To meet the needs of the population of North Carolina, an epic transformation is under way in health care. This transformation requires that we find new ways to educate and train physicians and other health care professionals. In this commentary, we propose that the success of the Brody School of Medicine in preparing a primary care physician workforce can serve as a model for meeting the state’s future physician workforce needs. Other considerations include increasing graduate medical education positions through state funding and providing incentives for medical students who stay in North Carolina.

The making of a physician is an arduous, complex, and challenging process. The education and training of physicians who will ultimately practice primary care in rural and underserved areas is even more challenging. Fortunately, a medical school in Greenville, which was envisioned 50 years ago and instituted soon thereafter, has achieving the intended vision. It now serves as a model for creating and sustaining a physician workforce for the next era of health care.

As the story goes, a passionate family physician from Plymouth, a very small town in Eastern North Carolina, convinced the president of East Carolina College, Dr. Leo Jenkins, that the people of the region were dying from chronic diseases at an alarming and unnecessary rate. He told Dr. Jenkins that he was unable to recruit any physicians to the region to help him provide care for these patients.

Dr. Leo Jenkins liked to say that the idea for a medical school at East Carolina College originated with a general practitioner from Plymouth, Dr. Ernest W. Furgurson. As Dr. Jenkins described it, Dr. Furgurson came to the President’s house on Fifth Street in Greenville one Sunday afternoon in the spring of 1964. He was very angry...he wanted to know why the college was not carrying through on its promises to the region that supported it. [1]

So began the School of Medicine at East Carolina University, now known as the Brody School of Medicine.

The mission developed for the Brody School of Medicine by the North Carolina General Assembly in the 1970s is tripartite: to increase the supply of primary care physicians to serve North Carolina, to improve the health status of the people of Eastern North Carolina, and to enhance the access of minority and disadvantaged students to a medical education. While this mission is a tall order for a brand new medical school in an impoverished region of the state, it has been far exceeded.

This success can be attributed to an intentional and consistent strategy: recruit students only from North Carolina; conduct a holistic review of applicants and look for students with backgrounds that are predictive of primary and underserved care; provide a primary care–focused educational process; and maintain tuition rates at a low level, so that specialty choice is not significantly influenced by student debt. One significant result of this strategy is that Brody School of Medicine is regularly ranked among the top 10 schools in the nation for producing family physicians [2].

Today, North Carolina and the nation are in the midst of a crucial transformation in health care. This transformation will take a generation to complete and will require innovation, flexibility, and engagement in order to achieve success. At its core, progress in this new transformation will be measured by the degree to which the health care workforce is able to absorb a growing population base and an influx of newly insured patients; resolve disparities in health care; and provide excellent care with better outcomes—all at an affordable cost, with greater patient engagement and satisfaction, and with care that is closer to home.

Physician Workforce Needs

Training the right number and mix of health professionals is vital to ensuring access to high-quality, affordable health care services. Between 2013 and 2025, the nation’s population is projected to grow by 10%, from 316.5 million to 347.3 million. During this same period, the population
aged 65 years and older is projected to grow by 46%, while
the population under age 18 years is projected to grow only
5% [3]. The projected increase in senior citizens with rela-
tively fewer young people could mean more patients and not
enough health professionals—a potentially dire situation,
especially for the physician workforce.

Several recent studies have projected the need for future
physicians by taking into consideration anticipated physi-
cian retirements; changes in specialty, practice type, and
location; and the impact of other health professionals in
meeting health care needs [4]. These projections of future
supply and demand suggest a shortfall of 46,100 to 90,400
physicians, including a shortfall of 12,500 to 31,100 primary
care physicians and a shortfall of 28,200 to 63,700 non-pri-
mary care physicians [4].

An important caveat is that the forecasting of physician
workforce needs is far from a perfect science. Economists
struggle with uncertainties regarding how emerging care
delivery models and changing health care practices might
affect physician supply and demand, as well as how cli-
nicians and care settings will respond to economic and
other trends [4-7]. A crucial factor in such forecasts is the
assumptions that are made about the average annual phy-
sician productivity in future years. That variable depends
chiefly on 2 factors: the number of hours per year that physi-
cians typically devote to patient care [8] and the degree to
which physicians delegate tasks for which an MD degree is
not required—for example, administrative tasks can be del-
egated to clerks or business managers, and certain medical
tasks can be delegated to physician assistants or nurse prac-
titioners [9].

Practically all graduates of medical school complete
residency training in their chosen specialty prior to begin-
ning the independent and unsupervised practice of medi-
cine. Despite a robust and growing pool of medical school
applicants, there is evidence for a pending bottleneck in the
availability of graduate medical education (GME) residency
program positions, the number of which has not increased
in concert with the increase in US medical student class size
in the past 10 years [10-12]. (In contrast to the many predic-
tions that there will soon be too few GME positions, Mullen and colleagues predict that slight growth in the number of GME positions will mean that US medical students have adequate numbers of residency opportunities [13].

Legislation is before Congress to increase the number of new residency positions nationally by 3,000 each year between 2017 and 2021 [14]. It is critical that new or existing residency positions be allocated where they are needed most—in primary care, rural areas, and community settings. Whether the forecasters are entirely or partially correct, there are several rural counties in North Carolina with no physicians at all, so there is unequivocally a physician shortage in those communities. Certainly, the way health care is delivered will need to change and adapt. That change must include how we train and educate health care professionals, especially physicians.

**Medical Education in the 21st Century**

Increasingly, teams of various professionals are providing health care services. At the center of the team is the most important member—the patient. Other team members include physicians, nurses, nutritionists, patient navigators, nurse practitioners, physician assistants, and social workers. Each member of an interprofessional team can be the key interface with the patient, at different times and with different patients.

Although such teams will increasingly become the norm, most medical students, nursing students, and other allied health students are not currently being taught how to work successfully in such teams and have few models of interprofessional collaboration. The health education silos of the past must come down in favor of providing interprofessional education [9].

In addition to teamwork, other aspects of health systems science—including population health, patient safety, quality improvement, and systems thinking—are looming as areas of expertise that will be critical for tomorrow’s physicians. Some are now calling health systems science the critical third science in medicine—in addition to basic science and clinical science, which all physicians learn in medical school,
residency, and fellowship training [15]. There must be additional emphasis placed on health systems science as an invaluable part of a physician’s education and training.

The Brody Model

The American Medical Association (AMA) recently awarded a $1 million grant to Brody School of Medicine—1 of only 11 such grants in the nation—to support the development of new ways of educating medical students. With this award, Brody School of Medicine has focused on improving the competency of its graduates in health systems science, critical aspects of which include patient safety, quality improvement, team-based interprofessional care, population health, and systems thinking.

To help prepare the faculty to institute the curricular emphasis on health systems science, Brody School of Medicine used funding from the AMA to create a Teachers of Quality Academy (TQA). To date, the TQA has graduated 1 cohort of interprofessional faculty who are teaching and serving as role models of 21st-century physicians—that is, health care providers who have clinical expertise but who also know and practice health systems science.

In addition to improving its curriculum and training its faculty, Brody School of Medicine is reemphasizing its original tripartite mission of focusing on primary care, improving health in Eastern North Carolina, and enhancing access of minority and disadvantaged students to medical education. This last part is especially critical at a time when there are still disparities in health care, especially among vulnerable populations.

A key to reducing disparities is to train physicians from underrepresented populations, as evidence shows that a diverse health care workforce is effective in providing equitable care [16-18]. However, the racial and ethnic diversity of North Carolina’s current health care professionals does not match the state’s population in terms of diversity [19].

With Brody’s mission focus on providing medical education for underrepresented students and students from disadvantaged backgrounds, as much as one-fifth of each medical school class is comprised of minority students (compared to a national median of about 6%), and there have been improvements in class diversity over time. These Brody graduates are more likely to locate in rural and underserved areas after training and to provide culturally concordant care to minority populations who suffer the greatest health disparities.

Where Do We Go From Here?

Even with a more deliberate and vigorous interprofessional education process and with curricular emphasis on health systems science, the process of training physicians requires further overhauling to produce physicians who are
ready for primary care and rural practice. North Carolina already relies on residency programs outside of the state to supply some of our physicians [20]. To reverse (or at least ease) our reliance on out-of-state residency programs, North Carolina must find ways to increase GME positions in the state, particularly in rural areas and in community-based settings. A potential model is a program in Georgia that established new teaching hospitals and programs to meet the state’s current and future physician workforce needs [21]. To achieve the goal of raising the number of physicians practicing in rural areas, we must create more opportunities for medical school graduates to do at least part of their residency training in such settings in North Carolina [22, 23].

Given recent trends, having more opportunities for training is critical. During his October 2015 report to the Board of Governors of the University of North Carolina, Dr. Warren Newton, director of the North Carolina Area Health Education Centers program, showed data indicating an ongoing decline in the number of primary care physicians who choose to practice in North Carolina. This decline is particularly evident in rural and economically depressed areas of the state (see Figure 1). Countering this trend is the relative success of Brody School of Medicine and the high percentage of its graduates who choose primary care and remain in practice within the state (see Figure 1). While slightly concentrated in Eastern North Carolina, Brody School of Medicine graduates provide care throughout the entire state to individuals, families, and communities, where they are enhancing the health of the state’s population (see Figure 2).

The challenge of meeting North Carolina’s physician workforce needs is considerable and complex. As a state, we must create policies, mechanisms, and incentives that will help us meet the health care needs of the future. Using the past as a guide and Brody School of Medicine as a model, we know there are several critical elements: keeping tuition low, recruiting underrepresented students, emphasizing primary care, and creating a curriculum that includes health systems science. In addition, it is time to consider providing incentives to certain students entering medical school in our state to entice them to stay in rural North Carolina. These incentives might include paying all or part of their medical student debt or providing a cash incentive to help primary care physicians establish a practice in one of North Carolina’s health professional shortage areas. Additionally, expanding the class size at North Carolina public medical schools for students who commit to primary care and rural service is worth serious consideration. With or without medical school class size expansion, the North Carolina General Assembly should look at supporting additional funding for GME positions, specifically in rural and community settings, in order to support an appropriately-sized and distributed health professional workforce. NCMJ

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FIGURE 2.
Primary Care Physicians With Degrees From East Carolina University Brody School of Medicine

Note. Each dot represents 1 physician.
Source: Data were collected from the North Carolina Medical Board on January 1, 2015.
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