560 (anolson@unc.edu).

N C Med J. 2013;74(4):271.

0029-2559/2013/74417

ORIGINAL ARTICLE

Surveillance of Injuries in Eastern North Carolina Following Hurricane Irene Using Emergency Department Data

James A. Miller, Gregory D. Kearney, Scott K. Proescholdbell

OBJECTIVE Our objective was to characterize nonfatal injuries, by age groups, that were seen in emergency departments (EDs) in 29 selected counties in Eastern North Carolina following Hurricane Irene.

METHODS A descriptive evaluation using data from the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) was performed to identify the numbers and types of nonfatal injuries among individuals who sought treatment at hospital EDs. Percentages of reported ED visits related to external injuries in the 7 most severely impacted counties were compared with results in the entire 29-county region and with data from a reference period in 2010.

RESULTS The total number of individuals who sought treatment at an ED for an external cause of injury was 22.3% greater during the week following Hurricane Irene than during the 2010 reference week. In the 29-county region, the increases were primarily due to falls; in the 7-county region, they were primarily due to cutting and piercing incidents. Following the storm, injuries related to falls, adverse effects of health care, or being struck by an object accounted for higher proportions of injury-related ED visits in the 7-county disaster region than in the 29-county region.

LIMITATIONS The inability to identify the patient's home address and the county where treatment was sought was a spatial limitation. Furthermore, data for urgent care visits, primary care doctor visits, and injuries treated at home were not included. Additionally, cautious inference should be made to distinguish between injuries that occurred as a direct result of the storm and those that occurred incidentally.

CONCLUSION Data from NC DETECT can be used to estimate the most common types of injuries seen in EDs following a natural disaster.

On August 27, 2011, Hurricane Irene, a storm with sustained winds of 85 miles per hour, made landfall on the Outer Banks of North Carolina, producing floods and causing property damage totaling approximately $71 million dollars [1]. Following the storm, Beaufort, Carteret, Craven, Dare, Hyde, Pamlico, and Tyrrell Counties were recognized as the most severely affected counties in the state, and they received federal disaster declarations [2]. Thousands of individuals throughout Eastern North Carolina had to deal with destroyed homes, power failures, fallen trees and limbs, flooded roads, and other adversities. Many residents engaged in cleanup activities, thereby increasing their risk of being physically harmed or even killed. As a result, individuals experiencing acute injury or illness sought treatment from health care providers, including hospital emergency departments (EDs). Individuals living in rural, isolated areas or areas with limited access to care may have cared for their injuries at home or sought care at a doctor's office or urgent care clinic. Nevertheless, characterizing the types of injuries seen in EDs following a natural disaster is important and may aid in developing strategies for targeted prevention efforts in the future [3]. Previous studies that have evaluated injuries and illnesses following hurricane events have reported an increase in the number of hospital ED visits [4-7]. Primary injuries reported following Hurricane Katrina (2005) included falls, bites or stings, motor vehicle crashes, toxic exposures, and poisonings [8]. In a study in Eastern North Carolina following Hurricane Floyd, 20 hospitals reported that they had treated orthopedic and soft tissue injuries as well as respiratory and gastrointestinal illnesses [9].

As public health researchers and practitioners from East Carolina University and the North Carolina Department of Health and Human Services, we decided to study the impact of Hurricane Irene on our state. Given the vast amount of physical destruction and potential for human harm created by Hurricane Irene, we chose to investigate ED visits associated with injuries surrounding the landfall date of the hurricane—August 27, 2011. Our study focuses on the affected area of the 29-county catchment region, which consists of counties located primarily in the extreme eastern part of North Carolina (see Figure 1). This area is predominantly rural and impoverished, and a large majority of the inhabitants have limited access to common services, including health care facilities [10]. Several counties within the 29-county region rank as having the highest mortality and morbidity rates in North Carolina. The region has therefore been targeted by the Brody School of Medicine at East

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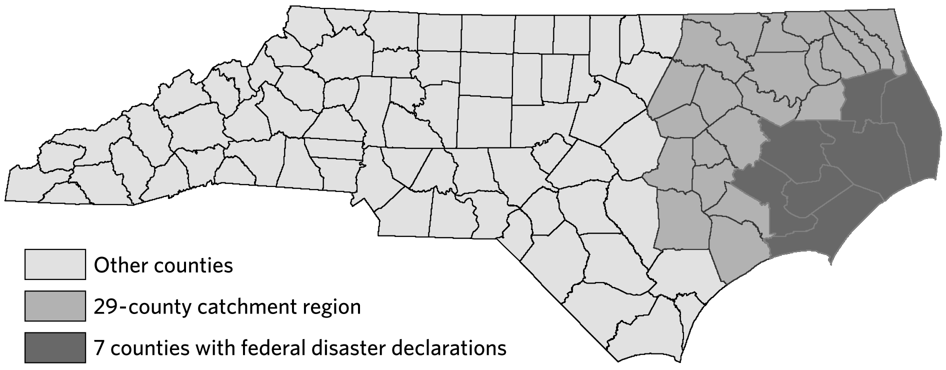
0029-2559/2013/74401

FIGURE 1.
Map Showing the 29 Counties in Eastern North Carolina That Were Most Affected by Hurricane Irene and the Subset of 7 Counties That Were Declared Federal Disaster Areas



Note. The 7 counties that were declared federal disaster areas are included in the 29-county catchment region.

Carolina University as a primary service area for health and medical improvement.

Given the breadth and severity of damage to the region, the objective of our project was to characterize the nonfatal patient injuries reported by EDs in Eastern North Carolina following the storm. ED data was stratified by age groups and by types of injuries to detect any unique patterns or trends. Results and information from this assessment can be used to evaluate additional health impacts of the storm and may offer health care providers and county emergency managers more specific information that can help them to appropriately staff EDs and to issue precautionary safety advisory statements before or during a natural disaster.

Materials and Methods

This study received approval (UMCIRB 11-001137) from the University and Medical Center Institutional Review Board at East Carolina University in December 2011. Data used for this project were obtained using the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). NC DETECT is a surveillance data and reporting system that captures records of EDs affiliated with acute-care civilian hospitals in North Carolina. The ED data in NC DETECT are all secondary data. Hospitals extract their data in near real-time from their respective administrative and clinical electronic databases to allow timely statewide public health surveillance. Medical coding is done by each hospital for its own operational purposes. Each hospital standardizes the data elements using Data Elements for Emergency Department Systems (DEEDS) guidelines prior to transmission to a data aggregator. Data files are received securely by NC DETECT every 12 hours in Health Level Seven (HL7)-like format. HL7 is a widely recognized and implemented standard for the exchange and transmission of health care data. Studies that have used NC DETECT have consistently shown that the data is accurate and reliable for public health surveillance purposes [11-17]. Of the 114 acute-care civilian hospital-affiliated EDs in North Carolina that are open 24 hours per day and 7 days per week, 113 (99%) were reporting data to NC DETECT on a daily basis as of 2010, with data validation every 12 hours [18].

Data from NC DETECT were evaluated for ED visits related to external injuries in all 29 counties in the catchment area, including the 7 aforementioned counties with federal disaster declarations. Topographically, those 7 counties are situated in coastal or tidally influenced areas, making them physically vulnerable to flooding, particularly from heavy rainfall events. Larger increases in the number of injuries relative to the 2010 reference week and relative to the week before the storm were expected in this area. Therefore injuries reported in the entire 29-county region were compared with injuries in the 7 disaster counties. All 29 counties in the catchment area were approved for federal financial assistance to help recover costs of emergency protective measures provided by local governments [2]. This provided confirmation that individuals in these counties had a higher probability of being affected by the hurricane. Those 29 counties, which are shaded on the map in Figure 1, are Beaufort, Bertie, Camden, Carteret, Chowan, Craven, Currituck, Dare, Duplin, Edgecombe, Gates, Greene, Halifax, Hertford, Hyde, Jones, Lenoir, Martin, Nash, Northampton, Onslow, Pamlico, Pasquotank, Perquimans, Pitt, Tyrrell, Wayne, Wilson, and Washington. The 7 counties with the darkest shading are those that received the federal disaster declarations.

Patients were included in this study if their visit to an ED at an acute-care civilian hospital resulted in a diagnosis that was related to an external cause of injury. Specifically, the diagnosis needed to have an International Classification of Disease, 9th Revision, Clinical Modification (ICD-9 CM) E-code in the grouping E000 through E030 or E800 through E999. The listed E-code grouping framework for codes E800 through E999 was based on the Web-Based Injury Statistics Query and Reporting System (WISQARS) injury matrix coding. WISQARS is an interactive online database maintained by the Centers for Disease Control and Prevention; injury codes assigned to each category are publicly available [19]. Causes of injury that accounted for less than 1% of the total number of injuries were added to a category labeled "other/unspecified" and are not reported. These causes included drowning and submersion, injuries caused by firearms, injuries caused by machinery, injuries to pedestrians not involving motor vehicles, suffocation, self-inflicted injuries and suicide, and injuries resulting from activities related to maintenance and hygiene. ICD-9 CM codes E000 through E030 are not included in the WISQARS framework. These codes accounted for injuries resulting from activities related to maintenance and hygiene at home or in the workplace and accounted for less than 1% of the total number of injuries. These injuries were included in the "other/unspecified" category.

To determine which types or causes of injury were associated with the greatest increases in ED visits following Hurricane Irene, descriptive statistics were generated separately for the 29-county region and for the 7-county region for the period August 1, 2010, through September 30, 2011. After generating descriptive statistics for the entire 14-month period, additional analysis was performed to determine whether the types of injuries reported by EDs differed immediately before and after the storm. Methods characterizing the number and types of ED visits following natural disasters have included descriptive evaluations of morbidity and mortality using comparative time frames of days, weeks, or months prior to the disaster, with similar earlier reference periods [8-9, 20-23]. For this analysis, data were extracted for the week immediately preceding the storm (August 20 through August 26, 2011) and for the week beginning on the date the storm made landfall (August 27 through September 2, 2011). These data were used to compare the proportion of ED visits relating to a specific type of injury during that week with the proportion relating to that type of injury during the reference period, which was the week of August 28 through September 3, 2010. (That week was chosen as the reference period because the dates encompassed the same days of the week—Saturday through Friday—as the 2011 post-storm week.) To determine whether age was a factor in the distribution of injuries, the 5 most commonly reported injuries for the 2011 post-storm week in the 29-county region and in the 7-county region were stratified using age groups (0–11 years, 12–19 years, 20–29 years, 30–39 years, 40–49 years, 50–59 years, 60–69 years, and older than 69 years). ED data were analyzed using IBM SPSS Statistics software (version 19). Pearson's chi-square test and Fischer's exact test were used to evaluate the relative changes in the proportions of various injury types during the post-storm week compared with the 2010 reference week. The 2010 reference week was used for comparison rather than the 2011 pre-storm week because activities performed in preparation for Hurricane Irene during the 2011 pre-storm week could have affected injuries during that time period. Significance was determined at a level of P<.05, and Fischer's exact test was used when counts were below 10 with 1 degree of freedom.

Results

During the 14-month study period, the sample consisted of a total of 112,751 ED visits in the 29-county region. As shown in Table 1, the 5 most common types or causes of injury resulting in ED visits in the 29-county region were falls (40.1%); injuries involving motor vehicles (21.5%); injuries resulting from recreational activities (12.2%); adverse effects of health care, which includes drug side effects and injuries sustained during surgeries or medical procedures (7.3%); and being struck by or against an object (5.9%). In the 7-county disaster region, the most common types or causes of injury were falls (41.9%), injuries involving motor vehicles (16.3%), recreational activities (8.3%), adverse effects of health care (7.5%), and overexertion (6.6%).

During the 2011 post-storm week, there were 2,252 ED visits related to injuries in the 29-county region, resulting in a 22.3% overall increase in the number of injury-related ED visits compared with the 2010 reference week. In the 7-county region, 648 ED visits related to injuries were reported in the post-storm week, compared with 463 such visits in the 2010 reference week, representing an increase of 45% in the number of injury-related ED visits.

When the number of reported injury-related ED visits in the 29-county region in the week preceding Hurricane

TABLE 1.
Types and Causes of Injuries Reported by Emergency Departments in Eastern North Carolina Between August 1, 2010, and September 30, 2011

Type or cause of injury	29-county region[a] Number of injuries (%)	7-county region[b] Number of injuries (%)
Falls	**45,183 (40.1%)**	**11,604 (41.9%)**
All motor vehicles	**24,264 (21.5%)**	**4,504 (16.3%)**
Recreational activities	**13,748 (12.2%)**	**2,307 (8.3%)**
Adverse effects of health care	**8,279 (7.3%)**	**2,085 (7.5%)**
Struck by or against an object	**6,673 (5.9%)**	1,707 (6.2%)
Overexertion	5,459 (4.8%)	**1,816 (6.6%)**
Cut/pierce	3,796 (3.4%)	1,053 (3.8%)
Natural/environmental	3,176 (2.8%)	858 (3.1%)
Poisoning	2,780 (2.5%)	966 (3.5%)
Transport: other	2,078 (1.8%)	517 (1.9%)
Pedal cyclist: other	1,343 (1.2%)	408 (1.5%)
Burns	1,271 (1.1%)	295 (1.1%)
Other/unspecified	34,810 (30.9%)	4,744 (17.1%)
Total	112,751 (100%)	27,692 (100%)

Note. The numbers and percentages of the 5 most prevalent types or causes of injury in each region are in boldface type.

[a] The counties in the 29-county region are Beaufort, Bertie, Camden, Carteret, Chowan, Craven, Currituck, Dare, Duplin, Edgecombe, Gates, Greene, Halifax, Hertford, Hyde, Jones, Lenoir, Martin, Nash, Northampton, Onslow, Pamlico, Pasquotank, Perquimans, Pitt, Tyrrell, Wayne, Wilson, and Washington.

[b] Beaufort, Carteret, Craven, Dare, Hyde, Pamlico, and Tyrrell are the 7 counties that were declared federal disaster areas following Hurricane Irene.

TABLE 2.
The Top 5 Types or Causes of Injuries Resulting in Emergency Department Visits in Eastern North Carolina During the Week Following Hurricane Irene, by Age Group

29-county region
Beaufort, Bertie, Camden, Carteret, Chowan, Craven, Currituck, Dare, Duplin, Edgecombe, Gates, Greene, Halifax, Hertford, Hyde, Jones, Lenoir, Martin, Nash, Northampton, Onslow, Pamlico, Pasquotank, Perquimans, Pitt, Tyrrell, Wayne, Wilson, and Washington Counties

Type or cause of injury	Age group							
	0–11 years Number of injuries (%)	12–19 years Number of injuries (%)	20–29 years Number of injuries (%)	30–39 years Number of injuries (%)	40–49 years Number of injuries (%)	50–59 years Number of injuries (%)	60–69 years Number of injuries (%)	>69 years Number of injuries (%)
Falls	165 (7.3)	163 (7.2)	263 (11.7)	200 (8.9)	149 (6.6)	157 (7.0)	100 (4.4)	106 (4.7)
MVR injuries	42 (1.9)	49 (2.2)	96 (4.3)	66 (2.9)	57 (2.5)	47 (2.1)	22 (1.0)	21 (0.9)
Recreational activities	29 (1.3)	45 (2.0)	28 (1.2)	22 (1.0)	13 (0.6)	25 (1.1)	11 (0.5)	25 (1.1)
Adverse effects of health care	8 (0.4)	3 (0.1)	11 (0.5)	13 (0.6)	11 (0.5)	21 (0.9)	21 (0.9)	37 (1.6)
Struck by or against an object	15 (0.7)	24 (1.1)	25 (1.1)	21 (0.9)	16 (0.7)	16 (0.7)	9 (0.4)	7 (0.3)
All injuries	**297 (13.2)**	**220 (9.8)**	**349 (15.5)**	**292 (13.0)**	**265 (11.8)**	**269 (11.9)**	**207 (9.2)**	**352 (15.6)**

7-county disaster region[a]
Beaufort, Carteret, Craven, Dare, Hyde, Pamlico, and Tyrrell Counties

Type or cause of injury	Age group							
	0–11 years Number of injuries (%)	12–19 years Number of injuries (%)	20–29 years Number of injuries (%)	30–39 years Number of injuries (%)	40–49 years Number of injuries (%)	50–59 years Number of injuries (%)	60–69 years Number of injuries (%)	>69 years Number of injuries (%)
Falls	42 (6.5)	36 (5.6)	68 (10.5)	55 (8.5)	48 (7.4)	54 (8.3)	35 (5.4)	73 (11.3)
MVR injuries	8 (1.2)	4 (0.6)	19 (2.9)	10 (1.5)	16 (2.5)	17 (2.6)	8 (1.2)	8 (1.2)
Recreational activities	8 (1.2)	12 (1.9)	6 (0.9)	0 (0.0)	3 (0.5)	4 (0.6)	4 (0.6)	2 (0.3)
Adverse effects of health care	0 (0.0)	0 (0.0)	3 (0.5)	2 (0.3)	3 (0.5)	8 (1.2)	6 (0.9)	14 (2.2)
Struck by or against an object	4 (0.6)	1 (0.2)	7 (1.1)	8 (1.2)	5 (0.8)	5 (0.8)	3 (0.5)	4 (0.6)
All injuries	**73 (11.3)**	**52 (8.0)**	**95 (14.7)**	**79 (12.2)**	**83 (12.8)**	**87 (13.4)**	**70 (10.8)**	**108 (16.6)**

Note. ED, emergency department; MVR, motor vehicle–related.
Types or causes of injury are ranked as a percentage of total ED visits. Data are for ED visits from August 28 through September 2, 2011. Percentages were calculated by dividing the number of ED visits related to injuries in that category and age group by the total number of ED visits in that region during that week. (There were 2,251 total ED visits in the 29-county region and 647 total ED visits in the 7-county region.) The bottom row represents the total number of ED visits for external injuries in each region for the listed week, including those for types of injuries that are not separately reported in this table; thus, the sum of the data in the first 5 rows does not equal the total in the bottom row.
[a]These 7 counties received federal disaster declarations.

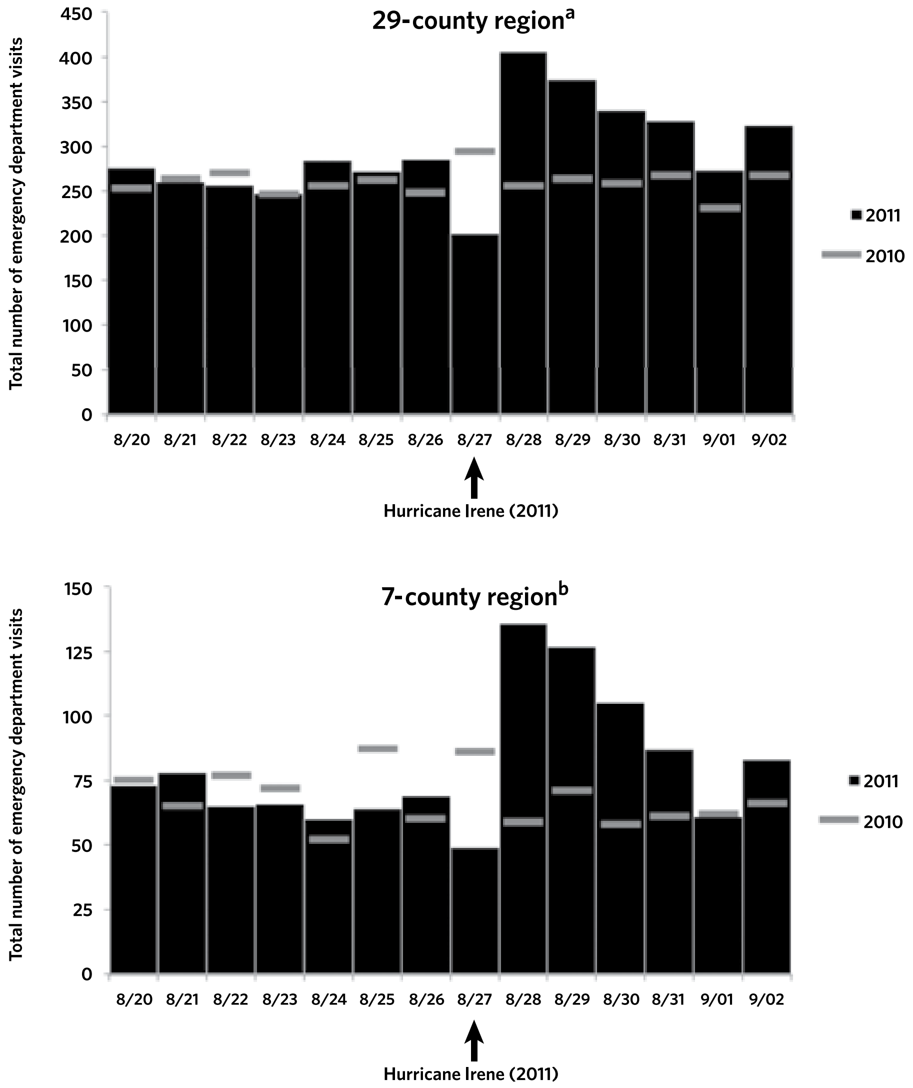
Irene was compared with the number of such visits in the 2010 reference week, an 18% overall increase in the number of injury-related ED visits was identified. In the 7-county disaster region, 488 injury-related ED visits were reported during the 2010 reference week, compared with 475 injuries during the 2011 pre-storm week, representing a decrease of 2%. Comparing the pre-storm week with the 2010 reference week showed that residents' preparations for the storm did not significantly affect the rate of injury-related ED visits; thus the pre-storm week could be used as a baseline for comparison with the post-storm week.

Both the 29-county region and the 7-county disaster region experienced a significant decrease in the number of injury-related ED visits on the day of the storm (August 27), followed by a substantial peak on the day after the storm (see Figure 2). Approximately 7–10 days after the storm, the number of injury-related ED visits gradually returned to baseline, with trends similar to those observed in 2010.

Pearson's chi-square test of independence was used to evaluate the frequencies of injury types in the post-storm week compared with the 2010 reference week. For the 29-county region, statistically significant increases were noted in the proportion of injuries caused by falls (P=.001). For this region, there were decreases in the proportion of injuries caused by assault (P=.038) and the proportion of injuries resulting from recreational activities (P=.001). When the 7-county region was evaluated using the same method, a significant increase was detected in the proportion of injuries caused by cutting or piercing incidents (P=.012); decreases in the proportions of other causes or types of injury were not statistically significant.

When the data were stratified by age group (Table 2), falls were the most common cause of injury in all age groups, with individuals 20–29 years of age having the highest number of falls in the 29-county region. In the 7-county region, 27.4% of the total number of injuries occurred in individuals older than 69 years; in the 29-county region, only 15.6% of all injuries occurred in this age group.

FIGURE 2.
Injury-Related Emergency Department Visits in Eastern North Carolina Before, During, and After Hurricane Irene in 2011 and During the Week of August 28 through September 3, 2010



Note. Hurricane Irene made landfall on August 27, 2011. This day is denoted by an arrow on the above histograms.
[a] The counties in the 29-county region are Beaufort, Bertie, Camden, Carteret, Chowan, Craven, Currituck, Dare, Duplin, Edgecombe, Gates, Greene, Halifax, Hertford, Hyde, Jones, Lenoir, Martin, Nash, Northampton, Onslow, Pamlico, Pasquotank, Perquimans, Pitt, Tyrrell, Wayne, Wilson, and Washington.
[b] The 7 counties that were declared federal disaster areas following Hurricane Irene are Beaufort, Carteret, Craven, Dare, Hyde, Pamlico, and Tyrrell.

Discussion

Overall, the number of ED visits related to injuries was significantly higher following Hurricane Irene than during the 2010 reference week. This increase became more evident when data from the 7-county disaster region were analyzed and compared with data from the 29-county region. Observed increases in injuries due to cutting or piercing and injuries caused by falls during the week following Hurricane Irene were consistent with the findings of other studies that have assessed the types of injuries seen in EDs following a natural disaster [21-23]. Nonfatal injuries and illnesses—including insect stings, dermatitis, diarrhea, and psychiatric conditions—increased following Hurricane Floyd, which caused a great deal of damage in North Carolina in 1999 [8].

Interestingly, our study found that the types of injuries most commonly seen in EDs during the 2010 reference period and during the 2011 pre-storm period were also commonly reported during the week following Hurricane Irene. This information could prove valuable for hospitals planning for the ED visits likely to occur after a natural disaster. Eastman and colleagues [5] found that injury-related surges in patient loads at EDs have the potential to overwhelm local resources following a disaster; the use of alternative sources of medical care, including temporary clinics, after disaster events therefore needs to be considered to help manage this expected increase in need. Local EDs need to be prepared to accommodate their typical patient loads along with additional injuries following a disaster. Preparations could include stockpiling supplies, adding personnel (including physicians), and other measures. It is important to remember that many underserved individuals in Eastern North Carolina live in rural and isolated areas and have limited access to medical treatment. The health needs of individuals in these areas are a critical concern and should continue to be addressed through coordinated efforts on the part of state and local governments, physician residency programs, and the community—both before and after a natural disaster event.

Although we met the aims of our evaluation, there were several limiting factors. We were unable to obtain the patient's home address, the patient's treatment location, or information about the patient's underlying health conditions. Lacking these types of specific details may have resulted in our either overestimating or underestimating the number of storm-related injuries for selected counties. Having the patient's home address would have been useful for determining how far an individual traveled and where he or she sought treatment. More descriptive information about how the injury occurred might have helped us to better identify whether the injury was a result of the storm. For public health surveillance purposes, the doctor or a member of the admitting staff could make a special notation on the patient's medical record indicating whether the injury was a direct or indirect result of the storm. This type of increase in reporting could assist public health practitioners and health educators in targeting injury-prevention outreach when undertaking hurricane preparation and planning. In addition, the inability to account for individuals who sought health care from nonreporting medical facilities (such as walk-in clinics) was a limitation. These types of private providers are under no obligation to report injuries to NC DETECT, and therefore the patients they saw are not included in our estimates. Also, any increases in the number of ED visits during the week prior to the storm may have occurred as a result of preparations for the storm. This may have distorted the accuracy of our estimates of the number of injuries associated with the storm. However, the information we obtained about ED visits during the week before the storm may be useful for hospitals that are trying to predict the number and types of pre-storm ED visits.

In conclusion, the outcomes of a natural disaster can have multiple devastating effects on individuals and communities. However, public health surveillance using NC DETECT can serve as a vital resource for evaluating public health injuries and adverse health outcomes. We recommend continuous monitoring of ED visit data and enhanced communication with the public regarding how to avoid injuries following natural disasters. In addition, other highly significant, but less immediately recognized types of impacts, such as effects on mental health, need to be considered. Studies with these types of focuses may prove important for underserved persons living in rural areas with limited access to health care facilities, who may suffer greater long-term effects from certain stress disorders. NCMJ

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Acknowledgments

Financial support. This research was supported in part by grants from the Office of Research and Graduate Studies, East Carolina University, Greenville, North Carolina.

Data for this project were provided by the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT).

Special thanks to Heather Vaughan-Batten and the North Carolina Division of Public Health for their assistance on this project.

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

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ORIGINAL ARTICLE

Collection of Family Health History for Assessment of Chronic Disease Risk in Primary Care

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BACKGROUND Family health history can predict a patient's risk for common complex diseases. This project assessed the completeness of family health history data in medical charts and evaluated the utility of these data for performing risk assessments in primary care.

METHODS Family health history data were collected and analyzed to determine the presence of quality indicators that are necessary for effective and accurate assessment of disease risk.

RESULTS More than 99% of the 390 paper charts analyzed contained information about family health history, which was usually scattered throughout the chart. Information on the health of the patient's parents was collected more often than information on the health of other relatives. Key information that was often *not* collected included age of disease onset, affected side of the family, and second-degree relatives affected. Less than 4% of patient charts included family health histories that were informative enough to accurately assess risk for common complex diseases.

LIMITATIONS Limitations of this study include the small number of charts reviewed per provider, the fact that the sample consisted of primary care providers in a single geographic location, and the inability to assess ethnicity, consanguinity, and other indicators of the informativeness of family health history.

CONCLUSIONS The family health histories collected in primary care are usually not complete enough to assess the patient's risk for common complex diseases. This situation could be improved with use of tools that analyze the family health history information collected and provide risk-stratified decision support recommendations for primary care.

Primary care providers routinely see patients who are at risk for, or are affected by, common complex diseases, such as coronary artery disease, cancer, and diabetes [1-5]. Family health history is one of the strongest predictors of the patient's risk for common complex diseases, and collecting this information can dramatically improve identification of at-risk individuals [4]. For example, having 1 first-degree relative with breast cancer results in a woman's risk for the disease being 1.8 times higher, and having 2 first-degree relatives nearly triples her risk [6]. Overall, 82% of primary care patients have a familial risk for at least 1 common disease—coronary artery disease, stroke, diabetes, breast cancer, colon cancer, or ovarian cancer [5, 7, 8]—and that risk alters the prevention recommendations for the patient. For instance, 15%–20% of patients meet family health history criteria for beginning colonoscopy screenings before age 50 years [9].

Because primary care providers are frequently a patient's first point of contact with the health care system, they are well positioned to identify patients who are at increased risk for disease and to implement appropriate prevention strategies in order to lower risk or detect disease earlier [2]. Professional [10-12] and evidence-based [13] guidelines are widely available; these guidelines can be used to collect family health histories for common diseases, such as colon cancer [14-17], breast cancer [17-20], heart disease [12], and diabetes [21, 22]. Such guidelines have been endorsed by primary care organizations [10, 23, 24], yet they are underutilized in primary care settings [25-27]. Barriers to their use include the time required to collect an accurate family health history, the need to balance the patient's agenda with the physician's goals, the difficulty of finding information about family health history within the chart, and the lack of procedures for quickly collecting and analyzing family health history data [2, 28-31]. Using patient-collected information about family health history and incorporating it into the electronic medical record (EMR) might help to overcome these barriers [32, 33].

Making recommendations based on familial risk requires an accurate and detailed family health history [26]. Key elements of such a history are that it covers 3 generations (grandparents; parents, aunts, and uncles; and half siblings and full siblings) and that it includes age of disease onset, relationship to the patient, and age and cause of death (if deceased) for each individual [29, 34-36]. It is also impor-

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Electronically published August 1, 2013.

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0029-2559/2013/74402

tant that the family health history make note of common diseases that are *not* found in the family (a negative, or "unremarkable," family history) [34]. Although most primary care providers collect a family health history, the documented elements vary [25, 26, 31].

The primary goal of this study was to assess the completeness of family health history data in the medical charts of primary care providers and to evaluate the utility of these data for providing patient risk assessments. The chart review was performed in selected primary care practices in a midsized community in the Southern United States.

Methods

Paper and EMR charts were reviewed in 1 internal medicine and 2 internal medicine/family medicine community-based practices serving patients with a range of socioeconomic and insurance statuses. The size of the practices ranged from 4 providers seeing 1,700 patients per month to 9 providers seeing 4,000 patients per month.

Data instrument. Our chart review checklist consists of 32 questions (including 14 multiple-choice questions, 9 dichotomous [yes/no] questions, and 9 fill-in-the-blank questions) and a chart on which the reviewer can circle whether particular types of information are "always," "sometimes," or "never" documented for various relatives. (See Appendix 1; online version only). The checklist is divided into sections dealing with the patient's demographics and personal health history, the patient's insurance, date(s) of personal and family health history collection, family health history data, and specialty referrals based on family health history. Fifteen of the questions on our checklist (marked with an asterisk) were adapted from the 2006 chart audit tool developed by the Michigan Department of Community Health's genomics team (D. Duquette, unpublished observations, 2012). Our checklist was piloted and modified to ensure that all of the necessary information would be obtained.

Appendix 1.
2009–2010 Baseline Family History Chart Review

This appendix is available in its entirely in the online edition of this article. Please go to the NCMJ Web site http://www.ncmedicaljournal.com/archives/?74402.

The checklist and methodology were approved by the institutional review boards of the University of North Carolina at Greensboro, Moses H. Cone Memorial Hospital, and the US Army Medical Research and Materiel Command.

Sampling. Administrators from each practice provided a list of patients with outpatient paper charts, sorted by physician and appointment date, who were seen for a new visit or well visit between May 1 and November 1, 2007. In order to draw from patients throughout the list, every third chart was reviewed, starting with the chart corresponding to a random digit provided by the Web site Random.org. At least 25 patient charts were reviewed for each provider. A chart was excluded if the patient was younger than 18 years or if the entire chart was not located onsite. Paper charts were abstracted by 2 genetic counselors between December 2008 and April 2010. Because 1 practice converted to an EMR system in 2010, an additional list of patients with outpatient EMR charts was provided; 2 study coordinators and the project director reviewed every other chart in this list in July and August of 2012. No identifying information was recorded, and standardized criteria for answering questions and interpreting family health histories were applied to reduce interobserver variability. Data quality was assessed by a genetics counselor who reviewed entries to correct errors. All data were analyzed in September 2012.

Statistical analysis. Abstracted data were entered into REDcap (Research Electronic Data Capture), a secure online survey and database storage tool. IBM SPSS Statistics software (version 19) was used for statistical analysis and reporting. Descriptive statistics were used to characterize the demographic characteristics of the patients and the health care providers and the characteristics of family health history collection.

To determine whether the family health history was informative enough to perform risk stratification and to alter a patient's recommendations for prevention, this study used a set of quality indicators, which were subdivided by whether or not any of the patient's family members were deceased. These quality indicators included: whether the family health history was updated during subsequent visits, whether a negative family health history was mentioned (eg, "no family health history of cancer"), whether the sex of affected relatives was noted, whether the age of the affected relative at disease onset was noted, and whether the affected relative's lineage was noted (ie, whether the affected relative was on the maternal or paternal side of the family). Two additional quality indicators were used to assess family health history when at least 1 relative had died: the cause of death and the deceased relative's age at death. Because each quality indicator is needed to perform an accurate risk assessment, family health histories were deemed highly informative (of high quality) only when the chart contained all 5 quality indicators (if the chart made no mention of any relative being deceased) or all 7 quality indicators (if any relative was deceased).

Results

A total of 399 paper charts and 100 EMR charts were abstracted and entered into REDcap. Data from the paper charts were cleaned and corrected when necessary, resulting in the removal of 9 records.

Patient and Physician Characteristics

Physician characteristics are presented in Table 1, and patient characteristics are presented in Table 2. The median

TABLE 1.
Characteristics of Providers Whose Patient Charts Were Reviewed (N = 16)

Characteristic	Number of providers (%)
Sex	
Male	4 (25.0)
Female	12 (75.0)
Years in practice	
≤21 years	8 (50.0)
>21 years	8 (50.0)
Medical specialty	
Family medicine	7 (43.8)
Internal medicine	9 (56.3)
Race	
White	13 (81.3)
Asian	2 (12.5)
Hispanic	1 (6.3)

patient age was 53 years. The most commonly noted diseases were cardiovascular disease (CVD) and cancer. In personal disease histories, hypercholesterolemia was the most frequently mentioned type of CVD; it was noted in the charts of 180 (76.3%) of the 236 patients with CVD. Nonmelanoma skin cancer was the most commonly noted form of cancer; it was reported in 27 (55.1%) of the 49 patients with cancer. The average number of years a patient had been seen in the practice was 9.76 (±8.38) years, and the median length of time a patient had been seen in the practice was 8 years.

Family Health History Within Paper Charts

Location. More than 99% of paper charts contained some family health history data, which was scattered over several areas of the chart. In 306 of the 390 charts (78.5%), family health history was located in the physician's notes. In 280 (71.8%) of the charts, the family health history was found on the patient's self-completed intake form; in 97 charts (24.9%), it was on the front summary page of the chart; in 63 charts (16.2%) it was found in the consult notes; in 16 charts (4.1%) it was found in a note from the patient; and in 1 (0.3%) of the charts, it was found in a nurse's note. Frequently, family health history was noted separately in 2 places. None of the examined charts contained a family health history in pedigree format.

Relatives assessed. When we looked at the health history of affected family members, we found that the health history of the patient's parents was documented in 339 (86.9%) of 390 charts, while only about half as many charts (168 [43.1%]) contained the health history of siblings. Only 131 charts (33.6%) contained the health history of grandparents; 67 charts (17.2%) contained the health history of aunts or uncles; and 32 charts (8.2%) contained the health history of children.

Diseases collected. A total of 390 charts were reviewed to assess whether the patient's family health history mentioned either the presence of a disease (positive history) or the absence of a disease (negative history); we looked for diseases such as CVD, cancer, stroke, diabetes mellitus, arthritis, or depression. For example, more than three-quarters of charts had a positive family history of CVD, whereas only 23.3% of the charts mentioned the absence of CVD in the family health history. Table 3 shows the diseases and conditions for which data were collected. Table 4 shows the number and proportion of charts that recorded each of the quality indicators mentioned previously; these quality indicators are also discussed below.

Quality indicators. One quality indicator is whether the family health history has been updated. After an initial visit, the number of years before the first family health history was recorded in a patient's chart ranged from 0 to 32 years, with a median of 0.0 and an interquartile range of 1.00. On average, the most recent family health history had been collected or updated within the past 0.18 years (standard deviation = 1.06). Of the 390 charts reviewed, 287 charts (73.6%) had been updated; 180 (62.7%) of the these charts had all updated changes, 53 (18.5%) of them had some updated changes, and 54 charts (18.8%) indicated that patients had been asked about updates but no changes had been made.

TABLE 2.
Characteristics of Patients Whose Charts Were Reviewed (N = 390)

Characteristic	Number of patients (%)
Sex	
Female	200 (51.3)
Male	187 (47.9)
Missing data	3 (0.8)
Race	
White	251 (64.3)
African American	59 (15.1)
Hispanic	4 (1.0)
Asian	4 (1.0)
Other	4 (1.0)
Missing data	68 (17.6)
Type of insurance	
Commercial	269 (68.9)
Medicare	54 (13.8)
Medicaid	4 (1.0)
Self-pay	1 (0.2)
Unable to determine	55 (14.1)
Missing data	7 (1.7)
Medical conditions	
Cardiovascular diseases	236 (60.5)
Hypercholesterolemia	180 (46.1)
Hypertension	157 (40.2)
Other cardiovascular diseases	28 (7.1)
Cancer	49 (12.5)
Skin cancer	27 (6.9)
Breast cancer	11 (2.8)
Prostate cancer	6 (1.5)
Other type of cancer	5 (1.2)

TABLE 3.
Types of Family Health History Identified in Reviewed Charts[a] (N = 390)

Medical conditions of relatives	Charts with positive FHH Number of charts (%)	Charts with negative FHH Number of charts (%)
Cardiovascular diseases	338 (86.7)	91 (23.3)
Hypertension	242 (62.0)	22 (5.6)
Heart attack	150 (38.4)	10 (2.5)
Hypercholesterolemia	69 (17.6)	4 (1.1)
Cancer	266 (68.2)	195 (50.0)
Breast cancer	83 (21.2)	34 (8.8)
Colon cancer	67 (17.2)	62 (15.9)
Lung cancer	64 (16.4)	0 (0)
Stroke	71 (18.2)	4 (1.1)
Other conditions		
Diabetes	200 (51.2)	48 (12.4)
Arthritis	71 (18.2)	14 (3.6)
Depression	39 (10.0)	12 (3.1)

Note. FHH, family health history.
[a] Totals do not sum to the sample size because of missing data.

Of the histories that were being taken for the first time, 37 (66.1%) were for patients who were new to the practice.

Another quality indicator is whether a negative family health history is reported. Almost half (173 [44.4%]) of the charts explicitly recorded a generalized negative statement regarding family health history for a specific disease or disease group (eg, "family history negative for cancer").

A third quality indicator is whether the sex of the affected relative is reported in the family health history. In 366 (93.8%) of the charts, a positive family history of a specific disease or disease group was noted. In these charts, the sex of the affected relative was the most frequently collected quality indicator, having been specified in 356 (91.2%) of the charts reviewed. In some cases, the sex of the affected relative was known because of the words used to describe the relative (ie, aunt, uncle, mother, father, sister, brother). The sex of the affected relative was noted in 92% of the instances in which the relative was a parent, aunt, uncle, sibling, or grandparent. The sex of the affected relative was noted in only 3 (17.6%) of the instances in which the relative was a cousin and in only 6 (24.0%) of the instances in which the individual was described as a "relative."

Age at disease onset for an affected relative was the least frequently collected quality indicator, having been collected in only 71 (18.2%) of the 366 family health histories that recorded a positive family history. Specifically, age of disease onset was documented in family health histories for 11 (6.6%) of the siblings mentioned, 14 (10.8%) of the grandparents mentioned, 4 (6.3%) of the aunts or uncles mentioned, and 50 (14.8%) of the parents mentioned.

The fifth quality indicator for a family health history is whether the lineage of the affected relative is reported. Of the 366 family health histories that recorded a positive family history, 255 (69.7%) did not include information about the lineage (ie, maternal or paternal side) of affected family members (Table 4). More than half of the 366 charts (233 [63.7%]) did not mention an affected second-degree relative, and 44 charts did not mention an affected first-degree relative.

If the family health history includes mention of deceased relatives, then 2 additional quality indicators should be evaluated: age at death and cause of death. A deceased relative was documented in 227 (62.0%) of the 366 records with a positive family health history. In 172 (75.8%) of those 227 records, the affected relative's age at death was recorded, either for all deceased relatives (94/227 [41.4%]) or for some of them (78/227 [34.4%]). Of the 227 charts that noted a deceased relative, 213 (93.8%) listed the cause of death, either for all deceased relatives (165/227 [72.7%]) or for some of them (48/227 [21.1%]).

Quality of family health history. Less than 4% of patients had family health histories that could be used to perform a risk assessment. The group of 227 family health histories that mentioned a deceased relative included more "moderately informative" histories and fewer "less informative" histories than did the group of family histories that did not include mention of any deceased relatives (Table 4). The number of quality indicators present in each group is shown in Table 4, and Table 5 shows the number of charts in which each of the first 5 quality indicators was reported. Among the charts that did not mention any deceased relative, 61 charts included 4 of the 5 quality indicators; the indicators that were most frequently absent were the age of the affected relative (missing in 28 [45.9%] of the charts), negative family health history information (missing in 16 [26.2%] of the charts), and the lineage of the affected relative (missing in 15 [24.6%] of the charts). Similar results were observed for the charts that mentioned one or more deceased relatives.

TABLE 4.
Characteristics of Reviewed Charts in Family Health History Project

Characteristic	All charts (N = 390) Number of charts (%)	Charts with FHH that do not mention deceased relatives (n = 163) Number of charts (%)	Charts with FHH that do mention deceased relatives (n = 277) Number of charts (%)
FHH status			
Updated	287 (73.5)	92 (56.4)	186 (81.9)
Not updated	91 (23.3)	49 (30.0)	38 (16.7)
Missing data	12 (3.2)	22 (13.6)	3 (1.4)
Negative FHH			
Recorded	173 (44.3)	70 (42.9)	92 (40.5)
Not recorded	213 (54.6)	71 (43.5)	135 (59.5)
Missing data	4 (1.1)	22 (13.6)	0 (0)
Affected relative[a]			
Recorded	366 (93.8)	135 (82.8)	226 (99.6)
Not recorded	24 (6.2)	6 (3.6)	1 (0.4)
Missing data	0 (0)	22 (13.6)	0 (0)
Sex of affected relative			
Recorded	356 (91.2)	129 (79.1)	222 (97.8)
Not recorded	10 (2.5)	12 (7.3)	5 (2.2)
Missing data	24 (6.3)	22 (13.6)	0 (0)
Affected relative's age at disease onset			
Recorded	71 (18.2)	27 (16.5)	44 (19.3)
Not recorded	256 (65.6)	108 (66.2)	182 (80.1)
Missing data	63 (16.2)	28 (17.3)	1 (0.6)
Lineage of affected relative			
Recorded	111 (28.4)	50 (30.6)	58 (25.6)
Not recorded	255 (65.3)	91 (55.2)	169 (74.4)
Missing data	24 (6.3)	22 (14.2)	0 (0)
Cause of death of affected relative			
Recorded	NA	NA	213 (93.8)
Not recorded	NA	NA	14 (6.2)
Age of affected relative at death			
Recorded	NA	NA	172 (75.8)
Not recorded	NA	NA	55 (24.2)
Number of quality indicators present			
0	2 (0.6)	2 (1.5)	0 (0)
1	37 (10.2)	14 (10.4)	2 (0.9)
2	119 (32.9)	41 (30.4)	6 (2.7)
3	131 (36.2)	49 (36.3)	32 (14.3)
4	61 (16.9)	26 (19.3)	86 (38.6)
5	12 (3.3)	3 (2.2)	65 (29.1)
6	NA	NA	24 (10.8)
7	NA	NA	8 (3.6)
Quality of FHH			
Not informative[b]	2 (0.6)	2 (1.5)	0 (0)
Less informative[c]	156 (43.0)	55 (40.7)	40 (18.0)
Moderately informative[d]	192 (53.1)	75 (55.6)	175 (78.4)
Highly informative[e]	12 (3.3)	3 (2.2)	8 (3.6)

Note. FHH, family health history; NA, not applicable.
"Not recorded" means a characteristic was not asked about or was not checked in the chart; "missing data" means data is completely missing from the dataset.
[a] Not included as an indicator of quality.
[b] Pedigrees were labeled "not informative" if they contained none of the quality indicators.
[c] Pedigrees were labeled "less informative" if they did not mention any deceased relatives and contained 1–2 quality indicators, or if they did mention a deceased relative and contained 1–3 quality indicators.
[d] Pedigrees were labeled "moderately informative" if they did not mention any deceased relatives and contained 3–4 quality indicators, or if they did mention a deceased relative and contained 4–6 quality indicators.
[e] Pedigrees were labeled "highly informative" if they did not mention any deceased relatives and contained 5 quality indicators, or if they did mention a deceased relative and contained 7 quality indicators.

TABLE 5.
Number of Charts Containing Each Type of Quality Indicator, Cross-Tabulated with the Number of Quality Indicators Present in the Chart (Number of Charts = 390)

	Number of indicators present				
Quality indicator	1	2	3	4	5
FHH status updated	3	91	112	59	12
Negative family history recorded	2	20	82	45	12
Sex of affected relative recorded	32	116	131	61	12
Affected relative's age at disease onset recorded	0	3	23	33	12
Lineage of affected relative recorded	0	8	45	46	12

Note. FHH, family health history.
Totals do not sum to the sample size because of missing data.

Family Health History Within EMRs

Out of 100 EMR charts, 97 (97%) documented some amount of family health history. No patient had a structured 3-generation pedigree. Interestingly, the EMR's family health history collection tool was not utilized for any of the charts we reviewed. In all cases, family health history was recorded in the free text section of the clinic note or on the patient intake form, and family health history was included for only a select few relatives.

Discussion

The inability to use family health histories in primary care poses a barrier to the practice of genomic medicine and limits physicians' ability to achieve benchmarks set by programs such as Healthy People 2020 [37]. Several problems were encountered with the charts analyzed in this study, including a lack of uniformity in the collection methods, variations in the location within the chart where family health history information was reported, and missing information about essential elements of the family health history (as presented in Tables 4 and 5). Without all of these elements, an adequate risk assessment cannot be performed.

Family health histories that included information about deceased relatives were more likely to be "moderately informative" than were those without any mention of deceased relatives. The algorithm used to assess the quality of the family health histories for the deceased-relative group included 2 additional indicators (age at death and cause of death of the affected relative). More than two-thirds of the family health histories in the deceased-relative group recorded these 2 indicators, thereby raising the mean quality of the family health histories and the quality of the information. It may be that when the death of an affected relative is recorded in a family health history, health care providers are more likely to seek details on the age at death and cause of death.

Although more than 97% of family health histories were updated, almost 23% contained incomplete information. Missing information included information that was previously collected but was not brought forward during subsequent visits and was thus lost. Some new EMR programs have addressed this problem.

In 80%–90% of the charts we reviewed, the age at diagnosis of an affected relative was never mentioned. Diagnosis of, or death from, a disease at an earlier age than expected can indicate a hereditary form of disease and is included in clinical algorithms to evaluate a patient's disease risk [13, 14, 19, 38]. Thus, there is a need for greater awareness about the importance of age at diagnosis for risk assessment. Age at diagnosis is particularly important when using family health history to identify those most at risk for heart disease and cancer, the 2 leading causes of death in the United States [39]. Interestingly, using an EMR did not increase the amount or quality of information collected by the practitioner. Because EMRs presently do not prompt the physician to collect all of the elements necessary for an assessment of disease risk based on family health history, it remains uncertain whether family health histories will be fully utilized for these widespread diseases.

The family health histories of cancer documented in these charts resemble those found in other studies [5, 31]. The vast majority of patient charts had a documented positive family health history; in more than 45% of cases, however, diseases that were not found in the family (ie, negative family history) were not explicitly mentioned. If a negative family history was mentioned by a consulting physician, it typically was not updated in the primary care provider's chart and was not considered when assessing the patient's risk for disease. Documentation of a negative family health history is almost as important as documentation of a positive family health history, and primary care providers may benefit from greater awareness of its value for interpreting family health history data [34].

Several studies have estimated the chance of having an increased risk for disease on the basis of the family health history taken by the patient's primary care provider [7, 8]. Based on the estimated frequency of at-risk patients seen in previous studies, we would have expected approximately 180 individuals in this study to have a family health history that established a strong or moderate risk for breast and ovarian cancer or colon cancer, which would suggest the need for referral to a genetic specialist. However, no such referrals were made. Although patients were sometimes referred to a specialist, such as an oncologist or a gastroenterologist, charts rarely mentioned that a patient was at high risk for disease based on family health history; this is probably because such an evaluation would be time-consuming and difficult for the primary care provider, even if the family health history were accurate and complete. Most charts had a patient intake form that allowed patients to self-report family health history. Several studies have found a bias for patients to overreport or underreport diseases, specifically cancer [40-42]. This may be another challenge to the effective utilization of family health history information.

Overcoming barriers to collection and use of family health histories in primary care. To remove several of the deficiencies we observed in the collection and interpretation of family health histories, it would be helpful if clinicians had a tool that creates a structure containing all of the key elements of family health histories (eg, a pedigree), provides decision support for providers [5, 32, 43], and is compatible with EMRs. A family health history decision support tool would need to be able to do the following things: allow patients to fill out a form about their family health history using a secure online system prior to their appointment; update family health histories without dropping previously collected information about family members; provide a single location for family health history within a chart (especially if the tool is compatible with the EMR); easily identify the number of affected and deceased family members; allow providers to quickly see whether a family has a negative disease history; and use clinically established information to provide an assessment of disease risk and recommendations regarding medical management.

Limitations

Limitations of this study that may reduce the generalizability of its findings to other populations include the small number of charts reviewed per primary care provider, the fact that the sample of primary care providers were all from a single geographic location, the failure to differentiate between patient-generated and physician-collected family health histories, and the inability to assess other quality indicators, such as consanguinity. The latter limitation results from confusion about the information included in charts. For example, a chart might be unclear as to whether the number of family members in the family matches the number of relatives mentioned in the family health history (eg, a patient might have 3 siblings, only 1 of whom is mentioned in the family health history), or there might be uncertainty about some pieces of information (eg, the family health history might mention a brother with heart disease and later refer to a brother with diabetes, without explaining whether these are 2 references to the same person or references to 2 different brothers). Another problem is that the chart review checklist does not collect certain additional types of information (eg, consanguinity). Lastly, there is evidence in the literature that patient-provided family health histories can differ from physician-collected histories. Most charts contained a patient intake form that had been used to collect family health history data, and this form was considered part of the family health history in the patient record.

Despite these limitations, our findings are consistent with those of previous studies, suggesting common factors in the use of family health histories across multiple settings. This study also did not allow for assessment of conversations between patients and providers; therefore, any information about family health history that was discussed in these conversations but was not mentioned in the clinic notes would not have been collected. The impact of verbally communicated but undocumented family health history information is unknown but is important to consider, especially in primary care settings where relationships are often long-lasting and the time available for documentation is often limited.

Conclusion

Despite the value of family health histories for disease risk assessment, the histories collected in primary care practices usually lack some of the crucial information needed to perform a risk assessment for hereditary cancer syndromes and other chronic disorders [26]. If the use of family health histories for disease risk assessment is to succeed in primary care, collection must be easier and more complete. This study indicates a need for the adoption of family health history collection tools that can analyze the collected information and provide risk-stratified decision support recommendations. NCMJ

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Acknowledgments

The Genomedical Connection is an alliance between the University of North Carolina at Greensboro, Duke University, and Cone Health to promote improved uptake and use of family health history and genomics for risk assessment and disease prevention.

Financial support. Funding for this project was provided by the US Department of the Army (W81XWH-05-1-0383).

Potential conflicts of interest. K.P. consults with CareCore National and Generation Health. C.C. has consulted with CareCore National. L.E. has been employed by, and owns stock in, Counsyl and is currently employed by Life Technologies. G.G. consults for CardioDx, Universal Oncology, and BG Medicine; owns stock in CardioDx and Universal Oncology; has 2 current grants each with Novartis and Pfizer; has received 3 patents and has 2 pending patents; and receives royalties from Elsevier. V.H. consults for LabCorp. All other authors have no conflicts of interest.

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ORIGINAL ARTICLE

Development and Validation of a Primary Care-Based Family Health History and Decision Support Program (MeTree)

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INTRODUCTION Family health history is a strong predictor of disease risk. To reduce the morbidity and mortality of many chronic diseases, risk-stratified evidence-based guidelines strongly encourage the collection and synthesis of family health history to guide selection of primary prevention strategies. However, the collection and synthesis of such information is not well integrated into clinical practice. To address barriers to collection and use of family health histories, the Genomedical Connection developed and validated MeTree, a Web-based, patient-facing family health history collection and clinical decision support tool. MeTree is designed for integration into primary care practices as part of the genomic medicine model for primary care.

METHODS We describe the guiding principles, operational characteristics, algorithm development, and coding used to develop MeTree. Validation was performed through stakeholder cognitive interviewing, a genetic counseling pilot program, and clinical practice pilot programs in 2 community-based primary care clinics.

RESULTS Stakeholder feedback resulted in changes to MeTree's interface and changes to the phrasing of clinical decision support documents. The pilot studies resulted in the identification and correction of coding errors and the reformatting of clinical decision support documents. MeTree's strengths in comparison with other tools are its seamless integration into clinical practice and its provision of action-oriented recommendations guided by providers' needs.

LIMITATIONS The tool was validated in a small cohort.

CONCLUSION MeTree can be integrated into primary care practices to help providers collect and synthesize family health history information from patients with the goal of improving adherence to risk-stratified evidence-based guidelines.

Family health history is widely accepted as a critical component of patient care. It serves as one of the strongest predictors of disease risk, provides information about environmental exposures, and has implications for the health of other family members. Many guidelines for screening and prevention—for instance, those of the American College of Cardiology for cardiovascular disease [1] and those of the American Gastroenterological Association for colon cancer [2]—strongly recommend (based on Level 1 evidence) that primary care providers collect family health history for disease risk stratification and risk management.

However, there are several barriers to gathering a family health history that is detailed enough to perform risk stratification and to guide clinical care: lack of time, due to competing clinical demands [3-7]; limitations in the patient's knowledge of his or her family's health history [8]; lack of reimbursement for the time spent collecting the history [9]; and lack of training in gathering family health history [3]. In addition, interpreting family health history information is difficult, particularly when this information is not available at the point of care, when it is not presented in a way that facilitates synthesis (eg, when it is scattered throughout the medical record and inconsistently formatted), or when it is not clearly actionable [9]. Unfortunately, adoption of electronic medical records (EMRs) has not improved family health history collection rates, and EMRs do not address the barriers listed previously [10]. This finding is supported by a review conducted by our group (results of which are published in this issue on pages 279-286) [11] that compares family health histories documented in paper charts (less than 4% of which were high-quality family health histories) with those documented in EMRs at the same clinic (less than 1% of which were high-quality family health histories).

Despite the limitations of EMRs, advances in technology are a key to overcoming many, if not all, of the barriers to family health history collection and use. For example, computer-based software programs that are referred to as "patient-facing" allow direct entry of family health history information by patients, which avoids the pressure to collect the data during the primary care appointment and permits patients adequate time to collect the necessary information from relatives. Such programs can also be linked to education on how to collect family histories, and they use auto-

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Electronically published August 1, 2013.

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N C Med J. 2013;74(4):287-296.

0029-2559/2013/74420

mated algorithms to generate clinical decision support for analysis and interpretation of the history collected.

In 2004, the Genomedical Connection—a collaboration on the part of Duke University, the University of North Carolina at Greensboro, and Cone Health System—obtained funding from the US Department of Defense to implement the genomic medicine model for primary care. The model is described in more detail elsewhere [12]. Briefly, it interweaves education, family health history collection, and recommendations for family health history risk-based prevention strategies within the clinical workflow of primary care practices. At the core of this model was the development of a self-administered, patient-facing computerized program, called MeTree, which gathers family health history from patients and generates decision support for patients and providers. In this paper, we describe the conceptual foundation, development, and validation of MeTree and compare its features with those of existing decision support programs based on family health history.

Methods

Program design goals. When we began developing MeTree in 2004, our clinical experience with family health history collection, the published literature, and a review of existing programs led us to conclude that a family health history software program should have the following characteristics, in order to be acceptable within clinical practice: It should improve clinical workflow by having patients enter their own family health history prior to an appointment with the provider; it should have point-of-care risk stratification; and it should facilitate uptake of risk-stratified preventive care recommendations that are clear, action-oriented, and evidence-based [13-15]. Therefore, we developed the following design goals for MeTree: (1) to develop a family health history collection interface that is easy for patients to use and that facilitates the collection of all the necessary components to perform risk stratification (ie, a full 3-generation pedigree with age of disease onset, current age or age at death, and cause of death for each relative); (2) to provide lay-level and technical decision support that is clinically actionable for providers and easy for patients and providers to understand; (3) to base decision support on guidelines that are widely accepted by primary care physicians; and (4) to capitalize on the patient-provider encounter to encourage discussions of preventive health and disease risk management.

MeTree description. MeTree, a stand-alone Web-based program, has 2 components: family health history collection and decision support. These 2 components were developed concurrently in order to maximize the effectiveness of each. For example, the Gail model [16, 17] was incorporated within the decision support component to identify women for whom breast cancer chemoprevention should be considered. Including this model and associated questions regarding chemoprevention and its contraindications required the addition of questions that are not routinely collected by family health history screening programs.

Family health history collection and decision support were developed by a team of 4 genetic counselors (with expertise in adult, pediatric, and cancer genetics), 3 medical geneticists, a cardiologist, a health behaviorist, 2 medical oncologists, and 3 experts in information technology. An iterative Delphi-based approach [18], along with a concurrent literature review, was used to reach a consensus regarding which professional guidelines and expert opinions to base the algorithms on and which conditions to include. Given that MeTree is intended for use in primary care clinical practices, preference was given to guidelines with which primary care physicians would be familiar (eg, those of the US Preventive Services Task Force and the American Cancer Society).

Family health history collection. The family health history collection component is the main patient interface. Patients use a Web-based survey that first establishes the family's structure, with the names and ages (current age or age at death) for 4 generations of relatives, and then identifies which relatives have been affected by any of 48 potential conditions (See Table 1). These conditions were selected by compiling a list of important familial and hereditary conditions and ranking them based on the strength of their familial risk and their importance to primary care providers. In order to maximize the effectiveness of the tool while minimizing the burden of using it, only the top-ranked 48 conditions were incorporated into MeTree.

To facilitate its ease of use, MeTree runs in full-screen mode, showing only questions and response fields, without toolbars or menus that could clutter the window. All fields are touch-screen capable, and fonts and buttons are large and easy to read. Survey questions are written at an 8th-grade reading level when possible. Use of branching questionnaire logic allows MeTree to skip irrelevant survey question screens, which minimizes the time patients need to complete the survey. Family health histories can also be updated and the algorithms rerun as needed.

Of note, a second MeTree interface was developed in 2012, employing a graphical user interface and tablet technology. Rather than relying on radio buttons and text-based input of family structure and health history, the new interface uses graphics, drag-and-drop technology for adding relatives, and drop-down lists that expand and minimize as desired to facilitate quick selection of health history by relative. Zooming, panning, and swiping facilitate rapid data entry.

Decision support. MeTree provides decision support for diseases that have a strong impact on population health, either because they are highly prevalent or because they have high morbidity and/or mortality (high clinical validity). The program also provides established risk-stratified screening and preventive care strategies that are known to have high clinical utility. Using these criteria, 5 pilot diseases

TABLE 1.
Health Conditions Included in MeTree

Cancers	Other conditions	Hereditary cancer syndromes
Brain cancer	Alzheimer disease/dementia	Hereditary breast and ovarian cancer (BRCA1/BRCA2 genes)
Breast cancer	Anemia	Hereditary nonpolyposis colon cancer (MLH1/MSH2/MSH6 genes)
Cervical cancer	Asthma	Familial adenomatous polyposis (APC gene)
Colon cancer	Blood clots in veins	Li Fraumeni syndrome (TP53 gene)
Kidney cancer	Colon polyps	Cowden syndrome (PTEN gene)
Leukemia	Diabetes	Other cancer syndromes
Liver cancer	Glaucoma	
Lung cancer	Heart attack	
Lymphoma	High blood pressure	
Melanoma	High cholesterol levels	
Ovarian cancer	Inflammatory bowel disease	
Pancreatic cancer	Lupus	
Prostate cancer	Macular degeneration	
Skin cancer (not melanoma)	Multiple miscarriages	
Small bowel cancer	Multiple sclerosis	
Stomach cancer	Osteoporosis	
Testicular cancer	Parkinson disease	
Thyroid cancer	Rheumatoid arthritis	
Uterine cancer	Seizures	
Unknown cancer	Stroke	
Other cancer, specify	Thyroid disease	

Note. Modified from Orlando et al. [19]

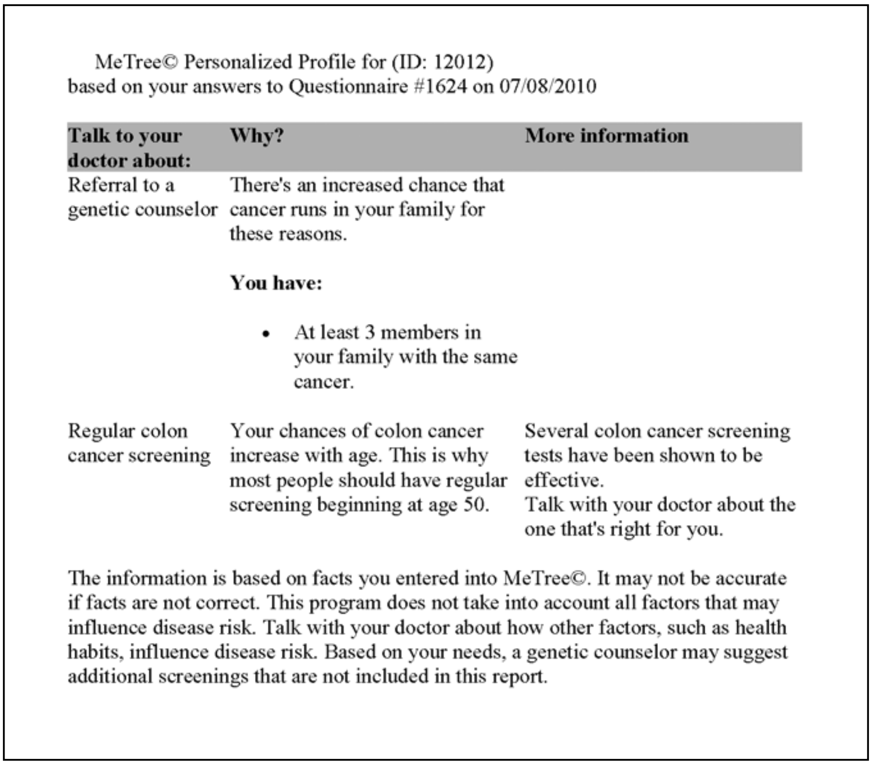
(breast cancer, ovarian cancer, colon cancer, thrombosis, and risk for a hereditary cancer syndrome) were chosen to demonstrate MeTree's effectiveness and acceptability. The decision support process risk-stratifies patients into one of several risk levels according to their family health history, and it then links the risk level to an action-oriented risk-management recommendation.

To foster discussion about risk, risk management, and disease prevention, decision support and structured family health history documents are given to patients (pedigree and patient report) and providers (pedigree, family health history in a tabular format, and provider report) prior to the scheduled appointment time. These documents are designed to be simple to read, with straightforward messages that are specific to the intended recipient. The patient report (Figure 1), written at an 8th-grade reading level, summarizes key points that patients might want to discuss with the provider regarding their family health history–based risk for the pilot diseases. The provider report (Figure 2) begins with an evidence-based action plan driven by the patient's estimated disease risk; this action plan is followed by a more detailed description of the criteria triggering each recommendation, along with relevant references. The increasing level of detail available in the provider report allows for just-in-time education determined by provider interest, curiosity, or need.

Decision support risk categories and their associated action-oriented risk-management strategies for thrombosis are as follows (in order of decreasing risk): genetic testing for inherited thrombophilia, with referral to genetic counseling; referral to genetic counseling alone; or no recommended intervention. Categorization for thrombosis is based on guidelines of the American College of Chest Physicians [20].

Decision support risk categories and their associated action-oriented risk-management strategies for breast cancer, ovarian cancer, colorectal cancer, and hereditary cancer syndrome are as follows (in order of decreasing risk): referral to genetic counseling, increased personal and familial risk managed by provider, and routine population-based screening. An algorithm evolved in which patients who met the criteria for genetic counseling referral were identified first, and then the patients at familial or population risk were identified. Women without a personal history of breast or ovarian cancer are selected for genetic counseling referral if they meet US Preventive Services Task Force guidelines [21]. However, these guidelines do not apply to men or to women who already have breast or ovarian cancer, so expert opinion [22] and the published guidelines of the National Society of Genetic Counselors [23] are used to select patients from these 2 groups who should be referred to a genetic counselor due to elevated risk of hereditary breast and ovarian cancer syndrome. Patients who meet the Amsterdam II diagnostic criteria for hereditary nonpolyposis colorectal cancer [24] or criteria established based on expert opinion [22] are selected for referral to discuss hereditary colorectal cancer risk.

FIGURE 1.
Example of Decision Support: Patient Report



MeTree© Personalized Profile for (ID: 12012)
based on your answers to Questionnaire #1624 on 07/08/2010

Talk to your doctor about:	Why?	More information
Referral to a genetic counselor	There's an increased chance that cancer runs in your family for these reasons. **You have:** • At least 3 members in your family with the same cancer.	
Regular colon cancer screening	Your chances of colon cancer increase with age. This is why most people should have regular screening beginning at age 50.	Several colon cancer screening tests have been shown to be effective. Talk with your doctor about the one that's right for you.

The information is based on facts you entered into MeTree©. It may not be accurate if facts are not correct. This program does not take into account all factors that may influence disease risk. Talk with your doctor about how other factors, such as health habits, influence disease risk. Based on your needs, a genetic counselor may suggest additional screenings that are not included in this report.

Note. Reprinted from Orlando et al [19].

The category "personal and familial risk management" includes patients whose risk for the 3 types of cancer does not warrant genetic counseling referral but is sufficient to merit consideration of surveillance or chemoprevention. Breast magnetic resonance imaging as an adjunct to mammography is recommended for those who meet American Cancer Society guidelines for breast cancer risk (eg, those with a lifetime risk greater than 20%) [25]. Lifetime risk is calculated using BRCAPRO, a statistical model and software program using Mendelian genetics and Bayesian updating. BRCAPRO incorporates the following information for patients and their first-degree and second-degree relatives (including those without cancer): sex; current age or age at death; diagnosis of breast cancer, second primary breast cancer, or ovarian cancer; age at cancer diagnosis; and presence or absence of Ashkenazi Jewish ancestry [26]. Breast cancer chemoprevention with tamoxifen or raloxifene is recommended for women aged 35–60 years whose 5-year breast cancer risk exceeds 1.65% [27, 28]. Five-year risk is calculated using the Gail model [16]. BRCAPRO and Gail model risk scores are included in the provider's report. Colorectal cancer surveillance is recommended for those who meet the joint guidelines of the American Cancer Society, the US Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology [29]; such surveillance often involves scheduling the first colonoscopy at an earlier age and performing follow-up colonoscopies more frequently.

"Average risk" patients who do not meet criteria for genetic counseling referral or familial or personal risk management are managed according to the American Cancer Society recommendations for individuals at population risk for cancer [30].

Genetic counselors on the team are using their clinical expertise and regular literature reviews to ensure that the clinical algorithms and decision support recommendations remain current. One of the genetic counselors reviews a random sample of pedigrees, patient reports, and provider reports on a monthly basis to identify inaccuracies and misclassifications. These are reported to a working group of content and information technology experts, who review and correct the algorithm code and make content changes as necessary.

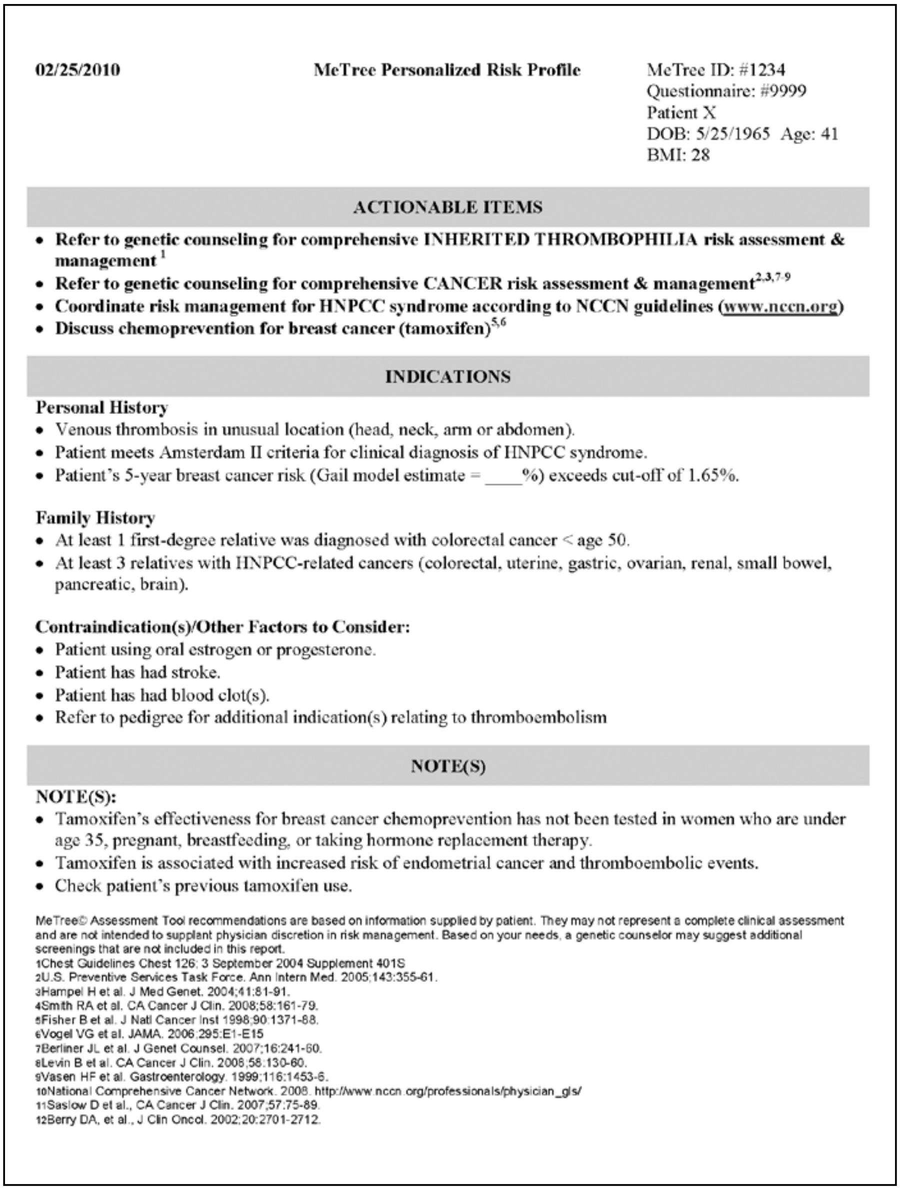
Coding. Several open-source computer software applications are incorporated into MeTree. These include PHP (version 5.4.9), a widely used general-purpose scripting language that is especially suited for Web development; Apache HTTP Server, a popular Web server; and Linux, a free UNIX-type operating system. Other programming resources include C++, which is used to calculate the Gail Score for 5-year breast cancer risk; R, an open-source statistical package used to calculate lifetime breast cancer risk using the BRCAPRO model with the BayesMendel R library; VBScript (Visual Basic Scripting Edition), a scripting tool provided with the Microsoft Windows operating system that is used to load provider and patient visit data; and Microsoft SQL Server, a relational database management system used to model decision support algorithms.

The MeTree Admin utility is a Web-based application written in PHP that provides administrators and clinical coordinators secure access to patient data and questionnaire data. It permits updating of patient contacts (letters, phone conversations, etc), mail merging of data sources for printing introduction letters for prospective participants, printing of postquestionnaire pedigree and summary reports, and display of important data elements for patient tracking and ongoing quality evaluation. For example, it can display demographics, patients by date of visit, questionnaires completed, and patients who were no-shows or who declined participation.

Validation

To optimize the collection of family health history and the development of decision support algorithms and reports, pilot testing was carried out in several phases prior to implementation of MeTree in primary care practices. The first phase involved testing with community volunteers, and the second phase involved testing with genetic counselors. Finally, the third phase was a 3-year pilot test within 2 different primary care practices, during which feedback from providers and patients was used to optimize clinical workflow and report content [31].

FIGURE 2.
Example of Decision Support: Provider Report



02/25/2010 **MeTree Personalized Risk Profile**

MeTree ID: #1234
Questionnaire: #9999
Patient X
DOB: 5/25/1965 Age: 41
BMI: 28

ACTIONABLE ITEMS

- **Refer to genetic counseling for comprehensive INHERITED THROMBOPHILIA risk assessment & management**[1]
- **Refer to genetic counseling for comprehensive CANCER risk assessment & management**[2,3,7-9]
- **Coordinate risk management for HNPCC syndrome according to NCCN guidelines (www.nccn.org)**
- **Discuss chemoprevention for breast cancer (tamoxifen)**[5,6]

INDICATIONS

Personal History
- Venous thrombosis in unusual location (head, neck, arm or abdomen).
- Patient meets Amsterdam II criteria for clinical diagnosis of HNPCC syndrome.
- Patient's 5-year breast cancer risk (Gail model estimate = ____%) exceeds cut-off of 1.65%.

Family History
- At least 1 first-degree relative was diagnosed with colorectal cancer < age 50.
- At least 3 relatives with HNPCC-related cancers (colorectal, uterine, gastric, ovarian, renal, small bowel, pancreatic, brain).

Contraindication(s)/Other Factors to Consider:
- Patient using oral estrogen or progesterone.
- Patient has had stroke.
- Patient has had blood clot(s).
- Refer to pedigree for additional indication(s) relating to thromboembolism

NOTE(S)

NOTE(S):
- Tamoxifen's effectiveness for breast cancer chemoprevention has not been tested in women who are under age 35, pregnant, breastfeeding, or taking hormone replacement therapy.
- Tamoxifen is associated with increased risk of endometrial cancer and thromboembolic events.
- Check patient's previous tamoxifen use.

MeTree© Assessment Tool recommendations are based on information supplied by patient. They may not represent a complete clinical assessment and are not intended to supplant physician discretion in risk management. Based on your needs, a genetic counselor may suggest additional screenings that are not included in this report.

[1] Chest Guidelines Chest 126; 3 September 2004 Supplement 401S
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Note. Reprinted from Orlando et al [19].

TABLE 2.
Features of Electronic Primary Care Decision Support Programs

Program	Diseases covered	Who enters the information?	Who receives the output?	Availability of output at point of care?	Public availability of program
MeTree	colon cancer, breast cancer, ovarian cancer, and hereditary cancer syndrome risk	Patient (online or in the physician's office)	Patient and physician	Yes	In future
Program described by Schroy et al. [36]	colon cancer	Physician	Physician	Yes	Unknown
Genetic Risk Assessment in the Clinical Environment (GRACE) [37]	breast cancer[a]	Patient (in the physician's office)	Patient, clinical nurse specialist, or physician	Yes	Unknown
Family Healthware [38]	coronary heart disease, diabetes, stroke, colon cancer, breast cancer, and ovarian cancer	Patient (online)	Patient or physician	Unknown	No
Family Health*Link* [39]	coronary heart disease, cancer	Patient (online)	Patient	No	Yes
Cancer Risk Intake System	colon cancer	Patient (in the physician's office)	Patient and physician	Yes	No
MyGenerations [40]	cancer	Patient (online)	Patient	No	Yes
HughesRiskApps [41]	breast and ovarian cancer	Patient or clinician (can be revised online or in the physician's office)	Patient and physician	Yes	Yes
Health Heritage [13]	87 diseases: including multiple cancers, diabetes, neuromuscular diseases, and cardiovascular diseases	Patient (online)	Patient	No	No

[a] GRACE is designed for use only with women who have a family history of breast cancer.

Community pilot program. The phrasing and clarity of the questions used to collect family health history were assessed via cognitive interviews with community volunteers, a technique that has been successfully used across diverse populations to ensure that health materials are understood as researchers intend [32-34]. Volunteers were acquired through convenience sampling: They were recruited from the pool of visitors and staff members entering Moses Cone Hospital and were offered a $20 gift card for participating. The volunteers were each asked to read the family health history collection questions one at a time and then tell the interviewer, a team member trained in cognitive interviewing, what the question meant to them and whether the question was clear. Usability of the family health history collection interface was evaluated by asking volunteers to complete the family health history collection and then to comment on screen layout, skip patterns, fonts, button size, and other formatting features. The amount of time required to complete the collection of family health history was tracked for each volunteer. Based on these results, the development team revised the content and presentation of the questions and then repeated the item phrasing and usability testing until saturation was reached—that is, until no new comments were given.

Genetic counselor pilot program. Ten cancer counselors and 3 thrombophilia genetic counselors, all of whom had had no prior interaction with MeTree, were recruited through local professional networks to assess the usability, quality, and thoroughness of the decision support content and the accuracy and clarity of the risk algorithms and recommendations. Each counselor entered at least 5 sample cases into MeTree, reviewed the decision support output, and completed an online survey developed by the study team. The following are examples of questions used to assess usability: "What problems do you foresee patients having with MeTree?"; "On a scale of 1 (not easy at all) to 5 (very easy), how easy will it be for your patients to understand the questions?"; and "What technical problems, if any, did you encounter?" Additional questions were used to assess content, such as: "What questions, if any, did you expect to see that pertain to cancer risk, but didn't?"; "Is the pedigree and risk report generated by MeTree more helpful than the typical referral information you receive (Y/N)?"; and "In your professional opinion, are the recommendations on the provider report consistent with the sample patient's level of risk for colon cancer?" The algorithms and reports were revised to address areas of deficiency or inaccuracy.

Clinical practice pilot program. MeTree was integrated into 2 community-based primary care clinical practices in the Cone Health system in Greensboro, North Carolina, as part of a hybrid type II implementation-effectiveness trial. (More information about how such trials are designed can be found in a 2012 article by Curran and colleagues [35].) Details of our study design can be found in the published protocol paper [19]. The 2 practices, which have served the community for almost 20 years, care for more than 21,000 unique patients annually and are staffed by 13 primary care providers (12 internal medicine or family medicine physicians and 1 nurse practitioner). Both practices used paper charts at the time of implementation, but each converted to an EMR system (although to 2 different systems) during the 3-year pilot program. During the first 6 months of the trial, implementation research methodology was used to assess and adapt the implementation effort, and a clinical expert assessed the accuracy of the risk algorithms and recommendations.

To address the quality and impact of integration into clinical workflow, a study coordinator was embedded into each clinical practice. The study coordinators verbally conducted daily cycles of feedback from stakeholders (patients, clinic staff, and providers), and the lead investigator, an internist with training in health services research, conducted monthly cycles of verbal stakeholder feedback. The study coordinator recorded all questions asked by patients during the visit as well as any unprompted questions asked by clinic staff members and providers; the study coordinator also asked staff members and providers specific questions. All stakeholders were encouraged to provide open and honest responses to open-ended questions such as: "What has your experience been so far?"; "What could we improve?"; What barriers are you encountering?"; "Do you have any concerns?"; "Is the report content and format clear and helpful?"; and "How and when are you receiving reports?" Responses were clarified using funneling questions to elicit greater detail regarding who, what, why, how, and when; the clarified responses were then used to adapt components of the program (including usability, decision support documents, and workflow integration) that did not meet stakeholder needs. Clinic staff members (nurses and clerks) were asked the same questions as providers, but data for the 2 groups were analyzed separately.

To assess the accuracy of the programming, coding, algorithms, and report output, a genetic counselor reviewed every pedigree and its associated recommendation reports for patients enrolled during the first 6 months of the pilot program. Mismatches between pedigree input and algorithm or report output were identified and referred to a second genetic counselor for review. When both genetic counselors agreed that a mismatch was present, coding errors were identified and corrected.

Results

Community pilot program. A total of 19 individuals completed cognitive interviews during 3 iterative cycles of data collection and MeTree revision, after which saturation was reached. Among the 19 cognitive interviewees, 11 were female and 8 were male; 7 were African American and 11 were white; and 14 of the interviewees had some college or less education. Age was recorded in 5-year increments, and interviewees included at least 1 person in each age bracket from 18 to 70+ years. Interviewees suggested ways of simplifying and organizing MeTree's questions and proposed that disease definitions be added. As a result of these suggestions, longer questions were broken into multiple shorter questions, questions about maternal and paternal relatives were organized more intuitively, and pop-up boxes were added that defined diseases in lay terminology.

During 3 iterative cycles of usability testing, 22 individuals (16 females and 6 males; 7 African Americans and 15 whites) completed MeTree's family health history collection. These individuals were diverse in education (8 had less than a bachelor's degree) and age (the only age bracket that was not represented was 65–69 years). The average time to complete MeTree was 20 minutes. Comments from volunteers included recommendations to increase the size of the font and buttons, to provide clearer error messages, to employ fewer drop-down lists, to give users the option of using either a mouse or a touch screen, to add "don't know" as a response option, to emphasize important instructional words, and to make the status bar more prominent. The programming was also revised to allow users to more easily remove relatives who had been entered by mistake and to automatically save information as it is entered, thus allowing users to jump between screens.

Genetic counselor pilot program. Feedback from the cancer genetic counselors regarding MeTree's usability, question content, printed reports, and algorithms included the following recommendations: to facilitate navigation by employing skip patterns (eg, avoiding cancer-specific questions in unaffected relatives); to allow users to quickly and easily move back and forth between questions; and to ask about cancer genetic testing in the patient and his or her relatives. To address these suggestions, program developers added skip patterns throughout the program, "bread crumbs" to allow users to find earlier pages more easily, and a series of questions about specific tests for hereditary cancer syndromes.

Suggestions regarding report content and clarity, which made up the bulk of the feedback, included proposals that the following information be added: colon cancer recommendations based on polyp histology (adenomatous versus nonadenomatous); recently published guidelines on breast magnetic resonance imaging screening [25] and colorectal cancer surveillance [29]; and screening and surveillance recommendations for patients who are referred for genetic counseling, in case they decline counseling. Reports were revised accordingly.

Suggestions regarding algorithms included a recommendation that patients meeting Amsterdam II criteria be referred to genetic counseling for Lynch syndrome screening [24], and a recommendation that maternal and paternal relatives be coded separately to restrict the counting of relatives to one side of the family. This last suggestion was due to concern regarding over-referral to counseling, because some of MeTree's recommendations are based on the number of affected relatives (eg, having 3 relatives with the same cancer merits referral to genetic counseling).

Clinical practice pilot. The implementation of feedback from clinical staff was uniformly positive, and no changes were recommended. Among the 192 patients (mean age, 58 years; 58% female; 75% white) who were enrolled in the study during the first 6 months, feedback was also uniformly positive, except from some individuals older than 60 years who were uncomfortable using a computer. In those cases, no actionable feedback was provided. Providers indicated that patient flow was unaffected by integration of MeTree and that patient discussions and the clinical encounter were improved by the presence of the reports.

However, providers did make several recommendations regarding report content and organization. Initially, the beginning of the reports contained a risk management recommendation along with a significant amount of detail supporting the recommendation. In addition, to avoid offending providers, most recommendations were passively worded using terms such as "consider a discussion about . . ." All providers agreed that reorganizing the reports to highlight simple, clear, action-oriented plans was crucial to usability during normal clinic workflow. The additional details supporting the recommendations, such as the personal history or family health history triggers that elicited the recommendation; "special cases," such as when not to follow the recommendation; and a link to the guideline itself were all strongly endorsed as useful just-in-time education that the providers wanted to continue to see, but in a separate section. They also requested the addition of clinical data supporting the recommendation (including trial data, such as clinical validity and utility) and potential harms and benefits of the recommendation. Therefore, the report was modified to present a bulleted list of action items in a prominent section at the beginning of the report, followed by several sublevels of just-in-time education, each with an increasing level of detail to give providers the depth of knowledge they desired without negatively impacting their patient workflow.

Programming validation. During the genetic counselor review of pedigrees and reports for the 192 patients enrolled during the first 6 months of the clinical practice pilot, 52 participants (27%) were identified as having 73 potential mismatches between the pedigree and the provider or patient report. After review by a second genetic counselor, no error was found in 22 (30%) of the 73 potential mismatches, but the remaining 51 mismatches (70%) had errors that required programming revisions. Errors and solutions within this group were as follows: With regard to formatting, 13 (25%) mismatches involved pedigree spacing that was off and needed to be revised. With regard to clarity of the report's contents, 2 (4%) mismatches occurred because a MeTree question was not clear, and those questions were revised for clarity; 10 (20%) of the mismatches occurred because the text of the provider reports and the patient reports was unclear, so that text was revised for clarity; and 15 (29%) of the mismatches involved the pedigree being inconsistent with the reports to the provider and the patient, so relevant details were added to the pedigree, and a separate data report was generated. With regard to coding errors, 11 (22%) mismatches involved algorithm coding problems, so the coding was revised. Examples of coding corrections include adding an upper age limit to chemoprevention recommendations and adding affected maternal and paternal relatives separately. To maintain confidence in the accuracy of the coding, pedigrees were randomly reviewed for 1 year following the 6-month pilot phase, and no new errors were found.

Discussion

Primary care providers are expected to systematically collect family health history and to manage their patients' disease risks accordingly, yet many provider-level, patient-level, and system-level barriers in primary care impede the uptake of this deceptively complex activity [9]. This paper outlines the foundational goals, development, and stepwise validation of MeTree, a computerized, patient-entered family health history collection and decision support program that addresses many of the barriers to the collection of high-quality family health histories and use of this information for risk assessment. MeTree was adapted during each step of validation: testing with community volunteers for usability and understanding; testing with genetic counselors for usability, content, and accuracy; and testing in clinical practice for feasibility, uptake, and accuracy. The end result of this process is a valid tool optimized to promote uptake of family health history collection and implementation of guidelines for risk-stratified evidence-based prevention and screening in busy primary care practices.

A structured family health history is crucial to appropriate risk assessment in asymptomatic or presymptomatic individuals. Compared with other markers of disease risk in this group (ie, clinical variables), family health histories are more readily available and have higher odds ratios for predicting disease, and the collection of a family health history is frequently the first (and sometimes only) step in risk stratification. In addition, a growing number of guidelines rely on risk stratification to guide the prevention and screening strategy. Examples of conditions for which guidelines rely on risk stratification include the conditions for which MeTree provides clinical decision support (breast and ovarian cancer, colon cancer, hereditary cancer syndromes, and thrombosis) along with cardiovascular disease, cerebrovascular disease, inherited cardiomyopathies and arrhythmias, and inherited neurologic conditions. Given that primary care practices are medical homes for all patients regardless of their health status, these practices are the ideal place to carry out risk assessment and risk-guided prevention strategies, which places much of the emphasis (and the burden) on the primary care provider.

Our goal in developing MeTree was to relieve some of this burden. MeTree has 5 of the 7 characteristics of the "ideal family history tool" described by Rich and colleagues [9]. MeTree is "patient-completed" and "adapted to patient age, gender, ethnicity, and common conditions" [9]. Our extensive pilot testing via cognitive interviewing, usability testing, genetic counselor review, and provider review showed it to be "brief, understandable and easy to use" [9]. Finally, MeTree "contains clinical decision support" at the point of care and "branches and prioritizes based on clinical significance" [9]. This combination of attributes, MeTree's focus on seamless integration within primary clinical practice workflow, and its emphasis on both the patient and the provider as recipients of different types of tailored information were unique at the time MeTree was developed. Table 2 shows a comparison of MeTree's characteristics with those of currently available electronic tools for family health history collection and decision support.

One limitation of MeTree is the lack of integration with a medical record (the most common request from providers). To our knowledge, none of the existing family health history tools directly integrate into EMR systems, although there may be institutions where local adaptions have overcome this barrier; these would be unique to the setting and permit only local integration. The reason for this lack of integration is simple, although not intuitive: Integration of a family health history collection tool into an EMR system comes with considerable limitations and complexities. Each EMR system structures family health history differently, requests different types of information (often not based on the need for risk assessment), and uses nonstandard formats (despite the push for compatibility with Health Level Seven [HL7] standards of health care informatics interoperability). In addition, compatibility with one EMR system frequently does not permit compatibility with another EMR system, or even with the same EMR system implemented in a different setting. With the current state of EMRs, the only way to directly integrate with EMRs would be to rebuild MeTree within each individual EMR system, restructuring their EMR data format in the process. The end result would be 100 different instances on 100 different systems, all of which would need algorithm maintenance and system support—an overwhelming task for an academic group with limited time and resources. Before integration can feasibly proceed, EMR systems need to adopt standards for data structure, storage, and transmission across systems.

Another limitation is that, despite extensive piloting among stakeholder groups, implementation of MeTree has been studied in only 2 clinics within a single community setting. Optimal performance in those clinics does not predict optimal performance in other settings. To promote broader uptake across a variety of settings, MeTree will need to be evaluated for uptake, fidelity, and performance in other types of settings.

The above limitations refer to the specific case of developing and validating MeTree; however, as a tool for clinical practice, its impact needs to be evaluated in the clinical environment, which we are doing as part of the hybrid type II implementation-effectiveness study that recently concluded at the pilot clinics. In order to continue to serve our goals of improving patient care and offloading provider work, we also intend to continue to do the following things: (1) optimize workflow integration by promoting family health history data standards and develop a demonstration of EMR integration; (2) add decision support for other conditions with risk-stratified evidence-based primary prevention guidelines; (3) enhance patient reporting by taking advantage of apps, online tools, and other tools to facilitate understanding and uptake of recommendations; and (4) incorporate patient behaviors, values, and preferences in the report's output to further personalize recommendations and adapt them to each patient's unique situation. NCMJ

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Acknowledgments

This work was performed under the auspices of the Genomedical Connection. In particular, we would like to thank Susan Blanton, PhD, and Peggy Vance, PhD, for their vision and hard work in envisioning, developing, and validating MeTree.

Funding for this project was provided by the US Department of the Army (grant # W81XWH-05-1-0383). This study was approved by the institutional review boards of all 3 collaborating institutions and by the US Department of Defense.

Potential conflicts of interest. L.A.O. and G.S.G received funding from the National Human Genome Research Institute for a U01 (grant # 1U01HG007282-01) to implement MeTree in a diverse set of clinical practices. All other authors have no relevant conflicts of interest.

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POLICY FORUM

The Affordable Care Act

Introduction

With many of the major provisions of the Patient Protection and Affordable Care Act of 2010 (ACA) poised for implementation in less than 6 months, a new era in health care seems to be just over the horizon. Yet I also feel a sense of déjà vu. Haven't we been here before? Where would medicine be today without bold, visionary, and often controversial legislation that disturbed the status quo?

A century ago, publication of the Flexner Report was the death knell for the apprenticing of medical students (mostly young men) to become physicians, and medical education soon evolved into a standardized medical school curriculum. A generation later, physicians in the armed forces discovered that World War II draftees were shockingly unhealthy, and they responded with screening, examination, treatment, vaccination, and the introduction of antibiotics. In the postwar period, President Harry S. Truman encouraged the expansion of Blue Cross and Blue Shield after his own plan for national health insurance coverage faltered, and the Hill-Burton Act provided capital funds to build hospitals in communities that otherwise could not have done so.

In the 1960s President Lyndon Baines Johnson expanded the social security net in America with the introduction of Medicare and Medicaid, both of which have been reviled by economists and legislators in succeeding administrations yet also blessed by subsequent presidents. Around the same time, Community Health Centers emerged from the Office of Economic Opportunity. Along with the Migrant and Rural Health Care Act, these centers brought quality primary care to areas where it was lacking.

In the 1980s President Ronald Reagan warned of socialized medicine and encouraged a focus on efficiency, cost cutting, and increased quality in service delivery. President Bill Clinton famously failed to explain or garner support for his complicated health care proposal. President George W. Bush helped provide affordable medications to elderly individuals with the Medicare Part D expansion. Unfortunately, it was plagued by a flawed rollout, difficult-to-explain options, and a donut hole. George W. Bush also promoted Health Savings Accounts to help people pay for uncovered benefits, fill gaps in coverage, and decrease the burden of copayments and deductibles.

Building on this history, the ACA has now arrived—with all its mandates and its challenges. Like much of the health care reform legislation preceding it, the ACA is confusing, frustrating, and incomprehensible to most, and it has already been vilified and criticized for these and other flaws. Nonetheless, the ACA attempts to address the 3 biggest issues in our current health care system—accessibility, quality, and cost—and any success in these areas might yet prove to be a cause for celebration. Like its predecessors, the ACA challenges the status quo; if history holds, it will also be a nonnegotiable part of our health care framework for years to come. NCMJ

Peter J. Morris, MD, MPH, MDiv
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ISSUE BRIEF

Implementing the Affordable Care Act in North Carolina:
The Rubber Hits the Road

Pam Silberman

The health insurance mandate, perhaps the best-known provision of the Patient Protection and Affordable Care Act of 2010 (ACA), is slated to go into effect on January 1, 2014. Yet most people do not know how the ACA will affect them. More than one-third of people in a recent national poll were unaware that new health insurance marketplaces will make it easier to purchase coverage or that some people will qualify for subsidies to help them purchase coverage. The ACA includes many other provisions that will have a profound impact on our health care delivery system. Some changes are already helping to break down silos in the delivery of care. Groups of health care professionals are working together to manage the health of populations. The ACA places a much greater emphasis on measuring quality and on paying health professionals and health care institutions based on the value of the services they provide. In addition, the ACA makes greater investments in prevention and in population health management. This issue brief highlights some of the health system changes that have taken place over the past 3 years, as well as some of the potential changes that are yet to come relating to insurance coverage, access to care, quality of care, rising health care costs, and overall population health.

Despite the fact that the Patient Protection and Affordable Care Act of 2010 (ACA) was passed more than 3 years ago, there continues to be substantial confusion about what the law does—and does not—do [1]. In a Kaiser Health Tracking poll conducted in March 2013, a majority of people (57%) reported that they do not have enough information to know how the ACA will affect them. This includes more than two-thirds of uninsured individuals and those in households that might be eligible for assistance in paying their premiums. Although most people in this poll knew about the individual insurance mandate (74%), fewer knew about the potential Medicaid expansion (59%), the creation of health insurance marketplaces (58%), or the availability of subsidies to help people pay for coverage (62%) [2].

Most of the publicity to date has been about the insurance coverage provisions of the ACA. However, the ACA goes far beyond insurance coverage. The legislation addresses 4 fundamental problems in our current health care system: barriers to access created by lack of insurance coverage and an inadequate supply of providers; uneven quality of care; rapidly rising health care costs; and poor population health outcomes. In upcoming months, the media will pay increasing attention to the new insurance options that will be available in the health insurance marketplaces (formerly called exchanges), as the initial open enrollment period runs from October 1, 2013, through March 31, 2014. What has received less coverage are the other changes in our health care delivery system that are the result—in large part—of the passage of the ACA. But these changes are at least as profound as those in the insurance marketplace.

Over the past 3 years, the federal government has made changes that have the potential to transform the way we pay for and deliver care. Changes are already helping to break down silos in the delivery of care. For example, hospitals are working more closely with community providers to reduce the number of hospital readmissions. Hospitals and local health departments are collaborating to address community health needs. And groups of health care professionals are working together to manage the health of populations. The ACA places a much greater emphasis on measuring quality and on paying health professionals and health care institutions based on the quality of the services they provide. In addition, the ACA makes greater investments in prevention and in population health management.

This issue brief highlights some of the health system changes that have occurred over the past 3 years, as well as some of the potential changes yet to come. It updates previously published articles in this journal [3, 4] about the implementation of health reform in North Carolina. This issue brief is divided into 4 sections, each of which addresses one of the major health care challenges facing our system: insurance coverage and access to care, quality of care, rising health care costs, and overall population health.

Electronically published August 1, 2013.

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N C Med J. 2013;74(4):298-307.
0029-2559/2013/74403

Insurance Coverage and Access to Care

In 2010–2011, almost 1 in 5 nonelderly North Carolinians —more than 1.5 million people—were uninsured [5]. Uninsured individuals are more likely to report barriers to obtaining needed health care services. On the 2011 Behavioral Risk Factor Surveillance System Survey, almost half (48%) of uninsured adults surveyed in North Carolina reported that there had been a time in the past 12 months when they needed to see a doctor but could not do so because of the cost, whereas only 11% of those with insurance coverage reported facing that access barrier [6]. Likewise, only 44% of uninsured individuals had seen a doctor for a routine checkup within the past 12 months, compared with 80% of those who had insurance coverage [7]. National research has shown that uninsured individuals are less likely to receive preventive health screenings, are more likely to be diagnosed with advanced health problems, and are more likely to die prematurely than are those with insurance [8].

As enacted, the ACA was expected to result in coverage for approximately 33 million of the 60 million uninsured Americans by 2022 [9]. The legislation sets out to accomplish this goal by building on our current system of health insurance coverage. Medicaid is expanded to cover adults with incomes up to 138% of the federal poverty level (FPL). Specifically, the ACA expands Medicaid to adults with incomes up to 133% of the FPL, plus it included a 5% income disregard, thus effectively raising the Medicaid income limits to 138% of the FPL [10]. The ACA will also require employers with 50 or more full-time-equivalent employees to provide employer-sponsored insurance for those working full time [11]. Individuals without other health insurance coverage and small businesses will be able to shop for coverage through the new online health insurance marketplaces to be set up in every state [12]. The law provides tax subsidies for health insurance premiums, on a sliding-scale basis, to individuals or families with incomes between 100% and 400% of the FPL if they are not eligible for public coverage and do not have access to affordable employer-sponsored insurance [13]. (See Table 1 for a list of FPL cutoffs for households of different sizes.) Per the so-called "individual mandate," most people will be required to have health insurance coverage beginning in 2014 or to pay a penalty [14].

TABLE 1.
Yearly Household Incomes Representing Certain Percentages of the 2013 Federal Poverty Level (FPL)

Number of people in the household	100% FPL	138% FPL	200% FPL	400% FPL
1	$11,490	$15,856	$22,980	$45,960
2	$15,510	$21,404	$31,020	$62,040
3	$19,530	$26,951	$39,060	$78,120
4	$23,550	$32,499	$47,100	$94,200
Each additional person	$4,020	$5,548	$8,040	$16,080

Note. 100% and 400% FPL are cutoffs used to determine eligibility for subsidies in the marketplace, 138% FPL is the cutoff for the Medicaid expansion, and 200% FPL is the maximum family income for a child to qualify for Medicaid or North Carolina Health Choice.
Source: Office of Assistant Secretary for Planning and Evaluation, US Department of Health & Human Services. 2013 Poverty Guidelines. http://aspe.hhs.gov/poverty/13poverty.cfm. Accessed April 24, 2013.

Several lawsuits were filed to challenge the constitutionality of both the individual mandate and the mandatory Medicaid expansion. The Supreme Court of the United States decided these issues on June 28, 2012. In *National Federation of Independent Business v. Sebelius* [15], the court upheld the constitutionality of the individual mandate, deeming it to be a constitutional exercise of the taxing authority of the US Congress. However, the court decided that the mandatory expansion of Medicaid to cover low-income adults was unconstitutionally coercive to the states. As a result, the Medicaid expansion became optional to the states. The rest of the ACA was left intact.

Medicaid Coverage

In North Carolina, approximately 41% of uninsured adults have incomes below 138% of the FPL [5] and would therefore be income-eligible for the Medicaid expansion. However, not everyone who is income-eligible would actually qualify for coverage. The ACA did not expand Medicaid coverage to undocumented immigrants or to lawful immigrants who have been in the United States for less than 5 years. In addition, past history shows that not everyone who is eligible for a public program actually applies for it. In fact, a recent study by Sommers and colleagues [16] estimated that only 62% of nonelderly adults who are eligible for Medicaid and who lack private insurance coverage are enrolled in Medicaid nationwide.

The North Carolina Division of Medical Assistance (DMA) estimated that between 494,010 and 536,481 people would gain Medicaid coverage during the years 2014 through 2021 if the state were to expand coverage to low-income adults [17]. For the first 3 years (2014–2016), the federal government would pay 100% of the costs of providing services to newly eligible individuals, and the federal match rate would then gradually be reduced to 90% by 2020 [10]. North Carolina would also achieve some savings in existing state programs if the state were to expand Medicaid, because the state currently pays for some (limited) services to uninsured individuals that would be covered through Medicaid under the expansion, with the federal government picking up all or most of the cost. In addition, the federal dollars that would flow into North Carolina would generate new state tax revenues. Thus the effect on state finances of expanding eligibility to cover this new group of adults would range from a net savings of approximately $124 million in state fiscal year (SFY) 2016, when the federal government would be paying 100% of the costs of services, to a net cost of approximately $120 million in SFY 2021 and thereafter, when the federal match rate would have been reduced to 90% [17]. As of May 2, 2013, the governors of 27 states had indicated an interest in expanding Medicaid. In contrast, governors of 20 states, including North Carolina, had indicated that they do not want to expand Medicaid. The governor's offices in 3 other states were weighing their options [18].

The North Carolina General Assembly passed legislation this year to reject the Medicaid expansion [19]. However, North Carolina, like any other state that rejects the Medicaid expansion this year, can choose to expand coverage at a later date. Likewise, states that choose to expand coverage now can later reject the Medicaid expansion [20]. Choosing Medicaid expansion in a later year would mean forgoing 1 or more years of the 100% federal match.

Even though the North Carolina General Assembly has chosen not to expand Medicaid, the ACA will nevertheless lead to more people being covered through Medicaid or through North Carolina Health Choice for Children (NCHC). NCHC is North Carolina's Children's Health Insurance Program (CHIP) for children whose parents earn too much to qualify for Medicaid but whose family income is no more than 200% of the FPL. The DMA has estimated that between 69,683 and 87,127 new people will enroll in Medicaid or NCHC between 2014 and 2021 [17]. These are people who are currently eligible for one of these programs but who are not enrolled in either. The ACA creates a "no wrong door" approach to eligibility and enrollment. In the health insurance marketplace, the same application will be used to determine eligibility for Medicaid, NCHC, and/or private coverage [21]. In fact, the system must first determine whether a person or family is eligible for public coverage before determining their eligibility for subsidies in the marketplace. In his commentary in this issue of the NCMJ, Atkinson [22] discusses how the state and county departments of social services are implementing the state's new eligibility system and preparing for the potential increase in enrollment that is likely to occur starting this fall.

Many of the people who will gain public coverage will be children, as approximately 150,000 uninsured children are currently income-eligible for either Medicaid or NCHC [5]. Since this group of new enrollees was already eligible but was not enrolled, the federal government will only pay its regular share of the costs of their health care services (currently approximately 65% for Medicaid enrollees). The cost to the state for covering those individuals who are currently eligible and are likely to gain coverage will range from approximately $37 million in 2014 to $203 million in 2021 [17].

Employer-Sponsored Insurance

More than half (57%) of nonelderly North Carolinians had employer-sponsored health insurance in 2011 [23]. Although employer-sponsored insurance is the primary source of coverage for nonelderly individuals who are insured, having a job does not guarantee coverage. Most uninsured individuals either work themselves, or they live in a household where someone is working full-time. In fact, more than 70% of uninsured North Carolinians live in households with at least 1 full-time worker, and more than one-quarter live in a household with 2 or more full-time workers [5].

The ACA requires large employers to offer health insurance coverage to their full-time employees or to pay a penalty [11]. For this purpose, a large employer is defined as any employer having 50 or more full-time-equivalent employees, and a full-time employee is defined as someone who works 30 hours or more per week. Employers must offer their employees and the employees' dependents (defined as children under the age of 26 years) [24] minimum essential coverage, which is comprehensive health insurance coverage that has an actuarial value of at least 60% [25]. That means that the health insurance must pay, on average, at least 60% of the costs of the covered services, leaving the individual employee to pay no more than 40% in out-of-pocket costs, including deductibles, coinsurance, or copayments.

If an employer does not offer coverage, or if they offer coverage that has an actuarial value of less than 60%, and at least one of their employees seeks and obtains subsidized coverage in the state's health insurance marketplace (described more fully below), then the employer will be required to pay a financial penalty to the Internal Revenue Service. Employers will be required to pay $2,000 per year for each full-time employee (not counting the first 30 employees) [11].

Although large employers must offer coverage that meets the 60% actuarial value requirement, they are not required to pay any particular proportion of the cost of the premiums. However, employers may be subject to a penalty if the coverage they offer is not affordable to the employee. The test of affordability is whether the employee must spend more than 9.5% of his or her income on health insurance premiums for self-only coverage [25]. Employers who offer coverage will be required to pay a penalty of $3,000 per year for any full-time employee who qualifies for subsidies in the health insurance marketplace [11]. Employers also have new reporting requirements as a result of the ACA [26]. Recently, the US Department of the Treasury announced that it would delay the reporting requirements, which effectively delays the employer mandate, until 2015 [27].

Some people have expressed concern that employers may drop coverage because of the ACA [28]. The Congressional Budget Office estimates that by 2022 there will be between 1 million and 4 million fewer people with employer-sponsored insurance than there would have been had the ACA not been enacted [29]. Other experts predict a slight increase in employer-sponsored insurance as a result of the ACA [30]. Historically, employers have not been required to offer health insurance coverage to their employees, but many have chosen to do so as a means of recruiting qualified employees. If employer-sponsored health insurance coverage does decline, this will continue a preexisting trend. The percentage of private firms that offer health insurance coverage to their employees in North Carolina dropped from 57% in 1999 to 48% in 2011; nationally during that same time period, this percentage dropped from 58% to 51% [31, 32]. Whether the ACA will affect this trend is unclear. Longobardo discusses some of the challenges that employers may face in implementing the ACA in his commentary in this issue [33].

Individual (Nongroup) Coverage

Beginning in January 2014, most people will be required to have health insurance or to pay a penalty [14]. Most people who have health insurance will meet this requirement through their existing coverage; this could be Medicaid, NCHC, Medicare, VA health benefits obtained through the Veterans Health Administration, the Department of Defense health care program TRICARE, employer-sponsored insurance, or insurance they buy on their own. Certain other individuals will be exempt from the insurance mandate, including those would be required to pay more than 8% of their income for the lowest-cost health insurance premium, those whose income is so low that they are not required to file taxes, prisoners, and some people with religious exemptions. In addition, the federal government recently expanded the exemptions to include people who would have been eligible for the Medicaid expansion but who live in states that chose not to expand Medicaid [34].

Health insurance coverage is expensive. In 2011, the average annual premium in North Carolina for an employer-sponsored plan was $5,230 for an individual or $14,304 for a family [35, 36]. Recognizing the high cost of health insurance, the ACA includes premium and cost-sharing subsidies for many individuals who seek private nongroup coverage. Individuals do not qualify for subsidies if they have access to publicly subsidized health insurance coverage (eg, Medicaid, NCHC, or Medicare) or to affordable employer-based coverage. In addition, individuals must meet income eligibility criteria, with subsidies limited to individuals with a family income between 100% and 400% of the FPL [13]. The subsidies are available on a sliding scale that is based on household income (Table 2). To qualify, an individual must purchase insurance through the state's federally facilitated health insurance marketplace. Because people with incomes below 100% of the FPL would have qualified for Medicaid under the legislation as it was passed, the ACA excludes most low-income individuals with incomes below 100% of the FPL from qualifying for subsidies in the marketplace.

In North Carolina, the federal government will create 2 insurance marketplaces—one for individuals and families, and the other for small businesses (the latter will be a Small Business Health Options Program, called a SHOP). Essentially, these marketplaces will be online tools that help consumers or small businesses understand and compare insurance options. The marketplaces will provide information about the plans that are being offered, covered benefits, premium costs, out-of-pocket costs, and the quality of the plans [12]. The marketplaces will also help determine

TABLE 2.
Sliding-Scale Health Insurance Subsidies To Be Provided as Part of the Patient Protection and Affordable Care Act of 2010

Household income, as a percentage of the federal poverty level	Maximum premium that can be charged, as a percentage of household income[a]	Out-of-pocket cost sharing, as a percentage of total costs[b]	2014 out-of-pocket cost-sharing limits[c] For an individual / For a family
	Subsidized		
100%-133%	2%	6%	$2,250 / $4,500
133%-150%	3%-4%	6%	$2,250 / $4,500
150%-200%	4%-6.3%	13%	$2,250 / $4,500
200%-250%	6.3%-8.05%	27%	$5,200 / $10,400
250%-300%	8.05%-9.5%	30%	$6,400 / $12,800
300%-400%	9.5%	30%	$6,400 / $12,800
	Not subsidized		
>400%	No limit	30%	$6,400 / $12,800

[a] The maximum premiums listed as a percentage of household income assume that the family purchases the second-lowest cost "silver" plan. If a family were to purchase the lowest-cost plan instead, they would pay a smaller proportion of their income in premiums. Conversely, if a family purchased a higher-cost plan they would pay the difference between the premium amount for the plan they chose and the premium for the second-lowest cost silver plan.

[b] Out-of-pocket costs include deductibles, coinsurance, and copayments; premium costs are not included. Thus, people with incomes up to 250% of the federal poverty guideline will pay a smaller proportion of total costs than will other individuals purchasing a silver plan.

[c] These out-of-pocket cost-sharing limits are taken from a bulletin from the Centers for Consumer Information and Insurance Oversight (CCIIO) at the Centers for Medicare & Medicaid Services titled Actuarial Value and Cost Sharing Reduction Bulletin. CCIO Web site. http://cciio.cms.gov/resources/files/Files2/02242012/Av-csr-bulletin.pdf. Published February 24, 2012. Accessed April 29, 2013.

eligibility for premium and cost-sharing subsidies and for coverage exemptions. The federal government recently created a Web site where people can access information about new insurance options: www.healthcare.gov. This Web site already includes information about the health reform law, and the marketplace applications and health plan comparison information will be available on October 1, 2013. Holliday and Lerche provide more information about the federally facilitated marketplaces in their commentary in this issue [37]; they also discuss the role that the North Carolina Department of Insurance will continue to play in regulating insurers and health plans.

Although many people will be able to go online and apply for coverage themselves, other people will want help in filing their application. The federal government will operate a toll-free hotline to answer questions and help people enroll in coverage (phone: 1-800-318-2596; TTY: 1-855-889-4325). The hotline will also refer people to trained enrollment counselors who can provide in-person assistance with the enrollment process. The overwhelming majority (77%) of uninsured individuals in North Carolina have been uninsured for longer than 1 year, and almost half (45%) have been uninsured for 5 years or longer [38]. Thus a large proportion of people who lack coverage in our state have no recent experience with health insurance. As the ACA requires, the federal government will contract with at least 2 organizations in every state that can help people understand their insurance options [39]. These entities, called navigators, will be trained and certified by the federal government. They will have a responsibility to conduct broad education and outreach about the ACA coverage requirements, and they will provide in-person assistance to individuals to help them understand their insurance options and enroll in coverage. Navigators must provide neutral, unbiased information and cannot advise people on which plan to select. Other trained and certified individuals, called certified application counselors, will also be available to help people enroll. Licensed agents and brokers will also be available to help individuals and/or small businesses select and enroll in coverage in the new marketplace, if they receive the requisite training and certification. The federal government will select navigator entities by August 15, 2013. Obiol describes the role of navigators in more detail in her commentary [40].

Health Insurance Coverage

Plans offered to individuals or small businesses, either inside or outside the marketplaces, must provide coverage of essential health benefits [41]. This includes services such as care from physicians and other health professionals; hospitalizations; emergency services; prescription drugs; maternity services; and treatment for mental health and substance use disorders, which must be covered in parity with coverage for physical health problems. In addition, parents will have coverage for vision and oral health services for their children. North Carolina's essential health benefits package is based on the most commonly purchased small-business health plan in North Carolina: Blue Cross and Blue Shield of North Carolina's Blue Options PPO (preferred provider organization) plan [42]. Insurers that choose to participate in the new marketplaces also have other requirements they must meet, including quality standards, network adequacy rules, and a requirement to contract with essential community providers [43]. In her commentary in this issue, Burke describes some of the implementation challenges facing insurers that are interested in participating in the marketplaces [44].

Helpful Resources

To help people understand their health insurance options, the federal government has established a Web site and a toll-free hotline.

Web site: www.healthcare.gov

Toll-free hotline: 1-800-318-2596 (phone) or 1-855-889-4325 (TTY)

In addition to essential health benefits, almost all insurance policies will be required to provide "first dollar" coverage (with no deductible or copayment) for in-network clinical preventive services that have been rated "A" or "B" by the US Preventive Services Task Force and for all immunizations that are recommended by the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention [45]. Insurers must also cover additional preventive services for children and women. The January/February 2013 issue of the NCMJ focuses on the new preventive services package for children. Beginning in 2014, insurers may not exclude people with preexisting health problems, nor will they be allowed to charge those individuals higher premiums [46]. Furthermore, they cannot impose annual or lifetime limits on the amount that is paid for covered services [47]. The ACA also includes out-of-pocket limits on covered services, thus protecting individuals and families from catastrophic costs [48].

Other Access Provisions

Health insurance coverage helps people pay for necessary health care services, thereby reducing financial barriers to care. Yet health insurance coverage alone is not sufficient to ensure access. There must also be health care professionals available to provide services. The ACA includes some provisions aimed at increasing the health professional workforce, and educational institutions in North Carolina have qualified for some of the grants associated with these provisions [49]. Most of the funding to date has focused on increasing numbers of nurses, nurse practitioners, and physician assistants—that is, health professionals who could be trained between 2010 (when the legislation was passed) and 2014, so that they will be ready to practice when the coverage expansion becomes effective. In addition, the legislation includes new funding to expand the National Health Service Corps, which provides scholarships or loan forgiveness for health professionals who are willing to practice in areas where there are shortages of health professionals

[50]. Ricketts discusses these workforce provisions in his commentary [51].

The ACA also specified that $9.5 billion be spent over a 5-year period (federal fiscal years [FFYs] 2011–2015) to expand or create new Federally Qualified Health Centers (FQHCs), which are also known as community and migrant health centers [52]. North Carolina received funding to create 11 new service locations, plus additional funding to help FQHCs achieve accreditation as patient-centered medical homes (PCMHs). Money discusses in his sidebar how the new funding will expand access to care and improve quality of care; he also describes some of the challenges that North Carolina's FQHCs will face in 2016 [53].

Improving Quality

The Agency for Healthcare Research and Quality ranks states on 149 different measures of health care quality. In 2011, the most recent year for which rankings are available, North Carolina's performance score for overall health care quality was "average" compared with the performance scores of other states [54]. North Carolina has undertaken many efforts aimed at improving quality of care, most of which predate the enactment of the ACA. The March/April 2013 issue of the NCMJ describes the efforts of various health care institutions and professional organizations to improve quality of care and patient safety.

Although many of the state's efforts to improve the quality of health care predate the ACA, the ACA has helped to accelerate these efforts. The legislation includes many provisions aimed at improving quality of care and health outcomes [55]. For example, the ACA requires the Secretary of the US Department of Health & Human Services to define quality, requires health care institutions and providers to report on quality of care measures, and includes provisions aimed at making data regarding quality of care available to the public. Data regarding the quality of care provided by hospitals and nursing facilities are already available at https://www.healthcare.gov/where-can-i-find-provider-information, and data regarding the quality of care provided by physicians will be made available in the next few years.

The ACA also includes provisions that begin to change the way that health care institutions and providers are paid; these provisions aim to reward providers based on quality of health care services and health outcomes. This builds on previous efforts by the Centers for Medicare & Medicaid Services (CMS) to reward quality. For example, in 2008 the CMS stopped paying hospitals for care provided to Medicare patients with hospital-acquired conditions, such as surgical-site infections following certain surgeries or removal of a foreign object left behind in the patient's body during a prior surgery [56]. The ACA extends this payment provision to Medicaid [57].

In addition, the ACA includes provisions that reduce Medicare payments to hospitals that have an excessive number of readmissions [58]. Hospitals with too many readmissions will be subject to a reduction in Medicare diagnosis-related group (DRG) payments of up to 1% in FFY 2013, 2% in FFY 2014, and 3% in FFY 2015. Initially, the CMS is tracking readmissions only for pneumonia, heart failure, and heart attacks, but this list of conditions will be expanded in 2015. In the first 6 months of FFY 2013, 59 hospitals in North Carolina were penalized for having too many readmissions, with an average reduction in reimbursement of 0.25% [59].

This year, the CMS began its Value-Based Purchasing (VBP) Program, which is another requirement of the ACA [60]. Under the VBP program, the CMS varies payments to hospitals based on the quality of the care delivered by the hospital; a hospital either receives bonuses or has its Medicare payments reduced based on the quality of care it is determined to have provided. Initially, in FFY 2013, the CMS examined 12 clinical measures of timely and effective care, as well as 8 patient satisfaction measures [61]. Hospitals were evaluated based on their aggregate achievement on these 20 measures, compared with the performance of other hospitals or compared with their own baseline performance. More than two-thirds (69%) of the 83 hospitals in North Carolina that were subject to the VBP program received a bonus, while the remaining 31% received a penalty [62]. On average, North Carolina hospitals experienced an increase in DRG payments of 0.11% as a result of this VBP program. Lawler and Floyd discuss how Vidant Health has been preparing for the VBP program in its 10-hospital system [63].

Reducing Escalating Health Care Costs

One of the biggest challenges facing the US health care system is the rapid escalation of health care costs. The United States spends more on health care than any other country, whether health care spending is measured as a percentage of gross domestic product (GDP) or in terms of per-capita costs. For example, the United States spent 17.7% of its GDP on health care in 2010 [64]. The Netherlands was the second highest spender of the 34 industrialized nations that are part of the Organisation for Economic Co-operation and Development (OECD); data reported in 2010 showed that the Netherlands spent 12.1% of its GDP on health care. Similarly, when health care spending is measured in terms of per-capita costs, the United States spent $8,247 per capita in 2010 on health care. The country with the second highest costs was Norway, which spent $5,413 per capita (in US dollars).

Health care costs are consuming an ever-increasing proportion of US and state finances, employer earnings, and family take-home pay. Between 2001 and 2011, the average employer health insurance premium for a single employee in North Carolina rose 188%, from $2,778 per year in 2001 to $5,230 per year in 2011, while the average premium for family coverage increased 204%, from $7,012 per year to $14,304 per year [34]. General inflation increased only 27% during that 11-year period [65].

The ACA includes many provisions aimed at reducing rising health care expenditures. Some of these provisions will have an immediate impact on health care spending, but they may not bend the cost curve. For example, the ACA cuts payments to Medicare Advantage plans [66], which historically have been overpaid compared with traditional Medicare [67]. The ACA also reduces the automatic increases in Medicare reimbursement to certain health care providers ("market basket" updates) [68]. These payment reductions will reduce Medicare spending in the short term, but they may have little impact on the rate of growth in future years.

Other ACA provisions are aimed at reducing the longer-term rate of growth in health care spending. Former CMS administrator Donald M. Berwick and RAND Corporation analyst Andrew D. Hackbarth have argued that between 21% and 34% of all health care spending is due to waste [69]. They attribute waste to the following 6 concerns: failures of health care delivery (eg, quality problems that lead to patient injuries or worse clinical outcomes); failures of care coordination caused by our siloed health care system; overtreatment; administrative complexity; pricing failures resulting from lack of transparency and a competitive marketplace; and fraud and abuse. The ACA takes several steps to address these problems. The law appropriates $10 billion over 10 years (FFYs 2011–2019) to study and test new payment and delivery models aimed at improving the patient's experience in the health care system (access and quality), improving population health, and reducing rising health care costs. These models include the PCMH, bundled payments, and accountable care organizations (ACOs) [70, 71]. These models are aimed at addressing 3 of the 6 identified sources of waste: failures of health care delivery, failures of care coordination, and overtreatment.

A PCMH essentially consists of multidisciplinary teams that provide comprehensive primary care, which includes preventive, acute, and chronic care. PCMHs actively engage patients in their own care, use electronic health records and information support to improve quality of care and patient outcomes, and generally include some form of payment reform to help support care coordination and care management [72]. North Carolina was one of the first states to receive a demonstration grant from the Center for Medicare & Medicaid Innovation; the money was used to test a multipayer PCMH model in 7 rural counties [17].

The concept behind episode-of-care models is to provide a bundled payment to a group of providers to cover all of the services provided to a patient during a single episode of care (eg, hip replacement, knee replacement, pacemaker placement, or treatment for a heart attack). The CMS is testing 4 different episode-of-care models: 3 are retrospective (meaning that the federal government will examine actual expenditures for an episode of care after services are rendered and compare them against a target price), and 1 is prospective (paying the hospital a prospective amount for all the services provided by the hospital, physicians, and other practitioners in the hospital for a specific clinical episode) [71]. Four North Carolina health care organizations are participating in the bundled payment initiative; 3 are health care systems and 1 is a home health agency. A commentary by McDonald describes the efforts of FirstHealth Moore Regional Hospital to test bundled payments for 4 clinical conditions [73]. This model is also being tested with private payers. Blue Cross and Blue Shield of North Carolina and CaroMount are testing a similar episode-of-care payment model for knee surgery [17].

The CMS is also testing ACOs, or Medicare shared savings arrangements, as part of the ACA. An ACO is an organization of eligible providers who assume responsibility for the quality, cost, and overall care of an assigned group of enrollees. Medicare ACOs can share savings with the CMS if they meet all of the ACO requirements, meet certain quality standards, and have measured savings below a calculated savings threshold. The CMS is currently testing 2 types of ACOs in Medicare: the Shared Savings Program and the Advance Payment Model, the latter of which is geared for rural providers with fewer enrollees [71]. Currently, 6 groups of health care providers in North Carolina are testing some form of Medicare ACO. In her commentary in this issue, Terrell discusses the work that she and her colleagues are doing at Cornerstone Health Care to participate in this Medicare demonstration project [74]. In addition, Community Care of North Carolina has received a grant to test a pediatric accountable care collaborative [17].

The ACA also appropriates new funding to support efforts to reduce fraud and abuse and to eliminate overpayments [75]. The ACA requires states to make changes in their state laws to more aggressively monitor fraud and abuse in Medicaid and CHIP. North Carolina passed a law satisfying this requirement in the summer of 2011 [76]. The ACA also includes provisions aimed at simplifying and standardizing health insurance administration [77, 78].

Improving Population Health

The goal of any health care system should be to improve the population's health. Yet the United States does not fare well compared with other countries when we examine population health measures. For example, among the 33 industrialized OECD countries reporting life expectancy data in 2010, the United States ranked 26th in life expectancy at birth (the country with the longest life expectancy was ranked 1st) [64]. Among the 33 countries reporting infant mortality rates that year, the United States ranked 30th; only Chile, Turkey, and Mexico had more deaths per 1,000 live births. Similarly, North Carolina does not fare well in comparison with other states. North Carolina ranked 33rd among the 50 states and the District of Columbia on overall population health based on a comparison of 24 different health-related measures [79].

The ACA includes provisions aimed at changing our health care system from one that focuses almost exclusively on treating illness to one that promotes health and well-being. The ACA has created the National Prevention Council and appropriates new funding for prevention [80]. The council is chaired by the US Surgeon General and includes 17 secretaries or other heads of federal agencies who are responsible for services or programs that potentially affect the health of the population. Included on this council are the secretaries of the Departments of Health & Human Services, Agriculture, Education, Labor, Transportation, Defense, Housing and Urban Development, and Veterans Affairs, and the Directors of the Domestic Policy Council and the Office of National Drug Control Policy. The Prevention Council has identified 7 priority areas: tobacco-free living, the prevention of drug abuse and excessive alcohol use, healthy eating, active living, injury- and violence-free living, reproductive and sexual health, and mental and emotional well-being [81]. The council's goal is to increase the number of Americans who are healthy at every stage of life.

The ACA has also created a new Prevention and Public Health Trust Fund (PPHTF) to invest more heavily in prevention and health promotion [82]. The ACA appropriated $500 million in new funding in FFY 2010, $750 million in funding in FFY 2011, and $1 billion in FFY 2012. Federal appropriations were scheduled to increase to reach $2 billion by FFY 2015. However, the Middle Class Tax Relief and Job Creation Act of 2012 [83] cuts $6.25 billion out of the PPHTF over the next 9 years. As a result, the Trust Fund will not reach $2 billion until FFY 2022 [84].

The US Department of Health & Human Services has distributed part of the PPHTF to states and localities through competitive and formula-based grants. North Carolina has done well in competing for the competitive grant awards. For example, the state received $10.6 million in grant funding between 2010–2012 to support evidence-based home visiting programs for infants and young children [85]. North Carolina is also receiving $14.9 million in 2011–2012 as part of a Community Transformation Grant (CTG) that will support efforts to reduce tobacco use and to promote healthy eating and active living [86]. The CTG grant is unique in that it supports multifaceted interventions at the community, policy, and clinical levels.

Although the work of the National Prevention Council and the PPHTF funding may be the most visible indications of the ACA's focus on prevention and wellness, they are by no means the only examples of the act's emphasis on improving population health. The ACA requires non-profit hospitals that want to maintain their tax-exempt status to conduct a community health needs assessment at least once every 3 years and to show what they are doing to address those needs [87]. In North Carolina, hospitals and public health agencies are collaborating to conduct the community health needs assessments and to develop interventions to improve population health. In their commentary in this issue, Randolph and Morrow [88] discuss how North Carolina is using the federal prevention funding and what the state is doing to support community-wide population health efforts.

Conclusion

Our experience with health care "reform" is still unfolding. We will not know for several years whether this health reform experiment is a success, a failure, or a little of both. The legislation has great potential to expand coverage to many uninsured individuals, to invest more heavily in prevention, and to improve quality of care. Furthermore, some of the new payment and delivery models supported by the CMS are likely to lead to improved quality of care, reduced waste, and greater collaboration between physicians, hospitals, home health, and other health care providers.

Yet there continue to be many challenges as we try to implement this complex legislation. Most people do not understand the law. How will people be educated about the new insurance options that will become available beginning this fall? How will we ensure that the poorest North Carolinians receive necessary health care services? Will our efforts to improve value in our health care system work? If so, will they continue to work as we move from pilot programs and demonstration projects to national implementation? Further, will we have the funding needed to successfully address the 4 major health challenges facing our country, given that some of the funding appropriated to support new programs or expansions has been cut by subsequent Congressional action?

Our current health care system has serious problems. We have far too many people without any coverage or with inadequate coverage. The quality of care is uneven, health outcomes are poor, and the rate of increase in health care spending is unsustainable. The ACA creates the needed framework for change, but the success or failure of the legislation will depend largely on our collective efforts to address these underlying health system challenges. NCMJ

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Acknowledgment

Potential conflicts of interest. P.S. has no relevant conflicts of interest.

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INVITED COMMENTARY

Shopping for Health Insurance in North Carolina's Federally Facilitated Marketplaces

Jean Holliday, Julia Lerche, Sarah Allen

North Carolina policymakers had initially planned for North Carolina to run its own health insurance marketplaces, but they have since decided to leave the operation of the marketplaces to the federal government alone. This article explores what it will mean for North Carolina to have federally facilitated marketplaces.

The health insurance marketplace (also called a health benefit exchange) is a key component of the health insurance expansion to be brought about by the Patient Protection and Affordable Care Act of 2010 (ACA) [1]. Although the legislation states that each state shall establish "an Exchange," states will actually have 2 marketplaces: One will provide online, telephonic, and in-person assistance to help individuals shop for and purchase private health insurance coverage; the other marketplace will offer the same types of assistance for small businesses that are seeking group coverage for their employees. The marketplaces are intended to increase health insurance coverage by providing a 1-stop shop for accessing new federal health insurance subsidies and tax credits for eligible consumers or small businesses, as well as allowing for easier comparison of plans based on cost and quality.

The key functions of the health insurance marketplaces include certifying and monitoring private health plans to be offered on the marketplace to ensure that they meet minimum standards; determining eligibility for subsidies and coordinating eligibility determinations with the state's Medicaid program and the Children's Health Insurance Program (CHIP); providing online consumer assistance; and facilitating enrollment into selected coverage. Marketplaces are required to be open and to begin processing applications by October 1, 2013, for enrollment in coverage effective January 1, 2014.

The ACA anticipated that each state would establish its own marketplaces, but it requires the federal government to run the marketplaces in states that choose not to operate their own. Because of the short timeline for implementation, the federal government also developed a third option in which states are allowed to take on some functions of the federal marketplaces, including in-person consumer assistance and plan certification and oversight. This model, referred to as the state-federal partnership, allows states to take on functions with which many states already have experience.

Requirements for Health Plans

The ACA places many new requirements on the health insurance plans that will be available for individual and small-group (50 or fewer employees) coverage beginning in 2014. (Some of the plans that were in place on or before March 23, 2010 are exempt from some of these new requirements.) For example, plans will be required to cover a minimum set of benefits based on a benchmark plan (called essential health benefits). There are 10 required-coverage categories that are part of the essential health benefits. Plans will also be required to meet new cost-sharing requirements, including limitations on out-of-pocket costs [2]. Insurers will be prohibited from rejecting enrollees and will not be allowed to set premiums based on an enrollee's health conditions. In fact, premiums for a given health insurance plan will vary based on only 3 factors: residence or employer location, member age, and tobacco use. Additionally, insurers will be prohibited from excluding coverage for preexisting conditions. All of these requirements apply to coverage offered both inside and outside the health insurance marketplaces [3].

There are additional requirements for plans offered through the marketplaces. For example, these plans will need to include a sufficient number and geographic distribution of "essential community providers" (generally safety-net providers) in their networks [4]. All plans offered by a single insurer in the federally facilitated marketplaces must be meaningfully different, to prevent insurers from flooding the marketplaces [5]. Additionally, insurers must price plans outside the marketplaces the same as similar plans inside the marketplaces [6].

At the time of this writing, the North Carolina Department of Insurance (NCDOI) was aware of 3 issuers that have applied to offer coverage to individuals through the federally-run marketplace in North Carolina, and 1 issuer that has applied to offer coverage to small groups in the federally-run

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Electronically published August 1, 2013.

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N C Med J. 2013;74(4):308-311.
0029-2559/2013/74404

marketplace. Other issuers will continue to sell insurance outside the marketplaces; however, consumers purchasing these plans will not have access to federal subsidies.

Availability of Subsidies

Individuals and families without access to public or "affordable" employer coverage who are legally residing in the United States and have household incomes between 100% and 400% of the federal poverty level can receive subsidies to help offset the cost of premiums for health insurance plans purchased through the marketplace [7]. (Employer coverage is considered to be affordable if the employee share of the premium for self-only coverage is no more than 9.5% of the employee's household income [8].) Additionally, those with incomes between 100% and 250% of the federal poverty level can receive financial assistance to help cover out-of-pocket costs, such as copayments, deductibles, and coinsurance [9].

Table 1 outlines a range of sample subsidy amounts. The subsidy level is determined using a sliding scale based on income and on the premium for a benchmark plan (defined as the second-lowest cost "silver" plan—one that covers 70% of costs on average [10]). For example, a family of 4 with a household income that is 200% of the federal poverty level (for 2013, that would be $47,100) [11] would not pay more than 6.3% of its annual income, or $2,970, for the benchmark plan. If the benchmark annual premium for families were $12,500, the family would receive a tax credit of $9,530. If the family chose a plan that was more expensive or less expensive than the benchmark plan, the subsidy would remain the same, and the family would pay, or get a tax credit for, the difference in premiums.

Individuals or families who receive a subsidy during the year will be required to file a tax return confirming their annual household income in order to reconcile the amount received with their actual income for the year. If an underpayment of premium tax credits is found, an additional tax credit will be applied to the tax return. If an overpayment of tax credits is found, the individual or family will be required to repay that amount. For those with incomes below 400% of the federal poverty level, the liability for repayment is limited to a maximum of $1,250 for individuals or $2,500 for families filing jointly for the 2014 tax year [12].

Marketplace for Small Businesses

Small employers (those with fewer than 51 employees) will be able to compare and purchase health insurance coverage through the Small Business Health Options Program (SHOP). The SHOP will allow employers to compare health insurance options based on premiums, benefit levels, and quality. The SHOP will expand to include employers with up to 100 employees starting in 2016. In 2017 states have the option to expand the SHOP to businesses with more than 100 employees [13].

Employers with 25 or fewer full-time employees with an average annual wage below $50,000 can qualify for tax credits to offset the cost of providing health insurance coverage to their employees. In 2014, these small employers, if they cover at least 50% of the cost of their employees' health insurance premiums, can claim a tax credit of up to 50% (or 35% if the employer is a nonprofit) of health insurance premiums paid. Small employers with fewer than 10 employees who have an average annual wage of less than $25,000 are eligible for the full credit. The size of the credit decreases as employer size and the average wage level of employees increase [14].

One expected benefit of the SHOP is that employees will have more choices for health insurance plans. In the SHOP, employers will be able to offer multiple health plan options and to allow employees to choose between those options. To facilitate employee choice, the SHOP will also offer a premium aggregation service to employers, which will simplify the payment of employee premiums to multiple insurers. The employee choice model with the associated premium aggregation will not be available through the federally facilitated SHOP marketplaces until 2015 [12].

Today, most employers work with agents and brokers to select health insurance plans and to enroll employees. Within the SHOP, most small businesses will likely continue working through an agent or broker who can help them select and purchase health insurance plans and can provide administrative assistance with billing and claims-related issues. Focus groups with small businesses in North Carolina showed that many employers value the guidance, education, and administrative help that agents and brokers provide. Small businesses are often overwhelmed by the task of offering health insurance to their employees and rely on an agent or broker for support (K. Holladay, unpublished report, 2012).

North Carolina's Marketplaces

In 2010 and 2011, North Carolina stakeholders, including the North Carolina Institute of Medicine, recommended to policymakers that the state operate its own health insurance marketplaces [15]. During the 2011 legislative session, the North Carolina House of Representatives passed legislation (House Bill 115) to establish state-operated marketplaces, but the legislation was not heard in the Senate. At the end of the session, however, the North Carolina General Assembly did pass legislation [16] stating its intent "to establish and operate a state-based health benefits Exchange," and it authorized the NCDOI and the North Carolina Department of Health and Human Services (NCDHHS) to "collaborate and plan in furtherance of the requirements of the ACA." The NCDOI was awarded a grant to develop plans for state-operated marketplaces. No action was taken by the legislature during the 2012 session. On November 15, 2012, Governor Beverly Perdue declared that North Carolina would have a state-federal partnership for 2014 and would continue to work toward state-based marketplaces, per the stated legislative intent [17].

TABLE 1.
Sample Health Insurance Contributions and Premium Subsidies for a Benchmark Plan, by Annual Household Income

Percentage of 2013 federal poverty level	Annual household income		Premium cap for benchmark plan as a percentage of income	Annual contribution for benchmark plan		Premium subsidy	
	Individual	Family of 4 people		Individual	Family of 4 people	Individual	Family of 4 people
100%	$11,490	$23,550	2.00%	$230	$470	$4,770	$12,030
150%	$17,235	$35,325	4.00%	$690	$1,410	$4,310	$11,090
200%	$22,980	$47,100	6.30%	$1,450	$2,970	$3,550	$9,530
250%	$28,725	$58,875	8.05%	$2,310	$4,740	$2,690	$7,760
300%	$34,470	$70,650	9.50%	$3,270	$6,710	$1,730	$5,790
400%	$45,960	$94,200	9.50%	$4,370	$8,950	$630	$3,550

Note. Subsidies are tied to the premium cost of a benchmark plan—the second-cheapest "silver" plan (one that pays 70% of costs). This table assumes that the annual health insurance premium for that benchmark plan is $5,000 for an individual and $12,500 for a family of 4 people. Contribution amounts are rounded to the nearest $10.

In February 2013, however, the North Carolina General Assembly passed legislation that repealed the 2011 intent to establish state-based marketplaces and that prohibited state agencies from participating in a state-federal partnership or forming state-run health insurance marketplaces. On March 6, 2013, Governor Pat McCrory signed this bill [18]. As a result, the federal government will operate North Carolina's health insurance marketplaces in 2014 and will continue running them unless state policymakers determine otherwise.

Although North Carolina will not play a formal role in the implementation and operation of these federally facilitated marketplaces, implementation will have an impact on state agencies. For example, NCDHHS's Medicaid eligibility system will need to interface with the federal marketplace to provide a "no wrong door" approach to eligibility determinations. NCDOI's Health Insurance Smart NC call center, which assists consumers with health insurance issues, expects to receive an increase in call volume because of the changes and choices consumers will face. Finally, the NCDOI will continue to review health plans and rates to ensure their compliance with applicable laws, and to monitor health insurance practices for all plans, including those offered through the new marketplaces.

A study sponsored by the Society of Actuaries [19] projects that the North Carolina individual coverage marketplace will have nearly 900,000 enrollees in 2014—roughly 200,000 more than would have been expected had North Carolina elected to expand Medicaid coverage to include adults with household incomes up to 138% of the federal poverty level. Approximately 500,000 of the new enrollees are expected to have been previously uninsured. Based on these projections, North Carolina's individual insurance market will more than double, and roughly 85% of those seeking individual coverage will enroll through the federally facilitated marketplace. More than 80% of marketplace enrollees are expected to be eligible for federal subsidies. Thus, a large a proportion of North Carolina's insurance market will be under some level of federal control. It is important to note that these projections are based on economic modeling; actual enrollment may vary and could depend on the level of consumer assistance provided to North Carolinians.

In contrast to the individual marketplace, the SHOP marketplace for small businesses is expected to make up only a small proportion of the market for small-group coverage. A 2011 study prepared by Milliman, Inc., for the NCDOI [20] estimates that only 51,000 individuals (employees and dependents), constituting less than 10% of the market for small-group coverage in 2014, will receive coverage through the SHOP. Actual enrollment in 2014 may be far less, given that the SHOP marketplace will not offer the employee choice option until 2015 [21]. Apart from potential tax credits, many employers may see limited value in purchasing health insurance through the SHOP.

As noted previously, the number of individuals who enroll through the health insurance marketplace will likely depend on the level and quality of marketing, outreach, and consumer assistance. [Editor's note: For more information on consumer outreach efforts, refer to the commentary by Obiol on pages 312-314.] The number of enrollees will affect the future cost of health insurance: The sickest individuals will likely be the first to enroll, and robust outreach and marketing will be needed to bring healthier individuals into the market. The marketplace has limited funding available for these functions; only $2.25 million has been allocated to fund the navigator grant program, which will establish entities that will provide in-person assistance to North Carolinians [22].

The navigator program will not be the only source of assistance; agents and brokers will also continue to help individuals and businesses with their health insurance purchasing decisions, and insurers can continue to compensate agents and brokers for this service. Agents and brokers wanting to sell products to individuals through the federally facilitated marketplace will need to register with the marketplace and receive federal training [23]. Other individuals and entities can choose to be trained and to serve as certified application counselors; however, they will not receive any compensation from the marketplaces or from insurers.

Conclusion

Despite the state's limited role in the operation of the new federally facilitated health insurance marketplaces, North Carolinians should expect to have access to the benefits available through the marketplaces, including premium subsidies and cost-sharing subsidies for coverage, starting January 1, 2014. The state has the ability to further engage in the operation of the health insurance marketplaces in future years, should it choose to do so. NCMJ

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Acknowledgment

Potential conflicts of interest. J.H., J.L., and S.A. have no relevant conflicts of interest.

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Informing Consumers About North Carolina's New Federally Facilitated Health Insurance Marketplace

Carla S. Obiol

This fall, the federal government will operate a new health insurance marketplace in North Carolina. Uninsured individuals will have the opportunity to purchase health insurance, but many of these individuals do not understand health insurance options and will need education and assistance in the selection of an insurance plan. This article describes the various ways in which this assistance will be provided.

Health care reform has been big news for a long time, but many people do not know the details and do not understand how the Patient Protection and Affordable Care Act of 2010 (ACA) could help them. As part of the ACA, new health insurance options will be offered in 2014 via health insurance marketplaces (also known as health insurance exchanges) that are being created in every state. However, a survey conducted in the fall of 2012 [1] found that 78% of uninsured adults were unaware of these new health insurance options. Finding and educating these consumers will be a challenging undertaking.

The recent federal reforms, which were the culmination of years of debate, have produced significant changes in health care coverage and options. These changes are certain to confuse consumers and to generate many questions and challenges. In North Carolina, about 1.35 million nonelderly residents who are currently uninsured are potentially eligible for coverage [2], so robust consumer assistance will be essential. There are many factors that will determine the success of North Carolina's new health insurance marketplace, but the effectiveness of the state's outreach and education efforts will certainly be a major factor.

Fortunately, the ACA addressed the need to reach and educate consumers by requiring every health insurance marketplace to award grants to *navigators*—entities that will help consumers learn about their health insurance options and will assist them with enrollment in a health plan [3, 4]. The law requires every state to have navigators who will help people who are currently uninsured, small businesses, and self-employed individuals to purchase insurance.

In North Carolina, the federal government will operate the new health insurance marketplace. Consequently, the federal government will also select the entities that will serve as navigators in our state. Those entities that are selected as navigators are required to demonstrate an existing relationship, or the ability to establish a relationship, with consumers who are likely to enroll in a health plan. The long list of entities likely to be considered as navigators includes community and nonprofit groups, professional associations, county and state agencies, brokers and agents, and any other entities that meet the statutory requirements and are able to carry out the duties of navigators.

The ACA requires that navigator grants be awarded to at least 2 types of entities, 1 of which must be a community- and consumer-focused nonprofit group. Whether the grant awards will be sufficient to pay navigators a full-time salary, a part-time salary, or a set fee per enrollee remains uncertain. The law requires that navigators be equipped to perform specific duties, which include providing public outreach and education about the new health insurance marketplace, distributing fair and impartial information, facilitating enrollment in a qualified health plan, providing information in a manner that is culturally and linguistically appropriate for the population being served, and providing referrals to any applicable office of health insurance consumer assistance (such as the Health Insurance Smart NC program [5] provided by the North Carolina Department of Insurance [NCDOI]).

The US Department of Health & Human Services released regulations in April 2013 that are intended to ensure that the organizations and agencies selected as navigators are qualified and have no conflicts of interest. The federal government will provide online training for navigators, and these entities must successfully complete this training and receive certification before undertaking any work as navigators [6, 7]. It is important to note that navigators cannot be health insurance issuers, nor can navigators receive benefits directly or indirectly from a health insurance issuer in connection with enrollment of individuals in a health plan.

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N C Med J. 2013;74(4):312-314.
0029-2559/2013/74405

The navigator model is not a new concept for public outreach. Other federal and state programs have used similar strategies for implementing effective consumer assistance. For example, the Seniors' Health Insurance Information Program (SHIIP) of the NCDOI uses volunteer counselors who receive training and certification from the NCDOI. The program is coordinated in each county through an existing human services agency, such as a Council on Aging office, a senior center, or a cooperative extension office. These agencies, which are models of interagency cooperation, serve as sponsors and provide important continuity and available points of access. Currently, SHIIP has 24 full-time staff members, 962 volunteer counselors, and 109 county-sponsored agencies that provide information, counseling, and assistance to persons who are eligible for Medicare. Through the efforts of SHIIP, thousands of Medicare beneficiaries receive one-on-one assistance each year.

The ACA also includes other consumer assistance provisions that will give potential insurance purchasers much-needed information and assistance. The new health insurance marketplaces are required to provide a toll-free call center [8] and a Web site featuring an electronic calculator that can facilitate comparisons of insurance products [9]. The calculator must take into account premium tax credits and cost-sharing reductions and should allow consumers to see what their actual out-of-pocket costs will be for each of the offered plans.

More recently, the federal government enlarged the pool of potential assisters by encouraging the use of volunteers or certified application counselors. This additional layer of consumer assistance is much needed, because the funding for navigators may be inadequate to meet the needs of all consumers. The state will need representatives from a variety of groups, agencies, and organizations to help with general outreach and education and to inform people about their eligibility for new health insurance options.

The ACA has created a foundation for outreach and education; however, states must establish their own consumer assistance plans. North Carolina's plan should be a reliable resource that the state's citizens can use when faced with questions or challenges regarding their health insurance options. In addition, the plan will be crucial to the overall success of the new marketplace. The goal of the plan is to reach all consumers who may benefit from the new coverage and to facilitate their enrollment. Special attention should be given to determining how best to reach the state's various populations. For example, different strategies may be needed for persons living in rural areas, minorities, faith-based communities, and young people.

All of these groups will need information and assistance, but there will be differences in the level of help they need and the best method by which to provide them with assistance. There will be opportunities for individuals to help themselves by using the toll-free call center, e-mail, or online chat. However, research indicates that a large percentage of people who are making health insurance decisions prefer in-person help [10]. Therefore, an effective consumer assistance program should be diverse and should include a variety of sources offering in-person counseling, such as navigators, volunteers, certified application counselors, agents, brokers, and others.

The state should offer a variety of assistance options through organizations that are trusted by the people living in the community. For many individuals, the selection of an insurance plan during the fall of 2013 will be a first-time experience. These individuals will need comprehensive counseling. Outreach and education must also be thorough and accurate, since much is at stake in these decisions. Groups and organizations that are accustomed to assisting people with other benefit plans or providing other types of assistance in their local communities would be ideally suited for this important work. NCDOI's experience with SHIIP has proved that having a local, trusted source of information is a critical element in reaching Medicare-eligible individuals and persons with disabilities. The same is presumably true when providing counseling to other target populations.

This summer, the federal government will award approximately $2 million to organizations in North Carolina that have applied to be navigators and have successfully demonstrated their ability to meet the requirements of the law as previously outlined. Grant decisions are expected by mid-August. Because this funding will probably be insufficient to pay for the amount of in-person help that will be required, volunteers will be needed to do much of the work. These volunteers will likely be staff members at hospitals, doctors' offices, health clinics, churches, county cooperative extension offices, Medicaid offices, universities, community colleges, banks, schools, and similar organizations. The entities designated as navigators will need to venture out into communities and engage as many groups as possible to help with outreach and appropriate referral. Many agencies, associations, and organizations will simply refer people to a trained navigator or volunteer in the community, but others may station navigators in existing office settings.

The following points should be kept in mind when designing consumer assistance programs. First, the individuals who are selected as navigators, volunteers, and certified application counselors must be chosen carefully and given extensive and ongoing training. Quality measures should be established for evaluating the performance of trainees, and providing accurate information for consumers should be their top priority. Second, the state's outreach efforts should be coordinated so as to provide uniform messaging across all forms of media. No matter which groups, businesses, and organizations are participating in these activities, consumers will benefit from clear directions on where to get assistance. Federal, state, county, and community partners need to work together to develop and launch a unified outreach message. Finally, North Carolina partners should consider creating a statewide coalition that could meet regularly to discuss training needs, to update statewide messages, and to discuss best practices that would improve their services. The coalition would promote a team effort, encourage cooperation, and reduce the possibility of duplication of effort.

The task of building a solid consumer assistance program to help North Carolinians respond to the new health insurance marketplace will not be easy. I anticipate that various difficulties will be encountered along the way. However, North Carolina has a strong track record for assisting consumers and building strong partnerships. I am therefore confident that people will receive the information and help they need to make wise decisions. NCMJ

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Acknowledgment

Potential conflicts of interest. C.S.O. has no relevant conflicts of interest.

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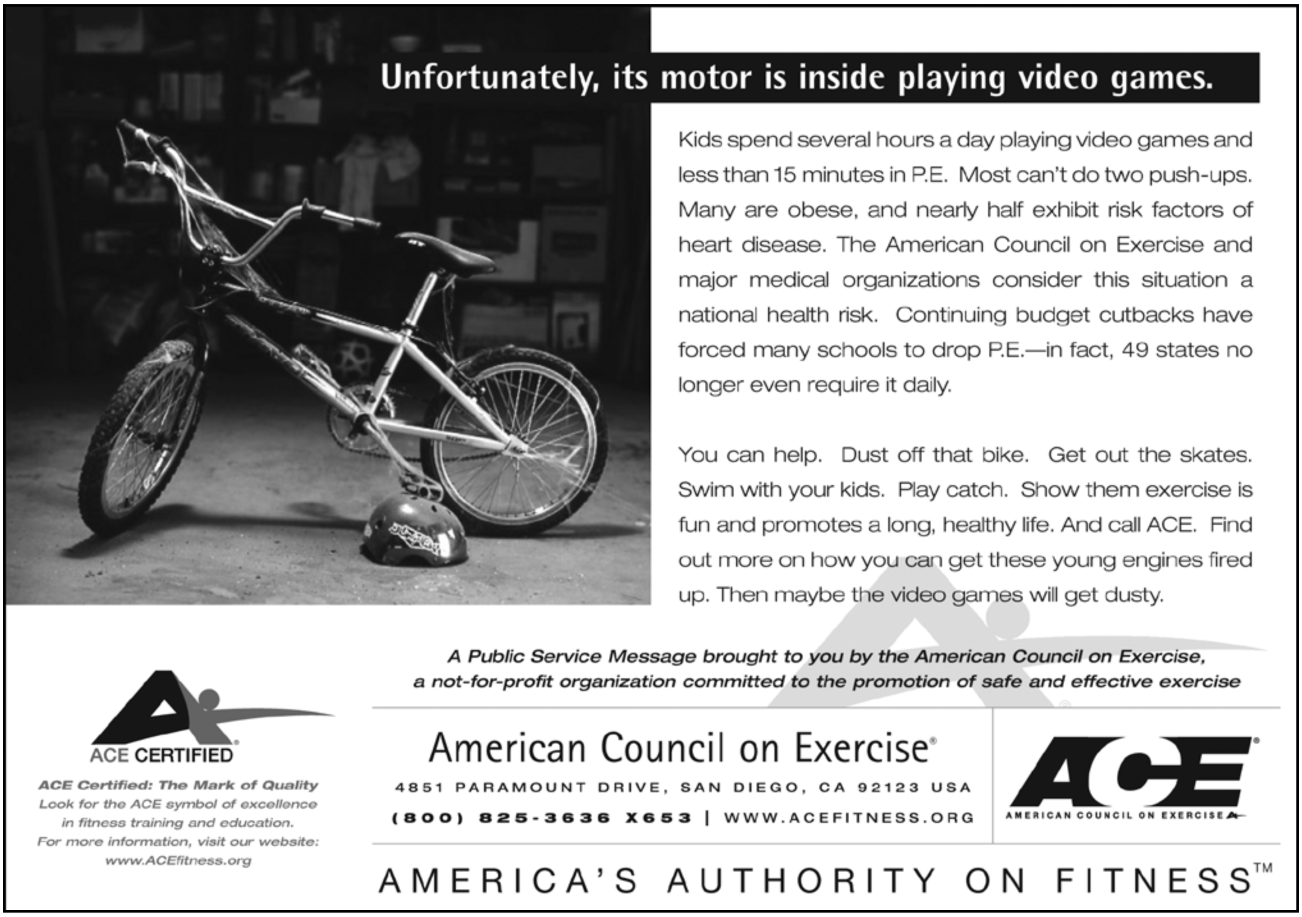

INVITED COMMENTARY

North Carolina's County Departments of Social Services in a Season of Change

David Atkinson

Every day staff members of county departments of social services are processing new applications, applying changes to established cases, and juggling constant telephone and walk-in traffic. There is a delicate balance between this ever-growing workload and the availability of skilled personnel to meet these demands.

North Carolina's 100 county departments of social services (DSS) are undergoing a seismic shift as they attempt to deal with new technology and the impact of new legislation. These departments are earnestly attempting to manage 2.5 million cases in means-tested programs across the state [1-4]; caseloads in other service-related programs, which include child welfare services, adult services, guardianship, and employment services; and a host of unfunded mandates, such as work permits, voter registration, and fishing license waivers. (Yes, at the county DSS we not only give customers fish to eat but also help teach them to fish.)

Means-tested programs are those that use household income, assets, or other resources as benchmarks for determining an individual's eligibility for the benefits provided by the program. The Food and Nutrition Service program, Medicaid, and Work First are examples of means-tested programs. For the most part, local DSS have been organized in silos around these means-tested programs and other service-related programs. In larger agencies, a program manager may be responsible for multiple units, each consisting of a supervisor and at least half a dozen eligibility specialists, all of whom work on a single program. In smaller agencies, the director not only knows how to accept a Supplemental Nutrition Assistance Program application but may also go out in the field on a child protective services case or to investigate allegations that an adult with disabilities is being exploited. The section of the North Carolina General Statutes that spells out the duties and responsibilities of a county director of social services [5] charges the director, or his or her designee, with the responsibility for administering such services and much more.

Technology has been slow in coming to the local DSS. Today most agencies still have paper applications and thousands of paper records, which sometimes occupy more square feet than do the staff members who accept the applications. After a paper application is created, the data from that application must be keyed into the state's legacy information systems. Formerly this information was keyed into a terminal that was hardwired directly to the state system. Over approximately the past 20 years, most of those terminals have been replaced with desktop computers; these computers are capable of performing many other helpful functions, but they still perform the same essential service as the old terminals: allowing the worker to key information from a paper record into the state system.

Because each program has its own corresponding state system, which must meet federal requirements, it has been convenient—even necessary—to organize around that function. As a result, subject matter experts have evolved for specific programs, and these individuals may work on only a single program. Silos, by definition, do not talk to or interact with other silos. DSS have evolved to be very efficient, but customers find it exasperating when they have to provide the same identifying information and tell the same personal story multiple times to staff members working on different programs during the same trip to their local DSS office.

For more than a decade, counties have been requesting—and the state has been developing—an electronic case management system, which will eliminate this redundancy for customers and will automate many of the activities that determine eligibility for means-tested programs. North Carolina Families Accessing Services through Technology (NC FAST) has been simultaneously a blessing and curse. As with any new automation of a large system, there have been a few bumps in the road, but the finished product will have been worth the wait. Once county staff members actually have the software on their desktops, anecdotal estimates are that it will take them approximately 2 years to return to their pre-rollout levels of paper proficiency. The second phase of NC FAST, which began in July 2013, will result in a seismic shift. (The first phase of NC FAST, launched in May 2012, involved pilot testing of a single module of the system in 4 counties). By late summer, counties will be implement-

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Electronically published August 1, 2013.

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N C Med J. 2013;74(4):315-317.
0029-2559/2013/74406

ing major automation reforms while simultaneously managing the complete reorganization of means-tested programs in order to transition to a "universal worker" concept. The DSS world is changing.

County agency staff members will no longer be organized around a single eligibility program. Rather, a staff member will interview the customer and collect financial and other eligibility-related data, and then the NC FAST technology will allow that staff member to determine the customer's eligibility for multiple programs simultaneously. Although a significant reorganizational effort will be required at the local level, this shift will constitute a tremendous improvement for customers. Today, local departments are educating themselves on how the system will function and how best to organize staff.

This new system will also impact how people gain health insurance coverage under the Patient Protection and Affordable Care Act of 2010 (ACA). People will be able to start enrolling in the new health insurance marketplace on October 1, 2013, for coverage beginning January 1, 2014. Most people in North Carolina will be required to have health insurance or to pay a penalty. Although the state has elected not to expand Medicaid coverage [6] to the approximately 500,000 North Carolina adults whose income is no more than 138% of the federal poverty level [7], local DSS are expecting a significant uptick in applications for Medicaid—not just from those who currently meet the eligibility criteria but have never applied for benefits, but also from those who are hoping they are eligible and want to avoid the penalty for not having insurance. The North Carolina Division of Medical Assistance estimates that the former group—those who are eligible but who have never applied—includes approximately 70,000 people [7]. Members of this group may have many reasons for not having applied for benefits previously, but it is generally believed that they will begin coming forth now in an effort to obtain health insurance coverage through Medicaid; this uptick in applications from previously eligible individuals is referred to as the "woodwork effect." In addition, many of the 500,000 low-income adults who would have been eligible for Medicaid under the state's expanded program may also apply, only to be told that now they are not eligible after all. Nonetheless it is still in their interest to apply, as some of these individuals may be eligible for subsidized coverage in the new health insurance marketplace.

A significant number of people who apply may be newly eligible as a result of the changes in income calculations that are required by the ACA. Federal regulations will change the formula for calculating adjusted gross income that is used to determine eligibility for Medicaid [8]. A particular methodology referred to as modified adjusted gross income (MAGI) will be used to determine countable income and to establish the composition of households [9]. It is still unclear how many newly eligible Medicaid applicants will be created by the new MAGI rules.

Early enrollment in the health insurance marketplace begins on October 1, 2013, which is just about the time when many county DSS will be adjusting to the shock of implementing the new automated case management system. NC FAST will be critically important in managing the influx both of people who are newly eligible for Medicaid and of people who are not eligible for Medicaid but who want assistance in purchasing a health insurance product through the state's federally operated health insurance marketplace (as the ACA's "no wrong door" policy requires). During the final 3 months of 2013, customers coming to the local DSS to apply for Medicaid must be assessed using 2 sets of rules. One set of rules is used to determine whether an individual is currently eligible for Medicaid; if that person is determined not to be currently eligible, a different set of rules will then be used to determine whether they will become eligible for Medicaid or for subsidized private coverage on January 1, 2014, under the new eligibility criteria of the ACA.

Other challenges facing local DSS beginning October 1, 2013, will be how best to assist county residents in understanding all of the nuances of purchasing health coverage through the federally operated health insurance marketplace, and how to determine whether these individuals are eligible for subsidies—an advance payment of tax credits to help with the monthly premiums for coverage and/or cost sharing to help with out-of-pocket expenses. The ACA makes provisions for navigators, which are entities that will help disseminate information to the public and will assist individuals with the purchase of insurance products offered through the marketplace [10]. Navigators will not be making eligibility decisions or advising customers about which qualified health plan to purchase; they will simply provide guidance through the enrollment process. This is an extremely valuable role at the local level, and navigators will be much needed. They will be particularly helpful to uninsured individuals in North Carolina who may be purchasing health insurance for the first time; this group includes many current customers of local DSS. However, in North Carolina today, no single agency or entity is coordinating the navigator functions, and few federal grant dollars are available to help with coordinated statewide efforts to educate the general population. Navigators and the valuable information they can disseminate to the local community will be tremendous assets during the months before and immediately after January 1, 2014. Currently, it appears more and more likely that some of the navigator responsibilities will fall to the local DSS.

Since their establishment around 1920, county DSS have been called upon to respond whenever a local crisis occurs, whether the crisis is a hurricane, flood, ice storm, or other natural disaster. The departments have always responded and given their best to meet the needs of those who are less fortunate. The next 6–9 months are going to require every ounce of courage and stamina they can muster. Although the challenges the departments currently face are not natural disasters, they will nonetheless call for flexibility, creativity, and day-to-day crisis management, for crises are inevitable with transitions of this magnitude. NC FAST, the implementation of health care reform, and organizational transformation are interrelated, and all must be successful if county DSS are to faithfully serve the needs of their customers. NCMJ

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Acknowledgment

Potential conflicts of interest. D.A. is an employee of Carteret County Department of Social Services.

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INVITED COMMENTARY

Implementation of the Affordable Care Act Poses Challenges for Insurers and Consumers

Barbara Morales Burke

Later this year, new provisions of the Patient Protection and Affordable Care Act of 2010 will transform the health care industry. Consumers will be able to purchase insurance through health insurance marketplaces, but many people who already have insurance could see their premiums rise. Insurers will need to help consumers navigate the new system.

The Patient Protection and Affordable Care Act of 2010 (ACA) has 2 key goals: extending medical coverage to more people and guaranteeing certain basic benefits to all insured individuals. These goals, which have animated the health care debate for decades, are admirable, but they come at a cost. By 2014, as some of the most robust parts of the ACA go into effect, the impact of this legislation will begin to become apparent.

The law will provide additional coverage and new benefits for many people. The ACA attempts to extend coverage under private insurance in 3 ways: by guaranteeing the right to purchase health insurance [1], by limiting rating factors [2], and by making income-based premium subsidies available for some people with incomes up to 400% of the federal poverty level [3]. New health insurance marketplaces (also called health benefit exchanges) and the Small Business Health Options Program (SHOP) for small employers, which will go into effect in 2014, will offer additional ways to buy private insurance for both new and existing participants in the health insurance system.

The tradeoff is that premiums for many people may increase sharply. People who are already in the health insurance system will pay more for newly mandated benefits and higher levels of coverage, which in the past they might have opted not to buy. People who are outside of the system may continue to forgo insurance, despite federal penalties for doing so, which could result in a costlier risk pool. New taxes and fees will also increase the cost of insurance. While federal subsidies for premiums and cost sharing will help to soften the blow for some, not everyone will qualify for assistance, and many who do qualify will receive only partial support.

Meanwhile, the health care costs on which consumer premiums are based will likely continue to spiral upward. Because the federal subsidies only redistribute the burden of paying for insurance, the pressure from taxpayers to address health care costs will likely be greater than ever. This pressure should provide even more incentive for insurers and providers to collaborate on ways to improve the quality and efficiency of care.

Insurers will have a role to play in helping consumers navigate this new environment of more choices and, for many, increased costs. The first way we can help is through education. No one inside or outside the industry knows everything that will happen, but we can address misinformation, of which there is plenty, and we can help to alleviate uncertainty on the part of consumers. As health insurance marketplaces begin operating later this year, the people we all work to serve are going to want to know how the changes will affect them, how they can navigate the system, and why they may be paying more. We can help them to understand.

Operational Challenges

By the time key provisions of the ACA, such as the individual mandate and guaranteed issue, go into effect in January 2014, nearly 4 years will have passed since the president signed the ACA into law. That sounds like plenty of time, but the complexity of the work coupled with delays in receiving regulations and technical guidance make the October 2013 deadline for open enrollment and the January 2014 effective date for coverage extremely challenging. The ACA is bringing about a top-to-bottom overhaul of the way consumer health insurance works in the United States; just a few hundred pages of legislation have provided a replacement blueprint for an industry that spent decades developing into its current form. Of course, the ACA did not arrive fully formed. Tens of thousands of pages of regulations have been written, and some regulations are still being created with only months remaining until the newly formed health insurance marketplaces go into operation. In addition, a complex web of information technology systems will be needed to support the marketplaces, and insurers' interactions with the marketplaces and their support of products sold on the market-

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Electronically published August 1, 2013.

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N C Med J. 2013;74(4):318-320.
0029-2559/2013/74407

places will involve another layer of technological and security considerations—all of which must align with the provisions of the ACA. The scope and complexity of reform and tight timeframes make it a tough target. The need to move forward on implementation based on best information, before all final requirements are known, makes it a moving target as well.

Change management is a challenge for any business, but health care reform magnifies that challenge for health insurers. New rules impose standards for an insurer's medical loss ratio, which is the amount an insurer spends on administrative expenses compared to the amount it spends on health care. Under these new rules, at least 80% of the money the insurer receives in premiums must be spent covering the cost of care for policyholders (the exact ratio varies from market to market and from state to state; in large group markets, the amount is 85%). If more than 20% (in large group markets, 15%) of the money received in premiums is spent on administrative costs, the difference must be rebated to customers [4]. These new standards have gone into effect at precisely the time when insurers need more administrative resources, not fewer, to implement a host of changes.

Business Challenges

Once insurers, providers, and other participants in the health care system settle into a post-ACA world, we will all be in a different business than we were in before. Previously, insurance of any kind, including health insurance, relied on fundamental concepts of risk management and used tools to strike a delicate balance between pooling and segmenting risks. This has been necessary for insurers to serve their customers and to maintain the financial stability necessary to continue serving them.

The ACA is upsetting the balance that has long been in place in the health insurance market, both in North Carolina and in all but a handful of other states. This is especially true for the individual insurance market, where people buy coverage on their own rather than as a member of a group. For example, consumers will now benefit from "guaranteed issue"—if they want coverage, an insurer must offer it to them, whether or not they have preexisting conditions or some other kind of heightened risk.

The effects of rating changes. Because everyone will have access to health insurance, new high-risk members will enter the pool. And pooling requirements will cause the cost of their care to be spread evenly across an insurer's entire individual insurance population or across an insurer's entire small-group insurance population. The ACA attempts to mitigate the negative impact that these high-risk members will have on rates by attempting to add healthier individuals to the insurance pool through an individual mandate that penalizes people who do not buy insurance [5]. There are also limited incentives for certain small employers to offer coverage [6] and penalties for large employers that do not offer coverage [7].

However, if a person is inclined to do without coverage—for example, a young, healthy individual with no dependents who is ineligible for substantial federal subsidies—he or she will likely find that paying the federal penalty is less expensive than buying insurance. If many of these low-risk people stay away, the cost to serve the insured population will increase, and premiums will rise accordingly.

The ACA will greatly limit insurers' ability to charge their customers different amounts based on their risk level. It has always been common for insurers—whether they sell health, automobile, or home insurance—to engage in "rating" practices in which they adjust a member's premiums based on his or her risk factors. In the health insurance industry, those risk factors have included such things as health condition, age, and sex.

Under the new law, rating based on a member's age will be restricted. Insurers will not be allowed to charge their oldest members more than 3 times the amount that the youngest adult members pay.

A more significant change is that rating based on a person's health condition will no longer be allowed. The population of individuals who are currently uninsured but who will soon be eligible to purchase coverage will include more persons who are sick than the population that is insured already. Because insurers will not be able to deny coverage based on preexisting conditions, people with more health problems and greater medical needs will be participating in the system, and these individuals will require more care than the other members. Aside from permitted differences in rating due to age, geographic location, and tobacco use, these less healthy individuals will pay the same as everyone else. The need to cover these sicker individuals will thus drive up the average cost of insurance plans.

The third major change in rating rules is that the ACA prohibits insurers from charging men and women different premiums. However, the effect of sex on a person's actual medical costs changes over time. Young women use more health care services than do young men; however, Blue Cross and Blue Shield of North Carolina's historic claims experience shows that the reverse is true for older individuals—men use more health care services than women. The cost effects of these differences are greater than the cost effects of age differences. Traditionally, insurers have adjusted people's premiums accordingly, but they will no longer be allowed to do so. In addition, the inclusion of maternity care as an essential health benefit that all plans will be required to provide will increase premiums for men because of new pooling requirements. In a similar vein, required pediatric benefits, including newly required pediatric dental and vision care, will increase premiums for all adults, including those who have no children.

The effect of the individual mandate. The framers of the ACA understood that childless adults do not need pediatric care and that men do not need maternity care. The intent of the law was to even out the burden of costly conditions by sharing them among the entire population. But for that to work, everyone must be part of the system.

In North Carolina, approximately 1.56 million nonelderly people lack any kind of health insurance [8]. Proposed regulations state that beginning on January 1, 2014, an individual who has no health coverage will pay a penalty of $95 per year or 1% of his or her taxable income, whichever is greater; by 2016, the penalty will grow to $695 per year or 2.5% of taxable income, whichever is greater [9]. For many people, a health insurance policy will cost more than that. This does not mean that the majority of people will choose the penalty over the mandate; after all, many people who do not have health insurance coverage would very much like to have it. It remains to be seen whether individuals who are not inclined to buy insurance will do so if the cost of insurance exceeds the penalty.

The Information Challenge

Although most insurers and providers have tried to steer clear of the political rancor that has permeated discussion of the ACA, people who buy insurance and use health care have heard a great deal of debate over the past 4 years. For many people, this has left them divided, confused, and fatigued. Given this environment, the health insurance industry faces a sizable challenge in its efforts to forge new relationships and win trust.

The more that people understand and appreciate the core value of buying insurance and using health care intelligently, the greater the likelihood that they will choose to participate in the system. Therefore, helping people become more informed about their health insurance options will increase the participation of those who are "good risks" and will help lower the cost of care over time. We who work in the industry can help people address these new questions, find the best value, and navigate their new choices. We will need to help them understand what they are getting, why they may be paying more, and how various parts of the law will affect them. Under the new system, health insurers will also need to assist people with new processes, such as applying for subsidies and demonstrating coverage.

Thus in a post-ACA world we all have 3 jobs: We have to do the jobs we had before, we have to be change agents, and we have to be educators.

The Underlying Costs

Ultimately, changes to risk pools and to rating requirements will change only the way that cost is divided among people. They will not change the costs themselves. Nor will subsidies, even for those who receive them in full measure. Medical costs are the primary driver of health insurance premiums, and this fact will remain the same.

Addressing the problem of high medical costs is an area in which insurers and providers can accomplish most through collaboration. It is now more important than ever to coordinate care, to deliver high quality care, and to demonstrate tangible value for everything that costs members money.

As we at Blue Cross and Blue Shield of North Carolina have been saying for several years, this is a shared responsibility that starts with a shared dialogue. These changes are law. Whether or not we asked for the changes, insurers are the front line charged with helping people to understand and accept them. NCMJ

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Acknowledgment

Potential conflicts of interest. B.M.B. is an employee of Blue Cross and Blue Shield of North Carolina.

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INVITED COMMENTARY

How the Patient Protection and Affordable Care Act Will Affect Employers

Vincent Longobardo

This article provides an employer's perspective on the Patient Protection and Affordable Care Act of 2010. Since this act was implemented, it has significantly impacted how employers have been planning for and providing health insurance to their employees.

The Employee Retirement Income Security Act (ERISA) was passed by Congress in 1974. ERISA was amended over time to include additional requirements, including those imposed by the Consolidated Omnibus Budget Reconciliation Act (COBRA), but the original ERISA legislation itself had far-reaching effects. Indeed, ERISA became the cornerstone on which all pension plans, 401(k) plans, and group insurance benefits are based, and this legislation affects how they have been funded, implemented, managed, and administered. Following the rules of ERISA is a formidable challenge for any company, but those rules are well understood and are considered to be a necessary evil.

As the codification of the Patient Protection and Affordable Care Act of 2010 (ACA) unfolds, it is becoming clear that the ACA will surpass ERISA in complexity, number of requirements, and overall impact. The ACA will change almost every element of the provision of group health benefits to employees, and it will change how employers strategically integrate benefits into a total compensation package. As West Virginia Senator Jay Rockefeller recently observed, "the Affordable Care Act is probably the most complex piece of legislation ever passed by the United States Congress . . . [it] is just beyond comprehension" [1].

Over the years, both large and small companies have been faced with the challenge of providing employees with affordable, high-quality health benefit plans while trying to keep the cost of those plans within the company's budget. For smaller companies that purchase health benefits through insurance company contracts, as well as for larger, self-insured companies, the cost of health benefits continues to rise, despite efforts to curtail costs through plan design, cost-sharing with employees, provider contract arrangements, and wellness programs. As we get closer to the date when health insurance marketplaces (also called health benefit exchanges) become operational—October 1, 2013—it is becoming clear that the ACA will likely add to the cost of providing health benefits. Some of these additional costs will be the result of increased administrative requirements and plan design constraints, and other costs will be transparent, such as required plan provisions, fees, increased premiums, and penalties.

Although employers have recently been focusing on 2014 and how the health insurance marketplaces will operate, employers have been making changes to their plans and to plan administration since 2010. They have had to provide employees, within a specified time period, with summary plan information in required formats using specific wording and examples of claim payments. They have had to change payroll systems to capture the total premium cost of health insurance for W-2 reporting. And they have had to adhere to a defined plan status (grandfathered or not) to determine compliance time frames for mandated plan enhancements such as expansion of coverage to include dependent children up to age 26 years [2], the elimination of preexisting condition provisions for dependent children under the age of 19 years [3], and the elimination of health benefit plan lifetime and annual maximums [4]. Changes in administrative systems and plan design have already increased employers' costs, without factoring in the person-hours that were allocated to initial planning and to administrative requirements. It has already become more expensive to offer a health benefit plan, and doing so will not get cheaper in the future.

Although some elements of the ACA have been in effect for 3 years, the majority of the law's provisions were scheduled to take effect in 2014. However, the Obama administration unexpectedly announced on July 1, 2013, that the implementation of the employer mandate to provide medical insurance to employees would be delayed until January 1, 2015 [5]. I believe that by now most companies have decided whether to "play or pay"—that is, whether they will "play" by offering a benefit plan, or whether they will pay the penalty for not offering affordable coverage for their employees. At this point, employers also understand the effects that that decision will have on employees and on company costs. This delay now rolls this decision and analysis forward for another

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Electronically published August 1, 2013.

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N C Med J. 2013;74(4):321-323.
0029-2559/2013/74408

year. This is good news for some, but I believe it also adds complexity in planning benefit design and assessing costs.

Delaying the employer mandate until 2015 is good news in that companies will not yet have to monitor the employee cost of coverage to make sure that the company offers plans that are affordable, and they will not face fines for noncompliance in 2014. The delay of the employer mandate also provides temporary relief from complex reporting requirements.

While the employer coverage mandate has been delayed until next year, many of the ACA's effects on employers remain unchanged. When the employer mandate is implemented, companies will have to comply with the definition of a full-time employee for benefit eligibility, which is now defined by the legislation as 30 hours per week. This may be a reduction for some employers who previously considered full-time employees to be those who work 40 hours per week. Although the federal government has created several alternative methods that employers can use to determine whether an employee is full-time, part-time, or seasonal, the rules are still complicated, particularly for new employees or those working variable hours [6]. In addition, employers will have to pay the following fees to the government: a comparative effectiveness research fee of $1 per plan member per year, which will increase to $2 in 2014 [7]; a transitional reinsurance fee of $63 per covered life per year to fund reinsurance pools that will be established to help offset the costs of the insurance plans offered through the individual and small-group health insurance marketplaces [8, 9]; and a health insurers' fee equal to approximately 2.5% of total premiums [10-12]. Finally, employees will still expect their company's human resources department to explain the health insurance marketplace options available to them, and employers will need to be able to answer their questions.

While employers are happy to see the ACA rules and guidelines being issued and clarified, there are still many questions that remain unanswered. For example, employers do not know the full extent of the information they will be required to communicate to employees when open enrollment in the health insurance marketplaces begins in the fall of 2013. They do not know which employees will choose to enroll in a health insurance plan through the marketplaces rather than getting coverage through their employer, which will affect the amount the employer has to pay in plan costs. Employers do not yet know how the insurance market will be affected by the number of insurance companies participating in the health insurance marketplaces. They do not know how health care providers will respond to changes in the number of patients seeking care; changes in the provider's relationships with insurance companies, employers, and the community; changes in network arrangements; and changes in profit and loss expectations. Employers do not know how they will review plan designs without knowing the rules that may take effect in 2015, which may change the overall compliance requirements. Employers also do not know whether plan designs will need to stay within a corridor whose top end is defined by a "Cadillac tax" (the excise tax that the ACA will impose on high-cost employer-sponsored coverage starting in 2018 [13, 14]) and whose low end is defined as the actuarial value of the plan's benefits. Employers also do not know what their health benefit plans will ultimately look like. Qualified health plans offered to small businesses and individual (nongroup) plans in the health insurance marketplaces must offer certain essential health benefits, but those same provisions do not apply to larger employers [15]. Finally, employers do not know what other changes might be made to the ACA over the next year.

Offering a health insurance benefit that employees and employers can both afford has always been a difficult task. With the increasing cost of health care, employers have had to persuade insurance companies to develop financial arrangements such as self-insurance products, and they have had to form relationships and partnerships with providers through preferred provider organizations (PPOs), health maintenance organizations (HMOs), and now the "medical home" model. All of this has changed—and continues to change—the way that employers provide health insurance benefits to employees.

Heretofore, these relationships were intertwined but seemed to move in opposite directions, with each player in the health care system seeking ways to lower costs while trying to improve the individual's access to high-quality health care. The methods that have been used have actually resulted in costs being shifted from one player to another. I believe that the ACA will put a stop to this, because each player will be operating in a box defined by rules, fixed reimbursement levels, unknown participation levels, the health status of newly insured patients, fees, fines, taxes, plan design constraints, required electronic system reporting, and added administrative burdens. The ways in which players can shift costs to one another will be limited.

Conclusion

This commentary has briefly addressed the challenges that employers are facing, but I have not gone into the challenges that confront the other players—providers and insurance companies. I believe that as we learn more about the unknowns I have listed, the challenges all of us face will become more complex. Employers, providers of health care, and insurance companies will have to work together to try to maintain the private sector health care system. This will require keeping costs affordable for employers and individuals while improving quality of care. Given how complex relationships between these groups are, this will not be easy to accomplish.

The intention of the ACA is benevolent: to provide affordable health insurance for all—to level the playing field across the health insurance industry and the health care delivery system, covering the uninsured, lowering insurance costs, improving access to providers, and requiring employers to make sure that employees have access to affordable coverage. As we continue to see the ACA unfold through procedural rulings, guidelines, and regulations, it will be interesting to watch how this legislation transforms the entire health care delivery system. NCMJ

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Acknowledgment

Potential conflicts of interest. V.L. has no relevant conflicts of interest.

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How the Affordable Care Act Will Affect Access to Health Care in North Carolina

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Reforming health care in the United States often focuses on improving access to care by removing financial barriers and bringing practitioners closer to patients. This article reviews the provisions of the Patient Protection and Affordable Care Act of 2010 (ACA) that are intended to improve access and discusses how the ACA will change access to care for Americans.

The central goal of the Patient Protection and Affordable Care Act of 2010 (ACA) is to expand access to health care for Americans. In the actual construction of the legislation, this meant giving people who currently lack health insurance some form of coverage by making health care affordable, through the expansion of Medicaid [1] and the subsidization of insurance costs [2]. However, simply providing insurance coverage does not guarantee access, which depends on a number of additional factors, including the availability, acceptability, coordination, and effectiveness of care [3].

Effective access, or what some experts call "realized access," can only be measured by comparing need with actual utilization [4]. It is essential that there are enough physicians in a community, that patients have transportation or proximity to care, and that patients have the ability to pay for care; however, meeting these conditions does not necessarily mean that people who are ill will get the treatment they need. Effective access also depends on the ability of individuals to negotiate the complex world of program eligibility, to recognize their need for care, to accept their diagnoses, to communicate effectively with caregivers, and to understand their role in the process as patients and citizens. The ACA tries to address all of these things to promote effective access. Nevertheless, affordability of insurance coverage is the fundamental element that supports this comprehensive approach.

The ACA was challenged in court primarily over the structure of health insurance coverage (a key to affordability)—specifically, the requirements that most people must have some type of health insurance coverage or pay a penalty and that the states must expand Medicaid program eligibility to cover more low-income adults. The Supreme Court upheld the coverage provision, but it held that mandatory Medicaid expansion was unconstitutional [5]. In their decision, the justices left in place many of the specific elements that would guide insurance coverage, such as the elimination of preexisting condition clauses that restrict coverage [6], the setting of essential health benefits to allow for informed choices among plans [7], and the requirement that Medicare pay for preventive services [8]. They also left in place those elements of the ACA that would change the way health care systems are organized to care for populations, such as the Medicare Shared Savings Program, with its accountable care organizations (ACOs) [9], and patient-centered medical homes (which are referred to as "health homes" in the ACA) [10].

How changes in insurance coverage will actually affect access is controversial: There are debates over how many individuals will gain coverage and what effect that new coverage will have on demand for services [11]. In North Carolina, we have credible estimates regarding the extent to which elements of the ACA will expand coverage, provided they are implemented. For example, the North Carolina Division of Medical Assistance estimated late last year that if the Medicaid program in North Carolina had been expanded as the ACA had anticipated, 564,000 additional people would have enrolled in Medicaid in 2014, and as many as 624,000 people would have enrolled by 2021 [12]. Other sections of the ACA will also expand coverage by changing the way health insurance is marketed and regulated. The provisions that guide the implementation of the health insurance marketplaces provide for subsidies in the form of premium tax credits or cost-sharing subsidies to help low-income and moderate-income individuals purchase health insurance [2]. The Milliman Group, working under contract to the North Carolina Department of Insurance, estimated that 660,000 people will buy coverage in the individual health insurance marketplace, and another 51,000 people in North Carolina will buy insurance through the small business marketplace (called the SHOP) [12]. Milliman estimated that 300,000 of these 715,000 people are currently uninsured.

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N C Med J. 2013;74(4):324-329.
0029-2559/2013/74409

Federally Qualified Health Center Expansion Through the Affordable Care Act

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In crafting the Patient Protection and Affordable Care Act of 2010 (ACA), the Obama administration recognized the need to expand primary care capacity in communities with many low-income and uninsured individuals. One of the key strategies for meeting this need involved the establishment of new Federally Qualified Health Centers (FQHCs) and new sites for existing FQHCs that would target underserved locations across the country. A Community Health Center Fund of $11 billion was established, appropriating $9.5 billion for organizational expansion and $1.5 billion in capital funding. To continue the economic stimulus, the capital funding (to be used for construction and renovation of community health centers) was made available for Federal Fiscal Years (FFYs) 2011 through 2015, and the expansion funding was scheduled for release annually, starting with $1 billion in FFY 2011 and increasing to $3.6 billion in FFY 2015 [1].

The American Recovery and Reinvestment Act of 2009 (ARRA) established new health centers and sites, and passage of the ACA by Congress allowed the administration to continue funding these centers [2]. One new community health center and one expanded center in North Carolina received ACA funding in 2011 [3]. ARRA also funded nearly all health centers nationally, allowing them to serve additional patients affected by the national economic collapse [4]. This operational funding was continued through the ACA, which added $1.8 million to the base budgets of each of the 26 FQHCs in existence in North Carolina prior to 2010. North Carolina applicants struck out in the first 2 rounds of ACA capital funding, but 4 health centers in the state received a total of $9.2 million in capital funding in the third funding cycle [5]. Funding was used to build 2 new facilities in communities that had previously had none and to replace cramped, aged clinics in 2 other communities.

Prior to the passage of the ACA, the North Carolina Community Health Center Association received a grant from the Kate B. Reynolds Charitable Trust to undertake an 18-month inclusive process that brought together safety-net providers and existing health centers to develop community-level plans and to assist organizations in applying for new start-up funds. North Carolina organizations submitted 30 applications for the initial 2011 round of funding.

The Congressional budget compromise of 2011 cut $600 million per year from the $2.19 billion base health center appropriation [6]. To keep the core level of services in place, the administration chose to "backfill" the budget hole by tapping the Community Health Center Fund. This change resulted in the health center expansion being reduced from $250 million [7] to just $28.8 million [4]. Consequently, only 67 grants were awarded nationwide [4]. In spite of this reduction, North Carolina received 2 New Access Point grants (for 1 new health center and 1 expanded health center) totaling $1.38 million [8], as well as 2 health center planning awards of $80,000 each [9]. In 2012, $128.6 million from the Community Health Center Fund was used to add 219 new health centers nationally from the pool of approved-but-unfunded applications [10]. As a result, North Carolina received 9 new grants (for 4 new community health centers and 5 expanded ones) totaling $5.1 million [10, 11]. Collectively, these 9 projects are expected to serve more than 52,000 new patients in 14 previously unserved counties in the first 2 years.

The second cycle of ACA-funded New Access Point applications closed on April 3, 2013. Eight North Carolina applicants were among those competing for $19 million; only 25 awards were to be granted nationally [12]. Because more than 400 applications were submitted, the administration will likely hold over approved-but-unfunded applications for funding in FFY 2014. There will then be one final round of applications in 2015, with 22 North Carolina counties still contemplating or planning FQHC development. Cuts to the community health center program resulting from the 2013 federal sequester are estimated to range from 4% to 9% and could further deplete support for existing programs and for expansion [13].

The ACA funding design for health centers was built on the premise that a large number of patients who were uninsured in 2010 would begin receiving health care coverage in 2014, either through the Medicaid expansion or through the purchase of a commercial plan in one of the new health insurance marketplaces (formerly called health benefit exchanges). Therefore it was expected that the health centers in existence prior to 2011, as well as those funded afterward, could be sustained with less federal support. The US Supreme Court decision of 2012 upset this assumption by allowing states to opt out of the Medicaid expansion [14]. In March 2013, the North Carolina

As I have noted, however, the potential expansion of insurance coverage is only one aspect of access to care. The ACA includes many additional provisions that promote access in a comprehensive attempt to improve the nation's health. For example, some sections of the ACA aim to help consumers negotiate the system. The ACA encourages the development of ACOs [13], which were originally structured around groups of Medicare beneficiaries and were intended to reward care coordination. ACOs also promote preventive measures that reduce overall costs of care by improving outcomes and preventing costly complications or the emergence of preventable disease. Multiple groups of hospitals, physicians, and suppliers of pharmaceutical and other health care services and products have begun to form ACOs and to develop the systems that will generate these savings and improve health. A large part of this effort involves the use of electronic

General Assembly elected not to participate in the Medicaid expansion and not to partner with the federal government in setting up the state's health insurance marketplaces. Because North Carolina's FQHCs treat a large proportion of uninsured patients—52.1% of patients at the 28 reporting community health centers in North Carolina in 2011 were uninsured [15] compared with 36.4% of patients at the 1,128 community health centers reporting nationally [16]—the state's decision not to expand Medicaid threatens the financial viability of North Carolina's community health centers. In 2016 ACA funding will end, at which time the 2011 budget cuts will have reduced the total national program budget to $1.58 billion.

Foreseeing an increased reliance on commercial payers, community health centers have been preparing to be value-added participants in the transformation of the health care marketplace. Through funding in 2011 from the Blue Cross and Blue Shield of North Carolina Foundation and the North Carolina Office of Rural Health and Community Care, community health centers and other safety-net providers have partnered with Community Care of North Carolina (CCNC) to connect through the North Carolina Health Information Exchange to CCNC's informatics center. CCNC's analytics will allow health centers to provide better, more cost-effective care through a population health approach. Additionally, the majority of FQHCs in North Carolina have banded together to form the Carolina Medical Home Network, a collaborative approach to performance improvement and practice transformation. However, it remains doubtful whether these system changes will be sufficient to overcome the growing number of uninsured individuals and the concurrent loss of federal funding. NCMJ

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Acknowledgment

Potential conflicts of interest. E.B.M. is an employee of the North Carolina Community Health Center Association.

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N C Med J. 2013;74(4):325-326.
0029-2559/2013/74410

medical records and dedicated care coordinators or patient navigators who can help move patients through the complex health care delivery system. The ACA also includes insurance navigators to help people obtain insurance through the health insurance marketplaces that are being set up in every state [14]. Fundamental to accessing care is simply understanding what is covered by your insurance plan, so the ACA requires every health insurance policy to include a "summary of benefits and coverage" that provides a clear and simple description of coverage [15]. The ACA also provides grants to the states to support consumer assistance programs that can help people when they have problems with their health insurance coverage [16]. There is such a program in the North Carolina Department of Insurance, called Health Insurance Smart NC (www.ncdoi.com/Smart/), which has regional offices in Asheville and New Bern.

Prevention of disease through timely actions, including visits to providers, is another important element of effective access to care. The ACA includes a number of sections (eg, sections 1001, 4001–4004, 4101–4108, 4306, 4402, 10406, and 10408) that mandate expanded coverage of preventive services recommended by the US Preventive Services Task Force. In most instances, insurance policies will have to cover preventive services such as testing to detect diabetes, elevated blood pressure, and elevated cholesterol levels, as well as cancer screenings, such as mammograms and colonoscopies. Policies will also have to cover regular well-baby and well-child visits, from birth to age 21 years. Coverage of routine vaccinations against diseases such as measles, polio, and meningitis will also be required, if these vaccinations are recommended by the Advisory Committee on Immunization Practices.

Taking advantage of this expanded coverage will require coordination and counseling from navigators, patient advocates, or community health workers. These roles are supported either directly or indirectly by the ACA. One such program is a demonstration project to develop training and certification programs for personal or home care aides [17]. North Carolina received a grant under this authority to support a Personal and Home Care Aides State Training Program (PHCAST), which trains qualified personal and home care aides to help address the needs of elderly and/or homebound individuals in areas with a shortage and/or high demand for these services.

The provisions of the ACA that touch on workforce training make up a large portion of the overall legislation. Title V of the ACA covers health care workforce provisions as well as programs specifically earmarked for "improving access to health care services" (Title V, subtitle G). The ACA recognizes that training the right people for the right jobs is a necessary element of access to care. These workforce provisions include programs and grants to increase overall health workforce supply, as well as focused support to expand the number of public health workers, allied health workers, nurses, primary care practitioners, and general surgeons. These programs translate into support for training programs in North Carolina's schools, community colleges, and universities, as well as focused training using the North Carolina Area Health Education Center (AHEC) Program.

Primary care physicians, physician assistants (PAs), nurse practitioners, and other advanced practice nurses—including nurse anesthetists, nurse midwives, and nurse educators—are the clinicians who are most likely to provide first-encounter access to the health care system and to serve as coordinators of care [18]. They are also well accepted by the public and by patients [19]. Fortunately, all of these groups are being supported by ACA funding. More than $5 million has been provided to expand primary care residencies in Chapel Hill and Wilmington through 2015. The PA programs at Duke University and Methodist University also received multi-year grants to support expansion of their training programs. Seven North Carolina nursing schools received grants under the Advanced Education Nursing Traineeships Program funds. This funding is for nurse practitioners, clinical nurse specialists, nurse-midwives, nurse anesthetists, nurse administrators, nurse educators, public health nurses, and other nurses requiring advance education through eligible institutions. Five North Carolina nursing schools received funding for nurse anesthetist training. These nurses serve in critical roles in smaller (and most often rural) hospitals, where they improve access to inpatient and outpatient surgery. Finally, the North Carolina AHECs are working with the North Carolina Hospital Association to provide focused training in quality assurance for staff members of ACOs, and they are also helping staff members in medical offices to implement electronic medical record systems. Overall, North Carolina programs received more than $12 million to support new or expanded health care workforce training programs under the ACA.

These workforce programs anticipate the expansion of demand that is likely to occur when health insurance coverage is increased. To understand the possible impact of this expansion, it is useful to review Massachusetts' experience with rapid and wide expansion of health insurance coverage [20]. One of the positive effects of that expansion was that more adults reported having a "usual source of care"—that is, a practitioner they see regularly, so that they no longer need to make use of the emergency department for regular care. These effects, and others, were achieved in a system that anticipated a rapid increase in demand and a potential shortage of available practitioners. There were indicators of a potential for a lack of access to practitioners in Massachusetts as health reform was being implemented, and there is evidence that some strain has been put on the system: In 2010, 17.9% of adults in Massachusetts reported being told by a physician or physician practice that no new patients, or no patients with a specific insurance type, were being accepted; there were also reports of longer waiting times for appointments [20]. The expansion of coverage in North Carolina may produce similar stresses if the use of services, especially primary care services, by new enrollees reaches levels that match the current level of health care utilization by higher-income, employed, insured adults and their families.

Whether physician supply will be able to keep up with increased demand is the subject of some debate. Petterson and colleagues have predicted a nationwide need for nearly 52,000 additional primary care physicians by 2025, primarily because the population is growing but also because of the aging of the population and the demand stimulated by the ACA [21]. Others have suggested that the proper deployment of teams, nurse practitioners, PAs, and other nonphysician health care providers can meet the increase in demand [22]. The Petterson study suggests that, if national trends hold in North Carolina, the state might face a shortage of more than 1,500 primary care physicians by 2025. A more detailed state-by-state analysis published in 2011 by Hofer and colleagues anticipated that North Carolina would have an increase in need of between 150 and 240 primary care physicians by 2019, solely due to immediate insurance expansion [23]. This estimate was based on the assumption that many people would gain coverage as part of the Medicaid expansion; in North Carolina, however, this expansion is likely to be delayed, if it is implemented at all.

Certain provisions of the ACA, especially those that promote the use of patient-centered medical homes, are intended to change the health care delivery system to more appropriately care for patients while potentially reducing demand for some services, thus freeing up physicians to provide more appropriate care. These provisions are likely to affect the actual demand for services in such a way as to reduce the need for physicians while increasing the need for care coordinators, navigators, and other workers who will be necessary in a more complex system of care. The need for a "new" workforce has been recognized in North Carolina, and training programs—from postgraduate residencies to community college short courses—are being organized to meet that need [24]. The North Carolina Institute of Medicine recommended that training programs and employers work together to increase the number of workers who have the core competencies that support interdisciplinary team-based care: competency in patient safety, an understanding of quality initiatives, cultural competency, the ability to use health information technology, and familiarity with the other necessary elements of a reformed and more effective health care delivery system [12]. These roles may be played by existing professionals, including nurses, or the roles may be combined into new occupational classifications such as patient navigator or care coordination specialist.

The safety-net structure in North Carolina is supported by local, state, and federal funds as well as through the provision of charity care by hospitals and other providers. However, the core of the safety net for primary care consists of Federally Qualified Health Centers (FQHCs). The ACA emphasizes the role of FQHCs in meeting the demand for care from newly insured individuals and in working with people who may have difficulty understanding the system and how to make use of available resources. Funding for operations and capital expansion of those centers is an important part of the ACA [25], both because Congress recognized that insurance coverage was not going to be extended to the entire population and because these centers make special adaptations to accommodate low-income individuals and those who face other barriers to access. North Carolina has its own network of rural health clinics, community health centers, free clinics, and public health clinics, as well as a Medicaid program (Community Care of North Carolina) that emphasizes coordinated care and meets the special needs of low-income patients and clients. This network—which is supported by teaching institutions, the North Carolina AHEC Program, hospitals, and independent practitioners—has created an effective safety net across the state.

In addition, FQHCs are now eligible to host the graduate medical training of primary care physicians in a context that emphasizes care coordination and team-based care. The Mountain AHEC in Asheville has already been funded and accredited to operate one of the "Teaching Health Center Graduate Medical Education Programs" authorized by the ACA [26]. This represents a milestone in the development of a health care system focused on complete access; although such centers have, from their inception, hosted students of all types, they are now seen as the locus where best practices for enhancing access can be actualized as well as taught [27]. The program in western North Carolina is likely to be the first of several that will be established in the state.

The ACA appropriately emphasizes the development of human resources as a necessary step toward increasing access to health care services. Developing the health care workforce to meet the changing needs of patients and populations is one of the obvious ways to improve overall health status, and North Carolina has taken advantage of the opportunities the ACA offers in this area. Fortunately for the state, some of the necessary groundbreaking has already been done. We have a primary care network that is focused on Medicaid beneficiaries but also provides substantial "halo" effects for other patient populations; a set of practice acts that can accommodate some, but not necessarily all, of the skills and capacities of a wide range of clinical practitioners; and education and training institutions supported by a robust AHEC system. NCMJ

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Acknowledgment

Potential conflicts of interest. T.C.R. has no relevant conflicts of interest.

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INVITED COMMENTARY

The Potential Impact of the Affordable Care Act on Population Health in North Carolina

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The need to improve population health is critical. This commentary explores how the Patient Protection and Affordable Care Act of 2010 (ACA) can help us improve population health, highlights some of the actions North Carolina has taken in response to the ACA's provisions, and discusses the value of health investments in the future.

The United States faces a critical need for improved population health. Compared with 16 other wealthy countries, the United States ranks last in life expectancy, and the gap between the United States and the top countries has increased over the past 3 decades. Worse, investments in health care in the United States are an abysmal value; the United States spends almost double what other wealthy nations do on health care, with scant improvement in outcomes to show for it [1]. North Carolina, unfortunately, ranks 33rd among US states in overall population health [2].

Adding to this "value crisis" is the unsustainable increase in US health care expenditures, which are spiraling out of control and are expected to reach 19.6% of the gross domestic product by 2021, up from 17.9% in 2010 [3]. Lack of availability of medical care and poor quality of care account for only 10% to 15% of preventable mortality in the United States; the remaining 85% to 90% is determined by factors such as level of education, behavioral choices, the physical environment, and socioeconomic conditions [4]. The sharply climbing costs of health care, combined with the current focus on governmental austerity at the federal, state, and local levels, will make it very difficult to achieve further investments in health. These sobering facts make it clear that fundamental changes are needed in US health policy.

The Patient Protection and Affordable Care Act of 2010 (ACA) will cause the most extensive changes in national health policy in decades. In this commentary we outline the provisions of the ACA that can impact population health, describe North Carolina's actions relating to the opportunities the ACA provides, explore what may be required to improve population health, and discuss the value of our health investments in the future.

Provisions of the ACA Relating to Population Health

The ACA provides several important opportunities to improve population health. One such opportunity, which is perhaps not well known to the general public, is the Internal Revenue Service's requirement that nonprofit hospitals complete a community health needs assessment (CHNA) every 3 years and report every year on how they are, or are not, addressing the identified needs [5]. Because local public health departments have been doing CHNAs for many years and have been making efforts to improve community health, this ACA requirement provides a fertile opportunity for hospitals and health departments to collaborate on the assessment and improvement of population health.

Another ACA requirement is that a National Quality Strategy be implemented by the federal government and monitored yearly [6]. The National Quality Strategy is framed around the Triple Aim approach created by the Institute for Healthcare Improvement; the 3 components of the Triple Aim are population health improvement, improved quality of care, and lower costs [7]. The use of the Triple Aim framework emphasizes the importance of population health improvement and the role of the health care system in bringing about that improvement.

The ACA also created the Center for Medicare & Medicaid Innovations (CMMI) [8, 9] within the Centers for Medicare & Medicaid Services (CMS) in order to test innovative payment and service delivery models designed to reduce costs while preserving or enhancing the quality of care for those who receive Medicare, Medicaid, or Children's Health Insurance Program (CHIP) benefits. The CMMI primarily focuses on clinical care, and one of the models being tested is the accountable care organization (ACO) [10]. An ACO is comprised of staff from hospitals and health care agencies, physicians and other practitioners, administrators, and others who work as a team to control costs for a defined patient population. Presently most ACOs are organized around providing primary care for the Medicare population, but if ACOs are successful, they may eventually be used to care for Medicaid recipients and other populations. The CMS provides a financial incentive for these ACOs to form and

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Electronically published August 1, 2013.

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N C Med J. 2013;74(4):330-333.
0029-2559/2013/74411

to collaborate on patient management by sharing with them the Medicare cost savings that result from improved coordination of care. One major uncertainty about the future of ACOs is the extent to which they will focus on population health in a community or region rather than focusing solely on the subpopulation of patients they cover [11].

Finally, the ACA created the Prevention and Public Health Fund to expand investments in prevention and public health programs in order to improve health outcomes [12]. This fund supports numerous initiatives aimed at improving population health, such as community transformation grants (CTGs). CTGs provide funding for the design and implementation of community-level programs that prevent chronic diseases—such as cancer, diabetes, and heart disease—by engaging partners from multiple sectors, including education, transportation, business, and faith-based organizations. The Prevention and Public Health Fund also supports the National Public Health Improvement Initiative (NPHII), which helps state, tribal, local, and territorial health departments make major enhancements to their organizations and services by using quality improvement (QI) [13]. A list of other important programs in North Carolina that are supported by this fund can be found on the US Department of Health & Human Services Web site (http://www.hhs.gov/aca/prevention/nc.html) [14].

North Carolina's Response to the ACA

The Prevention and Public Health Fund holds great promise for further increasing the impact of state and local public health departments. North Carolina's Division of Public Health (DPH) has been very successful in garnering Prevention and Public Health Fund grants that can impact population health. For instance, North Carolina was awarded one of the largest CTGs in the country. This grant will fund regional efforts across the state to improve access to physical activity and healthy eating, to promote tobacco-free living, and to improve preventive and primary care for hypertension and diabetes. The project's aim is to decrease chronic diseases by making the healthy choice the easy choice. The North Carolina CTG will provide more than $7.4 million per year for 5 years, to be invested statewide. The money funds 10 multicounty collaboratives, led by local health departments, which cover 98 of the state's 100 counties (Wake County and Mecklenburg County were excluded due to federal grant requirements). These collaboratives are using the funding to improve community health by implementing changes such as smoke-free multi-unit housing, joint use agreements that increase access to physical activity facilities, and new or enhanced farmers' markets. These community changes are linked with quality initiatives in primary care practices that address high blood pressure, high cholesterol, and tobacco use. Efforts of the CTG project also target health disparities and promote health equity.

North Carolina has been a national leader in the NPHII program by building QI capacity across the state's public health system. In addition, North Carolina was 1 of only 14 states that received additional funding through a competitive grant process; this award is being used to enhance the capacities of the North Carolina State Center for Health Statistics by developing and implementing a centralized data resource, HealthStats (which provides interactive data on the health status of North Carolinians), and by planning and developing the requirements for an electronic death registration system. Through its NPHII program, North Carolina has provided comprehensive QI training and QI support to teams from 16 DPH programs and partners. The 16 QI projects carried out by these teams, with the support of the North Carolina Center for Public Health Quality (CPHQ), have resulted in substantial improvements in program services and efficiency and have already generated an estimated $4.8 million in cost savings for the citizens of North Carolina. (This estimate is based on an internal 2-year economic impact analysis of 6 of the 16 QI projects). In addition, the CPHQ has provided advanced training for approximately 50 QI advisers, who are leading QI efforts at the DPH and in local health departments. Likewise, the North Carolina State Center for Health Statistics has successfully increased its capacity through NPHII efforts. For example, the center's Vital Records Special Registration Unit recently increased its productivity by 97%, and it has reduced the waiting time for special record requests.

North Carolina was one of the first states to adopt the Triple Aim initiative as an improvement framework. Triple Aim efforts in North Carolina began in 2008 and have involved community projects led by Vidant Health, Cape Fear Valley Hospital, Caldwell Memorial Hospital, CaroMont Health, and the Western North Carolina Health Network. Although many of these efforts were initiated by hospitals, all have included the involvement of local health departments, Community Care of North Carolina networks, the North Carolina Area Health Education Center (AHEC) Program, and other community partners. In addition, North Carolina has been readily adding new ACO models. There are 6 ACOs currently under way in the state [15].

North Carolina's hospitals and health departments have been actively collaborating on the ACA's requirements for CHNAs. In 2010 the North Carolina Hospital Association began hosting monthly collaborative meetings with the DPH, the North Carolina Association of Local Health Directors, university public health leaders, and other stakeholders to determine how to leverage these new requirements to benefit population health. Some key actions have promoted widespread collaboration among health departments and hospitals. For example, in 2011 the State Health Director and the President of the North Carolina Hospital Association sent a joint letter to all hospital chief executive officers and public health directors to encourage them to collaborate on CHNA efforts. The North Carolina Local Health Department Accreditation Board altered their requirement for CHNA frequency (every 4 years) so that it would align with the

ACA requirements for hospitals (every 3 years). In 2012, the North Carolina Community Health Assessment and Improvement Collaborative was formed and launched a public health/hospital innovation community. The collaborative included 5 communities: Alamance County, Dare County, Davidson County, Pitt County, and 16 counties in Western North Carolina that are working together. These communities collaborated with academic experts to create new models for using joint hospital/public health CHNAs to improve community health. As a result of these efforts, the Institute for Healthcare Improvement recently recognized North Carolina as a national leader in this groundbreaking work.

Ever since the ACA was passed, local health departments have been trying to predict how this legislation will impact their future directions and vision. In 2011, 28 local and state public health leaders formed the 2011 North Carolina Public Health Task Force to create a blueprint for the future. This ongoing planning exposed a need to better explain to state and local leaders and to the general public what public health is and what public health professionals do. The planning also reinforced the importance of boards of health for public oversight. Strategic planning is now even more urgent, because some counties are consolidating human services agencies and eliminating their boards of health.

Looking to the Future

Looking ahead at our country's long-term well-being, there are 2 certainties regarding health policies, regardless of the impact of the ACA. First, the United States must address its unsustainable rise in health care costs. Second, we cannot effectively address rising health care costs without improving the health of our population. For example, by decreasing rates of obesity, reducing tobacco use, and promoting healthy behaviors, we can hopefully lessen the overall burden on our health care system. Keeping these premises in mind, the public health and health care sectors must collaborate to improve population health. The level of collaboration (often via community partnerships) and its focus on population health will require numerous purposeful changes in workforces, organizations, and resources in order to successfully improve population health. North Carolina's health care and public health leaders should aim to stay ahead of the curve on these issues in order to benefit our state and its citizens.

To effectively and efficiently improve population health, community partners need to know what methods work best to address the health needs of the population. Evidence-based interventions (EBIs), such as North Carolina's Tobacco Quit Line, are validated approaches to improving health, but there are far fewer population health EBIs than will likely be needed. The Institute of Medicine of the National Academies has therefore recommended greater investment in population health research [16]. Perhaps even more important, as the North Carolina Institute of Medicine recommends, community partners need assistance with the selection and implementation of EBIs [17]. The DPH is presently partnering with local health departments, academic partners, the Center for Healthy North Carolina, and the CPHQ to develop a package of resources for communities to help them select and implement population health EBIs.

Additional workforce deficiencies must be addressed across the public health and health care sectors. Members of the current workforce and the future workforce (eg, nursing, medical, and public health students) will need to learn more about population health and QI. Knowledge and skills in these areas, if taught in a coordinated, standardized way, will provide a common language for successful implementation of population health EBIs. In addition, collaborative leadership skills will be required to work across sectors and in diverse partnerships. Continuing education providers such as the North Carolina AHEC Program and the North Carolina Institute for Public Health, as well as the state's many health professional schools, will need to work together to address these needs.

We will need innovation in organizational design to identify the governance and operational structures that can most effectively improve population health. The recently developed "collective impact" framework [18] appears to be a promising, comprehensive guide for designing these structures. This framework includes the following key strategies for a successful partnership: a common agenda, shared measurement systems, mutually reinforcing activities, continuous communication, and management by a "backbone" organization. In addition, community partnerships that address population health will need to be supported by new, creative financial models [19]. Public health funding is woefully inadequate, and this seems unlikely to change given the current focus on governmental austerity [16, 20]. The ACA's requirement that nonprofit hospitals perform CHNAs provides a remarkable opportunity for creative partnerships, as hospitals are now required to provide greater justification to the Internal Revenue Service regarding the money they spend on community benefit activities. The North Carolina Community Health Assessment and Improvement Collaborative and other collaborations across the state can provide a platform for exploring innovative financial models.

Finally, another important gap is the lack of timely and actionable population health outcomes data to guide local community improvement efforts. To be actionable in improvement efforts, data must be timely [21], but most population health data at the local level are several years old, and often 3–5 years of data are combined into "moving averages" [22]. The increasing prevalence of electronic health records, surveillance systems, disease registries, and health information exchanges offers promise for addressing this gap.

Conclusion

The ACA is intended to revolutionize the quality of our health system, to help reduce health care costs, and to improve population health. This is a major undertaking for a federal law that must be implemented in 50 states, many of which face significant political and/or public opposition to the legislation. How this new law will impact population health is difficult to predict at this time. Nevertheless, there are numerous activities under way in North Carolina that have the potential to positively affect our population's health. Regardless of the future impact of the ACA, improving population health will be crucial to our state's well-being. NCMJ

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Acknowledgments

The authors would like to thank Kerri Ward for her invaluable assistance in preparing the manuscript. The authors would also like to thank Gibbie Harris, Tom Irons, Beth Lovette, Ruth Petersen, Kevin Ryan, and Chuck Willson for thoughtfully reviewing the manuscript and making suggestions for improving it.

Financial support. G.D.R. is funded by The Duke Endowment, the Blue Cross and Blue Shield of North Carolina Foundation, the Centers for Disease Control and Prevention, the American Academy of Pediatrics, and the North Carolina Area Health Education Centers Program.

Potential conflicts of interest. G.D.R. and J.H.M. have no relevant conflicts of interest.

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INVITED COMMENTARY

Refusing Our Default Future:
Organizations That Are Accountable for Care Can Lower Costs and Improve Quality

Grace Emerson Terrell

Models of health care payment and delivery are being rapidly transformed. In North Carolina, multiple organizations are involved in this redesign. Cornerstone Health Care has reorganized its care models and renegotiated its contracts in order to improve the quality and lower the cost of health care.

Everyone has a default future—the future we have if we just keep doing what we've been doing and passively accept what comes our way. The default future of health care in the United States is not pretty. The US health care system is too expensive, and outcomes and quality of care fall short of expectations. National health spending per capita now equals 30% of median income and consumes 18% of our gross domestic product (GDP) [1, 2]. Demand for health care services and the cost of those services continue to grow, driven by the aging population, declining health status, improvements in technology, and general medical cost inflation. Meanwhile, the supply of funding across all sources has reached a constraint point; Medicare insolvency is on the horizon, state Medicaid budgets are heavily limited, and employers are choosing not to offer coverage because of large increases in premiums. The growing gap between the demand for services and the supply of funds means that we cannot sustain the rate at which health care spending is increasing. Reductions in overall spending and a decrease in long-term growth will be required for sustainability of the system.

Fortunately, no one has to accept a default future [3]. We can eliminate our default future by choosing to redesign it—by creating a vision and a good strategy to get there. The logical place to start is with a redesign of the fee-for-service (FFS) payment model, which destroys value for all stakeholders. Under a FFS payment model, providers are paid based on the volume of the services they provide, not the value to the patient. FFS thus creates a disjointed health care system comprised of siloed sites of service, each operating as its own profit center, in which there is no intrinsic monetary incentive to coordinate services. Health care professionals are paid separately for the services they provide and are not incentivized to coordinate care with other health care professionals or institutions. Patients have difficulty navigating a FFS system since their care is uncoordinated and each service is paid for separately. Payers have increasing costs, declining member satisfaction, and increased attrition. Physicians face constantly declining FFS payments and have no ability to fund the development of coordinated, evidence-based care models. Beneficiaries face increasing costs for poorer benefits and disappearing employer coverage. Employers pay higher premiums, which reduces their ability to pay competitive wages and to compete internationally. And society experiences a decline in health status, even as we invest a greater portion of our GDP in health care (and as a result are underinvesting in other important aspects of our economy, such as in infrastructure and education).

In 2010 Congress passed the Patient Protection and Affordable Care Act. Much of this legislation is focused on improving access to care through insurance reform and expansion of care for uninsured and underinsured individuals. A smaller portion of the legislation is focused on the redesign of the FFS payment system. In 2012 the US Supreme Court's decision to uphold the Affordable Care Act reinforced strategic activities under way across sectors of health care. All of these new payment models have been lumped under the rubric of "value-based" payment systems, in contradistinction to the volume-based incentives in FFS care [4]. The value-based trend has gained momentum with commercial insurers and employers, and the Medicare Shared Savings Program, launched in April 2012, has further accelerated the creation of accountable care organizations (ACOs) across the country. Currently 45% of the US population lives in a primary care service area with at least 1 ACO [5], and there are now 441 identified ACOs across the country [6], including 8 in North Carolina [7].

Broadly speaking, an ACO is simply a group of health care providers who are organized in such a way that their reimbursement is based on how well they take responsibility for both the quality and the cost of the services they pro-

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Electronically published August 1, 2013.

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N C Med J. 2013;74(4):334-337.
0029-2559/2013/74412

vide. An ACO must bear financial risk for a defined population, coordinate and oversee the clinical provision of care across a continuum of health care services, and provide measured outcomes related to cost and population health. Accountable care can be facilitated by more than one type of organizational structure, including clinically integrated health systems, independent multispecialty medical groups, independent physician organizations, hospitals and their organized medical staff, and health plan and provider collaborations.

Throughout North Carolina, there are multiple examples of these models. Novant Health, which participated in the Centers for Medicare & Medicaid Services Group Practice Demonstration Project and recently announced an ACO partnership with Cigna, is an example of an integrated system ACO [8]. Cornerstone Health Care and Wilmington Health Associates are independent multispecialty medical groups that participate both in the Medicare Shared Savings Program and in ACO arrangements with commercial payers. The Triad Health Network, made up of Cone Health's employed and affiliated physicians, is an example of the organized medical staff model, whereas Key Physicians is an example of an independent physician association model. Finally, the partnership of Caldwell Memorial Hospital and its physicians with Universal American and the Medicare Shared Savings Program is an example of a payer-provider model.

The type of infrastructure necessary for an ACO to be successful differs considerably from that required for a successful FFS health care business. ACOs need new forms of governance and structure, care transformation support, financial analysis and reporting, operational support, information continuity and management, quality management, and network development and support; underinvestment in any of these crucial pieces of ACO infrastructure creates considerable risk in the new payment models. The American Medical Group Association has identified 7 aspects of a high-performing health system [9]. These include the efficient provision of services, an organized system of care, quality measurement and quality improvement activities, care coordination, use of information technology and evidence-based medicine, compensation practices that promote the 5 objectives just listed, and accountability. The association does not define a high-performing health system as a hospital with employed physicians, a multispecialty medical group, an independent physician association, a traditional hospital with its organized medical staff, or a large multihospital health system. Rather, performance is defined by the provision of value-based services.

Cornerstone Health Care is an independent multispecialty medical practice in the Piedmont Triad area of North Carolina, with more than 370 providers on staff at 15 hospitals that are part of 6 separate health systems. Its broad primary care base, comprehensive specialty coverage, and extensive outpatient ancillaries have allowed an integrated approach to health care. Despite Cornerstone's success, the practice's physicians have concluded that the unsustainable nature of the current health care delivery system necessitates a transformative shift in their clinical and business model.

Cornerstone has made extensive progress in transitioning from a FFS organization to one that will be successful in a pay-for-value health care delivery system. It has done so by simultaneously transforming its care models and payer contracts and investing in new technologies, facilities, and human resources. Cornerstone developed a 5-pronged strategy for developing the capabilities required to become an ACO: It has focused on development of primary care medical homes, clinical integration across the spectrum of care, information integration, organizational realignment around service lines, and reimbursement-model transformation.

Medical home development began in 2007 with the first efforts at improving care through 3 programs developed by the National Committee for Quality Assurance: the Physician Practice Connections Recognition Program (which recognizes practices that use systematic processes and information technology to improve patient care), the Diabetes Recognition Program (which recognizes clinicians who use evidence-based measures and provide excellent care to patients with diabetes), and the Heart/Stroke Recognition Program (which recognizes clinicians who use evidence-based measures and provide excellent care to patients who have cardiovascular disease or have had a stroke). A broad range of capabilities began to evolve across the full care continuum, including clinical pharmacy services for anticoagulation management and diabetes management. Multiple practices in primary, specialty, and ancillary services began offering extended and weekend hours. Outpatient infusion services permitted the administration of intravenous medications and fluids 7 days per week. Patient-care advocates who were trained in customer service began using an analytic tool to identify high-risk patients who had experienced gaps in care and to reengage them with primary care physicians. Realizing that a true medical home is based not on recognition but on function, we are continuing to make efforts to improve care coordination, and we are integrating health navigation, team-based advanced practice providers, clinical pharmacy, behavioral medicine, and social work into care model design.

Clinical integration requires that high-impact specialty care models be integrated into medical homes to improve outcomes via better management of the full care continuum. The FFS model is replaced by a process in which the population is stratified by health status and condition in order to allow for categorization of patients based on their level of need for health care delivery resources. At Cornerstone, patients were risk-stratified into several categories—such as healthy adults, healthy adults with risk factors, adults with early chronic conditions, and adults with complex chronic conditions—and care models were designed accordingly.

Cornerstone followed a disciplined process to identify areas of opportunity and to quantify the potential impact of planned changes on each care model.

In late-stage and uncontrolled advanced chronic conditions, such as end-stage renal disease and congestive heart failure, an intensive focus on the individual patient's overall health delivery ecosystem can improve the management of care. Initially, high-impact specialty care models were developed for cardiology, oncology, and advanced primary care patients who have multiple complex chronic diseases or a single chronic disease with multiple comorbidities. Beyond the development of specific care models, Cornerstone instituted a number of targeted quality and value-driven initiatives in its key service lines, including implementation and tracking of prevention quality measurements in pediatrics; standardization of routine prenatal testing and annual tests around evidence-based guidelines in obstetrics and gynecology; coordination with primary care to create evidence-based imaging protocols in orthopedics; and guideline-based imaging protocols for lower back pain, migraine, and dementia in neurology.

Information integration is crucial to improving and measuring performance in an accountable care structure. Necessary technology capabilities include tools for financial and clinical risk management, care coordination, effectiveness analysis, patient safety, and patient engagement. In this early era of population health management, many of these tools are still immature. Cornerstone has chosen to use the best software and analytic tools available commercially and to augment these with homegrown solutions to improve population analytics and care coordination. A focus on reduction in waste, reduction in variation, and an increase in influence have permitted focused evaluation of technology. Data from a variety of sources, including claims and the clinical record, have been integrated through a data warehouse using a number of individual tools to create outcomes-oriented solutions for patient identification, patient engagement, care coordination, financial predictive modeling, clinical predictive modeling, and referral management. Clinical decision support tools are superimposed on the electronic health record, and provider performance reports and patient registries are beginning to improve processes. A technique called exception management can identify patients or provider care patterns that are outliers in order to analyze patterns of risk, costs, and gaps in care. This technique enables individualized attention to be given to those patients who may receive the most benefit from additional services. Clinical data science systematically analyzes patient data to look for opportunities to improve both the cost and quality of care provided to patients.

Organizational realignment is an ongoing effort that includes monthly clinical service line meetings, redesign of committees around quality improvement (which includes improving the patient experience and performance improvement), redesign of physician compensation, a focus on patient safety and patient compliance, and broad investment in physician leadership. More than 40 physicians are compensated for taking leadership roles in the organization as committee chairs, senior administrative leadership, board members, or service line medical directors. All providers are compensated for attending service and committee meetings. These efforts have led to broad participation in the organization's transformational change efforts, which has permitted more rapid adoption of improvement efforts.

Cornerstone made the decision to move to value-based reimbursement as quickly as possible in order to align its investments in care model redesign and infrastructure with consistent payment models. As of April 2013, 100% of its commercial and governmental contracts have value-based reimbursement. All of these models are superimposed on a traditional FFS reimbursement model, but they include additional reimbursement for meeting quality and patient satisfaction performance metrics, and they offer substantial potential revenues for savings over predicted costs of care. This model, termed "gain-sharing," gives providers a portion of the savings, while returning the rest to the payer where it can be used to lower premiums for the patient. Ultimately, as Cornerstone continues to improve its care models and processes, we will have the ability to accept other forms of value-based payments such as bundled payments, global payments, or full-risk capitation.

Within the past 12 months, Cornerstone has aggressively renegotiated all of its contracts and has simultaneously developed multiple care models intended to provide higher-value care. These include the Personalized Cardiac Care Program at Carolina Cardiology Cornerstone, the Cornerstone Personalized Cancer Care Program, the Personalized Primary Care Program, the Cornerstone Care Outreach Clinic, and the Cornerstone Lifecare Clinic. The focus of each clinic is a specific at-risk patient group (congestive heart failure patients, cancer patients, patients with multiple complex chronic conditions, dual-eligible Medicare-Medicaid patients, or end-stage disease patients), but the redesign emphasis is similar for all of these programs: An integrated team of physicians, nurse practitioners, social workers, psychologists, care navigators, health coaches, and pharmacists work together to meet the needs of the individual patients.

The results of Cornerstone's redesign efforts are thus far unknown, although early data are promising. Cornerstone is currently tracking the total cost of care per patient, which is $2,041 lower on average than the average cost of care for other participants in the Medicare Shared Savings Program. Since 2010 Cornerstone has received more than $8.2 million from pay-for-performance incentive programs, and unpublished results of a national collaborative show that Cornerstone has more patients with on-target lipid levels than does any other participating group. In 2012 Cornerstone won the Success Story Award from Press Ganey for patient satisfaction. Access to care also continues to improve, with visits on weekends and during extended hours increasing to 28,692 last year.

Regardless of the ultimate results of Cornerstone's efforts, in the current environment of an unsustainable FFS health care delivery environment, it is important to remember that survival depends on the ability to adapt to a changing environment. Without rapid change throughout our health care delivery system, significant problems await our nation. NCMJ

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Acknowledgments

Potential conflicts of interest. G.E.T. is an employee of Cornerstone Health Care.

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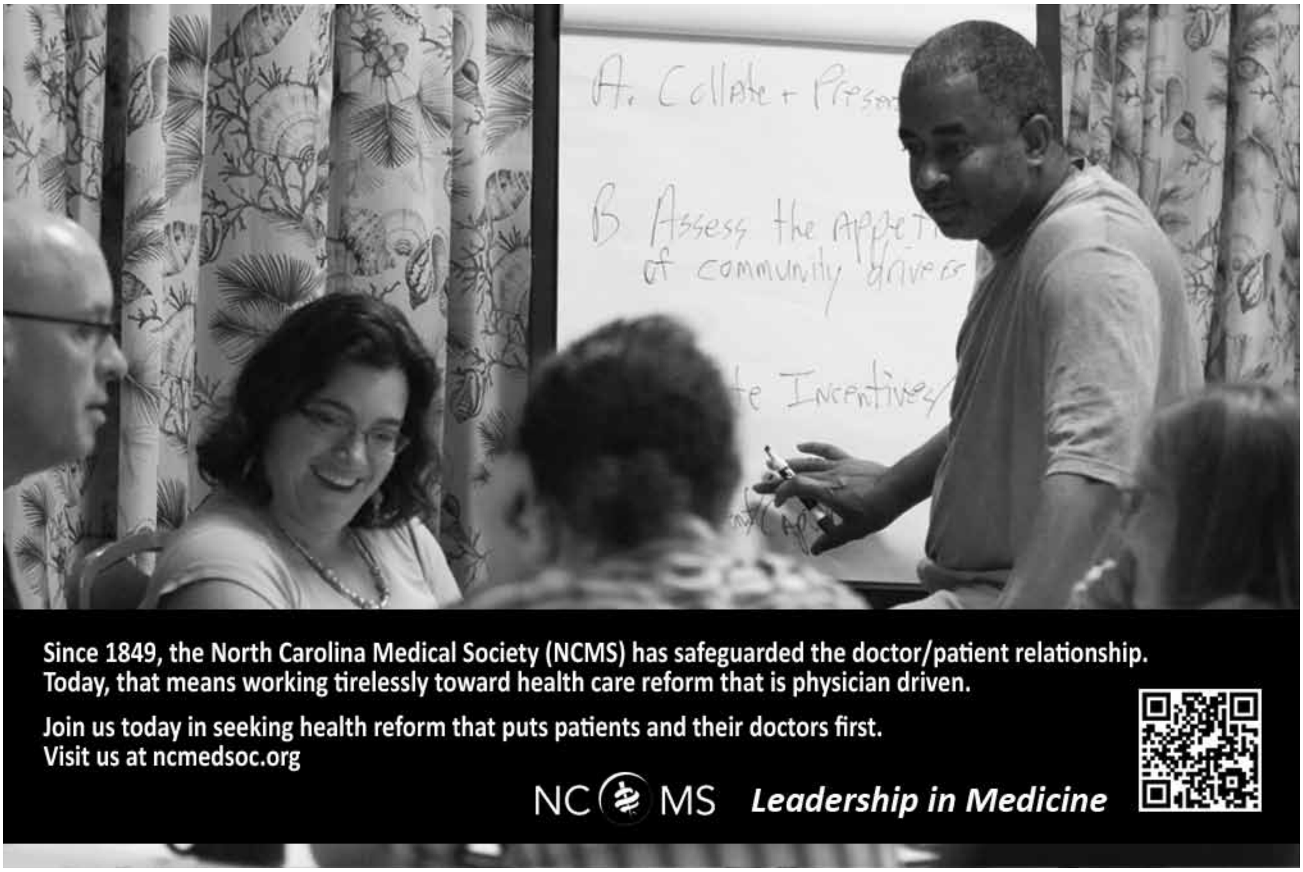

INVITED COMMENTARY

Laying a Foundation for Success in the Medicare Hospital Value-Based Purchasing Program

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Steve Lawler, Brian Floyd

The Centers for Medicare & Medicaid Services (CMS) is seeking to transform Medicare by purchasing "value" from health care providers and physicians. At Vidant Medical Center, we have begun to link the requirements of the CMS Value-Based Purchasing Program to the goals and objectives embedded within our quality improvement initiatives.

The Patient Protection and Affordable Care Act of 2010 (ACA) contains many provisions that are intended to help support the long-term financial viability of the Medicare program. These changes were enacted to improve quality of care, reduce unnecessary costs, promote accountability among physicians and other providers for the quality and cost of care, ensure equitable access to care, foster the use of electronic health records to coordinate care, and require greater transparency regarding the safety and effectiveness of care. Many of those aims are furthered by the ACA's establishment of the Hospital Value-Based Purchasing (VBP) Program [1], which is part of a larger effort by the Centers for Medicare & Medicaid Services (CMS) to link the Medicare payment system to improved health care quality. The program builds on the infrastructure that was developed for the hospital inpatient quality-reporting program authorized by the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 [2]. Based on the premise that competition among hospitals will improve performance on key measures of quality, the VBP program gives the provider community (beginning with hospitals) incentives to eliminate the occurrence of adverse events that result in harm to patients, to adopt evidence-based care standards and protocols, and to reengineer hospital processes to improve the patient experience.

The incentive structure for the program compensates hospitals for their relative performance on clinical process of care measures and on patient experience of care scores [3]; the latter are obtained through the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, which asks patients about their recent hospital stay [4]. Table 1 lists the clinical process and patient experience measures that the VBP program will use in Federal Fiscal Year 2013. The value points a hospital accumulates are multiplied by domain-specific weights; in 2013, the weighted values are 70% for clinical process of care and 30% for patient experience of care. Incentive payments are based on each individual performance measure and use either relative achievement (ie, performance compared to similar hospitals nationwide) or degree of improvement, whichever is greater. In this way, hospitals can earn incentives by competing successfully against high-performing organizations, or they can be rewarded for improvement if they are among the low-performing organizations.

The ACA specifies that the program be funded with reimbursement withholds—that is, reductions in the base operating diagnosis-related group payment amount. There is a 1% withhold in 2013, which increases by 0.25% each year until it reaches 2% in 2017. High-performing organizations can earn back the money withheld and also qualify for additional payments based on their relative performance. The intended consequence of the program is a level of competition that accelerates improvements in quality and patient experience.

Improving Performance at Vidant Medical Center

Vidant Medical Center began using several methods and practices designed to improve performance before the ACA became law. These methods and practices drive performance on each of the VBP metrics. To promote transparency, Vidant has been actively sharing performance data on VBP quality measures using standard scorecards since 2007. These metrics are now displayed in specific operating units throughout the hospital where they are visible to patients, families, and visitors. The same information is also posted on the medical center's Web site. In recent years, similar information has been made available for specific measures of physician performance. Transparent reporting is now leading to studies of variability among providers. The goals of these studies are to enhance standardization among providers and to improve quality.

As part of its journey in creating a more robust quality improvement program, Vidant adopted a practice of set-

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Electronically published August 1, 2013.

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N C Med J. 2013;74(4):338-342.
0029-2559/2013/74413

TABLE 1.
Hospital Value-Based Purchasing Program: Performance Measures for Federal Fiscal Year 2013

Patient experience of care measures
Communication with nurses
Communication with doctors
Responsiveness of hospital staff
Pain management
Communication about medicines
Cleanliness and quietness of hospital environment
Discharge information
Overall hospital rating
Clinical process of care measures
Acute myocardial infarction
Fibrinolytic therapy received within 30 minutes of hospital arrival
Primary percutaneous coronary intervention received within 90 minutes of hospital arrival
Heart failure
Discharge instructions
Pneumonia
Blood cultures performed in emergency department prior to receiving initial antibiotic
Initial antibiotic selection for community-acquired pneumonia in immunocompetent patients
Surgical care improvement project
Health care–associated infections
Prophylactic antibiotic received within 1 hour prior to surgical incision
Prophylactic antibiotic selection for surgical patients
Prophylactic antibiotics discontinued within 24 hours after surgery
Cardiac surgery patients with controlled 6 AM postoperative serum glucose
Cardiology
Surgery patients receiving beta-blocker therapy prior to arrival who received a beta blocker during the perioperative period
Venous thromboembolism
Surgery patients with recommended venous thromboembolism prophylaxis ordered
Surgery patients who received appropriated venous thromboembolism prophylaxis within 24 hours

Source of data: Centers for Medicare & Medicaid Services [3].

ting board-approved stretch targets in the areas covered by VBP quality metrics. In some instances, the medical center advanced to setting targets based on all-or-nothing metrics for core measures and harmful events. For example, heart failure discharge instructions are measured this way. The measure states: "Heart failure patients discharged home with written instructions or educational material given to patient or caregiver at discharge or during the hospital stay addressing *all* of the following: activity level, diet, discharge medications, follow-up appointment, weight monitoring, and what to do if symptoms worsen." To help us reach this goal, a statement was developed that was placed in the discharge instructions given to heart failure patients. Targets are set based on the percentage of patients who receive all required core measures; if even a single measure is missed for a patient, then the score for that patient is zero. Setting stretch goals, such as a 50% reduction in patient harm, has resulted in sustained and continuous improvements in performance. For example, medication errors that caused harm were decreased by 86% from 2011 to 2012. The same has been true for patient experience. The organization's goal was to be in the top decile of performers nationally for patient experience. Vidant Medical Center achieved that goal in 2012, at which time it was also recognized as a top-decile performer in equity of care.

Another key component of Vidant's journey has been leveraging leadership accountability for performance on quality measures. Many tactics are used to drive consistent behaviors among leaders and to maintain accountability for quality outcomes and financial performance. One such tactic is the requirement for service line leaders to report their quality performance in weekly group meetings attended by the hospital president. Physician leaders and administrators are present for a discussion of the previous week's performance, including every event of harm during the week. Performance variance data are reviewed and discussed in the group meetings among hospital leaders, and these data are used to identify quality projects that are adopted by an administrator and a physician partner. Each quality measurement is owned by a physician and an executive sponsor who is responsible for leading performance improvement teams, removing barriers, championing the improvement effort, and reporting on progress. Leaders are expected to conduct their own daily rounds with their staff in order to maintain a focus on the expectations and processes that drive performance.

As leadership accountability increases, the capabilities of the teams led by these individuals must also increase. As we increase transparency and share tactics of accountability, deploying Lean methods and other tools of quality improvement among teams becomes increasingly important. As Vidant's frontline teams and physicians came to appreciate and understand the use of statistical analytics and Lean methodology, they began to focus on the process of care rather than outcomes, and Vidant experienced improvements in performance, employee retention, and employee satisfaction. Without a focus on team capabilities, the organization would have seen its valuable people become disengaged, and quality performance would likely have declined.

Vidant Medical Center has been a leader in engaging patients and families in the work of improvement. Each service line within the medical center has a Patient and Advisory Council made up of former patients and family members. These patient advisers are directly involved in the quality work. They attend rounds on hospital units, participate in design and construction projects, serve as members of performance improvement teams, and even serve on the organization's board of trustees. Having patients play an advisory role has accelerated improvements in patient experience and has been a true differentiator in the quality work, both compared with our past performance and compared with other hospitals.

Vidant Medical Center's performance on VBP measures is depicted in Table 2. As a result of its performance on each of these measures, the medical center is in a good position to earn back incentives in the VBP program. In fact, Vidant Medical Center ranks among the top 25 in North Carolina for number of VBP points earned.

The disciplined and proactive approach to improvement that Vidant Medical Center has taken since 2007 has paid off in terms of better quality and positive financial results. Increasing transparency, reporting outcomes and process information, setting stretch targets, instilling greater leadership accountability, and engaging patients and families have proved effective in elevating the performance of this academic medical center with more than 900 beds. The quality methods used are scalable and can be effective in organizations of any size. NCMJ

The Bundled Payments for Care Improvement Initiative at FirstHealth Moore Regional Hospital

Cindy McDonald

Since passage of the Patient Protection and Affordable Care Act of 2010, the health care industry has been developing payment models for Medicare beneficiaries that move beyond fee-for-service programs. One of the latest models offers hospitals and physicians incentives to improve the quality of care provided to Medicare beneficiaries while decreasing costs, by standardizing care to avoid unnecessary readmissions, tests, and procedures. The Bundled Payments for Care Improvement (BPCI) Initiative was recently launched by the Center for Medicare & Medicaid Innovation, which was created by the Affordable Care Act. The initiative provides 4 different payment models (4 different ways of bundling payments), all of which are designed to encourage doctors, hospitals, and other health care providers to work together to better coordinate care for Medicare patients. If these providers meet certain quality standards and save money, they are eligible to share these savings with the federal government. These BPCI initiatives include retrospective acute care (hospital stay only), retrospective acute and post-acute care episodes, retrospective post-acute care only, and prospective hospital care only [1].

Under a fee-for-service reimbursement system, providers of health care services receive a set fee for each unit of service provided to a patient. There is no incentive to decrease costs, because the more services a provider delivers, the more reimbursement that provider receives. New payment models will focus on outcomes and cost rather than volume. With payment bundling, providers receive their customary payment under the current reimbursement methodologies, but there is an annual reconciliation of payments and costs to the program against the established bundle fee for an episode of care. Based on this reconciliation, the hospital assumes the financial risk for the costs of care and is eligible to share any extra savings with its providers. Participating providers can choose among 48 episodes of care and decide the types of episodes of care for which they want to receive bundled payments [1].

FirstHealth Moore Regional Hospital, a 395-bed, not-for-profit hospital in Pinehurst, North Carolina, is participating in this BPCI beginning in January 2014. FirstHealth chose coronary artery bypass grafting (CABG), cardiac valve replacement, hip replacement, and knee replacement as the types of episodes for which they would accept bundled payments. Although FirstHealth and its cardiac and orthopedic surgeons have worked collaboratively in service lines for years, they applied for the BPCI because they wanted an opportunity to work more closely together and to share the savings generated by their cost-reduction efforts. The BPCI provided a framework for aligning incentives.

A set of metrics and standardized order sets for each type of episode for which payments would be bundled was developed collaboratively by FirstHealth and the participating surgeons and staff members. For example, the standardized order set of tests and procedures for CABG and valve-replacement procedures will follow evidence-based practices. Patients who are selected for these procedures must be cleared for surgery based on cardiac and medical condition risk assessments and physician recommendations. Care Maps created by the Centers for Medicare & Medicaid Services (CMS) will be used to standardize the processes of care for each bundle. Computerized provider order entry will be used to track adherence to the Care Maps. All patients in both groups will be followed to ensure that the order set is adhered to; patients will be monitored for risk assessments, complications, readmissions, and emergency department visits, and follow-up phone calls will be made up to 30 days after hospital discharge. A similar process has been developed with orthopedic surgeons for hip-replacement and knee-replacement patients.

As the costs for complete episodes of care were studied, it became apparent that maximizing quality and efficiency of care would require aligning incentives across the continuum of care, including post-acute care. Accordingly, providers of post-acute care were added to the organizations participating in the bundled payment. FirstHealth and its surgeons have also been working closely with acute rehabilitation facilities, skilled nursing facilities, and home health providers to develop discharge protocols that achieve the best outcomes for patients.

Improving care transitions across settings is a critical component of the care redesign effort. Challenges include ineffective communication, medication errors, lack of physician follow-up, and poor coordination of services. These challenges often lead to rehospitalization and reduced quality of life. Building on the Institute for Healthcare Improvement's Triple Aim initiative, FirstHealth developed an innovative transitional care model that addresses these challenges. The core philosophy of this model is to provide patients with the tools, skills, and support to effectively manage their care as they move from one setting to another, particularly after hospital discharge. Based on its experience with this method, FirstHealth plans to establish a position for a transitions nurse at FirstHealth Moore Regional Hospital; this individual will address patient needs during an acute hospitalization episode, ease transitions, and coordinate care across the continuum.

Beneficiary and caregiver engagement are also key elements of the BPCI, and encouragement of such engagement is embedded throughout the care redesign model. FirstHealth will use Insignia Health's Patient Activation Measure (PAM), which assesses a patient's skills, knowledge, and confidence in managing his or her own health care. PAM assessments will allow physicians and practitioners to develop individualized care plans that provide a patient-centric approach to care while efficiently applying resources.

All participating providers will enter into a contractual agreement with the CMS that defines the terms and conditions for participation, including roles and responsibilities of all parties, eligibility requirements, and specific criteria and methods for determining shared saving payments. Finally, clear language indicating voluntary participation will be included, along with a description of the conditions under which participation can be terminated.

As the parties have moved through the development and pilot phases of the BPCI, key lessons have been learned. Primary among these are the need for communication and transparency and a willingness to make changes based on historical cost data and evidence-based outcome measures. NCMJ

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Acknowledgment

Potential conflicts of interest. C.M. is an employee of FirstHealth of the Carolinas.

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N C Med J. 2013;74(4):340-341.
0029-2559/2013/74414

TABLE 2.
Vidant Medical Center's Scores and State and National Rankings on Hospital Value-Based Purchasing Program Measures

Variable	December 2011 update[a]	May 2012 update[b]	July 2012 update[c]
	Clinical process of care measures		
Score	47.47%	55.45%	65.45%
Rank within state	43rd of 84	40th of 85	31st of 85
Rank within nation	1,312th of 3,044	1,136th of 3,061	821st of 3,069
	Patient experience of care measures		
Score	66.00%	65.00%	64.00%
Rank within state	8th of 84	9th of 85	13th of 85
Rank within nation	255th of 3,044	284th of 3,061	328th of 3,069
	Total performance score		
Score	52.89%	58.32%	65.02%
Rank within state	33rd of 84	27th of 85	23rd of 85
Rank within nation	728th of 3,044	612th of 3,061	448th of 3,069

[a] The December 2011 update was for the fourth quarter of Federal Fiscal Year (FFY) 2011; data collection dates were April 2010 through March 2011.
[b] The May 2012 update was for the first quarter of FFY 2012; data collection dates were July 2010 through June 2011.
[c] The July 2012 update was for the second quarter of FFY 2012; data collection dates were October 2010 through September 2011.
Source: Internal hospital data provided in a quarterly report from the North Carolina Hospital Association.

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Acknowledgments

Potential conflicts of interest. S.L. and B.F. are employees of Vidant Medical Center.

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Running the Numbers

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

County-Level Estimates of the Number of Individuals in North Carolina Who Would Be Eligible for Coverage Under the Affordable Care Act's Expanded Insurance Options

As has been described elsewhere in this issue of the NCMJ [1], the Patient Protection and Affordable Care Act of 2010 (ACA) contains provisions for 2 major programs to expand eligibility for health insurance among low-income and moderate-income individuals: the expansion of Medicaid to include individuals with incomes up to 138% of the federal poverty level (FPL) [2]; and the availability of sliding-scale subsidies through the health insurance marketplaces (also known as health benefit exchanges) for certain individuals with incomes between 100% and 400% of the FPL [3]. Numerous measures have been used to estimate the number of people who would be eligible nationally [4], and some state-level estimates have been developed [5], but outreach and enrollment efforts will likely be performed at the local level using community resources. Thus an understanding of the number of local individuals who are potentially eligible for these programs is important in order to optimally implement outreach and enrollment efforts.

The US Census Bureau, through the Small Area Health Insurance Estimate (SAHIE) program, has developed local area (ie, county) estimates of the number of uninsured individuals in specific age and income categories by combining US Census Bureau data (American Community Survey and County Business Patterns), demographic data (eg, data from the US Census 2010), and program administration data (eg, data from aggregated federal tax returns and from participation records for the Supplemental Nutrition Assistance Program, Medicaid, and the Children's Health Insurance Program) [6]. These synthetic estimates are based on triangulating multiple data sources to develop estimates at the local level, where even existing surveys that gather county-level data (eg, the Behavioral Risk Factor Surveillance System surveys) have sample sizes too small to yield reliable results. This method is similar to other processes for developing small area estimates [7]; interested readers may refer to the methodology section of the SAHIE website for more details [6].

This analysis presents estimates that are relevant for the above-mentioned ACA programs. It is important to note that the estimates presented here are for potential eligibility, *not* for enrollment. It has been well documented that insurance programs rarely enroll 100% of eligible individuals [8, 9]; however, the individual mandate included in the ACA should provide an incentive for people to enroll. It is also important to note that additional eligibility criteria are not incorporated into the SAHIE estimates (notably, the criterion that an individual must either be a US citizen or have been a resident of the United States for at least 5 years), so the presented rates are overestimates. Furthermore, SAHIE provides estimates for specific income cut points; as stated previously, 100% of the FPL is an important cut point, but it is not included in the list of available SAHIE queries. For this analysis, we use previously published estimates [10] that 183,000/(183,000 + 355,000) or 34.0% of uninsured adults under 138% of the FPL have incomes between 100% and 138% of the FPL. Finally, the SAHIE interactive tool allows age groups of less than 19 years, and 18–64 years, both of which include individuals aged 18 years. For these data, estimates for adults were adjusted to account for "double-counting" of

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N C Med J. 2013;74(4):343-347.
0229-2559/2013/74415

18-year-old individuals.

For the Medicaid expansion included in the ACA, individuals would be eligible if they have income below 138% of the FPL. Currently, for children to be eligible for North Carolina Medicaid or North Carolina Health Choice, they must live in households with an income of no more than 200% of the FPL; thus the expansion of Medicaid under the ACA would have no effect on children's eligibility. However, the so-called "woodwork effect" may encourage parents to enroll currently uninsured, though potentially eligible, children in Medicaid. Because North Carolina has decided not to expand Medicaid, some of the adults who would have potentially been eligible for Medicaid under the expansion—those with incomes between 100% and 138% of the FPL—will instead be eligible for subsidies through the health insurance marketplace and are thus included in that group. For the health insurance marketplace subsidy, adults are eligible if they have an income between 100% and 400% of the FPL, and children are eligible if they live in a household with an income between 200% and 400% of the FPL. Table 1 shows the estimated numbers of uninsured North Carolinians with incomes in these various ranges.

Figure 1 contains 3 maps of North Carolina. Map A shows the percentage of the population, by county, who are currently uninsured. Map B shows the percentage of the population estimated to be children who are currently uninsured despite being eligible for Medicaid. Map C shows the percentage of the population who are currently uninsured and are estimated to be eligible for subsidies in the health insurance marketplace.

One notable feature of Map A is that a smaller percentage of the population in higher-income counties (eg, metropolitan counties such as Wake, Mecklenburg, and New Hanover) is estimated to be uninsured, as is also the case in counties with generally younger age profiles (eg, Cumberland and Pender). It is somewhat surprising that the percentage of the population estimated to be uninsured is low in the northeastern part of the state, given the high poverty rates in that area.

Map B shows the proportion of the population estimated to be children who are uninsured and currently eligible for Medicaid; the northwestern and western counties and the noncoastal counties east of Interstate 95 should expect a larger proportion (up to 3.1%) of their population to be children currently eligible for Medicaid. Map C shows similar patterns overall, with up to 16.6% of the population eligible for subsidies in some counties.

However, it is important to remember that these percentages convey only one piece of the problem; the estimated magnitude will also be an important consideration. Figure 2 shows the estimated numbers of individuals who are potentially eligible for the health insurance marketplace subsidy, by county. Unsurprisingly, a large proportion of the individuals who are expected to be eligible are in counties along the Interstate 85 corridor. In fact, the 4 counties with the largest number of potentially eligible individuals (Mecklenburg, Wake, Guilford, and Forsyth) contain 25% of the total estimated number of eligible individuals in the state; 50% of the individuals who are expected to be eligible live in the largest 15 counties.

Figure 3 shows that, compared with counties

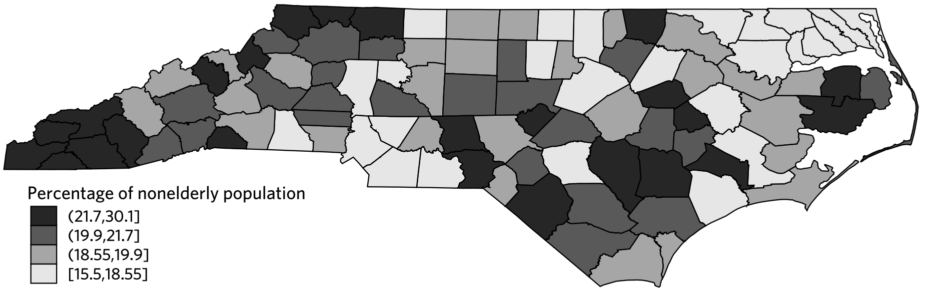
TABLE 1.
Estimated Numbers of Uninsured North Carolinians by Income Level

Income level	Children (age 0–18 years)	Adults (age 19–64 years)	Total
<100 % FPL	72,813	409,682	482,496
100%–200% FPL	60,382	453,707	514,088
200%–400% FPL	49,766	361,102	410,866
>400% FPL	13,173	129,294	142,468
Total number of uninsured individuals	**196,133**	**1,353,785**	**1,549,918**

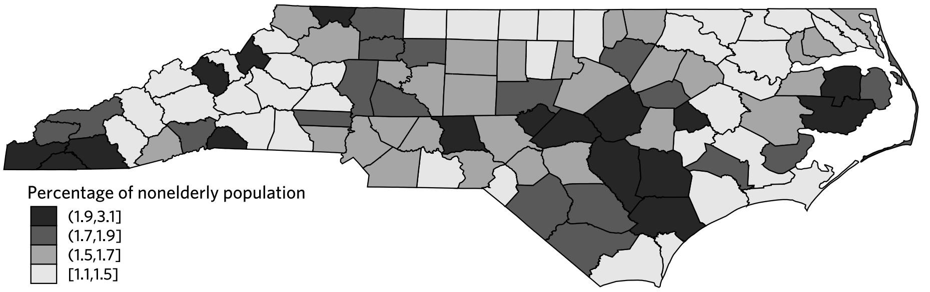
Note. FPL, federal poverty level.
Key to shading of cells: Lighter grey cells denote eligibility for subsidies in the health insurance marketplace; darker grey cells denote eligibility for Medicaid. Values may not sum to totals due to rounding.
Source: 2010 Small Area Health Insurance Estimates, US Census Bureau.

FIGURE 1.
Maps of North Carolina Showing the Percentage of the Nonelderly Population, by County, Who Are Uninsured, Uninsured and Eligible for Medicaid, or Uninsured and Eligible for Health Insurance Subsidies

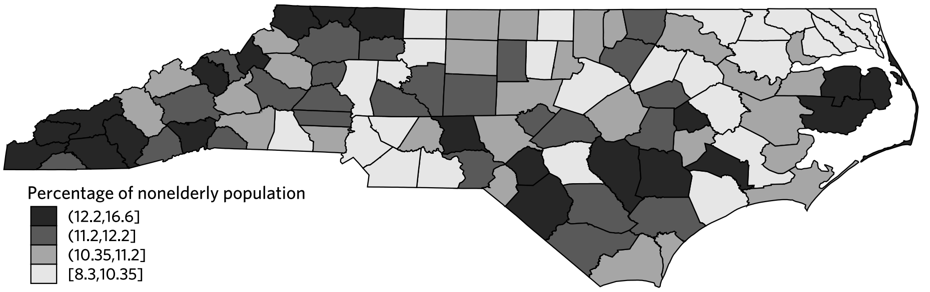
Map A: Currently Uninsured



Map B: Uninsured Children Eligible for Medicaid



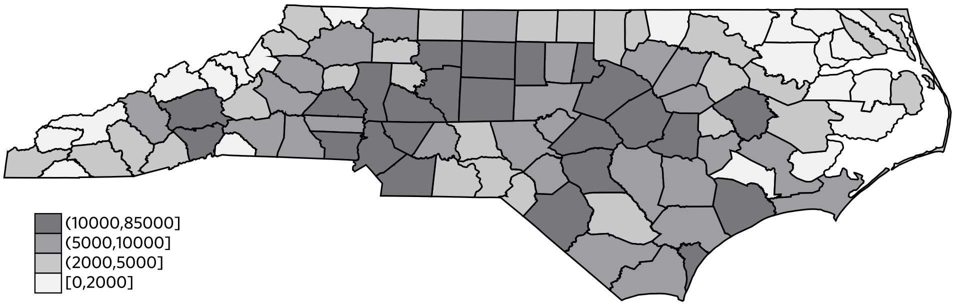
Map C: Eligible for Subsidies



Note. Map A shows the percentage of the nonelderly population who are uninsured. Map B shows the percentage of the nonelderly population who are children and are uninsured despite being currently eligible for Medicaid. Map C shows the percentage of the nonelderly population who are currently uninsured and are eligible for subsidies in the health insurance marketplace.
Source: Author's calculations using data from the 2010 Small Area Health Insurance Estimates, US Census Bureau.

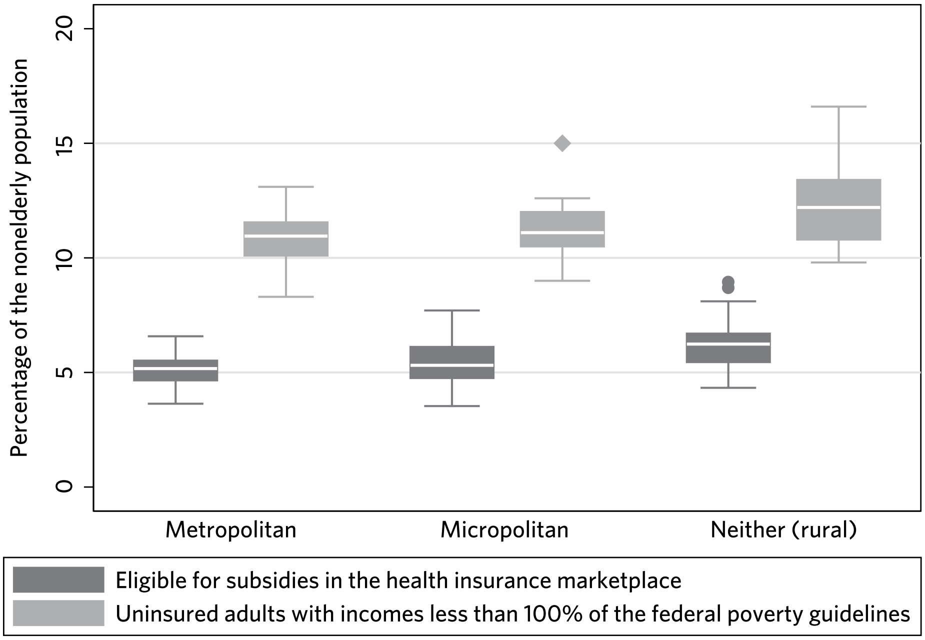
that are considered to be metropolitan (having a core urban area with a population of 50,000 or more) or micropolitan (having an urban core with a population of at least 10,000 but less than 50,000), counties in rural areas have a greater percentage of individuals who are uninsured and potentially eligible for subsidies in the health insurance marketplace. Likewise, the percentage of the nonelderly adult population (individuals 18–64 years of age) who have incomes less than 100% of the

FIGURE 2.
Numbers of Uninsured Individuals in North Carolina Who Are Potentially Eligible for Subsidies in the Health Insurance Marketplace, by County



Source: Author's calculations using data from the 2010 Small Area Health Insurance Estimates, US Census Bureau.

FIGURE 3.
Percentage of the Population Who Are Uninsured Adults with Incomes Less than 100% of the Federal Poverty Level and Percentage Who Are Eligible for Subsidies in the Health Insurance Marketplace in North Carolina Counties, by Rurality



Note. A metropolitan county is one that contains a core urban area with a population of at least 50,000, and a micropolitan county is one that contains an urban core with a population of at least 10,000 but less than 50,000.
Source: Author's calculations using data from the 2010 Small Area Health Insurance Estimates, US Census Bureau.

FPL and are currently uninsured is higher in nonmetropolitan areas. Thus, if North Carolina decides in the future to expand Medicaid to adults with incomes below 138% of the FPL, nonmetropolitan counties will have a larger percentage of their population benefit. This higher rate of Medicaid coverage (and coverage by public insurance generally) in rural communities has previously been demonstrated nationally [11]; North Carolina is no exception. NCMJ

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Acknowledgment

Potential conflicts of interest. M.H. has no relevant conflicts of interest.

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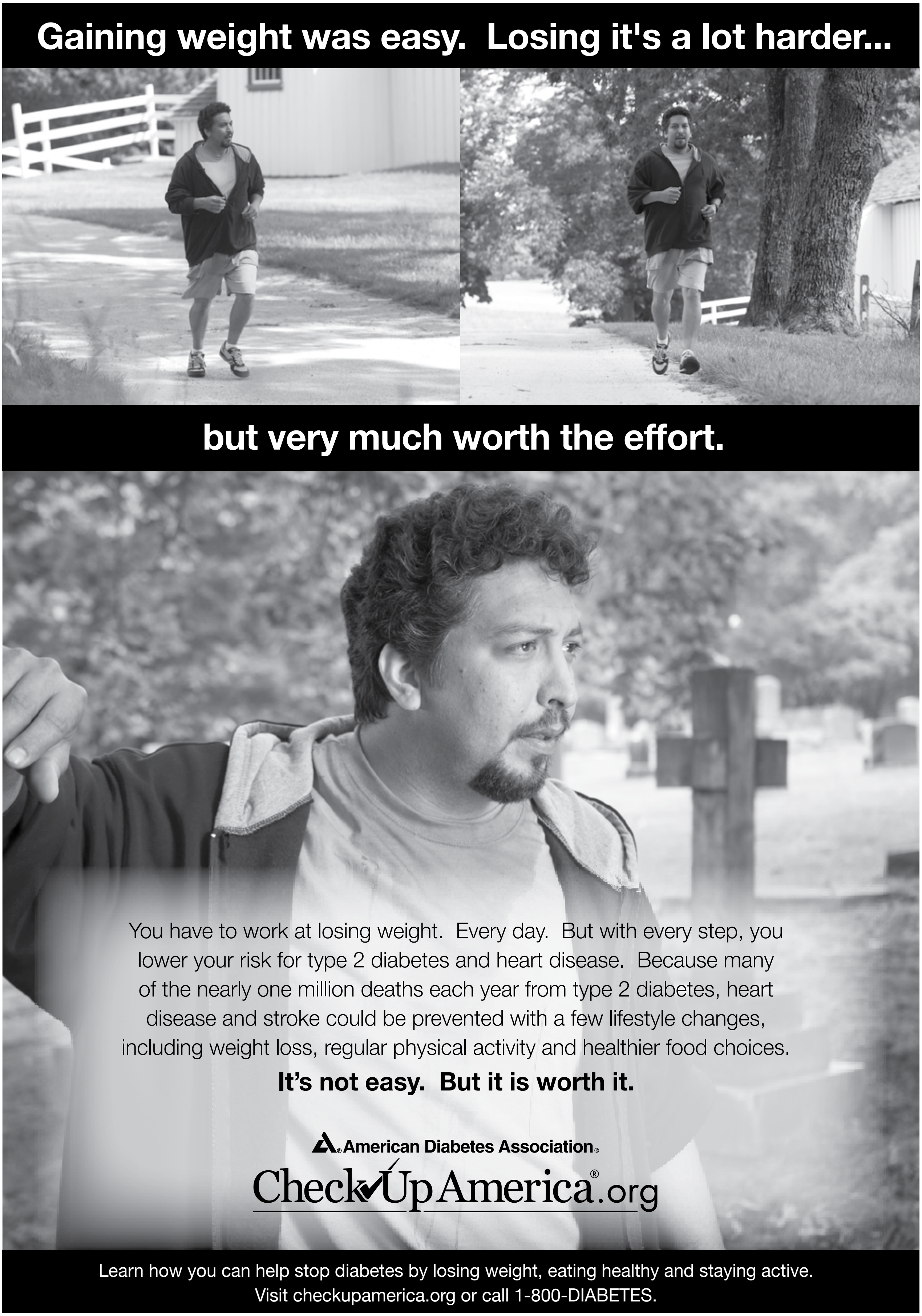

Spotlight on the Safety Net

A Community Collaboration

Aligning Efforts to Meet Community Health Needs:
Collaboration in Rockingham County

Rockingham County, located in the foothills of the northern Piedmont region of North Carolina, is comprised primarily of rural areas where residents' health needs are largely served by 2 local hospitals and the public health department. The local economy has traditionally been dependent on agriculture and manufacturing, which have declined sharply in the past decade. Like other low-wealth counties, Rockingham County is therefore experiencing a shifting economic climate even as its safety-net providers are working to cope with a changing health care landscape.

A perfect storm of economic deprivation combined with an aging population has compelled local health care leaders to think creatively about how to address ongoing health needs. Health status across the hospitals' service area ranks from "fair" to "poor," well below the US mean. Uninsured rates in Rockingham County are relatively high; 1 in 5 nonelderly adults is uninsured [1]. And Rockingham County ranked in the bottom quartile for both health outcomes (78th) and health factors (85th) in the 2013 Robert Wood Johnson Foundation County Health Rankings [2]. In addition, the overall service area population is expected to decline over the next 5 years; the only segment of the population that is projected to show significant growth is the Medicare group—those 65 years or older. In this context, hospitals in Rockingham County realized that their community benefit plans and programs could have a measurable impact on the health of the county's 93,643 residents.

New provisions of the Patient Protection and Affordable Care Act of 2010 require nonprofit hospitals to conduct regular community health needs assessments (CHNAs) and to document their efforts to address the most pressing needs identified. These new requirements have provided an opportunity for local stakeholders to align and coordinate their efforts. The Rockingham County Healthcare Alliance, a local collaborative network, includes Annie Penn Hospital, a Cone Health facility; Morehead Memorial Hospital, an independent community hospital; the Rockingham County Department of Public Health; and other health and health care organizations. With a foundation for collaboration already in place, the stakeholders in this rural county immediately saw the potential of the required CHNAs and began to coordinate the separate implementation plans required for each hospital.

The assessment process was initiated and conducted jointly by the 2 hospitals in conjunction with the collaborative network and the Rockingham County Department of Public Health. In 2012 the Rockingham County Department of Public Health completed a comprehensive community health assessment (CHA). As part of this process, public health department staff members conducted and analyzed stakeholder interviews and service-user focus groups. The CHNA was developed jointly by the 2 hospitals by building on the success of this CHA and its findings.

The CHA contained updated statistics from city, county, and state sources; national statistics were also included for trend analysis. Additional assessments were also identified and incorporated into the CHNA; these included the most recent Robert Wood Johnson Foundation County Health Rankings, an assessment of local safety-net capacity, a 2011 competitive assessment, the collaborative network's community-wide strategic plan, a dental task force report, and stakeholder interviews.

Care Share Health Alliance, which furnished consultants and facilitators for this project, used

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N C Med J. 2013;74(4):349-350.
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the Hanlon method for prioritizing health problems to compile the health needs identified in the above data sources [3]. Teams from the 2 hospitals considered this list alongside utilization rates, hospital strategic plans, particular areas of expertise, and previous community benefit initiatives to identify 3 priority areas for each hospital. Through separate processes of deliberation and analysis, the hospitals jointly identified access to care and chronic disease as the top health needs for the populations they serve. Health behaviors and mental health needs were also recognized as priority needs by Morehead Memorial Hospital and Annie Penn Hospital, respectively.

Each hospital then tapped additional individuals and departments to develop implementation strategies for each priority area. Workgroups researched other community efforts in these areas; organized teams to establish goals, objectives, outcome measures, and indicators for each priority; and coordinated their work with other CHNA teams. The resulting implementation plans will be overseen and managed by select department heads at the 2 hospitals. Once the plans are approved by the hospitals' governing boards, they will be made available to the public.

The collaborative process that Rockingham County hospitals spearheaded was built on the foundation created by the Rockingham County Department of Public Health CHA. This process underscores both the importance of regular, comprehensive assessment and the potential for using this resource when hospital and health department assessment schedules are coordinated. The first joint CHNA, which is scheduled to be completed this summer, marks the start of a long-term program of community health improvement. With all stakeholders on board, we feel certain it will have a lasting impact. NCMJ

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Acknowledgments

Financial support. Financial and in-kind support for this work was provided by Cone Health, Morehead Memorial Hospital, and the Reidsville Area Foundation.

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

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Philanthropy Profile

Convening Community Conversations That Matter

As Guilford County's only health-specific philanthropy, Cone Health Foundation supports organizations on the front lines of health care. In 2010–2011, approximately 79,000 (nearly 17%) of the nonelderly residents of Guilford County were uninsured [1]. These individuals and families have trouble accessing the health care system but are often those most in need of health care. Providing care for these individuals is a tremendous challenge for Guilford County, one that falls primarily on the shoulders of safety-net organizations.

Since Cone Health Foundation's founding in 1997, access to care has been its largest funding priority area. Many individuals in our community have only limited access to primary care and delay seeking treatment until they are seriously ill. Emergency departments are overwhelmed with patients who have no other options for medical care. In nearly all cases, these patients could be better treated in a primary care office.

At Cone Health Foundation, we know that changes in public policy can yield broad-scale, sustainable advances in population health. Relatively small advances in health advocacy can bring about systemic changes that address the social determinants of health and promote health equity, resulting in large improvements in the accessibility, quality, and efficiency of health care [2]. The foundation recognized that the Patient Protection and Affordable Care Act of 2010 (ACA), though far from perfect, held the promise of providing affordable access to health care for many uninsured individuals in Guilford County. It could also improve coverage and relieve many families of the lingering burden of medical debt.

Research has shown that people know very little about the ACA and the health care options it will offer beginning in 2014 [3]. If Cone Health Foundation could define the problems with accessing high-quality health care so that people understood them, we could engage our community in an important conversation. Then we could inject research, scholarship, and analysis into the debate.

After carefully considering its goals, assets, and grant-making portfolio, Cone Health Foundation committed to a nonpartisan public education effort. Our goal was to increase understanding both of the ACA and of the need for health reform. A central element of the strategy was to join forces with like-minded organizations to increase the impact of our efforts. Our partners included the League of Women Voters of the Piedmont Triad, Greensboro Public Library, and the public radio station WFDD.

"Decoding the Affordable Care Act" became the title for a series of community conversations and activities that took place over a period of 18 months. One set of events featured presentations by journalist T. R. Reid, author of *The New York Times* bestseller *The Healing of America: A Global Quest for Better, Cheaper, and Fairer Health Care*. In his book and as an on-air correspondent for 2 *Frontline* documentaries based on that book, Reid explained that other industrialized democracies provide health care for every citizen and spend only half as much as the United States does on care; then he went on to explain how they do it. A panel discussion following Reid's presentation was moderated by Denise Franklin, former general manager of WFDD. Participants included E. Benjamin Money, Jr., chief executive officer of the North Carolina Community Health Center Association; Mark Hall, the Fred D. and Elizabeth L. Turnage Professor of Law at Wake Forest University School of Law, who teaches health care law and policy there and at Wake Forest School of Medicine; and Marian Earls, MD, lead pediatric consultant at Community Care of North Carolina. This group brought a real-world lens to Reid's work and provided a North Carolina–specific perspective on the ACA. WFDD also aired a series of reports describing the challenges that many individuals face when trying to access health care.

Electronically published August 1, 2013.

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N C Med J. 2013;74(4):352-353.

0029-2559/2013/74416

The League of Women Voters developed an ACA presentation that included slides, videos, and handouts. This presentation was delivered throughout the community; sessions were held with community groups, with lay health coaches, and with staff members of the Congregational Nurses and Pastoral Care programs at Cone Health.

Cone Health Foundation partnered with the League of Women Voters to host additional educational opportunities. One of these sessions featured Adam Linker, policy analyst at the North Carolina Justice Center's Health Access Coalition, who spoke on emerging issues, including how the health insurance marketplaces (also called health benefit exchanges) might be established in North Carolina. Also, leading health care policy scholar Mark Hall gave 2 talks about the arguments the US Supreme Court was considering. Hall led the team that wrote and filed a friend-of-the-court brief on behalf of more than 100 health law professors in support of the ACA's constitutionality.

Greensboro Public Library hosted "Health Care Facts and Fiction," a citywide literary event encouraging people to read and discuss Reid's *The Healing of America* and a novel by Lionel Shriver called *So Much for That*. The library's goal was to engage a wide spectrum of the community in a thoughtful exchange of ideas about this important issue. One well-attended book discussion was led by R. Timothy Rice, chief executive officer of Cone Health, and Allen Johnson, editorial page editor of the Greensboro *News and Record*. Greensboro Public Library also hosted a health care film festival to help frame this important conversation. Films shown included *John Q, Money-Driven Medicine*, and *Obama's Deal* (another *Frontline* documentary).

Cone Health Foundation supported the League of Women Voters' efforts to host a prerelease showing of the movie *Escape Fire: The Fight to Rescue American Healthcare*. The film, which premiered at the Sundance Film Festival in January 2012, examines the powerful forces trying to maintain the current medical industry and efforts to fix it.

In May 2012, Cone Health Foundation released its seventh white paper, titled *Health Care Access in Guilford County* [4]. The paper, written by a group of scholars at North Carolina Agricultural and Technical State University and Wake Forest School of Medicine, provides a road map for the foundation's access-to-care funding strategy for the future.

In April 2013, the foundation hosted health care policy expert Len M. Nichols, director of the Center for Health Policy Research and Ethics and professor of health policy at George Mason University. Nichols, known for his unbiased analysis of health reform, participated in 3 community conversations framing the current health care debate in historical terms and examining the issue of Medicaid expansion.

Have We Made a Difference?

Cone Health Foundation's ultimate vision is for every person in Guilford County to have a primary health care home. Although we cannot achieve that vision overnight, we must focus on the here-and-now activities that move us toward that goal. Advocacy plays a crucial role in this process.

Through this campaign, we learned that it is possible to have civil conversations about highly contentious issues. We hosted well-attended events; generated television coverage, editorials, and letters to the editor; inspired community conversations; and made a smart, strategic investment in our future. For Cone Health Foundation, this is an investment that makes sense. **NCMJ**

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Acknowledgment

Potential conflicts of interest. S.W.B. is an employee of the Cone Health Foundation.

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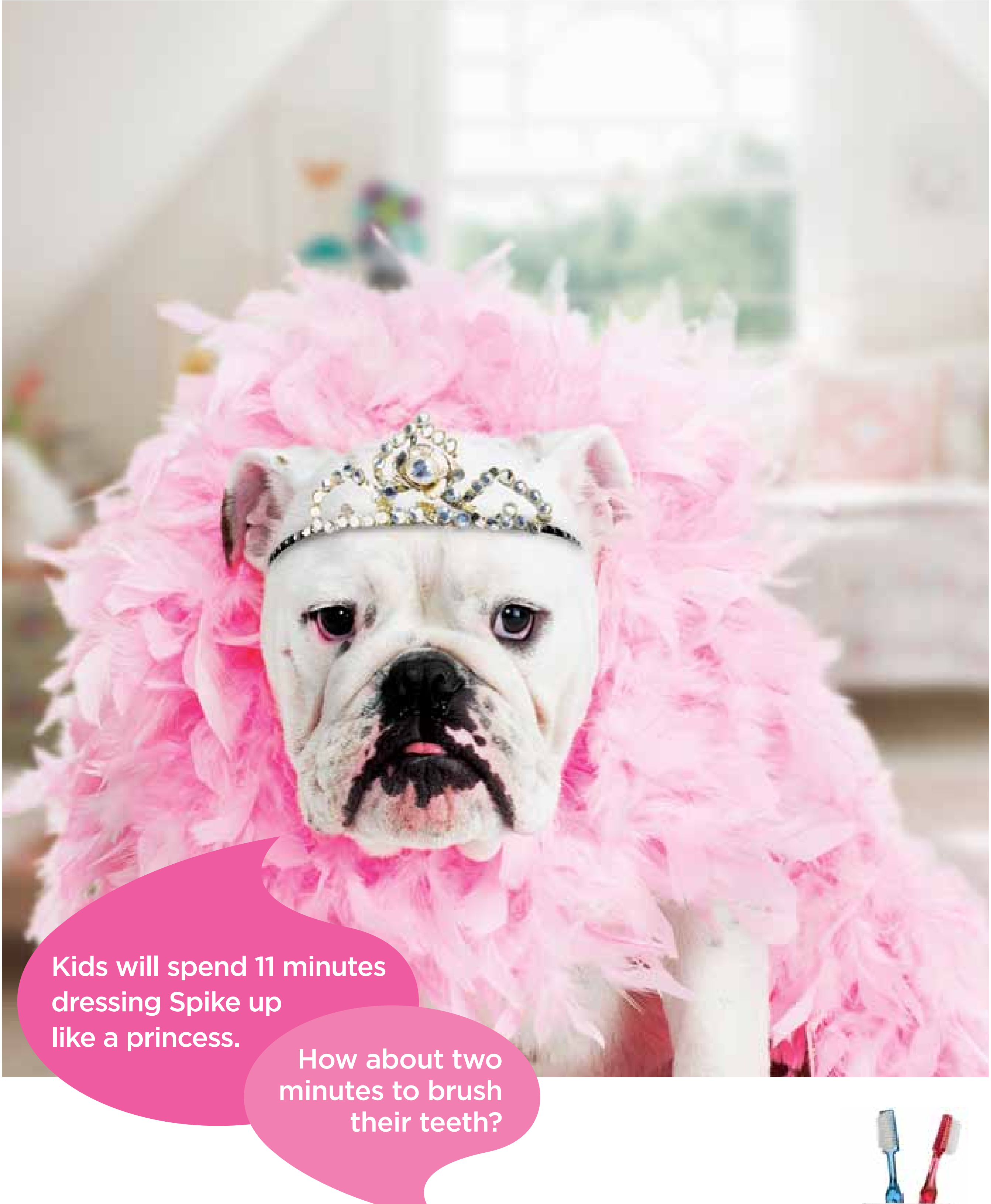

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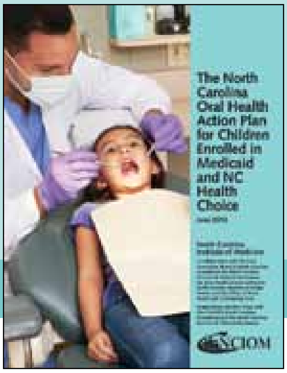

Issue Brief

The North Carolina Oral Health Action Plan

for Children Enrolled in Medicaid and NC Health Choice

June 2013

Dental caries, also called "tooth decay" or "cavities," is the most prevalent chronic infectious disease among children in the United States.[1] Tooth decay can lead to pain and swelling and limit a child's ability to eat and speak. It can also create problems that distract from a child's ability to learn. The pain and discomfort diminishes a child's quality of life.[2,3] Fortunately, dental caries is both preventable and manageable. With proper dental care and dietary choices, dental caries could almost be eliminated among children.[1]

In the fall of 2012, the Centers for Medicare and Medicaid Services (CMS) launched an oral health initiative aimed at increasing the percentage of children enrolled in Medicaid or Child Health Insurance Programs (CHIP) who receive preventive dental services and dental sealants. CMS oversees Medicaid and CHIP in all states. CMS launched this oral health initiative in response to low utilization rates for preventive dental services across the country. In North Carolina, children with family incomes below 200% of the federal poverty level[a] qualify for health care coverage, including dental services, through Medicaid or NC Health Choice, North Carolina's State Child Health Insurance Program.[4-6]

> *The Task Force on Children's Preventive Oral Health Services was convened to help the Division of Medical Assistance develop its required dental action plan to improve access to preventive oral health services for children.*

The North Carolina Institute of Medicine Task Force on Children's Preventive Oral Health Services was convened to help the Division of Medical Assistance (DMA) develop a dental action plan to improve access to preventive oral health services for children enrolled in Medicaid and NC Health Choice, as required by CMS. The Task Force is a collaboration between DMA, the Blue Cross and Blue Shield of North Carolina Foundation (BCBSNCF), the Oral Health Section within the North Carolina Division of Public Health, and the Office of Rural Health and Community Care. Financial support for the Task Force comes from BCBSNCF and DMA. The Task Force included 35 task force and steering committee members representing dental health professionals, state policy makers, public health and other health professionals, researchers, consumer representatives, and others. The Task Force met monthly from December 2012 to May 2013.

The Task Force developed three goals. The first two were required by CMS and focus on preventive dental services provided by dental providers. The third was added because the Task Force felt it was important to expand the role of primary care providers in providing preventive oral health care. The Task Force Goals are to:

1. Increase the proportion of children ages 1-20 enrolled in Medicaid or NC Health Choice (enrolled for at least 90 days) who received any preventive dental services from dental providers by 10 percentage points, from 45% to 55% for children enrolled in Medicaid and 42% to 52% for children enrolled in NC Health Choice, over a five-year period from federal fiscal year (FFY) 2011-FFY 2015.

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[a] In 2013, the federal poverty level for a family of four is $23,550. 200% of the federal poverty level is $47,100.

North Carolina Institute of Medicine
Supported by the Blue Cross and Blue Shield of North Carolina Foundation and the North Carolina Division of Medical Assistance.

2. Increase the proportion of children ages 6-9 enrolled in Medicaid or NC Health Choice (enrolled for at least 90 days) who receive a dental sealant on a permanent molar tooth by 10 percentage points, from 17% to 27% for children enrolled in Medicaid and 25% to 35% for children enrolled in NC Health Choice, over a five-year period from FFY 2012[b] to FFY 2017.
3. Increase the utilization of preventive oral health services among children ages 6 months to 20 years old enrolled in Medicaid and NC Health Choice (enrolled for at least 90 days) by any appropriate health professional by 10 percentage points, from 55% to 65% for children enrolled in Medicaid and 42% to 52% for children enrolled in NC Health Choice, over a five-year period from FFY 2011-FFY 2015.

The Task Force developed recommendations to address Goals 1, 2, and 3, as well as crosscutting recommendations that could positively impact all three goals. The following provides a summary of the recommendations from the Task Force on Children's Preventive Oral Health Services.

Increasing Preventive Care Utilization

In FFY 2012, only 45% of children enrolled in Medicaid, and 42% of the children enrolled in NC Health Choice received at least one preventive service from a dentist.[4,5] Preventive care, which includes cleanings, fluoride treatments, sealants, and space maintainers, is a critical first step to ensuring that children do not develop dental disease or that dental disease is identified early and treated. Utilization is particularly low among very young children; only 29% of eligible children ages 1-2 received preventive dental services in FFY 2012. One reason for low utilization is parents do not understand the importance of taking their children to the dentist at an early age. **The Division of Medical Assistance (DMA) and the Oral Health Section of the Division of Public Health should increase efforts to educate families about the importance of early childhood oral health and to connect young children with a dental home.** To support efforts to increase utilization of preventive dental services, **DMA and the North Carolina Community Care Networks (NCCCN) should examine whether an additional per member per month payment is needed to expand the capacity of Health Check Coordinators to help families with young children understand the importance of oral health and connect to a dental home**.

In addition to increasing education and efforts to connect young children with a dental home, increasing the number of dentists who participate in Medicaid and NC Health Choice and who are willing to treat very young children is critical to improving access and utilization of preventive dental services. **The North Carolina Dental Society (NCDS) should partner with DMA to encourage more dentists to participate and to increase the willingness of general dentists to treat young patients. DMA could further increase the likelihood of dentist participation by reducing administrative barriers**.

Promoting and Increasing Sealant Utilization

Sealants are clear or opaque materials applied to the rough surfaces, called pits and fissures, of premolars and molars to prevent tooth decay. In North Carolina, 17% of children ages 6-9 enrolled in Medicaid and 25% of similar age children enrolled in NC Health Choice received a sealant in FFY 2012.[c,5] Despite the well-supported case for their use, sealants are not highly utilized in oral health prevention for many reasons, including underutilization by dentists, poor reimbursement by Medicaid and NC Health Choice, inability to receive reimbursement to reapply sealants if they fail, and lack of knowledge about sealants among parents. To increase the use of sealants, **DMA should explore changes in Medicaid payment policies to increase reimbursement to the 75th percentile of a commercial dental benchmark for dental sealants.** Additionally, **DMA should create new coverage policies to allow reapplication of sealants when medically necessary**. Educating dentists about the efficacy of sealants and current sealant research is also critical. **NCDS should disseminate information about the efficacy of dental sealants and promote their use. Other organizations that provide continuing education for dental professionals should increase their focus on sealants.** Finally, there is a need for

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[b] For the purposes of this report we are using FFY 2012 as the baseline year. CMS has not yet defined the baseline year for this measure for their requirements, therefore, the baseline year may need to be changed once CMS has decided on a baseline year.

[c] It is important to note that the target is not 100% in a year. If the goal is to have 100% of children have sealants on permanent molars by age 9, we would expect about 25% of 6-9 year olds to get their molars sealed in any given year.

primary care providers to understand the role sealants play in preventing dental caries and for them to share this information with the children and families they see. **DMA, NCCCN, and NCDS, in collaboration with other partners, should expand or create continuing education opportunities for primary care professionals to educate them on sealants.**

The Role of Primary Care Providers

Primary care professionals also have the ability and responsibility to support children's oral health. In North Carolina there are many efforts underway within the primary care setting to improve children's oral health. However, there is a need for more guidance for primary care providers to help clarify the expectations for oral health care provided during medical visits. **DMA and NCCCN should continue to work with primary care providers (PCPs) who see children and pregnant women and their partners to help them further encourage families with children to obtain oral health services. As part of this effort, DMA and NCCCN should develop and disseminate guidelines that specify oral health expectations for PCPs as well as obstetricians and gynecologists.** Additionally, lack of communication between PCPs and dental professionals impedes efforts to improve the oral health of children. **DMA, NCCCN, NCDS, the North Carolina Pediatric Society, North Carolina Academy of Family Physicians, and other partners should create systems for greater collaboration between PCPs and dental professionals.**

Crosscutting Strategies to Increase Preventive Dental Services Utilization

Increasing children's access to preventive dental services in North Carolina is a challenge due to a low dentist-to-population ratio and limited public resources, as well as family, dentist, and policy barriers. In discussions, the Task Force repeatedly came back to the need for additional mechanisms to deliver efficient and affordable services at times and in places convenient for children and families. The Task Force also struggled with how to ensure that North Carolina has a sufficient oral health workforce to deliver quality care. These issues came up in discussions of Goals 1 and 2. To answer these challenges, the Task Force developed four crosscutting recommendations. To support the provision of high-quality dental health prevention and education for children across the state, **the North Carolina General Assembly should maintain the structure of the Oral Health Section (OHS) of the Division of Public Health and increase funding in order to hire additional dental hygienists.** To ensure that children seen for dental care in any setting receive high-quality, comprehensive care, **DMA should examine current dental payment policies to support dental homes that provide continuity of care and comprehensive oral health services.** Furthermore, new methods for delivering efficient and affordable services at times and in places convenient for children and families should be explored. **The NCDS, OHS, and DMA should seek funding to create school-based pilot programs to provide screenings, preventive services, and sealants. For this pilot, a dental practice would serve as the dental home. Dental hygienists, employed by the dental office, would need additional training to provide the dental services in schools with remote supervision by the participating dentist. If successful and financially viable, the model should be expanded across the state.** In order to increase the number of dentists in North Carolina, **the North Carolina State Board of Dental Examiners, which is charged with regulating dentists in the public interest, should consider opportunities to increase the supply of high quality providers practicing in North Carolina, with special attention to underserved areas and populations.**

Conclusion

The Task Force examined the main barriers to utilization of preventive oral health services by children enrolled in Medicaid and NC Health Choice and developed recommendations to address these barriers. *The North Carolina Oral Health Action Plan for Children Enrolled in Medicaid and NC Health Choice* includes a wide variety of recommendations that could be pursued and promoted by both public and private stakeholders. The report includes a multifaceted approach that, if implemented, will significantly improve access and utilization of preventive oral health services by children enrolled in Medicaid and NC Health Choice, thus helping the state meet the goals set forth by the Centers for Medicaid and Medicare Services. In turn, this will help promote the health and wellbeing of some of our most vulnerable children.

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Acknowledgements: The work of the Task Force would not have been possible without the dedicated and voluntary efforts of the Task Force and Steering Committee members.

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A copy of the full report, including the complete recommendations, is available on the North Carolina Institute of Medicine website, http://www.nciom.org.
North Carolina Institute of Medicine. In collaboration with the Blue Cross Blue Shield of North Carolina Foundation, the North Carolina Division of Medical Assistance, the Oral Health Section within the North Carolina Division of Public Health, and the Office of Rural Health and Community Care. Supported by the Blue Cross and Blue Shield of North Carolina Foundation and the North Carolina Division of Medical Assistance.

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