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North Carolina MEDICAL JOURNAL

a journal of health policy analysis and debate

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Tarheel Footprints in Health Care

Recognizing unusual and often unsung contributions of individual citizens who have made health care for North Carolinians more accessible and of higher quality

Recognizing Daniel Stroup, MD Hayesville, NC



Daniel Stroup, MD

When the National Health Service Corps was established in 1968, its goal was to recruit enthusiastic physicians to practice in remote and underserved areas. The expectation was that they would find their missions in these rural places and remain there as community doctors. That ideal outcome was not often achieved but there is at least one example of an ideal outcome in western North Carolina in the hills above Lake Chatuge.

In 1982 Dan Stroup came to North Carolina as a National Health Service Corps scholar. He had just finished his family medicine residency in Waukesha, Wisconsin and was recruited by the North Carolina Office of Rural Health to a practice in Hayesville in Clay County. Twenty-five years later Dr. Stroup is still there but he's much more than the "town doc." He is the leader of a progressive and modern medical practice of 3 physicians, a nurse practitioner, and a physician assistant serving the local hospital, a nursing home, and the citizens of Clay and Cherokee counties.

The Chatuge Family Practice, which has offices in Hayesville in Clay County and Murphy in Cherokee County, is known for its progressive outlook and early adoption of quality-enhancing technology. The practice has an electronic medical record system that links into the PPRNET quality management system, a regional system of disease management and care coordination. This dedication to keep up with the latest in medical care is one of the characteristics of Dr. Stroup who combines old-fashioned community care with the best and latest medical information and the mechanisms to apply that information to care.

Dr. Stroup supports the local schools and their sports teams in both Clay and Cherokee counties as well as taking care of patients in the local nursing home, acting as medical director of the office, and taking call for the hospital in Murphy. He also has served an 11-year stint as county medical examiner and currently is on the Murphy Hospital Authority Board. These supporting roles are done to enhance the scope and quality of the primary care practice and are done on a voluntary basis. Even with all this, Dr. Stroup still has time for kayaking the Ocoee River in nearby Tennessee.

The people who work with Dr. Stroup see him as a "firm but fair" leader who treats everyone equally—patients and staff alike. He acts as the supervising physician for a nurse practitioner, Judith Wikstrom, who has been with the practice for 12 years and a physician assistant, John Tucker, who joined the practice in 2004. Dr. Stroup was instrumental in recruiting his physician colleagues to the community. Dr. Theresa Heavner came in 1990 and Dr. Matthew Molison, another National Health Service Corps scholar, arrived in 1997. Both have found a permanent home in Cherokee County.

Dan Stroup is a model for how the National Health Services Corps can work. But it requires special people with dedication and the drive to build up as well as just "fill-in" a place. It also requires the support and assistance of organizations like the NC Office of Rural Health and Community Care which brought Dr. Stroup together with the people of Hayesville as well as the support of colleagues and patients to make rural primary care in the North Carolina mountains a leader in quality.

The editors of the *North Carolina Medical Journal* are pleased to recognize Dr. Daniel Stroup for his service and dedication to provide access to quality health care in rural North Carolina.

Physician Reported Communication About Depression and Psychosocial Issues During Postpartum Visits

Betsy Lynn Sleath, PhD; Naveen Thomas, MD, MHP; Elizabeth Jackson, PhD; Suzanne L. West, PhD; Bradley N. Gaynes, MD, MPH

Abstract

Objective: Postpartum depression occurs in 13% of women after delivery, making it one of the most common puerperial complications. The purpose of the study was to examine: (1) the extent to which obstetricians/gynecologists and family physicians report discussing depression and other psychosocial issues during postpartum visits and (2) how physician specialty and gender are related to whether physicians report discussing depression and other psychosocial issues with patients during postpartum visits.

Methods: A survey was sent to a random sample of 600 obstetricians/gynecologists and 600 family practitioners in North Carolina.

Principal Findings: The overall response rate was 42%. Forty-six percent of the responding physicians (N=228) reported that they had seen women for postpartum visits during the past 3 months. Of physicians conducting postpartum visits within this time period, 43% of physicians were almost certain to ask whether the woman felt down, depressed, or hopeless and 27% were almost certain to ask about the woman's interest in her usual activities. Seventy-nine percent of physicians stated that they were unlikely to use a formal screen for depression. Obstetricians/gynecologists were less likely to ask about a woman's social support network (OR=0.33, 95% CI=0.14, 0.75), to ask about her relationship with her partner (OR=0.40, 95% CI=0.18, 0.87), and to use a formal depression screen (OR=0.16, 95% CI=0.04, 0.57) than family practitioners.

Limitations: The study only examined physician self-report of the extent to which they communicated about different issues with women during postpartum visits.

Conclusions: Communication about depression and related psychosocial issues during postpartum visits is substantially limited, likely contributing to the underdiagnosis of this common disorder.

Background

The most recent estimates suggest that 13% of women have postpartum depression after delivery.¹ Yet it is only during the routine postpartum visit that occurs approximately 4 to 6 weeks after delivery when postpartum depression can be detected. Women may not readily discuss depression with their providers. Therefore, detection depends on whether the health

care provider asks about the woman's emotional and psychological well-being to elicit indicators of postpartum depression. Very little is known about the interaction of providers and patients during postpartum visits, especially with regard to emotional or social support content. In a recent study of obstetrician-patient interactions during the prenatal period, Roter and colleagues² noted that most of the communication was predominantly biomedical with little psychosocial or social discussion.

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Elizabeth Jackson, PhD, was a research associate at the time this research was conducted at the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill.

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Bradley N. Gaynes, MD, MPH, is an associate professor in the Department of Psychiatry at the School of Medicine at the University of North Carolina at Chapel Hill.

One of the only studies that assessed general practitioners' beliefs about what should be discussed during postpartum visits was conducted in Australia.³ Seven hundred and fifteen general practitioners responded (70% response rate) to a survey that asked about physical symptoms such as urination and back problems rather than psychosocial ones. Despite the focus on physical problems, 88% of practitioners believed that the mother's feelings should be discussed during postpartum visits and 49% believed that the woman's relationship with her partner should be discussed. The researchers did not specifically ask whether the providers felt the woman's social support network should be discussed, whether they discussed depression or anhedonia (loss of interest in usual activities), or whether they used a depression screener during postpartum visits.

Previous studies have found that the following psychosocial factors are related to whether women develop postpartum depression: (a) lack of adequate social support,^{4,6} (b) being a single parent,⁷⁻⁹ (c) marital instability,^{6,10,11} and (d) stressful life events.^{6,8,12,13} If physicians took the time to ask women about these areas and about the women's emotions and feelings during postpartum visits, they could potentially identify and help those women who already have or are at risk of developing postpartum depression.

To our knowledge, no prior study conducted in the United States has examined the extent to which either family practitioners or obstetricians/gynecologists report discussing psychosocial issues with women during postpartum visits. Examining whether there are differences in communication about psychosocial issues during postpartum visits by physician specialty could help target efforts to where they are most needed. Furthermore, examining whether there are differences in communication about psychosocial issues during postpartum visits by physician gender could also help tailor efforts. Gunn et al^{3,14} surveyed 1104 Australian general practitioners and found that female general practitioners were 3.7 times more likely to provide postpartum care than male general practitioners. Roter et al² examined communication between obstetricians and their patients, and they did not find gender differences in physician discussion of social and emotional adjustment during prenatal visits. However, the researchers did not specifically examine whether depression or other specific psychosocial issues (eg, relationship with partner, social support network) were discussed. The researchers found that only 8.6% of male physicians and 7.3% of female physicians discussed social adjustment, and 3.4% of male and 1.7% of female physicians talked about emotional adjustment.

Therefore, the purpose of the current study was to examine: (1) the extent to which obstetricians/gynecologists and family physicians report discussing depression and other psychosocial issues during postpartum visits and (2) how physician specialty and gender are related to whether physicians report discussing depression and other psychosocial issues with patients during postpartum visits.

Methods

We developed a data collection instrument using information derived from a literature search focusing on surveying physicians about depression or postpartum depression and communication about depression or postpartum depression.^{2,3,15,16} The survey was targeted toward determining physician attitudes and experiences in providing postpartum care.^{3,15,16} Some questions were modified from other studies and new questions were added. After obtaining IRB approval, the survey was pretested on 7 physicians (3 family practitioners and 4 obstetricians/gynecologists), and their suggestions were used to develop a final version of the survey.

The survey was sent to a random sample of obstetricians/gynecologists and family practitioners licensed in the state of North Carolina. They were identified from the 2002 North Carolina Physicians Database (NCPD) which is maintained by the North Carolina Medical Board. Information for a random sample of 600 obstetricians/gynecologists and 600 family practitioners was obtained from the NCPD, including physician name, address, specialty, practice setting, birth date, date of medical school graduation, and demographic information. A second mailing of the survey was sent to nonresponders approximately 3 weeks after the first mailing was sent. All identifiers were destroyed after the second mailing.

The first question of the survey asked whether the physicians had seen women for postpartum visits during the last 3 months. If physicians answered no, they were asked to stop and return the survey at that point.

Measurement

There were two sources of variables used in this study, the NCPD and the survey. Physician specialty (family practice or obstetrics/gynecology), gender, age, years of experience, and race were obtained from the NCPD. Physician gender and specialty were measured as dichotomous variables. Physician age and years of experience were measured as continuous variables. Physician race was originally measured as a categorical variable (white, Hispanic, African American, American Indian/Alaskan native, Asian/Pacific Islander, other) but was recoded into a dichotomous variable (white, nonwhite) because the majority of physicians were white. As physician age and years in practice were highly related (Pearson correlation coefficient = 0.96, $p < .001$), only physician age was included in the analyses.

The variables that examined physician likelihood of discussing psychosocial and other issues with women during postpartum visits were obtained from the survey. We asked about psychosocial and nonpsychosocial issues so that the physicians would not know that our main focus was communication about psychosocial issues. The physicians were asked on a 4-point Likert scale how likely (unlikely, somewhat likely, very likely, almost certain) they were to discuss 11 different areas with women during postpartum visits. The 11 areas were: (a) breastfeeding, (b) interest in her usual activities (anhedonia), (c) exercise patterns, (d) diet, (e) feeling down, depressed, or hopeless, (f) relationship with her partner, (g) social support network, (h) sleeping patterns, (i) job/work,

(j) using a formal tool to screen for depression, and (k) sexual functioning. Of note, either anhedonia (b) or depressed mood (e) is a required core element of a postpartum depression diagnosis. For analysis purposes, the 11 variables were recoded into dichotomous variables (unlikely or somewhat likely versus very likely or almost certain).

Analysis

Descriptive statistics were calculated for physician characteristics. We compared responding and nonresponding physicians by gender, age, race, and specialty using chi-square or t-tests. We then compared physicians who did see women for postpartum visits during the last 3 months to those who did not by gender, age, race, and specialty using chi-square or t-tests. Our remaining analyses included only those physicians who reported seeing women for postpartum visits during the last 3 months. Descriptive statistics were calculated for physician reports of how likely they were to communicate about certain issues during postpartum visits. Next, the bivariate relationships between the variables were examined using t-tests, chi-square statistics, and Fisher's exact tests. Multivariable logistic regression techniques were run to predict how physician gender, age, race, and specialty influenced whether physicians reported being almost certain or very likely to ask about depression, anhedonia, a woman's social support network, the woman's relationship with her partner, job/work, and sleeping patterns and whether physicians used a formal screening instrument to assess for depression. All analyses were conducted by the first author (Betsy Lynn Sleath).

Results

A total of 1200 physicians were sent surveys with postage-paid return envelopes. Sixteen were returned as undeliverable (2 obstetricians/gynecologists and 14 family practitioners). The response rate for obstetricians/gynecologists was 43% compared to 40% for family practitioners. The overall response rate for both specialties was 42% (N = 491). Responding and nonresponding physicians did not differ significantly by gender, age, or race.

A total of 228 of the 491 (46%) responding physicians reported that they had seen women for postpartum visits during the past 3 months. Female physicians were significantly more likely to report seeing women for postpartum visits during the past 3 months than male physicians (56% versus 42%; Pearson chi-square = 8.55, p = 0.003). Obstetricians/gynecologists were significantly more likely to report seeing women for postpartum visits during the past 3 months than family practitioners (74% versus 16%; Pearson chi-square = 168.56, p < 0.000). Female physicians who responded to our survey were not significantly more likely to be obstetricians/gynecologists than male physicians. Younger physicians were significantly more likely to report seeing women for postpartum visits during the last 3 months than older physicians (t-test = 6.08, p < 0.000). Table 1 presents the characteristics of the physicians who reported seeing women for postpartum visits during the past 3 months.

Table 1.
Characteristics of Responding Physicians Who Treated Women for Postpartum Visits During the Past Three Months

	Percentage (N)
Age	
26 - 41	53.9 (123)
42 - 56	40.0 (91)
57 - 71	6.1 (14)
Sex	
Female	37.3 (85)
Male	62.7 (143)
Race	
White	82.9 (189)
Nonwhite	17.1 (39)
Practice type	
Obstetrics	84.2 (192)
Family practice	15.8 (36)
Sample Demographics (N = 228)	

Table 2 illustrates how likely these physicians were to communicate about depression and psychosocial and other issues during postpartum visits. Forty-three percent of physicians were almost certain to ask about the woman feeling down, depressed, or hopeless and 27% were almost certain to ask about the woman's interest in her usual activities. Twenty percent of physicians were almost certain to ask the woman about her relationship with her partner and 16% of physicians were almost certain to ask the woman about her social support network. Seventy-nine percent of physicians stated they were unlikely to use a formal screen for depression.

We found no differences by physician race, gender, age, or specialty in whether physicians were very likely or almost certain to ask versus somewhat likely or unlikely to ask the woman about feeling down, depressed, or hopeless or whether they were to ask about her interest in her usual activities (results not shown).

Table 3 presents the multivariable logistic regression results. Obstetricians/gynecologists (46%) were significantly less likely to be almost certain or very likely to ask about a woman's social support network than family practitioners (75%; OR=0.33, 95% CI=0.14, 0.75). Obstetricians/gynecologists (49%) were significantly less likely to be almost certain or very likely to ask about the woman's relationship with her partner than family practitioners (68%; OR=0.40, 95% CI=0.18, 0.87). Obstetricians/gynecologists (4%) were significantly less likely to be almost certain or very likely to use a formal tool to screen for depression than family practitioners (14%; OR=0.16, 95% CI=0.04, 0.57).

Table 2.
Physician Reports of How Likely They Were to Communicate About Depression and Psychosocial and Other Issues During Postpartum Visits (N=228)^a

	Unlikely Percent (N)	Somewhat likely Percent (N)	Very likely Percent (N)	Almost certain Percent (N)
Ask the woman about...				
Breastfeeding	0 (0)	2.6 (6)	12.7 (29)	84.2(192)
Feeling down, depressed, or hopeless	4.4 (10)	20.2 (46)	31.6 (72)	43.4 (99)
Job/work	10.5 (24)	14.5 (33)	35.1 (80)	39.0 (89)
Sleeping patterns	11.8 (27)	23.7 (54)	32.5 (74)	32.0 (73)
Interest in her usual activities	14.5 (33)	30.3 (69)	27.6 (63)	27.2 (62)
Sexual functioning	12.7 (29)	28.9 (66)	34.2 (78)	23.7 (54)
Relationship with her partner	12.7 (29)	36.0 (82)	31.6 (72)	19.7 (45)
Exercise patterns	10.1 (23)	37.3 (85)	32.9 (75)	19.3 (44)
Diet	16.2 (37)	34.6 (79)	31.6 (72)	17.1 (39)
Social support network	18.4 (42)	30.3 (69)	34.6 (79)	15.8 (36)
Use a formal tool to screen for depression	79.4 (181)	14.9 (34)	2.2 (5)	3.1 (7)

^aEach row does not add to 228 due to missing data for certain items

Table 3.
Multivariable Logistic Regression Results Predicting Whether Physicians Were Almost Certain or Very Likely to Ask About Social Support, Relationship with Partner, Job/Work, Sleeping Patterns, and Use of a Formal Depression Screen (N=228)

Variable	Social support OR, 95%CI	Partner OR, 95%CI	Job/work OR, 95%CI	Sleep OR, 95%CI	Depression screen OR, 95%CI
Physician age	0.99 (0.95, 1.01)	1.01 (0.98, 1.04)	0.98 (0.95, 1.02)	0.97 (0.94, 1.00)	1.02 (0.95, 1.10)
Physician gender-male	0.57 (0.31, 1.06)	0.84 (0.46, 1.55)	0.38 (0.17, 0.85)*	0.77 (0.40, 1.47)	4.21 (0.78, 22.83)
Specialty-obstetrics/gynecology	0.33 (0.14, 0.75)**	0.40 (0.18, .87)*	0.36 (0.12, 1.13)	1.46 (0.68, 3.13)	0.16 (0.04, 0.57)**
Physician race-nonwhite	0.86 (0.41, 1.81)	0.74 (0.36, 1.51)	0.28 (0.12, 0.62)**	0.38 (0.18, 0.79)**	1.07 (0.20, 5.74)
* p<0.05, ** P<0.01					

When examining nonpsychosocial issues, we found that male physicians (68%) were significantly less likely to be almost certain or very likely to ask about a woman's job/work than female physicians (86%; OR=0.38, 95% CI=0.17, 0.85). Nonwhite physicians (59%) were significantly less likely to be almost certain or very likely to ask about a woman's job/work than white physicians (78%; OR=0.28, 95% CI=0.12, 0.62). Nonwhite physicians (49%) were significantly less likely to be almost certain or very likely to ask about a woman's sleep patterns than white physicians (68 %) (OR=0.38; 95% CI=0.18, 0.79).

Discussion

Postpartum depression occurs in more than 1 out of every 10 women who have a baby. It is an important problem that

can have effects on both the baby and the mother. One of the key places where postpartum depression can be recognized and diagnosed by a health care professional is during a woman's routine postpartum visit. We found that 43% of physicians stated that they were almost certain to ask about the woman feeling down, depressed, or hopeless and just 27% were almost certain to ask about the woman's interest in her usual activities. These are two of the core symptoms of depression, at least one of which is required for the diagnosis of major depressive disorder. Assessing women for depression is an essential part of postpartum care.

Less than 6% of physicians stated that they were very likely or almost certain to use a formal depression screening instrument during postpartum visits. Physicians might consider using a brief depression screen among women during postpartum visits

so that problems are identified early and treatment initiated if appropriate. For example, the 9-item Patient Health Questionnaire is an easy to use depression screening instrument that has been successfully used in primary care and obstetrical settings; the Edinburgh postnatal depression scale^{17,18} is another option.

In addition to screening for depression, it is also important that women who screen positive for depression have access to appropriate systems to receive treatment. This may include practices referring women to mental health professionals in their area if they do not have a mental health specialist as part of their practice. Future research should examine the extent to which practices have systems in place to treat women with postpartum depression.

Physician demographics were not significantly related to whether physicians reported being very likely to almost certain to ask about depression or anhedonia. However, there were some interesting differences by specialty. Family practitioners were more likely than obstetricians/ gynecologists to report asking women about social support and their relationships with their partners and they were more likely to report using a depression screener. Perhaps this is due to differences in educational training or differences in the amount of time spent with patients. Future work should explore why there might be differences between

family practitioners and obstetricians/gynecologists in discussing psychosocial issues.

The study was limited in that we only examined physician self-report of the extent to which they communicated about different issues with women during postpartum visits. Future research should compare physician self-reported communication to actual care, as documented through audio tapes or other research methods. The study was also limited in that only 42% of physicians responded and responding physicians might have been more interested in these issues. Another limitation is that social desirability bias may have led to overestimates of physician self-report practices.

Despite the limitations, the study provided new information on the extent to which physicians report discussing different psychosocial issues with women during postpartum visits. Postpartum visits are one of the key places where postpartum depression can be recognized and treated. Providers should consider asking all patients at their postpartum visits about depression, anhedonia (loss of interest in usual activities), and risk factors for postpartum depression (social support, relationship with partner). Providers should also consider using a brief depression screen during postpartum visits so that problems are identified early and treatment is initiated if appropriate. **NCMJ**

REFERENCES

- 1 Wisner KL, Parry BL, Piontek CM. Clinical practice. Postpartum depression. *N England J Med.* 2002;337(3):194-199. [PMID: 12124409]
- 2 Roter DL, Geller G, Bernhardt BA. Effects of obstetrician gender on communication and patient satisfaction. *Obstet Gynecol.* 1999;93(5 Pt 1):635-641. [PMID: 10912958]
- 3 Gunn J, Lumley J, Young D. The role of the general practitioner in postnatal care: A survey from Australian General Practice. *Br J Gen Pract.* 1998;48:1570-1574. [PMID: 9830181]
- 4 DaSilva VA, Moraes-Santos AR, Carvalh MLP, et al. Prenatal and postnatal depression among low income Brazilian women. *Brazilian Journal of Medical and Biological Research.* 1998;31(6):799-804. [PMID: 9698826]
- 5 Dobie SA, Walker EA. Depression after childbirth. *J Am Board Fam Pract.* 1992;5(3):303-311. [PMID: 1580177]
- 6 Paykel ES, Emms EM, Fletcher J, et al. Life events and social support in puerperal depression. *British Journal of Psychiatry.* 1980;136:339-346. [PMID: 7388241]
- 7 Bryan TL, Georgiopoulos AM, Harms R, et al. Incidence of postpartum depression in Olmsted County, Minnesota: A population-based, retrospective study. *J Reprod Med.* 1999;44:351-358. [PMID: 10319305]
- 8 Leadbeater BJ, Linares O. Depressive symptoms in black and Puerto Rican adolescent mothers in the first years postpartum. *Dev Psychopathol.* 1992;4:451-468.
- 9 Georgiopoulos AM, Bryan TL, Yawn BP, et al. Population-based screening for postpartum depression. *Obstet Gynecol.* 1999;93:653-657. [PMID: 10912961]
- 10 Stowe ZN, Nemeroff CB. Women at risk for postpartum-onset major depression. *Am J Obstet Gynecol.* 1995;173(2):639-645. [PMID: 7645646]
- 11 Schaper AM, Rooney BL, Kay NR, et al. Use of the Edinburgh postnatal depression scale to identify postpartum depression in a clinical setting. *J Reprod Med.* 1994;39:620-624. [PMID: 7996526]
- 12 O'Hara MW, Varner MW. Assessing stressful life events associated with childbearing: The peripartum events scale. *J Reprod Infant Psychol.* 1986; 4:85-98.
- 13 O'Hara MW, Rehm LP, Campbell SB. Predicting depressive symptomatology: cognitive-behavioral models and postpartum depression. *J Abnorm Psychol.* 1982;91:457-461. [PMID: 7153419]
- 14 Gunn J, Lumley J, Young D. Involvement of Victorian general practitioners in obstetric and postnatal care. *Aust Fam Physician.* 1998;27(2):S78-S83. [PMID: 9679360]
- 15 Gerrity MS, Williams JW, Dietrich AJ, Olson AL. Identifying physicians likely to benefit from depression education: a challenge for health care organizations. *Med Care.* 2001;39:856-866. [PMID: 9679360]
- 16 Williams JW, Rost K, Dietrich AJ, Ciotti MC, Zyzanski SJ, Cornell J. Primary care physicians' approaches to depressive disorders: effects of physician specialty and practice structure. *Arch Fam Med.* 1999;8:58-67. [PMID: 9932074]
- 17 Spitzer RL, Williams JBW, Kroenke K. Validity and utility of the PRIME-MD Patient Health Questionnaire in assessment of 3000 obstetric-gynecologic patients: The PRIME-MD Patient Health Questionnaire Obstetrics-Gynecology Study. *Am J Obstet and Gynecol.* 2000;183(3):759-769. [PMID: 10992206]
- 18 Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry.* 1987;150:782-786. [PMID: 3651732]

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Scientific Editor, *North Carolina Medical Journal*

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POLICY FORUM

North Carolina's Primary Care and Specialty Workforce

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Aaron McKethan

*“By 2030, under
almost any realistic
scenario, North
Carolina is likely to
experience significant
practitioner shortages
absent any changes
in supply or
productivity.”*

INTRODUCTION

Policy Forum: *Primary Care and Specialty Supply in North Carolina*

Many of us have had the experience of wanting to see a doctor or a primary care practitioner as soon as possible but are told we have to wait for an appointment. Sometimes that wait is many days, even weeks. The ability to see a health care practitioner “on demand” is as much a function of their local availability as it is a problem with the overall supply of practitioners in the state. For individuals seeking care of a certain type or in a certain geographic region of the state, getting to see the doctor or any health care professional for a nonurgent problem can be even more difficult. These delays can have consequences for an individual’s health.

North Carolina, along with the rest of the nation, is beginning to experience a situation where the availability of practitioners is becoming tighter. Some parts of the state have had a chronic undersupply of physicians and other primary care professionals, and there is evidence that we will soon experience regional shortages for some specialists. The good news is that North Carolina, as a whole, currently has what most would consider a sufficient number of practitioners on a population basis. However, there are a few exceptions, specifically in the areas of child psychiatry and in some rural and low-income communities. These conditions exist in places not too distant from cities with some of the highest concentrations of physicians in the entire nation.

What has become apparent, given the lack of any appreciable growth in the number of doctors trained in the United States, is the fact that we will not be bringing in as many physicians as we have in the past. This pattern is especially problematic because our population continues to grow, age, and face a higher incidence of chronic disease. North Carolina is one of the fastest growing states in the nation. However, the supply of practitioners is not expected to increase at the same rate. We also expect that demand for services will grow very quickly as the baby-boom generation reaches the age when need for care rises rapidly. The physician population also is aging, and many practitioners will be preparing to retire in the next two decades.

In response to these trends that have emerged over the past 3 years, a group of North Carolina health policy experts, government officials, health care providers, and businesses formed a task force to evaluate strategies for ensuring the state’s ability to meet our health care needs under these conditions. The nature of the problem itself presents a challenge. Practitioners are working more efficiently and they can be even more efficient with the advent of new technology and the expansion and sharing of roles and skills within and across disciplines and professions. Thus, the issue may not be one of simply supply and demand or need for practitioners, but of organization and policy. This issue of the *North Carolina Medical Journal* highlights the perspectives of a number of individuals who participated in the North Carolina Institute of Medicine’s Task Force on Primary Care and Specialty Supply.

The commentaries in this issue highlight a range of opportunities for improving future access to care. Some of the strategies include increasing the supply of underrepresented minority practitioners, expanding clinical rotation and residency opportunities for medical and health professional students, developing new models of care, and targeting funding to programs that support putting practitioners in underserved areas of the state or in shortage specialties.

We hope these commentaries illuminate the primary care and specialty supply challenges facing North Carolina and present tangible strategies for improvement. Clearly, no single strategy will sufficiently address our future concerns. However, if we implement a number of different strategies and take action now, we have the opportunity to make a difference in reducing future shortages. We should encourage our policy makers to heed the warning signals and support policy changes that could greatly benefit the future health of North Carolinians.

Thomas C. Ricketts III, PhD, MPH
Editor-in-Chief

Kristen L. Dubay, MPP
Managing Editor

Weathering the Practitioner Workforce Shortage

Pam Silberman, JD, DrPH; E. Harvey Estes Jr., MD; Kristen L. Dubay, MPP; Mark Holmes, PhD

Growth in the overall population, and particularly growth among older adult populations, will have significant implications for North Carolina's health care system. The state's population is expected to grow by 39% over the next 25 years (July 2005-2029). The population of older adults age 65 or older is expected to grow more quickly, by 107% during the same time period, and the cohort of adults age 75 or older will grow by 100%.¹ On average, people make approximately 3 visits per year to a physician's office or clinic. However, visit rates vary by age: in 2003, 25-34 year olds made 2.3 annual visits to a physician's office or clinic, whereas 65-74 year olds made 6.2 visits and 75-84 year olds made 7.3 visits.² In addition to rapid growth among older adult populations, North Carolina is experiencing growth in the number of people with chronic illnesses.^{a,3} These 3 factors—growth of the overall population, aging of the population, and increased prevalence of chronic illnesses—will create increased demand on the health care system. Within 25 years, the confluence of

these factors will create a perfect storm of health care need. Absent any meaningful change in production or retention, the supply of health care practitioners will not grow sufficiently to meet this need.

Physicians, physician assistants (PAs), nurse practitioners (NPs), and certified nurse midwives (CNMs) comprise the health care workforce needed to diagnose and treat individual patients.

“These 3 factors—growth of the overall population, aging of the population, and increased prevalence of chronic illnesses—will create increased demand on the health care system.”

Having access to these practitioners contributes to the overall well-being of our population. While the exact relationship of overall practitioner supply to population health measures is disputed,⁴ specific contributions of physicians, PAs, NPs, and CNMs to individual health is not in doubt. The consequences of not being able to see health care practitioners when needed are clear. Studies have shown people with less access to medical care live shorter lives, with more disability and lower productivity.⁵

No one currently knows the optimal number of or type of practitioners needed to optimize population health. Yet, by

a Between 1987 and 2002, there was a significant increase in the treated disease prevalence of certain chronic diseases such as cerebrovascular diseases (161% increase); kidney problems (99% increase); pulmonary conditions (90% increase); diabetes (64% increase); the presence of abnormal or elevated lipids (fatty molecules) in the blood (437% increase) with cholesterol being most common; and certain back problems (78%).

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Mark Holmes, PhD, is vice president of the North Carolina Institute of Medicine and senior research fellow at the Cecil G. Sheps Center for Health Services Research.

most measures, North Carolina has neither too many nor too few physicians. North Carolina had 20.7 physicians to every 10 000 people in 2005, which is slightly less than the national average. If nothing is done to change the supply of practitioners in North Carolina, the ratio of physicians-to-population is expected to decline by 8% by 2020 and by 21% by 2030. The ratio of all practitioners-to-population, including PAs, NPs, and CNMs, is expected to drop between 2% and 13% by 2030.

The practitioner workforce shortage is not only a problem North Carolina will face in the future; practitioner shortages currently exist in many areas of the state. Many counties have experienced a decline over the last 5 years in primary care practitioners, psychiatrists, general surgeons, and practitioners delivering babies. In addition, the state has far fewer minorities in these health professions than their representation in the population.

The North Carolina Institute of Medicine (NC IOM) convened the Task Force on Primary Care and Specialty Supply to analyze current and projected trends in practitioner supply and to examine whether the existing production of physicians, PAs, NPs, and CNMs would address the state's growing health care needs. The task force was a collaborative effort with the North Carolina Area Health Education Centers Program (AHEC), the Southeast Regional Workforce Center, and the North Carolina Health Professions Data System in the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill (UNC-CH). The task force met for more than a year, and its work culminated in a one-day summit to obtain feedback from a larger group of practitioners, leaders of academic health centers and health professional schools, and community leaders. This issue brief summarizes the findings of the task force along with its priority recommendations. The paper is organized into 4 sections: overview of future supply, areas of the state experiencing persistent shortages, trends in practitioner supply by practitioner specialty (including primary care), and underrepresentation of minorities in health professions.

Overall Supply

For most of the last 20 years, North Carolina experienced a steady increase in the ratio of practitioners-to-population because the number of licensed practitioners grew faster than the population. However, the rate of growth has slowed over the last 5 years. The physician-to-population ratio increased by approximately 2.1% annually between 1985 and 2000 but has slowed to a 0.9% growth rate since 2000.

The physician workforce is aging. A sizable portion of physicians are likely to retire in the next 25 years, and older physicians who do not retire tend to work fewer hours in direct patient care. A significant

proportion of nurse practitioners and, to a lesser extent, physician assistants also will reach retirement age within the next 25 years. Absent significant increases in production, in-migration, or retention of practitioners in North Carolina, the supply of practitioners is unlikely to keep up with growing demand. Assuming current growth trends, the number of primary care and specialty practitioners is expected to grow between 23% and 39% between 2005 and 2030 while the population is expected to grow 42% during this same time period. The aging of the population and increased number of people with chronic illnesses will lead to the growing demand for health services beyond that due to population growth.

It is impossible to fully predict the demand for and supply of practitioner services 25 years into the future. There are a number of different factors that must be considered in projecting practitioner supply and increased demand for health services. Some of these factors include the anticipated growth in supply of new physicians, PAs, NPs, and CNMs; anticipated exodus of practitioners from the profession (due to death, retirement, moving out of state, or other factors); growth in the overall state population; aging of the population (which affects demand for services); and overall prevalence of chronic illness. The combined effect of 3 of the primary drivers of demand—growth of the overall population, aging of the population, and increased prevalence of chronic illnesses—is expected to increase demand for services in North Carolina (measured in annual visits) considerably. The first two factors alone will lead to a 52% increase in annual visits between 2005 and 2030. The increasing prevalence of chronic disease may add an additional increase of 5%.

The NC IOM Task Force on Primary Care and Specialty Supply developed different workforce projections based on different assumptions, including a “best case” and “worst case” scenario. (See Table 1.) The “best case” scenarios are based on current growth of physicians and the higher than average rate of growth of PAs, NPs, and CNMs experienced in the last 5 years. These projections weigh PAs, NPs, and CNMs at 0.75 full-time equivalent (FTE) of a physician.⁶ The “worst case” scenarios are based on current growth of physicians and average rate of growth of PAs, NPs, and CNMs averaged over the last 25 years. These projections weigh PAs, NPs, and CNMs at 0.50

Table 1.
Projected Change in Practitioner-to-Population Ratios, North Carolina, 2020 and 2030

	Projected Change in Practitioner-to-Population Ratios		Projected Change in Practitioner-to-Adjusted Population Ratios	
	2020	2030	2020	2030
Physicians only	-8%	-21%	-12%	-26%
All practitioners				
Best case	4%	-2%	-1%	-8%
Worst case	-4%	-13%	-8%	-19%

Source: NC Institute of Medicine and the North Carolina Health Professions Data System.

FTE of a physician (as used by federal workforce projections). In addition, there are separate estimates for practitioner-to-population only and practitioner-to-adjusted population (based on increased demand due to aging of the population). These projections do not factor in growth in the number of people with chronic illnesses because current projections for disease prevalence and its effect on ambulatory services are too tenuous. By 2030, under almost any realistic scenario, North Carolina is likely to experience significant practitioner shortages absent any changes in supply or productivity.

CNMs or interdisciplinary teams of practitioners. Lloyd Michener discusses these new models of care in his commentary of this journal issue. Another trend which may increase the number of patients that practitioners can see in an ambulatory setting is use of hospitalists. Hospitalists free up community practitioners' time by assuming care of patients once they are admitted to hospitals. While these options are conceptually attractive, few large-scale system redesigns have led to major increases in productivity. Yet these models are worth further study.

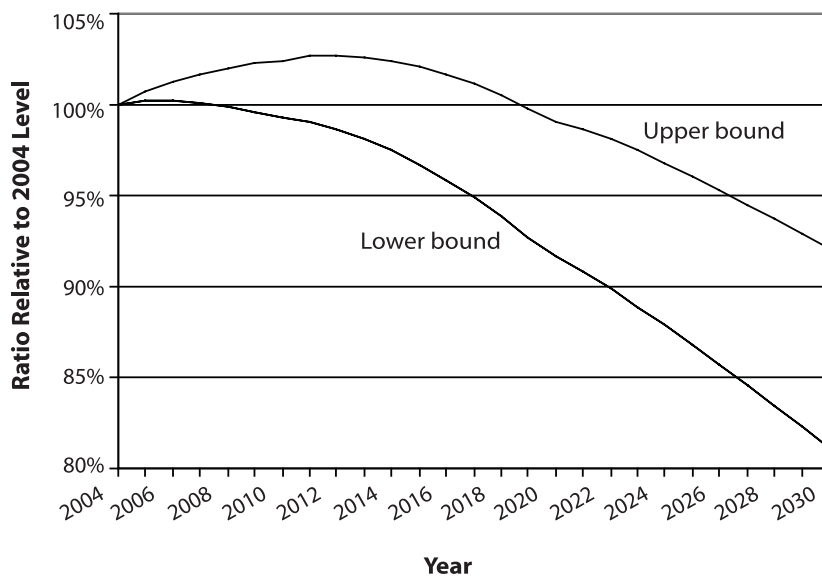
Thus, one of the task force's priority recommendations was that North Carolina foundations fund and evaluate new models of care to improve quality and efficiency of existing practices. If effective, insurers and other payors should reimburse practitioners to support these models.

Absent new models of care or improvements in the underlying health status of the state's population, North Carolina is likely to need a significant increase in the number of practitioners practicing in the state. The state must either increase the number of practitioners entering practice, decrease attrition, or both. (See Figure 1.) There are short-term and long-term strategies to address the practitioner shortage. Over the short term, the state can try to recruit more practitioners from other states to practice in North Carolina. However, as Tom Ricketts describes in his commentary, most other states also will be experiencing a physician shortage.^{b7} As a result,

there will be increased competition in recruiting the limited number of physicians.

Over the long term, there is a need to educate and train more physicians by increasing undergraduate medical education and residency positions.^{c8} **The task force recommended that North Carolina increase the number of physicians trained in North Carolina medical schools either by increasing enrollment on existing campuses, by creating a satellite campus, or by creating a new medical school.** James McDeavitt and Kara King discuss the potential to expand the medical school class of UNC-CH through a satellite campus at Carolinas Health Care System in Charlotte, while Gary Bowers, Teck Penland, and Joseph Damore discuss the potential for creating a medical school expansion in Western North Carolina. Nevertheless, it is not sufficient to train new physicians

Chart 1.
Range of Projected Practitioner-to-Population Ratios, North Carolina, 2005-2030



Note: Lines represent upper and lower bounds of reasonable estimates of practitioner supply per North Carolinian, relative to 2004 levels.

Source: NC Institute of Medicine and the North Carolina Health Professions Data System.

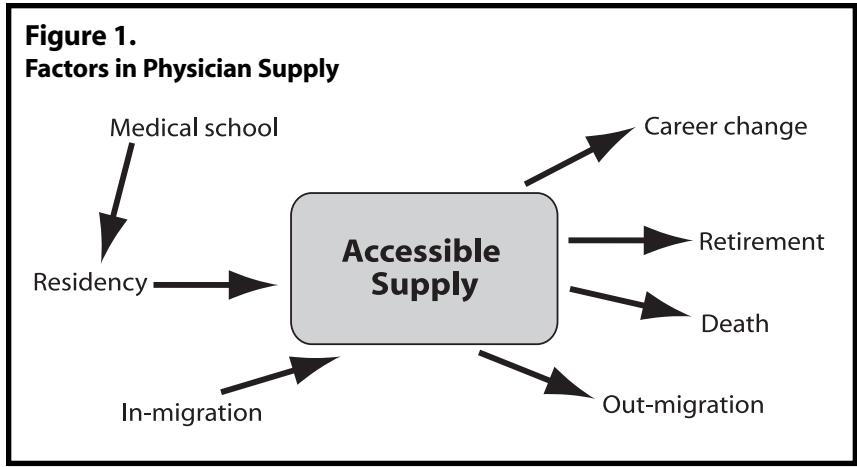
Chart 1 presents the best and worst case projections for the age-adjusted populations between 2005 and 2030. The supply of practitioners-to-population is expected to increase until 2015, at which time North Carolina will see a precipitous drop in the overall supply of practitioners.

There are two fundamentally different approaches the state can take to address future practitioner shortages: (1) restructure the health care delivery and finance system to create new and more efficient systems of care (particularly for people with chronic illnesses) or (2) increase practitioner supply.

The state should explore ways to restructure the health care delivery and financing systems to increase quality and efficiency so that practitioners, practices, and health care systems can appropriately manage a higher caseload. Theoretically, this goal could be accomplished through expanded use of PAs, NPs, and

b The following states have issued reports highlighting physician workforce shortages: Texas (2002), California (2004), Mississippi (2004), Wisconsin (2004), Arizona (2005), Georgia (2005), Kentucky (2005), Massachusetts (2005), Michigan (2005), and Oregon (2005).

c The Association of American Medical Colleges recently recommended US medical schools increase the number of undergraduate medical students they enroll by 30% in order to meet the need for physicians in the future.



targeted toward the high priority specialty areas of primary care, general surgery, psychiatry, and other types of specialties experiencing shortages as well as to support programs designed to graduate physicians likely to settle in rural or other underserved areas of the state.

North Carolina also needs to train more PAs, NPs, and CNMs to meet the state's health care needs. Justine Strand, Nancy Short, and Elizabeth Korb discuss the important role of PAs, NPs, and CNMs in meeting the health care needs of the state's population. Expanding the number of PAs, NPs, and CNMs is a less

if these physicians ultimately choose to practice in another state. Over the last 40 years, only 40% of students trained in North Carolina medical schools ended up practicing in-state.⁹ Those who complete their training in a publicly-funded medical school with a mission to serve the state are more likely to practice in-state. (See Table 2.)

The task force also recommended that North Carolina medical schools expand enrollment and the priority recommendation suggested that state funding be targeted to medical schools that produce North Carolina physicians that fill the unmet health needs of the state's population. The task force also recommended the state expand the number of residency positions. Almost half (49%) of physicians who completed their residency in North Carolina over the last 40 years set up practice in-state. This percentage is even higher among residents who completed their residency at AHEC family practice programs: more than two thirds (67%) of these physicians remained in-state. Unfortunately, the federal government has frozen funding for new residency positions so any expansion would need to be supported with state funds. **The task force recommended that the General Assembly appropriate money to support 100 new residency positions across the state**

expensive option and yields more immediate results than increasing the number of physicians. Unlike medical schools, which typically require 4 years of training and 3-year, postgraduate residency programs, NPs, PAs, and CNMs can complete their education and training within 2 to 3 years after completing their undergraduate degrees. In North Carolina, the PA, NP, and CNM schools collectively graduate approximately the same number of practitioners as do the medical schools. **Along with increasing medical school enrollment, the task force recommended that North Carolina health professional schools increase enrollment of PAs, NPs, and CNMs, but that state funding be tied to those schools that produce practitioners who meet the health care needs of the state.**

There are many challenges to creating new schools or expanding existing schools including the costs of expansion, limited classroom space or lab space in existing schools, and limited faculty (depending on the type of program). Lack of clinical training sites is a challenge for existing programs and would be exacerbated if new programs were created or existing programs expanded. As Tom Bacon discusses in his commentary, there are challenges to creating new clinical training sites. Further, clinical training sites often impact where health

professional students choose to practice. Thus, there have been attempts to move clinical rotations out of academic health centers and hospitals and into communities, particularly underserved communities, in an effort to enhance clinical training and to encourage practitioners to set up practice in those locations. **The task force recommended that the General Assembly provide additional funding to the North Carolina Area Health Education Centers Program to support the development of additional clinical training**

Table 2.1
North Carolina Medical School Enrollment and Graduates Practicing in the State

School	2004-2005 Academic Year			
	Total Enrollment	New Entering Students	% New Students In-State	% Graduates Practicing in NC*
Brody School of Medicine, East Carolina University	290	72	100%	59%
Duke University School of Medicine	467	101	20%	24%
University of North Carolina School of Medicine	649	160	85%	49%
Wake Forest University School of Medicine	427	108	40%	39%

Source: American Medical Association. Medical schools in the United States. *JAMA*. Medical Education Issue. September 7, 2005;294(9):1119-1127; NC Health Professions Data System. September 2006.

sites necessary for the training of additional health professional students.

The task force also recommended other options to increase overall practitioner supply including expanded marketing efforts to recruit out-of-state practitioners to North Carolina, maintaining and/or improving the practice environment for health care practitioners, and expanding the supply of trained practice managers to help physicians and other health professionals maintain financially viable practices. To continue examinations of impending practitioner shortages and develop workable strategies to expand the health professional workforce, **the task force recommended that the General Assembly appropriate funding to support and expand the current Health Professions Data System, housed within the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill, and create an ongoing Health Workforce Policy Board.**

Maldistribution

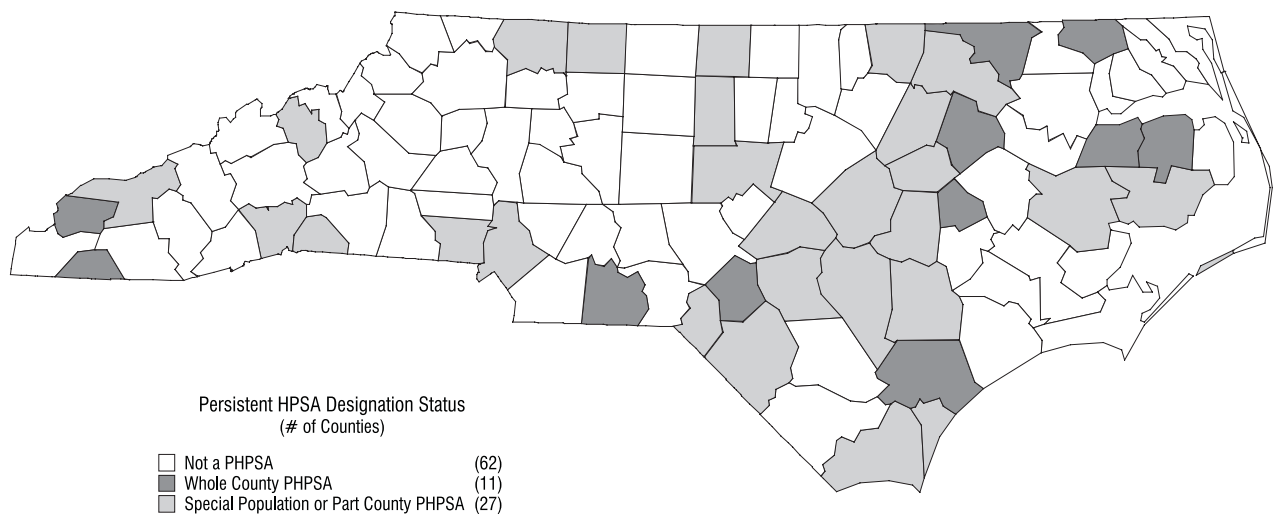
North Carolina's practitioner-to-population ratio is similar to the rest of the country; the ratio of physicians per 10 000 population in North Carolina reached 20.7 in 2005. This ratio is lower than the US average of 22.77 per 10 000 but is consistent with ratios for states that border North Carolina.¹⁰ However,

this statewide average masks some stark differences in practitioner supply. Some areas of North Carolina have an abundance of health professionals while others lack sufficient practitioners, forcing individuals to travel long distances for health care. Shortages typically exist in rural areas, but there also are pockets of low practitioner supply in low-income areas of larger cities.

The Bureau of Health Professions in the US Department of Health and Human Services has designated certain communities, population groups, or medical facilities as health professional shortage areas (HPSAs).¹¹ Certain counties, or parts thereof, are considered primary care HPSAs if they have more than 3500 people per primary care practitioner.^d In 2005, 11 whole counties and parts of 40 additional counties in North Carolina were designated as HPSAs.

Some counties change their HPSA designation from one year to the next depending on growth in the population and whether the county gained or lost a physician. However, other counties are persistently considered HPSAs. The task force focused on areas of the state designated as HPSAs in 6 of the last 7 years or as "persistent health professional shortage areas" (PHPSAs). Eleven counties in North Carolina are considered whole-county PHPSAs and 27 counties are part-county or special population PHPSAs. (See Map 1.) In the last 5 years, more than half (55%) of the 38 PHPSAs experienced a decline in their primary care practitioner-to-population ratios. Whole-county

Map 3.3
Persistent Health Professional Shortage Areas* (PHPSAs) in North Carolina, 2005



Source: Area Resource File, HRSA, DHHS, 2005;
Bureau of Health Professions, Shortage Designation Branch, 2005.
Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center
for Health Services Research, University of North Carolina at Chapel Hill.

*Persistent HPSAs are those designated as HPSA by the Health Resources and Services Administration (HRSA) from 1999 to 2005 or in 6 of the last 7 releases of HPSA definition.

^d Areas that are designated as HPSAs must define and justify a rational service area for the delivery of health services (often a county), have a sufficiently low practitioner-to-population ratio, and show evidence that nearby resources are overutilized, too distant, or otherwise inaccessible. For primary care professionals, areas with more than 3500 people per primary care provider can qualify as HPSAs, although the standard is lower for certain "high need" areas. An area is designated as "high need" if the area has more than 100 births per year per 1000 women aged 15-44, has more than 20 infant deaths per 1000 live births, or has more than 20% of the population (or of all households) with incomes below the poverty level.

PHPSAs are more likely to be rural and to be located in eastern North Carolina than non-PHPSAs and have a higher percent of the population living below the poverty line (15.2% for whole, 10.4% for non-PHPSAs).¹²

Populations with lower physician supply may be less able to address their health care needs in a timely manner. Not only does lack of practitioners have an impact on access to health services, it also can have an adverse impact on the economic health of a community. In his commentary, Aaron McKethan discusses the importance of having a stable health professional workforce when recruiting industries into rural areas. The current and future health professional shortage has implications that go beyond the specific health care needs of individuals.

Historically, North Carolina's Office of Rural Health was considered a national leader in recruiting physicians and other practitioners into rural areas.¹³ Torlen Wade, director of the North Carolina Office of Rural Health and Community Care (ORHCC), Maggie Sauer, director of the North Carolina Community Practitioner Program, and Christine Kushner discuss the state's past experience recruiting practitioners into rural and medically underserved areas of the state. North Carolina made significant headway in addressing practitioner maldistribution problems in the 1980s and 1990s; however, improvements have stagnated, and now maldistribution problems appear to be getting worse.

Practitioners choose their location of practice based on a number of factors including economic potential, lifestyle, family preference, and training location. Provider practices must be financially sustainable, which is a challenge in rural areas that lack population density and in low-income communities where a higher proportion of people lack health insurance. Financial incentives and practice support (eg, information technologies) will increase the financial viability of practices treating historically underserved areas and populations. **To address these maldistribution problems, the task force recommended that the General Assembly appropriate additional funding to ORHCC to recruit practitioners and provide them with loan repayment or other financial incentives to encourage them to establish practice in underserved areas of the state. In addition, the task force recommended that North Carolina foundations fund regional, multi-county demonstrations to test new models of care to serve patients in rural and urban underserved areas.**

Primary Care and Specialty Shortages

Examining overall supply of physicians, PAs, NPs, and CNMs can mask shortages in particular specialty areas and overlook the importance of having an appropriate mix of practitioners. The task force was unable to examine every medical specialty. Instead, the task force focused on the supply

of primary care practitioners, practitioners who deliver babies, general surgeons, and psychiatrists. As Erin Fraher, director of the North Carolina Health Professions Data System, discusses in her commentary, North Carolina currently has an adequate supply of most practitioner types when compared to national or regional averages. However, practitioner types are not well distributed throughout the state, and North Carolina is likely to experience severe shortages among many of these practitioner types in the future.

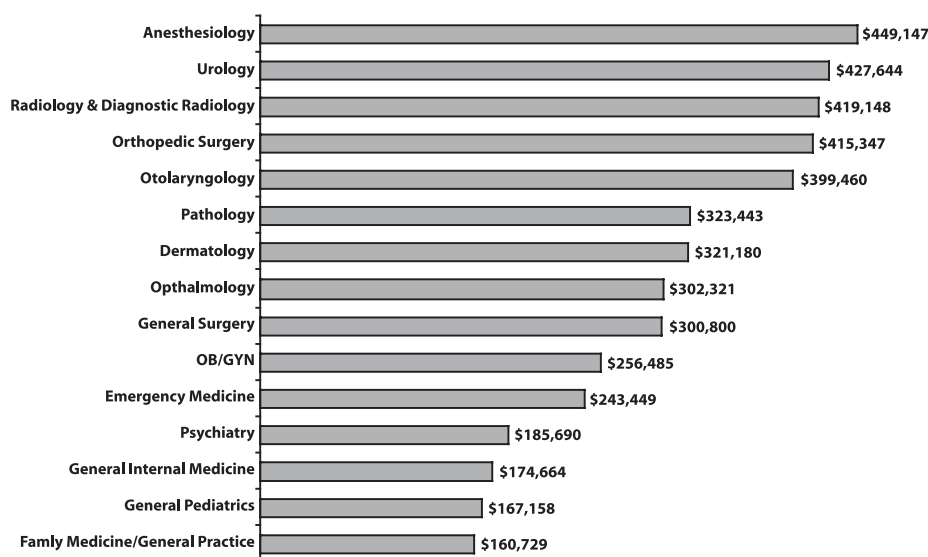
Primary care: Primary care practitioners (PCPs) serve as the entry point into the health care system for most patients.^e They provide preventive, primary, and acute medical services that can address most of a person's health care needs.¹⁴ Recent evidence suggests fewer practitioners, including allopathic trained physicians, PAs, and NPs, are going into primary care than in the past. For example, between 1997 and 2005, the number of medical student graduates choosing primary care residencies dropped 50%.¹⁵ Instead, students are moving into specialty areas. PAs and NPs also are less likely to practice primary care today than 4 years ago.¹⁶ As noted in the maldistribution section, primary care practitioners are not well distributed throughout the state.

One reason for declining interest in primary care is that primary care practitioners experience increased demands with lower overall reimbursement. The number of and need for recommended preventive and chronic care treatment services has increased to the point that it is impossible for physicians to provide all recommended care to their patient mix in a regular workday.¹⁵ Although the scope of care has increased, primary care practitioner reimbursement has decreased in inflation-adjusted dollars. Between 1995 and 2003, inflation-adjusted salaries decreased 7.1% for all physicians but 10.2% for primary care physicians.¹⁷ Primary care practitioners are paid less for their services than are specialists. Insurers generally pay more for procedures and less for cognitive and diagnostic skills, which make up a greater proportion of the clinical work of primary care practitioners. (See Chart 2.)

Primary care is very important for preventing disease, increasing quality of care, and reducing costs. Barbara Starfield and Leiyu Shi discuss the influence of primary care practitioner supply on community health. Evidence indicates that unnecessary hospitalization rates are higher in communities with limited access to primary care practitioners. Studies also show quality of care is higher and expenditures are lower in states with higher generalist-to-population ratios compared to those with higher specialist-to-population ratios.¹⁵ **To encourage more practitioners to become primary care practitioners, the task force recommended that public and private insurers enhance payments to primary care practitioners to recognize the value of their diagnostic and cognitive skills. Specifically, primary care practitioners should be provided financial incentives to create a primary care home where patients can obtain preventive health services, chronic disease**

e PCPs include PAs, NPs, CNMs, and doctors both of allopathic medicine (MD) and osteopathic medicine (DOs) who are family practitioners, general practitioners, internists, pediatricians, or obstetrician/gynecologists.

Chart 2.
Median Physician Salary by Specialty, 2006



Source: Cohen J. Presented at: North Carolina Institute of Medicine Primary Care and Specialty Summit, December 21, 2006; Raleigh, NC. Citing MGMA Physician Compensation and Production Survey 2001-2006

management, and case management.

Practitioners who deliver babies: Ensuring women have continuous and early prenatal care is critical to the well-being of the infant and mother. Women need access to physicians and other clinicians who are trained to deliver babies and who can address any complications that might arise during delivery. North Carolina appears to have an adequate number of practitioners who offer prenatal care and delivery statewide, but the statewide average masks significant practitioner shortages in certain parts of the state. Currently 13 counties in the state have no physicians reporting a practice location that provides prenatal care services. Eight of these counties have no practitioners (physician, PA, NP, or CNM) who report providing prenatal care on their licensure files. Community members in these counties have access to some prenatal care through their local health departments, but delivery services are not available in these counties. Even in counties with prenatal practitioners, there is wide variation in the ratio of practitioners to women of childbearing age.

There is even more of a maldistribution problem of physicians who deliver babies. In 2004, there were 19 counties without physicians who reported delivering babies; 12 of these counties had not had a physician deliver a baby in the prior 5 years. More than one half of all North Carolina counties had either a decline in the ratio of physicians delivering babies to women of childbearing years between 2000 and 2004 (40 counties) or no physicians providing deliveries in either 2000 and 2004 (12 counties). **To address the shortage of practitioners delivering babies in underserved areas, the task force recommended that the General Assembly appropriate funding to help subsidize the malpractice premiums for physicians and CNMs who provide delivery services in medically underserved areas of the state.**

General surgeons: North Carolina currently has more general

surgeons per 10 000 population (0.75) than the nation as a whole (0.60) or the south (0.64). However, trends indicate fewer medical graduates are choosing to practice in general surgery. For most entering surgeons, progressive specialization is narrowing their scope of practice. In addition, supply of general surgeons varies drastically across the state. In 2005, North Carolina had 22 counties with no surgeons while another 35 counties had below the state average of 0.62 general surgeons to 10 000 population. The majority of the counties with no surgeons or fewer than 0.62 surgeons per 10 000 population are found in the eastern and western parts of the state. As Larry Chewning and Jeff Spade

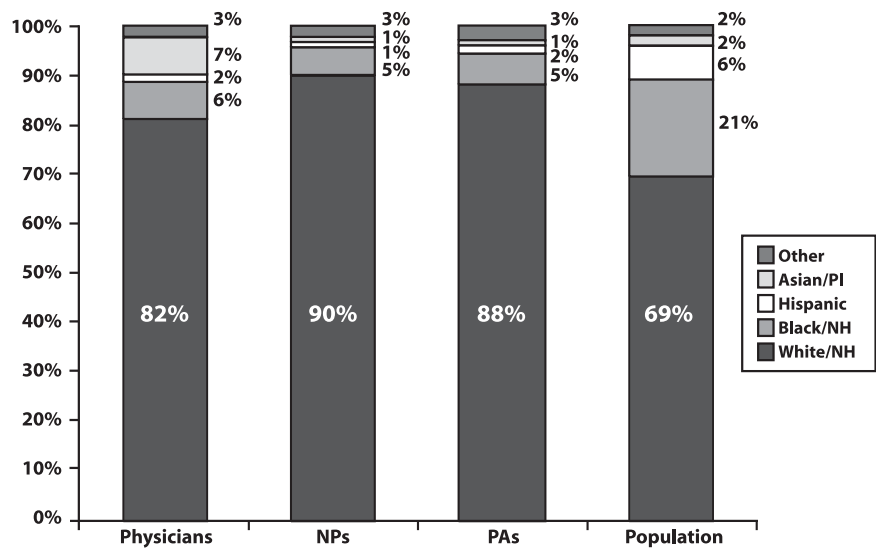
discuss in their commentary, general surgeons are critical to the viability of small rural hospitals. **The task force recommended that medical schools be incentivized to produce the type of physicians (eg, physicians who deliver babies, general surgeons) needed to meet the state's health care needs. In addition, special consideration should be given to funding a track in an existing residency program that focuses on training general surgeons for rural practice. The task force also recommended that some of the funding to the ORHCC be used to provide incentives to general surgeons who practice in underserved areas.**

Psychiatrists: Nationally, almost one third of nonelderly adults and a sizeable number of children experience a mental disorder in any given year.¹⁸ Many types of health professionals treat mental health disorders including, but not limited to, psychiatrists, psychologists, primary care practitioners, social workers, and clinical nurse specialists. While these practitioners are all trained to provide psychotherapy, some people need further consultations and treatment by psychiatrists or other physicians who can prescribe medication therapy. Aside from primary care practitioners, psychiatrists are among the lowest paid of physician specialties (Chart 2) which may discourage some physicians from choosing to specialize in this field.

As with other types of health care professionals, the statewide ratio of psychiatrists-to-population masks severe maldistribution problems. In 2004, there were 17 counties with no psychiatrists and another 27 counties with ratios low enough (0.33 or below) to be designated as mental health HPSAs.¹⁹ Psychiatrists are most densely located close to the state's 4 mental health hospitals, in counties with major medical centers, and in large metropolitan areas. In general, psychiatrists are less likely than all other physicians to locate in rural areas or in HPSAs.

North Carolina's mental health reform has also impacted the provision of care to mental health patients in the public sector. Mental health services in North Carolina are coordinated by local management entities (LMEs). Between 2003 and 2005, the number of LME psychiatrists per capita fell 16%. Per capita losses were higher in rural areas (20%) compared to urban areas (14%). Small-population LMEs experienced an even larger decrease (44%) in the number of psychiatrists per capita.²⁰ In the absence of psychiatrists, primary care practitioners often are faced with the responsibility of diagnosing and managing the care of people with mental illness. However, 7 of the 17 counties with no psychiatrists are also whole-county primary care HPSAs.

Chart 3.
Race of Population and Practitioners, North Carolina, 2004



Source: NC Health Professions Data System and US Census.

To address the shortage of psychiatrists, the task force recommended that the General Assembly and North Carolina Division of Mental Health, Developmental Disabilities and Substance Abuse Services provide funding to establish new models of care to serve public patients in rural and underserved areas. In addition, public and private insurers should reimburse psychiatrists to consult with primary care practitioners and other clinicians through face-to-face consultations or telemedicine. John Frank, Director of the Kate B. Reynolds Charitable Trust, discusses one such model, ICare, in the Philanthropy Profile of this journal issue.

Underrepresentation of Minorities in Health Professions

Minority populations comprise 30% of North Carolina's population, but they account for only 15% of physicians, 12% of PAs, and 10% of NPs in the state.²¹ African Americans, American Indians, and Hispanics are particularly underrepresented in health professions. (See Chart 3.)

When given the option, people are more likely to choose a practitioner that has a similar racial and ethnic background.²² Concordance of practitioner and patient race or ethnicity might be particularly important for members of minority populations who, because of real and perceived past discriminatory treatment, have lower levels of trust in practitioners of other racial groups.²³

Underrepresented minority practitioners also are more likely to practice in underserved areas than are white practitioners.⁶

Similarly, health care practitioners from underrepresented minority ethnic and racial groups are more likely to serve patients of their own ethnicity or race and patients with poor health.^{24,25,26} This practice is very important because African Americans, American Indians, and Hispanics are more likely to lack health insurance, suffer from certain chronic health conditions, and report access barriers to health care.²⁷

In order to increase the supply of underrepresented minorities in the professions, the task force recommended that North Carolina medical and health professional schools develop new strategies to increase the number of racial and ethnic minorities admitted and trained in North Carolina. For example, the state could expand minority scholarship programs or develop new or satellite health professional schools in historically minority public or private colleges or universities. Schools could modify their admission policies to facilitate the enrollment of minority applicants or hire faculty and chairs who are members of underrepresented minorities in order to reduce the professional isolation of minority health professional students. **The task force also recommended that the state evaluate existing minority health professional pipeline programs and tie future state funding to the programs that are most effective in increasing underrepresented minorities in the health professions.**

More bilingual and bicultural practitioners are needed to reduce language and cultural barriers to health care services. In North Carolina, there are approximately 150 000 Spanish-speaking residents who do not speak English well or

f Underrepresented minority practitioners are 3 times more likely than white practitioners to serve in whole-county PHPSAs (12% for minority practitioners compared to 4% for white practitioners) and are more likely to serve in part-county PHSPAs (42% for minorities and 34% for whites).

do not speak English at all.²⁸ Studies show people with limited English proficiency are more likely to report being in fair or poor health and are more likely to defer needed medical care, miss follow-up appointments, and experience drug complications.^{29,30} Bilingual and bicultural practitioners can help address language and cultural barriers for the growing Latino and immigrant populations. **The task force recommended that medical and health professional schools recruit and admit more bilingual and bicultural students into their programs and encourage others to take Spanish medical language courses as part of their training.**

Conclusion

Access to health care practitioners including physicians, PAs, NPs, and CNMs is very important to the health of individuals and populations. However, North Carolina is likely to face challenges meeting the population's demands for care over the next 25 years. Although the potential shortfall is considerable, the state has a number of policies that could be used to reduce this deficit. The state should identify options to improve the quality and productivity of existing practices so that health professionals can provide high-quality health services to more North Carolinians. The state should concurrently examine options to develop new models of care that would reduce the need for health care practitioners and/or expand the supply of physicians, PAs, NPs, and CNMs. North Carolina needs to engage in multiple strategies, simultaneously, to increase the balance of supply with needs. If new medical school slots are created without new residency slots, then in-state retention of the expanded number of medical school graduates will not be realized because many will need to leave the state for residency and are not likely to return. Similarly, initiatives to increase awareness of health careers among rural and minority middle and high school students will have little impact without also

expanding available enrichment programs to help students overcome the hurdles to being accepted into medical school. North Carolina also should explore ways to recruit physicians and other practitioners into North Carolina and to encourage existing practitioners to remain in practice in North Carolina. In short, many of the policy options are interdependent. Success requires adoption of many complementary strategies.

North Carolina need not implement all the practitioner supply strategies in order to maintain the current practitioner-to-population ratio. For example, the state does not need to increase the number of physicians, PAs, NPs, and CNMs each by 30% in order to maintain current ratios. To some extent, these recommendations are alternate strategies that depend, in part, on when the strategies are implemented. If implemented *today*, the state could maintain its current ratio over the next 25 years by:

1. Increasing yearly educational production of physicians by 20%, *or*
2. Increasing production of PAs, NPs, and CNMs by over 30%, *or*
3. Increasing in-migration to produce a net increase of physicians by 15%, *or*
4. Increasing capacity of the health system to manage effectively the health of more North Carolinians or improve the health of North Carolinians to reduce the need for health services by 15%.

The time to act is now. The longer the state waits to implement the recommended strategies, the greater the number of practitioners it will need to produce on a yearly basis to address anticipated practitioner shortages. The state must take the necessary steps to ensure we have the right mix of practitioners in the right locations to meet current as well as future health care needs. **NCMJ**

REFERENCES

- 1 North Carolina State Demographics. NC Population by Age 2000-2009. April 1, 2030 County Total Age Groups-Standard. North Carolina Office of State Budget and Management. <http://demog.state.nc.us/>. Accessed April 26, 2007.
- 2 National Center for Health Statistics. *National Ambulatory Medical Care Survey (NAMCS)*. Number, percent distribution, and annual rate of office visits with corresponding standard errors, by patient characteristics: United States, 2004. Hyattsville, MD: National Center for Health Statistics. Advance Data No. 374; Table 3. <http://www.cdc.gov/nchs/data/ad/ad374.pdf>. Accessed August 24, 2006. National Center for Health Statistics. *National Ambulatory Medical Care Survey (NAMCS)*. Number, percent distribution, and annual rate of office visits by patient's age, sex, race and geographic region: United States. Hyattsville, MD: National Center for Health Statistics. Advance Data No. 213; Table 1. <http://www.cdc.gov/nchs/data/ad/ad213.pdf>. Accessed September 15, 2006.
- 3 Thorpe KE, Florence CS, Howard DH, Joski P. The rising prevalence of treated disease: effects on private health insurance spending. *Health Aff*. Web Exclusive 2005;W5:317-325.
- 4 Cochrane AL, St Leger AS, Moore F. Health service "input" and mortality "output" in developed countries. *J of Epidemiol and Community Health*. September 1978;32(3):300-305.
- 5 Millman M, ed. *Access to Health Care in America*. Institute of Medicine. Washington, DC: National Academy Press; 1993.
- 6 Larson EH, Hart LG, Ballweg R. National estimates of physician assistant productivity. *J Allied Health*. Fall 2001;30(3):146-152.
- 7 Michener JL. US plans to increase the medical workforce. Presented at: North Carolina Institute of Medicine Primary Care and Specialty Supply Task Force Meeting; February 13, 2006; Cary, NC.
- 8 Association of American Medical Colleges. *AAMC Statement on the Physician Workforce*. Washington, DC: Association of American Medical Colleges; June 2006. <http://www.aamc.org/workforce/workforceposition.pdf>. Accessed July 10, 2006.

- 9 Health Professional Data System. Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill. Data from the NC Medical Board. July 2006.
- 10 North Carolina Health Professions 2004 Data Book. NC Health Professions Data System. Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. http://www.shepscenter.unc.edu/hp/2004_HPDS_DataBook.pdf. Accessed June 12, 2006.
- 11 Shortage Designation. Bureau of Health Professions, Health Resources and Services Administration, US Department of Health and Human Services. <http://bhpr.hrsa.gov/shortage/>. Accessed June 12, 2006.
- 12 Data Sources: Area Resource Files, Claritas, US Office of Management and Budget.
- 13 Madison DL. The work of James D. Bernstein of North Carolina. *NC Med J*. Jan/Feb 2006;67(1):27-42.
- 14 Estes EH. Primary care: building a model for the new medical environment. *NC Med J*. July/Aug 2002;63(4):189-194.
- 15 Bodenheimer T. Primary care-will it survive? *N Engl J Med*. August 31, 2006;355(9):861-864.
- 16 NC Health Professions Data System. *New to File and New to Practicing*. Cecil G. Sheps Center for Health Services Research. Chapel Hill, NC: University of North Carolina at Chapel Hill; September 2006.
- 17 Tu H, Ginsburg PB. *Losing Ground: Physician Income: 1995-2003*. Tracking Report. No. 15. Washington, DC: Center for Studying Health System Change; June 2006. <http://www.hschange.org/CONTENT/851/851.pdf>. Accessed September 23, 2006.
- 18 Kessler R, et al. Prevalence and treatment of mental disorders. *N Engl J Med*. June 16, 2005;352:2515-2523.
- 19 Bureau of Health Professions, Health Resources and Services Administration. <http://bhpr.hrsa.gov/shortage/hpsaguidement.htm>. Accessed September 30, 2006.
- 20 *Discarding Community Psychiatrists: The Third Report Card by the North Carolina Psychiatric Association*. Raleigh, NC: North Carolina Psychiatric Association; April 18, 2006. <http://ncpsychiatry.org/NCPA%20Report%20Card%20III.pdf>. Accessed October 5, 2006.
- 21 North Carolina Health Professions Data System and US Census.
- 22 LaViest TA, Nuru-Jeter A. Is doctor-patient race concordance associated with greater satisfaction with care? *J Health Soc Behav*. 2002;43(3):296-306.
- 23 Cooper LA, Roter DL, Johnson RL, Ford DE, Steinwachs DM, Powe NR. Patient-centered communication, ratings of care, and concordance of patient and physician race. *Ann Intern Med*. 2003;139:907-915.
- 24 Moy E, Bartman BA. Physician race and care of minority and medically indigent patients. *JAMA*. 1995;273:1515-1520.
- 25 Komaromy M, Grumbach K, Drake M, Vranizan K, Lurie N, Keane D, Bindman AB. The role of black and Hispanic physicians in providing health care for underserved populations. *N Engl J Med*. 1996;334(20):1305-1310.
- 26 Cooper LA, Powe NR. Disparities in patient experiences, health care processes, and outcomes: the role of patient-practitioner racial, ethnic, and language concordance. New York, NY: The Commonwealth Fund; July 2004. http://www.cmf.org/publications/publications_show.htm?doc_id=231670. Accessed November 7, 2006.
- 27 Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention. <http://apps.nccd.cdc.gov/brfss/>. Accessed July 19, 2006.
- 28 Bureau of the Census. 2000 Summary File 3. P19. Age by Language spoken at Home by Ability to Speak English for the Population 5 Years and Over. http://factfinder.census.gov/home/saff/main.html?_lang=en. Accessed July 19, 2006.
- 29 Ku L, Flores G. Pay now or pay later: providing interpreter services in health care. *Health Aff*. 2005;24(2):435.
- 30 Brach C, Fraser I, Paez K. Crossing the language chasm. *Health Aff*. 2005;24(2):424.

Reinventing the Wheel, Yet Again!

E. Harvey Estes Jr., MD

In 1966, I became the chair of a new department at Duke University created to address the growing shortage of primary care physicians in North Carolina and the nation. Computers, physician assistants, and new models of care were among the “solutions” that emerged from this effort. In 1978, I chaired a major task force of the Institute of Medicine of the National Academies to “formulate a cohesive health manpower policy for assuring the accessibility and appropriateness of primary health delivery.” Reduction in payment disparities between primary care physicians and other physicians and payment to physicians for health education and preventive services were among the recommendations. Preferential selection of medical students likely to go into primary care, clinical experience in primary care settings, and training of all medical students in a team approach were some of the other recommendations.

Forty years later, we are facing the same problems of insufficient numbers of primary care physicians and maldistribution of practitioners, plus an added shortage of other essential medical specialists and a projected shortage of all medical practitioners. As can be seen in the North Carolina Institute of Medicine Primary Care and Specialty Supply Task Force report, we are proposing many of the same solutions. Why have we not solved these problems? Why were many of these recommendations not implemented?

The health care system is a ponderous, complex, and expensive system with many parts and no single controlling authority. Each of the component parts has decades of experience and investment in the *status quo* and resists change. The system clearly responds to new infusions of money, but there has been little investment in ordinary medical care and the infrastructure for its delivery. At the same time, there has been a huge investment in science and technology. Each advance brings forth a call for even more investment and

the promise of even more spectacular new advances, but at an ever increasing cost. New specialized treatment centers and new “dreaded disease” research centers have more appeal to citizens at large and to legislatures than new investments in primary care or other shortage specialties.

The disparity in available health care between larger cities and small communities and rural areas seems greater now than 40 years ago, in spite of a modest increase in per capita supply of physicians. At that time, generalist physicians and doctors delivering babies were available in most small communities, and small hospitals were still viable. In the interval, general internists and pediatricians have joined general practitioners and family doctors on the endangered list, and small hospitals are disappearing at an increasing rate. Large hospitals and technical specialties appear to thrive, but the expense of possessing and maintaining the latest technology and keeping up with similar

“New specialized treatment centers and new “dreaded disease” research centers have more appeal to citizens at large and to legislatures than new investments in primary care or other shortage specialties.”

enterprises is taxing their financial capacity.

No logical person would argue that every North Carolina town should have the same medical facilities and personnel as the major medical centers. But the fact is that even in our most privileged communities, well-insured citizens now have difficulty obtaining the personal medical advice and care that was generally available 40 years ago. This disparity is compounded when the community is hours away from a medical center, is economically

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distressed as a result of recent plant closings, and has no major shopping centers or desirable social amenities.

The recommendations in the NC IOM report are aimed at increasing the overall number of medical practitioners, but they are principally directed at those areas and communities that are at the bottom of the pile in practitioner supply. They call for both increased production and measures to move practitioners into shortage areas and to increase the number of minority practitioners. Many of the recommendations are remarkably similar to those made decades ago. Why should we think that these recommendations will work now, when they have not solved the problem in the past?

Perhaps the fact that the problems are worse will convince decision makers in the health care system to work harder at solutions and to make the needed changes. More and more ordinary citizens and recipients of health care are unhappy with our system. Business and industry leaders are increasingly alarmed with the cost of health care and the fact that we are not achieving the level of benefit seen in other countries with less expensive systems. The lack of care available in some areas of our state, combined with the financial distress of poor counties that must pay their share of Medicaid costs, leads to calls for adjustments in the distribution of state tax dollars.

The unpleasant predictions of this new task force may not seem very alarming to most people or to most health professionals. A shortage of medical practitioners in 2030 may seem to be a distant and even unlikely possibility, in spite of the sound analyses upon which this prediction is based. To some, asking the legislature, philanthropic organizations, and the public to support this set of recommendations will seem foolish, especially to those who fear bigger government roles, higher taxes, and intrusions into personal and professional lives. Why should legislators risk their political future by directing new money to increase the supply of medical practitioners several decades in the future? Why should leaders of academic medical centers retool to recruit a new type of student, change curricula, increase enrollment, and take other measures when this course can be predicted to divert resources and attention from the current highly rewarding path of research and the development of technical superiority in highly specific diagnostic and treatment methods?

The first task is to convince citizens of the state that the predictions contained in the report are valid and that change is needed. Most will turn to physicians, other health care leaders, and government experts for confirmation. This report is the first step in this process. It must receive wide attention, and the serious consequences of inaction must be recognized. Community leaders must have access to the details and understand that our state must compete with our neighbor states and other parts of the country, which face the same problems and have not previously worked as hard as North Carolina to recruit new practitioners. We must accept that change is necessary and be willing to work unselfishly to achieve it.

Even with widespread acceptance of the impending shortage of practitioners, can we be assured that the needed changes will occur? The leaders of our current academic health centers must play a huge role in achieving the objectives outlined in the report.

They face a daunting task. How can they recruit more students from minorities and from small North Carolina communities (those most likely to settle in small towns) without curtailing those activities in their current mix that produce a large part of the financial rewards supporting their work? How can they convince their current faculty, largely engaged in research and cutting edge practice, that these new students have equally important life goals which must be nurtured and respected? How can they be convinced that training family doctors for rural towns is equal in importance to training potential Nobel prize winners and achieving a higher score in the *US News and World Report* annual ranking? Financial incentives and added attention to their role in achieving these new goals must be among their rewards.

One of the most important ways to improve the supply of needed specialists is to reduce the current payment disparities between specialties. It is no coincidence that the specialty groups in short supply are those in the bottom tier of professional incomes. An anesthesiologist earns 2 or 3 times as much as a family physician, yet has a more predictable schedule and personal life. It is not hard to see why career choices are made as they are today. This could be corrected by increasing reimbursement for low paying specialties, by reducing the pay of higher paying specialties, or by a mixture of both. Payment of physician services is largely determined at a federal level through the Medicare payment scale but North Carolina legislators and administrators have an important role through their influence in the NC Medicaid Program and the State Employees Health Plan.

These and other key objectives can only be achieved with the approval and support of the North Carolina General Assembly. It has an absolutely critical role in assuring that we have the practitioners we need in 2020 and 2030. This group must work in a bipartisan fashion and show great political courage because adopting these recommendations will face opposition from powerful groups including some that will receive less as a result of reallocations of funds. The NC General Assembly must recognize that good medical care is a necessary component in the restoration of prosperity in areas of the state that have been hardest hit by the decline of tobacco as a crop and the relocation of manufacturing to other countries. Legislators must see that the greatest potential for economic recovery lies in achieving productive employment for the young people in these communities. They must see that there is no better solution to this problem than the creation of higher level health careers and investing these careers in health care in their own home towns.

Other groups critical to implementing the recommendations of the current report are the professional groups representing health care providers such as physicians, nurses, and hospitals. They too must recognize that investments to enhance the prosperity of low-wealth counties eventually enhance the prosperity of the state as a whole. Some who have prospered from previous investments may see this as a setback for their own prosperity, but, in the longer time frame, these groups will also benefit from the more equitable distribution of both health and prosperity in the entire state.

It is also important to recognize that the recommendations in the NC IOM report involve more than the health care sector. Our educators and educational institutions are heavily involved. Identification of young people who have the intellectual and personal skills to become caregivers, guiding them into careers without limitations as to level, and equipping them to assume professional roles in needed areas of our state, is a major objective of this report. This investment has profound implications for our state which state leaders must recognize and support.

It is my sincere hope that the North Carolina Institute of Medicine Primary Care and Specialty Supply Task Force report will produce a more profound and long-lasting effect than those activities cited at the beginning of this article. I see it as blazing a trail for a more prosperous and optimistic North Carolina, with more equitable opportunities for young people, with more equitable health care, and an even better state in which to live. I also hope that those who must clear the trail and make it a well established roadway to progress will share this vision. **NCMJ**



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New Models of Care: Building Medical Homes in Empowered Communities

J. Lloyd Michener, MD

Quality health care has long been viewed as a relationship between a competent and compassionate physician and a patient who seeks advice and guidance.¹ Unfortunately, for a growing number of North Carolinians such relationships are increasingly hard to find, and the health outcomes, even in the best of circumstances, are often less than ideal.²

There is no question that having an adequate number of physicians is essential to ensuring health, but it is also increasingly clear that doctors alone are not sufficient. This is not because individual physicians have become less important, but rather because there is not enough time for individual physicians to provide everything a patient needs; the challenges our patients face today require new models of care that build on the work of physicians and extend out to involve entire communities.

The growing rates of chronic disease, rising numbers of uninsured, unrelenting racial disparities, and soaring obesity rates are problems for which physicians have essential roles but which require multidisciplinary teams across multiple locations to provide the continuum of needed services. From the public health department dietitian or agricultural extension agent encouraging healthy eating and exercise habits to the church members who are providing health ministries about chronic illness, every part of the community has a role to play.

The traditional focus on individual patients in the office and hospital, which is necessary to deal with acute care needs, has often obscured the need for physicians to collaborate and partner with community groups

who can help institute the larger changes needed to confront the growth of chronic disease. This new model seeks such collaboration and resolves the growing time demands on practicing physicians by sharing tasks—in particular, those dealing with prevention and education—with members of the office team and other groups within the local community. In doing so, this model extends the efforts of each physician.

The Time Trap

Primary care physicians today face a scarcity of time due to our exceptional fortune in finding effective therapies to prevent or treat illness in primary care settings. As the number of prevention and treatment guidelines has increased, so has the burden of following those guidelines. In our own research at Duke University, we found that it takes an average of 7.4 hours a day

for a physician to deliver recommended prevention messages and services to an average panel of patients. To deliver all recommended care for patients with chronic conditions takes an additional 10.6 hours a day.³

A vicious cycle ensues. There is not enough time for individual doctors to properly encourage prevention and, too often, this lack of prevention leads to the onset of chronic conditions. A lack of good chronic disease management leads to

increased acute care visits that are more painful for the patient, difficult for the physician, and costly to the system. The increased level of acute care cases (and the higher reimbursement rates for

“...the challenges our patients face today require new models of care that build on the work of physicians and extend out to involve entire communities.”

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procedures associated with them) encourages physicians to choose specialties other than primary care.

The number of medical students attracted to primary care has been steadily declining in recent years in part because of the inflexible demands on their time. Students, as well as currently practicing doctors, care about having time for their personal lives. Among physicians under the age of 50, time for family is cited as very important by 69%—more than any other factor. Of physicians under 50, 80% would reduce their hours if they could.⁴

This cycle seemingly indicates that primary care is a Sisyphean effort—only doomed to failure. The time needed is impossible for one physician who holds her or himself accountable for delivering all needed care. However, it is quite possible for an interdisciplinary team of physicians, nurse practitioners, physician assistants, nurses, health educators, social workers, and other professionals assisted by technology who work with each other and in tandem with their community.

Interdisciplinary Teamwork

Primary care has been traditionally centered on the role of the physician with subordinate roles for all other members of the health care team—including the patient. But as the demands and expectations on practices grow, the role of the physician needs to shift. With medical practice increasingly faced with the challenges of managing chronic disease, the role of the nurse practitioner, physician assistant, nurse, health educator, social worker, psychologist, and dietitian become more important. And with so many of the underlying cases of chronic disease rooted in personal behaviors, the role of community health and nonhealth agencies in supporting long-term behavior change becomes as important as the work done in the office.

The idea of interdisciplinary teams is not new. Literature abounds with examples of successful interdisciplinary teamwork in all fields of medicine. In primary care practices across the nation, private and group practice physicians have invested in training their office staff, physician assistants, nurse practitioners, and nurses in office systems that rely on technology to seamlessly capture patient information, ease scheduling and billing, consistently provide patient education, and ensure follow-up.^{5,6,7,8} Physicians based solely in the hospital managing inpatient care are also helping to streamline care and free up doctors in outpatient settings. What is different in all of these new models is the shift from the physician being the center of the team, coordinating all of the care, to the patient being at the center of the team with the physician playing a key leadership role.

Here at Duke, we are working to change our primary care offices systemwide. By shifting staffing, we are able to better support our many patients with chronic illness. We are adding dietitians, social workers, physician assistants, and nurse practitioners to enhance the services of our clinics and make appointments and care more available. Developing new electronic medical records helps our clinics coordinate information across offices and hospitals.

The transition from physicians operating as independent practitioners to their participation in and sharing of tasks and

responsibilities within interdisciplinary teams is a significant challenge by itself. But teamwork alone is not the answer to improving primary care if it means that care begins only after patients choose to come to us for help. Teamwork must be accompanied by delivery systems that are accessible to those we seek to serve. Although the science of prevention and chronic disease management has grown stronger, racial and ethnic minorities and the poor have not benefited from these advancements as much as other groups. For example, minorities and those with lower incomes are more likely to be at risk for cancers and chronic diseases and less likely to be screened or treated effectively. Waiting for people to be seen in the medical office is not sufficient. For too many, the office is too far, too threatening, or too expensive.

Empowered Communities

We also need to be effective not only in forming teams downstream with specialists, hospitalists, and others involved in the care of our patients but also upstream with organizations and leaders in our communities that have the capabilities to support the difficult lifestyle changes that our patients increasingly need.

Careful coordination of resources at all levels on the continuum—upstream and downstream—is the keystone to the overall health of a community. Data from the United Health Foundation, which ranks health status in each state, find that offering and rendering more services does not always equate to better overall health care and, in fact, in some states greater use of services goes hand-in-hand with poorer quality and lower satisfaction.⁸

Instead, we need to think creatively about how and where to deliver health care services and information in a way that centers on the patient. For example, care does not always need to be provided in the doctor's office. Community-based teams of health educators and social workers can ably assist patients in caring for their illnesses, as has been demonstrated in communities across the state by Community Care of North Carolina.^{9,10} Senior center-based physician assistants using laptops with electronic medical records and backed up by physicians, can dramatically improve outcomes for senior citizens—and decrease inpatient admissions as well—even when these patients already have primary care physicians.¹¹

The effectiveness of the office encounter is greatly enhanced when it works in tandem with communities. At Duke, we are working with neighborhoods across the state to find ways to reduce the risk of chronic disease from obesity and inactivity, building on the strengths and resources of not only doctors but also schools, health departments, and community agencies. Through the Just for Us program, in-home chronic disease management visits are provided to over 350 Durham seniors living in 10 low-income apartment complexes.¹² The LATCH program connects thousands of Latino immigrants in Durham to health care services and culturally and linguistically appropriate health education classes. We operate 4 school-based clinics and 2 neighborhood clinics offering easier access to services for hard-to-reach populations. Community health isn't just a

concept. It's a reality that improves the health of thousands of North Carolina residents every day.

These innovations are not ideas that can be instantaneously dropped into place. A rural county with rampant poverty and a dearth of providers or a wealthier suburban area with higher rates of insurance but care that isn't integrated will require different solutions.¹³ Diverse communities require diverse solutions, but the common thread to each is teamwork and new roles for all the members of the primary care team including the physician.

Preparing physicians for both teamwork and a focus on community-centered care requires new approaches at every level of education. In undergraduate and graduate medical education, students must be afforded opportunities to practice teamwork so they can appreciate the overlapping and complementary skills of different disciplines. And those who teach them must model that teamwork and interdisciplinary collaboration.

Communicating across disciplines is also a challenge and educators in programs for nurses, physicians, social workers, dietitians, physical therapists, nurse practitioners and physician assistants need to standardize how teamwork is conceptualized and taught. In real-world situations, this highly coordinated communication and collaboration among teams is facilitated by technology. Educational programs need to address teamwork and define explicit goals, methods, and outcomes so that graduates are competent to practice in this new environment.

As has been widely reported, Duke is restructuring our Family Medicine Residency program to better prepare family physicians for teamwork both upstream with the community, downstream with hospitalists and specialists, and horizontally within the office. Part of our effort to restructure the program is a shift in emphasis from the inpatient setting to the community. Hospitalization rates for primary care have dropped by almost 72% over the past decades¹⁴ so it no longer makes sense to focus family medicine residencies in hospital settings. Instead, we should be training residents in the settings where needs are greatest and there is more opportunity to practice prevention and early intervention. In addition to moving where we train residents, we are changing how we train residents. We want to find ways to better instill teamwork with physician assistants, nurse practitioners, physical therapists, and other health professionals.

Put all of these pieces together and the result is a very different form of medical practice. It begins by asking the community what services it needs, provides an analysis of the areas for potential improvement in health status (and in North Carolina there are plenty of opportunities) and then seeks to provide

those services in ways acceptable to those being served. The practice does not wait for a patient to come to the office with a problem; the practice is engaged with community groups, employers, schools, and health departments to identify ways in which it can help support needed services without duplicating them. It uses health educators to supplement the individual instruction in the office and to empower and educate patients to take control of their health and take on primary leadership roles in their care. It uses physician assistants and nurse practitioners in the community and in the office to provide care in settings and frequencies beyond what the most dedicated physician can provide.

To many old timers and small town physicians, this may not seem radical or even new. Those who trained in community-oriented primary care, and/or public health, or who have already evolved this community-integrated form of practice, are familiar with these concepts. But to mitigate, and eventually reverse, the decline of primary care, what once was an interest of a few now needs to become a core skill of all.

An obvious critique of all these ideas is, "How do you pay for it?" The financial challenges to primary care are well documented.^{15,16} The reimbursement system is currently not equipped to encourage or sustain these types of innovations and to build the case for change requires evidence of success. So should we wait or should we try? Funding for innovation is difficult but not impossible. At Duke, we have used a mixture of grants, contracts, public and private insurance funding, and our own funds to create sustainable, community-oriented programs.¹⁷ It has not been easy, but it is possible. It is the obligation of physicians, and especially academic physicians, to help find ways to improve the health of our citizens.

What if we succeed in redesigning care? Imagine that interest in primary care is rekindled by medical students who know they do not have to do it all, who are equipped with the knowledge, skills, and attitudes to not only be excellent clinicians but also excellent leaders, and who can effectively harness the power and spirit of teamwork to improve the health of their communities. Imagine empowered, informed populations that become leaders in managing their own health, instigating a culture of accountability, and improving access to and quality of care in their communities. Imagine that the racial and economic gaps in health care delivery narrow and evaporate, that the incidence of chronic disease is lowered, and that those who do live with chronic disease find their challenges eased. If we succeed in this effort to build and test new models that allow adequate time for prevention and disease management, we just might find a North Carolina with healthier people and happier and more productive doctors. **NCMJ**

REFERENCES

- 1 Stoever J. ACP calls for medical home for patients, Medicare reform: AAFP president comments on proposals. American Academy of Family Physicians News & Publications. <http://www.aafp.org/online/en/home/publications/news/news-now/professional-issues/medicalhomeacp.htm>. Accessed March 22, 2007.
- 2 McGlynn EA. The quality of health care delivered to adults in the United States. *N Engl J Med*. 2003;348(26):2635-2645.
- 3 Yarnall KSH, Pollack KI, Ostbye T, Krause KM, Michener JL. Primary care: Is there enough time for prevention? *Am J Public Health*. 2003;93(4):635-641.
- 4 Grover A. Physician Workforce Issues for Family Medicine. Presented at Center for Workforce Studies; February 23, 2007.
- 5 Bodenheimer T. Primary care—will it survive? *N Engl J Med*. 2006;355(9):861-864.
- 6 Grumbach K, Bodenheimer T. Can health care teams improve primary care practice? *JAMA*. 2004;291(10):1246-1251.
- 7 Cohen DJ, Tallia AF, Crabtree BF, Young DM. Implementing health behavior change in primary care: lessons from prescription for health. *Ann Fam Med*. 2005 Jul-Aug; 3 Suppl_2:S12-19.
- 8 Woolf SH, Glasgow RE, Krist A, et al. Putting it together: finding success in behavior change through integration of services. *Ann Fam Med*. 2005 Jul-Aug; 3 Suppl_2:S20-27.
- 9 Wagner EH. Effective teamwork and quality of care. *Med Care*. 2004;42(11):1037-1039.
- 10 America's Health Rankings: A Call to Action for People & Their Communities. United Health Foundation. <http://www.unitedhealthfoundation.org/ahr2006/index.html>. Accessed April 10, 2007.
- 11 Willson CE. Community Care of North Carolina: saving state money and improving patient care. *NC Med J*. 2005;66(3):229-233.
- 12 Newton WP, DuBard CA, Wroth TH. New developments in primary care practice. *NC Med J*. 2005;66(3):194-204
- 13 Sauer ML, Frank JH, Michener JL, Yaggy SD, Ostbye T. The Kate B. Reynolds smoking education lifestyle fitness improvement program: Preventing and reducing chronic disease in low-income North Carolina communities. *NC Med J*. 2006;67(4):317-323.
- 14 Yaggy SD, Michener JL, Yaggy D, et al. Just for Us: An academic medical center-community partnership to maintain the health of a frail low-income senior population. *Gerontologist*. 2006;46(2):271-276.
- 15 Rosenthal TC, Campbell-Heider N. The rural health care team. In: Geyman JP, Norris TE, Hart LG, eds. *Textbook of Rural Medicine*. New York, NY: McGraw-Hill; 2001:41-55.
- 16 Stafford RS, Saigam D, Causino N, et al. Trends in adult visits to primary care physicians in the United States. *Arch Fam Med*. 1999;8(1):26-32.
- 17 Harris ED. Endangered Species. *The Pharos of Alpha Omega Alpha-Honor Medical Society*. Winter 2007. <http://www.alphaomegaalpha.org/PDFs/Pharos/Articles/2007Winter/editorial.pdf>. Accessed April 25, 2007.
- 18 The Impending Collapse of Primary Care Medicine and Its Implications for the State of the Nation's Health Care. The American College of Physicians. January 30, 2006. http://www.acponline.org/hpp/statehc06_1.pdf. Accessed March 29, 2007.
- 19 Michener JL, Champagne MT, Yaggy D, Yaggy SD, Krause K. Making a home in the community for the academic medical center. *Academic Medicine*. 2005;80(1):57-61.

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Medical Practitioner Supply from a National Perspective

Thomas C. Ricketts III, PhD, MPH

Medical practitioners are the central asset of our health care system. As a society we have committed substantial resources to preparing skilled and effective professionals. We use public tax revenues and funds collected under the Medicare program to support their training. Our state and federal laws give them special privileges and freedoms to treat injuries and cure disease. For these reasons, the question of whether there are enough practitioners to meet the health care needs of our population is a public issue.

Medical care in the United States through much of the twentieth century had been the exclusive preserve of physicians. In 1950, the professional medical care supply for the nation could be described almost exclusively by the total number of allopathic physicians in active practice. There were alternative groups of practitioners but their numbers were small and they were not fully recognized as “doctors” in many states. At that time, most physicians were generalists practicing in small communities and larger cities and many rural parts of the country had no doctor. By 1960, the nation began to recognize there was a doctor shortage and that it was primarily affecting the generalists. By the late 1960s and into the 1970s, Congress took note and began to support the medical education of primary care practitioners and to encourage them to practice in less well served communities.

Some of the programs developed included the National Health Service Corps (NHSC), which placed doctors in health professional shortage areas; Area Health Education Centers (AHEC), which trained doctors in rural settings; and a series of programs that came to be known under the generic term Title VII, which encouraged minorities to consider medical careers and promoted the development of family medicine and primary care training programs. In the 1980s, federal programs were introduced to support rural practice and training.

Over the same time, states also recognized their role in expanding the supply of physicians and began the process of expanding the medical franchise to other professions. In the 1960s and 1970s, new medical schools were opened to train predominantly primary care physicians with an emphasis on rural practice. East Carolina University, East Tennessee State University, The University of South Carolina, and Eastern Virginia Medical School were all of this generation of new, primary care-oriented medical schools. The profession of physician assistants (PAs) was developed at Duke University and the University of Washington, and programs to train nurse practitioners (NPs) were opened. North Carolina graduated the

“...we are faced with the question of whether we have the right number and the right kinds of health care practitioners in the right places to meet our current health care requirements.”

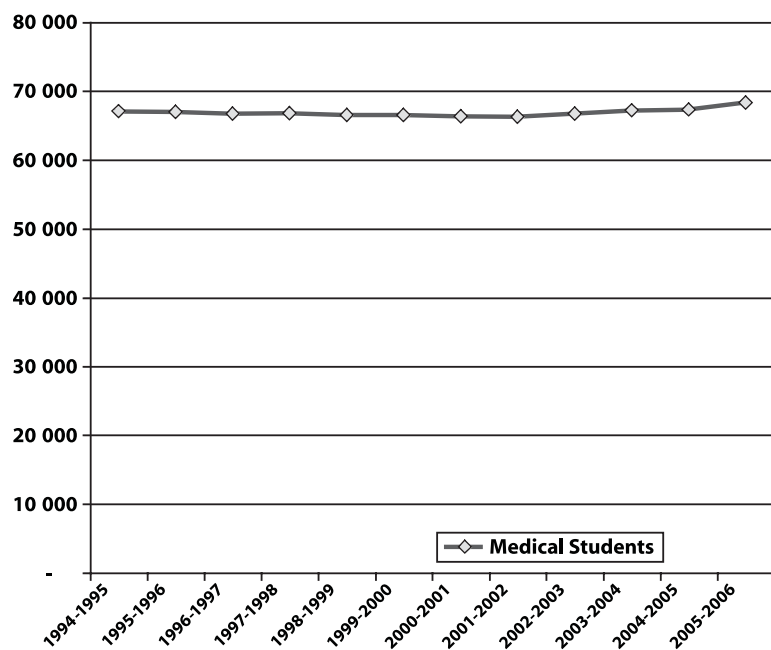
first NPs who were soon working in the state’s new rural health clinics (RHC), which were developed by the nation’s first Office of Rural Health.^a

These national and state efforts should have alleviated the problems of physician supply and distribution, but they have not. In 2007, we are still talking about an impending shortage of doctors, as well as nurses, and a need to reorganize the structure and financing of medical care to achieve an effective health care delivery system focused on the patient with primary care, or as

a See the January/February 2006 issue of the *North Carolina Medical Journal* for detailed descriptions of the rural programs.

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Figure 1.
Total Enrollment in US Medical Schools, 1994-2006

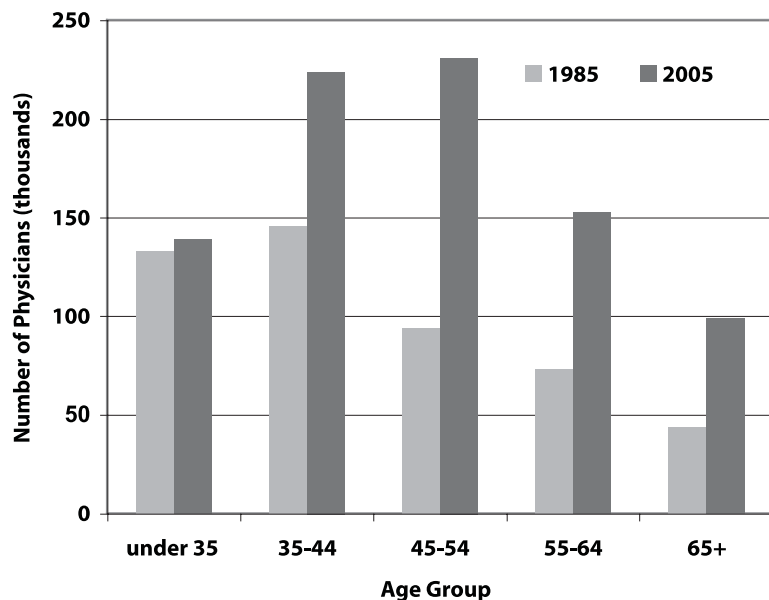


Source: Barzansky B, Etzel SI. Medical schools in the United States, 2005-2006. *JAMA*. 2006;296(9):1147-1152.

we now term it, the medical home, at the center of the system. One primary reason for this situation is the countervailing influence of the largest input into physician training—graduate

United States while the population has grown and become proportionately older. We have expanded the number of new primary care clinicians we train—nurse practitioner and

Figure 2.
Age Structure of US Physician Supply



Source: Association of American Medical Colleges. Center for Workforce Studies. Help wanted: More U.S. doctors. Washington, DC: AAMC; 2006. <http://www.aamc.org/workforce/helpwanted.pdf>. Accessed April 23, 2007.

medical education payments. Graduate medical education payments go to teaching hospitals through the Medicare and, to a lesser extent, Medicaid programs. They are combined with the physician component of the reimbursement structure of Medicare itself and tend to favor specialty medicine practiced in large cities.

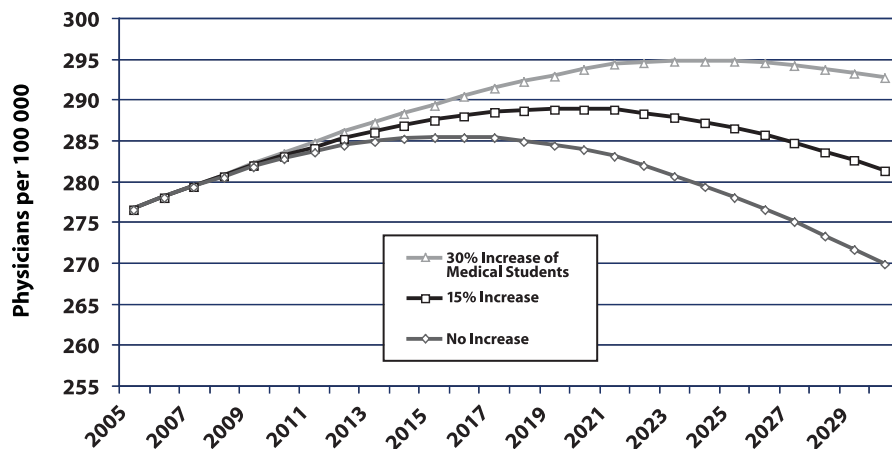
The past 30 years have seen a diffusion of authority and privilege to other practitioners. Thus, we need to look beyond physicians to understand how many and what kinds of human resources are available to meet our health care demands and needs. Nurse practitioners, physician assistants, and certified nurse midwives have become important contributors to the equation that balances supply of practitioners to needs and demands for health care.

In this first decade of the 21st century, we are faced with the question of whether we have the right number and the right kinds of health care practitioners in the right places to meet our current health care requirements. This is due to a growing recognition that we have not invested in expanding the ways and means to prepare physicians in the

United States while the population has grown and become proportionately older. We have expanded the number of new primary care clinicians we train—nurse practitioner and physician assistant programs have increased rapidly in recent years. For example, in 1990 there were 1000 students enrolled in PA programs; by 2005 that number grew to 4460. There were an estimated 140 000 nurse practitioners at work in the US in 2005, up from 104 000 in 2000. Despite that growth, these new clinicians will not allow us to meet growing requirements brought on by population growth, especially among older people, and to utilize the opportunities to cure and prevent disease fostered by technology changes.

A tightening in physician supply appeared during the period around 2000. Studies of consumer and practitioner behavior found patients waiting longer for appointments and physicians reporting inadequate time with their patients.¹ One promising development in the supply situation during this period was that physicians did work more often with nurse practitioners and physician assistants. In 1980, the ratio of first year medical students per 100 000 people in the US began a steady decline from 7.3 that year to 5.6 in 2005.² This trend in medical education reflects the

Figure 3.
Anticipated Trends in US Physician Supply



Source: AAMC Center for Workforce studies. Unpublished data, 2005.

policy decisions of earlier decades based upon incorrect predictions of a persisting physician surplus by 2000 and beyond.

In response to those predictions, there were practically no new allopathic medical schools established in the US between 1980 and 2000, and total medical school enrollment stayed steady at around 68 000 students. In 1985 there were 126 allopathic medical schools graduating 16 117 students. In 2006 there were 17 370 entering first year medical students in 125 allopathic medical schools, a very meager growth rate of 7% given the US population grew 25% in the same period. In 1985 there were 1560 osteopathic medical students graduating from 15 schools. In 2005 there were 2740 from 20 schools. The growth in the number of osteopathic medical schools has been rapid and will continue; six new schools opened since 2000 and 6 more are set to open. In comparison, there are only 2 new allopathic schools, both in Florida, that are on schedule to

accept students. Osteopathic medical doctors are licensed equivalently in all of the states with osteopaths practicing more often in primary care and rural areas than allopathic physicians.

This slowdown in production has been filled in the recent past by international medical graduates (IMGs) coming into the US for their post graduate training or as immigrants. Slightly more than a quarter (25.3%) of all US physicians are IMGs. Half of these are US citizens or permanent residents.³ Similarly, a quarter of all physicians in post-graduate training (residencies) are IMGs. Again, 45.6% of these are US citizens or permanent residents.⁴

This trend may not persist because many other nations have also turned to our traditional sources of IMGs to bolster their medical practitioner supply. Furthermore, there are efforts to stem the importation of physicians into the developed countries to stop what has been termed “brain drain,” which is seen as thwarting health status improvement in the developing world.⁵

The term “shortage” has evoked a good deal of controversy because many see the human resource problem of our health system as being a problem more of organization and financing than of numbers. However, there is more predictability in the demography of the workforce than there is in the policies that structure those professionals. The demographic trends point clearly toward a period of stress between what we expect from medical practitioners in terms of numbers and access to care and what can be delivered. **NCMJ**

REFERENCES

- 1 Trude S. So much to do, so little time: physicians capacity constraints, 1997-2001. *Track Rep.* 2003 May;(8):1-4.
- 2 Association of American Medical Colleges. Center for Workforce Studies. *Help wanted: More U.S. doctors.* Washington, DC: AAMC; 2006. <http://www.aamc.org/workforce/helpwanted.pdf>. Accessed April 23, 2007.
- 3 Smart D. *Physician Characteristics and Distribution in the US, 2006 Edition.* Chicago, IL: American Medical Association; 2006.
- 4 Brotherton SE, Etzel SI. Graduate Medical Education, 2005-2006. *JAMA.* 2006;296(9):1154-1169.
- 5 Mullan F. The metrics of the physician brain drain. *N Engl J Med.* 2005;353(17):1810-1818.

Carolinas Medical Center Academic Infrastructure: Implications for Physician Workforce Expansion

James T. McDeavitt, MD; Kara C. King, PhD

The city of Charlotte is known for being the second largest banking center in the country after New York. Its growth rate in recent years—in terms of new businesses, jobs, and population—has been nothing short of explosive. While such distinctions are positive, Charlotte has one other distinction that renders the city something of an anomaly in the world of medical education: it is one of the largest cities in the United States without a medical school.

However, this may change. Late in 2006, leaders of the University of North Carolina School of Medicine (UNC-SOM) approached Carolinas HealthCare System (CHS) with a proposal to develop a second UNC medical school campus in Charlotte. The plan as initially proposed by UNC would expand the existing class size by 50 students, from 160 to 210. The students would complete their first two years of training in Chapel Hill. To accommodate the expanded class during the last two years of training, a new campus would be developed in Charlotte in association with the Carolinas Medical Center (CMC).

One major advantage of the UNC proposal is that it builds on the existing academic infrastructure at CMC. Carolinas Medical Center, the 861-bed flagship facility of CHS, has a long history of involvement with education and research and serves as one of 5 state designated academic medical center teaching hospitals. The academic nature of the other 4 hospitals is probably more apparent because all are affiliated with highly visible universities (Duke University, Wake Forest University, The University of North Carolina at Chapel Hill, and East Carolina University). Nonetheless, CMC hosts residency and fellowship programs that serve over 200 medical school graduates at a given time. These students come from 32 states and represent 84 different US medical schools. In fact, CMC has hosted approximately 1000 medical students from UNC-SOM in the

past 4 year years alone as part of the school's normal clinical rotations. As a result, the addition of a more formal program, should it occur, would be a fairly logical extension of current capabilities.

There is growing consensus that North Carolina, and the nation, face a significant physician shortage. The Association of American Medical Colleges, for example, recently called for a 30%

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increase in the number of trainees being produced by American medical schools over the next decade.¹ The North Carolina Institute of Medicine recommends similar sharp increases in training of physicians and other health care practitioners.² To better understand the benefits of a proposed collaboration between UNC-SOM and CHS, it is helpful to know something about the origins of CHS and its long history of involvement in both medical education and research.

Carolinas Medical Center traces its history, which is extensively documented,³ to the years following the Civil War. In 1876, Charlotte Home and Hospital of St. Peter's Episcopal Church was established as the state's first civilian general hospital. The hospital grew and relocated several times during the next 50

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years, and the name eventually changed to St. Peter's Hospital.

By the 1930s, local physicians were pioneering a movement to construct a new public hospital that would be spacious enough to eventually accommodate more than 800 patients. Their goals at the time were to practice medicine to the best of their abilities, serve the community, including the indigent population, and reflect the superior training of Charlotte's physicians through high-quality care. Other key objectives were to take advantage of that same physician training to educate and train medical residents and encourage research.³ After start-up proposals were thoroughly investigated and justified, a decision was made to construct a new facility known as Charlotte Memorial Hospital. Charlotte Memorial, which formally opened in 1940, was constructed utilizing land donated by St. Peter's Hospital.

The hospital grew steadily over the years and in 1990 was renamed Carolinas Medical Center to more accurately reflect the growth and regional presence of the institution. Today, CMC is the highest-volume provider of tertiary/quaternary medical services in the state. During this same period CMC's parent corporation, Carolinas HealthCare System, was beginning a period of steady regional expansion that involved acquiring, leasing, or managing hospitals and physician practices primarily in North Carolina but extending into South Carolina as well. Today CHS is the third largest public health care system in the United States behind only the University of California system and the nationwide system of Veterans Affairs hospitals.

Carolinas HealthCare System owns, leases, or manages 19 hospitals and has two more under development. Including 11 nursing homes, the system has nearly 4500 licensed beds. CHS has more than 150 delivery sites in all, including 75 Carolinas Physician Network medical practices, and employs approximately 29 000 part- and full-time employees. Carolinas Medical Center's commitment to graduate medical education took root at the time of its founding, in 1940 with the establishment of a variety of graduate training programs. Residency programs grew steadily during the 1960s, prompting CMC to begin recruiting full-time teaching faculty to supplement the strong support already being provided by private practitioners.

Physician residency programs are currently offered in 10 fields including emergency medicine, pediatric emergency medicine, family medicine, rural family medicine, internal medicine, obstetrics and gynecology, orthopedic surgery, pediatrics, physical medicine and rehabilitation, and general surgery. Fellowships are offered in medical toxicology, sports medicine, orthopedic trauma, vascular surgery, and thoracic surgery. In addition, CMC is actively considering the addition of fellowships in gastroenterology and pulmonary/critical care medicine. All programs are fully accredited by the Accreditation Council for Graduate Medical Education (ACGME) and are competitive in attracting the best qualified of the nation's medical students. After completion of residency, approximately 80% of CMC-trained physicians enter practice directly while 20% pursue fellowship training. Current plans for CHS to merge with NorthEast Medical Center in Cabarrus County will also complement the overall educational portfolio. When the merger

is complete, it will result in the addition of an innovative family medicine training experience that incorporates a strong rural focus as a part of CHS's expanding commitment to general and graduate medical education.

Currently, CMC's residency program includes 212 physicians. Additionally, there are 193 faculty members (up from three dozen less than 25 years ago) teaching in the following primary care and subspecialty departments: pediatrics, family medicine, internal medicine, obstetrics and gynecology, emergency medicine, general surgery, physical medicine and rehabilitation, orthopedics, oral medicine, vascular surgery, thoracic surgery, and neurology. All faculty physicians at CMC are expected to make contributions in the 3 areas of clinical care, education, and research.

Carolinas Medical Center has also served as a primary regional training site for medical students since the inception of UNC-SOM. Initially, UNC students received clinical experience in internal medicine at CMC. That program was soon expanded to include obstetrics and gynecology and pediatrics. The list of established clinical rotations has since expanded to include general surgery, family medicine, emergency medicine, physical medicine and rehabilitation, orthopedics, plastic surgery, and psychiatry. Although most of the student rotations at CMC are filled by UNC students, clinical rotations are also offered to medical students nationally. During the 2004-2005 academic year, approximately 444 undergraduate student months were provided through CHS facilities and physicians.

Supplementing its role in physician education, CHS also trains allied health professionals. The Carolinas College of Health Sciences (CCHS), located on CMC's main campus in Charlotte, educates nursing students and other personnel. The school was initially established as the Charlotte Memorial Hospital Authority School of Nursing in the late 1980s after a comprehensive feasibility study supported the need for more nurses, both locally and statewide. The school's name was changed to CCHS in 1996 when programs expanded to include disciplines other than nursing. Carolinas College of Health Sciences is fully accredited by the Commission on Colleges of the Southern Association of Colleges and Schools and currently has an enrollment of 450 students. Academic programs and courses are offered for prenursing; nursing; emergency medical sciences; radiologic, surgical, and medical technology; general education (ie, liberal arts); and nurse aide training.

Carolinas Medical Center also has a long history of involvement in continuing education. In 1972, CMC was invited by UNC-SOM to become one of 9 Area Health Education Centers (AHECs) in North Carolina. Area Health Education Centers act as regional extensions of universities and teaching hospitals, providing educational programs to physicians, health care professionals, and other students. The Charlotte AHEC serves an 8-county area. The AHEC programs reached approximately 27 000 care practitioners during the 2005-2006 academic year alone.

Charlotte AHEC also offers a variety of ancillary programs. For example, training opportunities in diversity management, foreign languages, and cultural immersion are offered to improve

services to underserved populations. The AHEC digital library has facilitated the delivery of certain courses, educational materials, and literature online. This level of accessibility has vastly expanded the opportunities available for community-wide involvement. Finally, CHS and Charlotte AHEC have developed a program called Health Career Education—Reaching Out to Excellent Students (HEROES). This program is designed to educate precollege students, especially underrepresented minorities and disadvantaged populations, about health careers.

Carolinas HealthCare System has also invested heavily in medical research. The James G. Cannon Research Center, which opened in 1991, attracts clinical and basic science researchers to CMC. Cannon currently houses active laboratory research programs in general surgery, urology, emergency medicine, orthopedic biology/engineering, obstetrics-gynecology, internal medicine, and pediatrics. Additionally, it houses the McColl-Lockwood Laboratory for Muscular Dystrophy Research and the Heineman Medical Research Laboratories for cardiovascular disease research. More research laboratories are located in the Blumenthal Cancer Center.

Carolinas Medical Center-based investigators have contributed to expanded knowledge and successful outcomes in medicine. For example, recent work helped to develop a new technique to transplant insulin-producing cells into Type I (insulin-dependent) diabetics.^{4,6} The first pancreatic islet transplantation in North or South Carolina was performed in Charlotte, and follow-up studies showed the recipient to be free from exogenous insulin injections 2 years postsurgery. The patient requires minimal immunosuppression.

Additionally, novel use of antisense oligonucleotide mediated therapy was used to improve Duchenne muscular dystrophy in an animal model.⁷ Yet another CMC laboratory has identified an array of genes implicated in the progression of ovarian cancer.⁸ These genetic markers may potentially serve as the basis for novel

treatment strategies and/or the development of more sensitive and earlier screening tests. NIH funding has been utilized at CMC to support the development of a Carboximeter.^{TM9} The purpose of the device is to detect pulmonary emboli quickly and easily by means of a bedside test. Another NIH-funded study is focused on identifying oral cavity pathogens that may correlate strongly with ventilator associated pneumonia.

The R. Stuart Dickson Institute for Health Studies is a program of applied research and public health studies that is geared toward facilitating improvements in the quality of care and the effectiveness of clinical practice. Dickson staff members include epidemiologists, biostatisticians, health services researchers, database analysts, and database developers.

As this article goes to press, the feasibility of starting a Charlotte Campus of UNC-SOM is still being analyzed. If the initiative does come to fruition, however, the new campus will not need to be built from scratch. The proposed expansion will capitalize upon a long established and mature relationship between UNC-SOM and CMC. A large part of the infrastructure necessary to support expanded medical educational opportunities is already in place. Additionally, a tradition of high educational standards, in conjunction with top-quality patient care and cutting-edge research, is well established. Therefore, the main questions under review tend to revolve around funding, logistics, timing, and capacity.

The medical school expansion concept proposed by UNC-SOM builds upon existing strengths of two organizations with a long-standing commitment to educating tomorrow's physicians. Assurance of an adequate supply of accessible physicians is an issue of seminal importance to the public today and for years to come. The UNC proposal represents a means of increasing the state's production of physicians in a rapid and cost effective manner. **NCMJ**

REFERENCES

- 1 AAMC Statement on the Physician Workforce. <http://www.aamc.org/workforce/workforceposition.pdf>. Accessed April 12, 2007.
- 2 North Carolina Institute of Medicine. *Task Force on Primary Care and Specialty Supply*. Durham, NC. In press.
- 3 Shinn, J. *A Great, Public Compassion: The Story of Charlotte Memorial Hospital and Carolinas Medical Center*. Charlotte, NC: The University of North Carolina at Charlotte; 2002.
- 4 Gores PF, Hayes DH, Copeland MJ, et al. Long-term survival of intratesticular porcine islets in non-immunosuppressed beagles. *Transplantation*. 2003;75:613-618.
- 5 Pollinger HS, Burns JM, Cassingal VP, Gores PG. Current immunosuppressive drugs and clinical use. In: Halberstadt CR, Emerich DF, eds. *Cell Transplantation from Laboratory to Clinic*. San Diego, CA: Academic Press; 2007:13-28.
- 6 Halberstadt CR, Emerich DF, eds. *Cell Transplantation from Laboratory to Clinic*. San Diego, CA: Academic Press; 2007.
- 7 Lu QL, Rabinowitz A, Chen YC, et al. Systemic delivery of antisense oligonucleotide restores dystrophin expression in body-wide skeletal muscles. *Proc Natl Acad Sci*. 2005;12:198-203.
- 8 Mougeot JL, Bahrani-Mostafavi Z, Vachris JC, et al. Gene expression profiling of ovarian tissues for determination of molecular pathways reflective of tumorigenesis. *J Mol Biol*. 2006;358:310-329.
- 9 Adjunct Faculty in the Biology Department at the University of North Carolina at Charlotte. <http://www.bioweb.uncc.edu/Faculty/AdjunctFaculty/CanonResearch/Kline/index.htm>. Accessed April 12, 2007.

The Potential for Medical School Expansion: A Western North Carolina Perspective

Gary Bowers; Teck Penland, PhD; Joseph F. Damore

The North Carolina Institute of Medicine (NC IOM) 2007 Primary Care and Specialty Supply Task Force report indicates that the overall supply of practitioners in North Carolina may currently be adequate, but escalating trends in the environment threaten a substantial future shortage. The overall population growth, combined with the aging of native residents and the influx of retirees from other states, presents a serious threat to quality health services in Western North Carolina (WNC), which is experiencing both of these phenomena at an accelerated rate.

The region's population is projected to increase by 21% over the next 18 years.¹ Of the 15 counties in North Carolina with the highest percent of older adults, 10 are in WNC, and, based on 2000 data, the population aged 65 years and older in WNC is proportionately greater than for North Carolina and the US (17.8%, 12.0%, and 12.4%, respectively).² Already, the ratio of physicians to population in WNC is substantially below the statewide average (14.8% and 20.7%, respectively),³ and as the population ages, they require more health care services.^{4,5}

The State Needs to Consider New Options and Alternatives for Training Medical Students

The NC IOM task force has recommended that North Carolina medical schools expand their enrollment by 30% in order to meet the future shortages. An increase of this magnitude would push existing schools well

beyond their facility and faculty capacity, leading to potential quality concerns. A more reasonable approach would be to consider off-campus teaching sites in WNC hospitals and private practices for up to a total of 100 third-year and fourth-year students. With additional resources, these sites could utilize existing faculty from community hospitals, including the 750-bed Mission Hospitals regional referral center, and Mountain Area Health Education Center (MAHEC) residency programs. These types of rotations would be new to the region but have proven successful in other states such as Michigan, Indiana,

“The region is relatively compact but offers a wide range of characteristics including metropolitan areas and relatively isolated rural communities, a growing elderly population, a strong tradition of collaboration, a sophisticated and high quality medical community, and recognized successful residency programs.”

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and South Carolina. It is believed that this method would be a more economically feasible approach to increasing practitioner supply because existing community hospitals and MAHEC resources could reduce program costs to the state.

Why Utilize Western North Carolina for Training Medical Students?

Western North Carolina possesses assets that make the region ideal for training medical students. The region is relatively compact but offers a wide range of characteristics including metropolitan areas and relatively isolated rural communities, a growing elderly population, a strong tradition of collaboration, a sophisticated and high quality medical community, and recognized successful residency programs. The region can stand apart in offering programs for training practitioners for a variety of settings and environments. .

Much of the region is nestled in areas somewhat isolated by the topography of the southern Appalachian mountains. The area is composed of many close-knit communities and residents depend on their local hospital and health care providers for their primary care needs. This setting exposes medical students to genuine rural practice with reasonable access to a large major tertiary care hospital. As more students are exposed to this environment and become integrated into the community, more may decide to practice in the rural settings,⁶ which often have the greatest demand for physicians.

The quality of health care in WNC has received national recognition. Mission Hospitals has been ranked as a "Top 50" and "Top 100" hospital in several clinical areas such as cardiology, cardiovascular surgery, and orthopedic surgery. Several other WNC hospitals have been recognized nationally for their quality health care services. In addition, the utilization and cost data in WNC is also perceived as low cost, as demonstrated by the Dartmouth Atlas database. The region has every major specialty

covered and provides all 3 levels of care.

The region also has a very successful history of collaboration among health care providers. The 16 WNC hospitals, MAHEC, and 14 public health departments work together closely through the WNC Health Network with the goal of improving access, enhancing quality, and reducing the costs of health care throughout the region. The hospitals formed one of the first initiatives in the country, the WNC Data Link project, to access and exchange electronic patient data across the region to facilitate care and treatment of patients. Western North Carolina community colleges and universities have a cohesive bond with the hospitals and MAHEC to project future demand for health care services and provide adequate training for professionals offering these services.

The region also has experience developing and maintaining very successful residency programs. Led by MAHEC, Mission Hospitals, and Margaret R. Pardee Memorial Hospital, with the cooperation and support of other regional hospitals, these programs have proven successful in attracting and maintaining health care practitioners in WNC. The residency programs boast a retention rate of 56% since their first graduating classes in 1978.⁷

Similar to other areas of the state, WNC has experienced a steep decline in the number of furniture, textile, and other manufacturing jobs over the past decade. The hospitals have partnered with AdvantageWest, the regional economic development team, to enhance and promote the region's strong health care services in order to attract more business and industry. A medical student training program could boost those efforts and help the economic development of the region.

Through the resources and attributes noted above, Western North Carolina can provide a high quality educational experience for third-year and fourth-year medical students. We are prepared to explore the feasibility of this program to ensure an adequate supply of physicians for our future. **NCMJ**

REFERENCES

- 1 NC State Demographics. <http://www.demog.state.nc.us>. Accessed May 1, 2007.
- 2 US Census Bureau. Census 2000. <http://www.census.gov/main/www/cen2000.html>. Accessed April 5, 2007.
- 3 North Carolina Health Professions Data System. 2005 data. Cecil G. Sheps Center for Health Services Research, The University of North Carolina at Chapel Hill. <http://www.shepscenter.unc.edu/hp/prof05.htm>. Accessed May 1, 2007.
- 4 The Quality of Health Care Received by Older Adults. Rand Health. Santa Monica, CA: Rand Corporation. http://www.rand.org/pubs/research_briefs/RB9051/RB9051.pdf. Accessed May 1, 2007.
- 5 Caring for Older Americans: The Future of Geriatric Medicine. *J Am Geriatrics Society*. 2005;53:S245-S256.
- 6 Pathman D. National recruitment and retention of providers. Presented at the NC Institute of Medicine Primary Care and Specialty Supply Task Force; March, 8, 2006; Cary, NC.
- 7 Mountain Area Health Education Center. Statistical data, 2007.

The Roles and Supply of Nurse-Midwives, Nurse Practitioners, and Physician Assistants in North Carolina

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Certified nurse-midwives (CNMs), nurse practitioners (NPs), and physician assistants (PAs) play a significant role in health care delivery in North Carolina. Within their scopes of practice, these health care professionals provide quality care with high levels of patient satisfaction.¹ Studies in many settings and specialties demonstrate the quality of care provided,²⁻⁷ cost-effectiveness,⁸⁻¹² and patient satisfaction.¹³⁻¹⁹ The PA and NP professions have been in existence for just over 40 years and CNMs for 50; but the impact of these clinicians on access to quality care is significant. Over half of the 464 primary care practitioners gained in rural North Carolina from 1998 to 2003 were NPs or PAs, and they comprise 35% of all primary care practitioners in whole county persistent health professional shortage areas.²⁰ In 2002, it was estimated there was one PA and NP practicing for every 10 practicing physicians.²¹ As policy makers and health care leaders consider strategies to confront the impending physician shortage, it is appropriate that the positive impact of CNMs, NPs, and PAs be considered.

Certified Nurse-Midwives

There are 202 CNMs approved to practice in North Carolina. The first nurse-midwives were approved to practice in the state in 1976, and they practiced in major cities throughout the state where more physicians were early adopters of the CNM concept. Their utilization was limited until 1989 when North Carolina's rank of 49th in the nation in infant mortality prompted the Division of Maternal Child Health to conduct a feasibility study for creating a nurse-midwifery education program and the Office of Rural Health to increase its efforts to place CNMs in underserved areas. The CNM degree program was established at East Carolina University and admitted its first class in 1992.

“North Carolina is the birthplace of the PA profession, with the first PA education program established at Duke University in 1965.”

Nurse-midwives are trained as women's health care practitioners specializing in care of women throughout their lives. Nurse-midwives regard the North Carolina practice environment as tenuous—North Carolina is one of only 6 states with supervisory language in statutes regulating nurse-midwives.²² This legislative barrier prohibits CNMs from hospital admitting privileges. This results in an inability to statistically quantify their contributions to health care in the state because patients must be admitted under the supervising physician's name. The supervisory requirements force many nurse-midwives to work in labor and delivery units as nurses, which limits their impact on women's health. Many more CNMs could be trained and utilized in rural and underserved areas if the regulatory environment were improved.^{23,24}

Nurse Practitioners

In North Carolina, 8 universities graduate about 190 master degree prepared nurse practitioners annually. In 2005 there

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were 2440 nurse practitioners approved to practice in North Carolina. The last decade has seen substantial growth in the numbers of NPs with North Carolina growing faster than the national average. The potential to expand existing NP programs in North Carolina is limited by access to clinical sites and preceptors. Another challenge is the worsening nurse faculty shortage. The major factors driving the faculty shortage are insufficient funds to hire new faculty, inability to recruit qualified faculty, lack of qualified applicants, noncompetitive salaries, and high faculty workload.²⁵ Recommendations to relieve the faculty shortage include developing and implementing nontraditional methods of instruction to educate future instructors, increasing public and private funding to expand nursing education programs and improve the profession's image, creating a work environment conducive to recruiting and retaining nurse faculty, increasing formal partnerships between schools of nursing and clinical facilities, and engaging retired nursing faculty in support of current faculty.

Physician Assistants

There were 2674 physician assistants in practice in North Carolina in 2005.²⁶ North Carolina is the birthplace of the PA profession with the first PA education program established at Duke University in 1965. For many years there were two PA programs in the state, at Wake Forest University and Duke, graduating fewer than 80 PAs a year. East Carolina University and Methodist College established PA programs in the mid 1990s, and the annual output of PAs in the state is now greater than 150. The number of PAs in the state has increased 140% since 1990. The practice environment for PAs in North Carolina has been rated the best in the nation, and this serves as a powerful incentive to in-migration.²⁷ Physician assistants are all trained as generalists, and thus they can provide primary care or be deployed in a variety of surgical and medical specialties. The Bureau of Labor Statistics ranks PA the 4th fastest growing occupation from 2004 to 2010,²⁸ and the applicant pool to PA programs nationally remains robust. Barriers to expansion of PA programs, nationally and in North Carolina, include adequate financial aid, expanded clinical rotation sites, and local constraints on facilities and resources within institutions.

Recommendations

The North Carolina Institute of Medicine Primary Care and Specialty Supply Task Force recommendations recognize

the contributions of nurse-midwives, nurse practitioners, and physician assistants to access to high quality health care for North Carolinians. One option identified to address the practitioner shortage is to increase the production of CNMs, NPs, and PAs by 30%. Although the challenges to such an expansion vary by discipline, there are some overarching themes: the need for adequate faculty and educational resources (including clinical rotation sites and financial aid for students) and the impact of the practice environment on retention of clinicians trained in the state.

A shortage of nursing faculty is an ongoing concern because many educators are approaching retirement. Strategies for increasing the number of faculty in nursing programs include improved salaries, faculty development opportunities, and improved work environment. While the number of physician assistant faculty is currently adequate, expansion of PA programs would likely engender similar difficulties.

Adequate funding for education programs is critical, as is access to clinical training sites. Clinical rotation availability is often cited as a reason not to expand medical school class sizes, and the situation is no different for CNM, NP, and PA educational expansion. In North Carolina, adequate funding of the Area Health Education Centers (AHECs) to expand the stipend for primary care preceptors will be a key factor in assuring adequate clinical training sites.

Underrepresented minorities and disadvantaged candidates for health professions programs face greater barriers to affording education, yet they are more likely to care for the medically underserved. Adequate financial aid packages, including scholarships and loan forgiveness programs, are central to enhanced diversity and deployment of clinicians to where they are needed most.

The foundation for recruitment of CNMs, NPs, and PAs from other states and retention of those educated here once they graduate is the regulatory environment. From the physician assistant perspective, North Carolina's environment is ideal, and it is ranked first in the nation for PA practice.²⁷ Nurse practitioners and nurse-midwives see the need for improvement in the practice environment to better align regulation with appropriate scope of practice and utilization.²⁴ For all three disciplines, legislated authority should coincide with clinical ability as precisely as possible. This requires an appropriate balance between assuring protection of the public and enhancing the ability of these clinicians to deliver care within their scopes of practice. **NCMJ**

REFERENCES

- 1 Nurse Practitioners, Physician Assistants, and Certified Nurse Midwives: A Policy Analysis Health Technology Case Study 37. Washington, DC: Office of Technology Assessment; 1986.
- 2 Schulman M, Lucchese KR, Sullivan AC. Transition from housestaff to nonphysicians as neonatal intensive care providers: cost, impact on revenue, and quality of care. *Am J Perinatol*. 1995;12(6):442-446.
- 3 Miller W, Riehl E, Napier M, Barber K, Dabideen H. Use of physician assistants as surgery/trauma house staff at an American College of Surgeons-verified Level II trauma center. *1998;44(2):372-376*.
- 4 Gujral H, Viscomi C, Collantes R. The role of physician extenders in managing patients with chronic hepatitis C. 2004;71 Suppl 3:S33-37.

- 5 Oswanski MF, Sharma OP, Raj SS. Comparative review of use of physician assistants in a level I trauma center. *Am Surg.* 2004;70(3):272-279.
- 6 MacDorman MF, Singh GK. Midwifery care, social and medical risk factors, and birth outcomes in the USA. *J Epidemiol Community Health.* 1998;52(5):310-317.
- 7 Raisler J, Kennedy H. Midwifery care of poor and vulnerable women, 1925-2003. *Journal of Midwifery & Women's Health.* 2005;50(2):113-121.
- 8 Record JC, McCally M, Schweitzer SO, Blomquist RM, Berger BD. New health professions after a decade and a half: delegation, productivity and costs in primary care. *J Health Polit Policy Law.* 1980;5(3):470-497.
- 9 Record JC. The productivity of new health practitioners. *Springer Ser Health Care Soc.* 1981;6:37-52.
- 10 Roblin DW, Howard DH, Becker ER, Kathleen Adams E, Roberts MH. Use of midlevel practitioners to achieve labor cost savings in the primary care practice of an MCO. *Health Serv Res.* 2004;39(3):607-626.
- 11 Grzybicki DM, Sullivan PJ, Oppy JM, Bethke A-M, Raab SS. The economic benefit for family/general medicine practices employing physician assistants. *Am J Manag Care.* Jul 2002;8(7):613-620.
- 12 Hooker RS. A cost analysis of physician assistants in primary care. *JAAPA.* 2002;15(11):39-42, 45, 48 passim.
- 13 Oliver DR, Conboy JE, Donahue WJ, Daniels MA, McKelvey PA. Patients' satisfaction with physician assistant services. *Physician Assist.* 1986;10(7):51-54.
- 14 Hooker RS, Potts R, Ray W. Patient satisfaction: comparing physician assistants, nurse practitioners and physicians. *Permanente Journal.* 1997;1:38-42.
- 15 Roblin DW, Becker ER, Adams EK, Howard DH, Roberts MH. Patient satisfaction with primary care: does type of practitioner matter? *Med Care.* 2004;42(6):579-590.
- 16 Counselman FL, Graffeo CA, Hill JT. Patient satisfaction with physician assistants (PAs) in an ED fast track. *Am J Emerg Med.* 2000;18(6):661-665.
- 17 Cipher DJ, Hooker RS, Sekscenski E. Are older patients satisfied with physician assistants and nurse practitioners? *J Am Acad Physician Assist.* 2006;19(1):36-44.
- 18 Bureau of Health Professions, US Department of Health and Human Services, Health Resources and Services Administration. *Eighth Report to the President and Congress on the Status of Health Personnel in the United States, 1991—Allied Health* 1992. DHHS Publication No. HRS-P-OD-92-1.
- 19 American College of Nurse-Midwives. Nurse-Midwifery in 2006: evidence-based practice. <http://www.midwife.org/siteFiles/news/NurseMidwifery2006.pdf>. Accessed April 15, 2007.
- 20 Fraher E. The supply of primary care physician assistants and nurse practitioners in underserved North Carolina. *The Journal of Physician Assistant Education.* 2007;17(1):39-42.
- 21 Hooker RS, Berlin LE. Trends in the supply of physician assistants and nurse practitioners in the United States. *Health Aff (Millwood).* Sep-Oct 2002;21(5):174-181.
- 22 King MS. State laws governing the relationship between CNMs and physicians: American College of Nurse-Midwives; 2006. http://www.midwife.org/siteFiles/legislative/LAWS_GOVERNING_RELATIONSHIP_BETWEEN_CNMs_&_PHYSICIANS.pdf. Accessed April 30, 2007.
- 23 Hartley H. Impact of health policy at state and local levels: the case of certified nurse-midwives. *Nursing and Health Policy Review.* 2003 Spring-Summer;2(1):25-34(19 ref).
- 24 Declercq ER, Paine LL, Simmes DR, DeJoseph JF. State regulation, payment policies, and nurse-midwife services. *Health Aff.* 1998;17(2):190-200.
- 25 American Association of Colleges of Nursing. Nursing faculty shortage. March 2007; <http://www.aacn.nche.edu/Media/FactSheets/FacultyShortage.htm>. Accessed April 6, 2007.
- 26 North Carolina Health Professions Data System. 2007.
- 27 Wing P, Langelier MH, Salsberg ES, Hooker RS. The changing professional practice of physician assistants: 1992 to 2000. *JAAPA.* 2004;17(1):37-40, 42, 45-49.
- 28 Bureau of Labor Statistics, US Department of Labor. Occupational Outlook Handbook, 2006-07 Edition. <http://www.bls.gov/oco/ocos081.htm>. Accessed April 28, 2007.

Recruitment and Retention of Physicians and Primary Care Practitioners for North Carolina: A Partnership Approach

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Population growth, the aging of the population, and an increase in chronic disease—all are expected to increase North Carolina's demand for physicians, physician assistants, nurse practitioners, and other practitioners. Overall in North Carolina, the ratio of all practitioners-to-population is expected to drop between 2% and 13% by 2030.¹

This will continue to strain counties and communities that historically have had practitioner shortages. In 2005, all or parts of 38 counties in North Carolina remained persistently medically underserved.² Without targeted strategies to recruit medical practitioners, access to health care in underserved areas of North Carolina will likely be more difficult than ever. In an effort to defray the effects of these trends, the NC Office of Rural Health and Community Care (ORH, formerly the Office of Rural Health Services) and the NC Medical Society Foundation's Community Practitioner Program (CPP) work as allies to offer loan repayment, financial incentives, and expert technical assistance to support primary care medical practitioners serving medically underserved patients in rural communities. Together, and with other key partners in the state, these organizations have created additional medical access points in rural North Carolina and powerful tools to attract

and retain primary medical care services in our state. These partnerships have created one of the strongest recruitment and retention systems in the nation. Yet, while North Carolina is still seen as a leader, many other states are catching up, providing community development, comprehensive and compatible matching in recruitment, and other longer-term support for rural and underserved practices. Now, more than ever, the partnership is critical to meeting the state's growing need for primary care practitioners.

“In order for North Carolina to maintain its competitive advantage, collaboration among all the stakeholders is critical and funding is essential to meet the present and future demands on our health care system.”

Recruiting Health Care Practitioners to North Carolina

In 1973, the NC ORH began its mission of establishing community-based primary care medical centers in rural and underserved parts of North Carolina. The staff soon found they needed the capacity to recruit physicians, physician assistants, nurse practitioners, and other practitioners to these sites, so in 1975 the ORH

began its Medical Placement Services (MPS) program. In the mid-1990s, the NC General Assembly recognized the severe shortage of general dentists in many parts of North Carolina, and recruiting dentists and dental hygienists was added to the mission of the ORH Medical Placement Services.

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Accompanying the move toward recent mental health reform, in 2005 the legislature provided \$1 million annually to ORH to expand the recruitment of psychiatrists to rural and underserved communities that had a shortage or absence of mental health professionals.

Since its inception, MPS has recruited more than 3000 primary care physicians, dentists, nurse practitioners, physician assistants, psychiatrists, and other practitioners to the state.³ More than half of those placements have been at sites federally designated as health professional shortage areas (HPSAs). Over the course of its history, MPS has contracted with more than 300 communities across the state and at any given time has 350 to 450 different opportunities to offer, including private practice, health departments, federal community and migrant health centers, and state rural health centers.³ Each year, the staff recruits approximately 140 practitioners to the state, almost all of them serving in medically needy communities, most of them rural towns and counties.

As incentives to placement, physicians, psychiatrists, and dentists locating in medically underserved communities are eligible for up to \$70 000 in State Loan Repayment funds for a 4-year commitment. Physician assistants, nurse practitioners, and dental hygienists are eligible for up to \$30 000 in State Loan Repayment for a 3-year commitment. MPS receives about \$1.4 million each year for primary care and dental loan repayment incentives. One month into the state's fiscal year, most of the funds are obligated to practitioners waiting to receive the funds and relocate to North Carolina.⁴ The MPS staff also coordinates applications for Federal Loan Repayment funds and offers state-sponsored High Needs Bonuses, providing greater flexibility in responding to each recruited practitioner's financial needs.

The ORH programs make a critical difference for both new and established practices across the state. Jo Hudson, an administrator with Benson Area Medical Center in Johnston County, said the health center has used ORH services for the past 28 years. "As a community-owned nonprofit rural health center, we often struggle to offer a salary and benefits package that can compete with those offered both in the private sector and in the federally-funded centers," she said. "The State Loan Repayment Program has made the difference for us."

Over the years, ORH staff members have developed strong and ongoing relationships with the state's primary care residency programs, the University of North Carolina at Chapel Hill School of Dentistry, and the 9 Area Health Education Center (AHEC) programs. ORH staff work to build an individualized and trusting relationship with each potential candidate, conducting in-depth interviews and creating an ongoing relationship to gather information on each candidate's professional qualifications, personal and professional goals, and specific individual needs. This one-on-one attention is continued throughout the recruitment process.

The success of the MPS staff hinges on its detailed knowledge of the communities it recruits for. ORH has helped establish numerous practices across the state, which enables staff to give prospective candidates unique details about each site. In addition,

MPS staff regularly confers with ORH consultants, community representatives, business leaders, as well as hospital and other health care administrators to accurately assess local health personnel needs and develop effective recruitment strategies.

Adding Resources to Recruitment and Retention Efforts

In the late 1980s, state leaders recognized that the ORH alone was not able to fulfill all the state's recruitment needs. In particular, the state office had few options to help private practitioners who worked outside a community-based or publicly-financed medical system, yet many private physicians were struggling to enter or maintain a rural practice in high-needs communities—communities that needed primary care practitioners.

In 1989, the NC Medical Society Foundation (NCMSF), ORH, the NC AHEC Program, and the Kate B. Reynolds Charitable Trust conducted a needs assessment to determine new strategies, and a \$4.5 million grant from Kate B. Reynolds Charitable Trust created the Community Practitioner Program. A program of the NCMSF, CPP was created to assist practitioners and sites not eligible for ORH incentives. The Community Practitioner Program uses its funds to provide loan repayment and financial incentives to physicians, physician assistants, and family nurse practitioners in return for 5 years of service in a targeted medically underserved community. The program typically pays up to half of a practitioner's educational loans and provides practice management assistance through its PractEssentials program to participants and their practice sites. Currently, 103 health care professionals participate in CPP in nearly half of North Carolina's 100 counties. Since its inception, 365 practitioners in 136 communities have been served by the program in 77 counties. About three-fourths of the participating practitioners remain in rural or economically distressed counties beyond their 5-year commitment, and 85% remain in North Carolina.

Beth Hodges, MD, said the chronic shortage of physicians was evident when she and her husband began their family practice in Asheboro with CPP help. "When we opened our practice, we acquired many patients who had not seen a doctor in more than 20 years," she said. "Now, 6 years later, hardly a day goes by that we do not receive thanks from someone for making such a difference in their mother's, father's, or grandparent's life."

From the initial grant provided by Kate B. Reynolds Charitable Trust, \$10 million in program expenditures have been leveraged producing \$226 million in health care to uninsured North Carolinians through CPP. In 2006, the Blue Cross and Blue Shield of North Carolina Foundation entered into a \$10 million, 5-year partnership to sustain CPP; the grant requires a \$5 million match from other sources. To date, some of the matching funds have been obtained from the NC Medical Society, Medical Mutual Insurance Co., the Physicians Foundation for Health Systems Excellence, individual physicians, and philanthropists. As a result, by 2010, CPP is projected to increase the number of practitioners assisted on an annual basis

Table 1.
North Carolina Loan Repayment Program Attributes

	NC Office of Rural Health-Medical Placement Services Program	NC Medical Society Foundation-Community Practitioner Program
Budget	\$1.4 million primary care annually \$1 million psychiatric care annually	\$700 000 annually
Funding source	State of North Carolina	Grants from Kate B. Reynolds Charitable Trust, Blue Cross/Blue Shield of North Carolina Foundation, The Duke Endowment, Golden Leaf Foundation
Loan repayment limit	Maximum \$70 000	At least half of medical school loan debt
Obligation	Up to 4 years	Up to 5 years
Eligibility	Must practice in community-based nonprofit in a health professional shortage area (HPSA)	Prioritize those practicing in HPSA designated regions, open to private practices treating patients and with a Medicaid, Medicare, and indigent care population constituting at least 30% of their practice
Provider eligibility	Primary care physicians, psychiatrists, dentists, dental hygienists, nurse practitioners, physician assistants, and nurse midwives	Primary care physicians, nurse practitioners, and physician assistants
Application process	Conducted through the Office of Rural Health staff	Application is completed for initial determination, followed by interview with the participant, practice manager, and supervising physician
Coordination of federal loan program resources	Yes	Applicant is ineligible if qualified for federal/state loan repayment programs
Practice management resources	Office of Rural Health and Community Care staff	PractEssentials through NC Medical Society Foundation
Flexible funding	Yes	Yes
Communities served	More than 400	More than 136
Counties served	100	77
Program participants 2006	198 (loan repayment and placements)	103 (loan repayment and placements)

from 103 to 160, increasing annual patient visits from 2 310 000 to 3 696 000.

Primary Care Recruitment: The Changing Landscape

The 1990s saw increased interest nationally in state-based recruitment programs. By 1996, there were 82 different programs in 41 states working to recruit health professionals to underserved communities.⁵ Programs in other states include loan repayment, scholarship programs, financial incentives, and residency support. There continues to be greater national competition for practitioners interested in serving rural and remote communities.

With increased pressure on supply, in the 1990s greater emphasis was placed on retaining existing practitioners. Retention in rural North Carolina improved when the federal National Health Service Corps moved from obligating scholars to fixed years of service based on front-end medical school scholarships to loan repayment that recruited medical residents who had been through training and recognized a desire and willingness to practice in a rural or medically underserved area,

according to Tom Tucker, a veteran recruiter with ORH. Practitioners who signed up as scholars to pay for medical school had low retention rates and usually left their NHSC site when their obligation was completed. Those recruited after residency through loan repayment have higher retention rates, he said.

In recent years, as the legislature expanded ORH's responsibilities to include recruiting psychiatrists, mental health professionals, and dentists, funding has not been commensurate with the increased demands to recruit practitioners. The 2007-2008 proposed budget allocates an additional \$500 000 for loan repayment, funds that will increase the ORH's current resources of \$1.2 million for primary care and \$1 million for mental health. The proposed increase will help North Carolina stay competitive in the national recruitment process, but it does not return the ORH to the peak of \$1.8 million it had in 2002 for primary care incentives. North Carolina remains unique with its extensive and varied resources for recruitment. Other states recognize the value of the programs piloted in North Carolina to meet critical access needs of their residents. In order for North Carolina to maintain its competitive advantage, collaboration among all the stakeholders is critical and funding

is essential to meet the present and future demands on our health care system.

Working Together

Leaders from the Office of Rural Health and the Community Practitioner Program have coordinated efforts from the beginning. Staff members from ORH and CPP meet regularly to discuss candidates, look over opportunities, and discuss overall workforce needs and strategies. They also continue to meet regularly with key partners including the NC AHEC Program, the NC Hospital Association's Rural Health Center, the NC Division of Public Health, granting organizations, and other state agencies to analyze trends and strategies concerning health professional supply, workforce issues, and opportunities for collaboration.

"If it weren't for the close collaboration between the Office of Rural Health and the CPP, I would not have found Sampson County," said Art Apolinario, MD, who practices in Harrells

and Newton Grove. "It just never really occurred to me that my perfect practice experience could come from one of the most rural counties in the state. Knowing they were behind me and my potential success in the communities of Newton Grove and Harrells made me that much more confident that a lifestyle and practice in Sampson County could work for me and my family. They worked hard to make sure I would match with these communities, and that has made the biggest difference in ensuring I would stay in the community."

North Carolina's ORH and CPP, together with their partners, give the state a national competitive advantage to recruit for medically underserved communities. By working together, they also maximize their resources and partner to recruit high-quality health professionals who will remain in North Carolina's rural and underserved communities. **NCMJ**

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REFERENCES

- 1 Ricketts TC. Medical practitioners in North Carolina: A review of supply. Presented at: North Carolina Institute of Medicine Primary Care and Specialty Supply Summit, December 21, 2006; Raleigh, NC.
- 2 Persistent Health Professional Shortage Areas, 2005. NC Health Professionals Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Persistent HPSAs are those that have been designated as health professional shortage areas by the federal government for at least six out of the last seven years.
- 3 Ashbaugh J. NC Office of Rural Health and Community Care. Interview; March 2007.
- 4 Price J. NC Office of Rural Health and Community Care. Interview; March 2007. The \$1.4 million in annual incentive funds excludes the \$1 million set aside for the recruitment of mental health professionals.
- 5 Pathman DE, Taylor DH, Konrad TR, et al. State scholarships, loan forgiveness, and related programs: The unheralded safety net. *JAMA*. 2000;284:2084-2092.

Rural Hospitals and Rural Physicians: Understanding the Physician Workforce Challenges that Affect Rural Communities and Providers

Larry H. Chewning, MHA, FACHE; Jeff Spade, CHE

Rural communities across North Carolina are constantly and increasingly facing significant challenges to their fragile health care systems. The health of rural North Carolina citizens depends on a delicate balance between health care providers; health system resources, facilities, and service development; community, public health, and social support structures; and the underlying health status of the community. Unfortunately, practitioner shortages have a significant potential to unbalance North Carolina's effective but fragile rural health care system.

Rural hospitals and their associated physicians and medical staff are particularly critical aspects of rural health care networks. As a consequence, rural hospitals and physicians are highly dependent upon each other to create services, resources, and access points that ultimately support community health improvements, prevention of disease, and treatment for chronic and acute illness and injury. In order to understand the community-wide impact of the availability of trained, reliable physician resources for rural North Carolina communities and hospitals, please consider the following North Carolina case studies.

Vulnerability to Specialty Practitioner Shortages

A 150-bed rural community hospital in eastern North Carolina has provided urology services for 80 000 citizens in the county and local communities for the past 40 years. Recently, one of the two urology physicians practicing in the community and providing care at the hospital decided to terminate his relationship with the practice and move out of state. The decision was based on family decisions as well as lifestyle issues. The physician was beleaguered by a call schedule that required 7 days on, then 7 days

off, to provide coverage for the two physician practice.

The rural hospital and the urologist remaining in the practice developed a strategy to successfully restore full physician coverage to the urology practice, including amendments to the hospital medical staff bylaws to create a maximum call exposure of 10

“Physician recruitment and retention are among the most, if not, the most important issues faced by hospitals today. For rural hospitals, the success of the recruitment process is often termed as a “life and death” objective.

days per month for any physician specialist. The rural hospital and the urologist then began an extensive recruitment process to replace the departing physician partner. Three months after the departure of the first urologist, the remaining urologist decided to depart the practice, leaving the rural hospital and the community as well. Thus, in just 6 months, a vibrant, thriving, and strong urology practice serving a significant rural community had completely collapsed. The consequences for patients in the rural community were devastating, requiring patients and families to seek care and physician relationships across county lines, further from home.

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For the rural community hospital, losing the urology practice led to an immediate loss of hospitalized patients, causing urology patients to bypass the rural hospital to receive basic outpatient services elsewhere and, ultimately, resulting in substantial decreases in surgical and diagnostic procedures and an estimated net revenue loss of \$2 million annually.

Subsequently, the rural hospital worked diligently to negotiate a partnership with a multi-physician urology practice affiliated with a larger urban hospital more than 60 miles away for one day per week of urology coverage in the rural community. Eventually, a full-time urologist was recruited to join the group practice and encouraged to develop a satellite clinic. The rural hospital estimates that the 6-month disruption in urology services will require nearly 3 years of persistent effort to bring services and volume back to where it was prior to the departure of the physicians. Reflecting on the difficult and untimely situation, the rural hospital CEO confirmed, "Recruiting another urologist to suburban North Carolina really doesn't matter. However, one urologist at our community hospital means the difference between 80 000 people receiving care locally or patients having to leave their local community to seek care."

Case Study of Successful Rural Hospital Physician Recruitment

A rural hospital in eastern North Carolina successfully operates a family medicine clinic in a remote rural community of approximately 4000 people located 10 or more miles from the rural hospital. The physician practice served as the only full service primary care clinic in the area. The practicing physicians held hospital privileges and were supported by the rural hospital's existing medical staff structure. After many years of practice, both the physician and family nurse practitioner announced their intent to leave the hospital-supported clinic. The decision left the rural community without immediate access to primary care. The rural hospital immediately began a search to replace the physician and primary care providers.

While the rural hospital is located within an hour and a half drive of 4 major North Carolina physician training programs that focus on primary care, North Carolina's training programs are not the usual resource for recruiting and locating new primary care physicians in this rural community. Of the 10 most recently recruited primary care physicians, only one physician had completed primary care training at a North Carolina-based physician residency program.

The rural hospital was successful in recruiting a husband and wife physician team from Ohio. The key success factors that achieved this recruitment opportunity included:

- Physician interest in the small town setting.
- The appeal of North Carolina as a place to both practice medicine and develop an attractive lifestyle.
- Recruitment support packages offered by the hospital including income guarantees for the practice and assistance with relocation expenses.
- An existing practice with active patient files, well-designed facilities, and readily available office staff.

- Access to a supportive community hospital with a full service compliment of diagnostic capabilities and physician specialists.
- The availability of a weekend hospitalist service, which allows the primary care physicians time off as they develop their practice.

The rural primary care practice is a striking success story. The community has been extremely receptive to the new physicians and their commitment to expand their base of patients. The financial incentives provided by the rural hospital served the practice well during their initial start-up. Financial assistance from the North Carolina Medical Society Foundation proved beneficial to the initial success of the practice as well.

Physician Recruitment and Retention

Virtually all North Carolina rural hospitals are actively and constantly recruiting physicians across many specialties to meet critical physician shortages. Recent surveys from state hospital associations and the American Hospital Association document the recruitment of new physicians to hospitals' medical staffs for small, medium, and large rural community hospitals. Physician recruitment and retention are among the most, if not the most, important issues faced by hospitals today. For rural hospitals, the success of the recruitment process is often termed as a "life and death" objective. The strategic value of the appropriate composition and continued development of the medical staff is critical due to the following factors:

- Each new physician generates incremental, new revenue for the hospital. Physicians with surgical specialties are particularly valuable in creating revenue opportunities for rural hospitals.
- Each new physician expands the market share of the hospital, allowing patients to receive health care services in their rural community.
- Success breeds success. Each new physician recruited to the medical staff improves the image of the rural hospital and the community and, in turn, helps attract more new physicians.

General Lessons Learned

Rural hospitals tend to serve communities whose demographic profiles are more difficult from a health standpoint than the urban hospital counterparts. Typically, communities served by rural hospitals are more elderly and have higher proportions of uninsured residents. Rural community residents also have higher incidence of chronic disease and lower per capita incomes. Recent studies published by the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill document Duplin County and Sampson County in eastern North Carolina as experiencing the highest uninsured vulnerability rate (approximately 25% of the population) throughout North Carolina. Duplin and Sampson are excellent examples of typical rural North Carolina counties served by rural community hospitals based within the county.

In addition, the specialty mix of physicians and services do not reward rural community hospitals. On average, the hospital service lines that feature tertiary services in cardiology, oncology, and surgical subspecialties are able to generate significantly higher operating margins than the primary and secondary care services characteristically offered at rural community hospitals. Obviously, the key to offering specialty services is linked to the availability of specialty physicians. Unfortunately, many of the medical and surgical specialty physicians tend to be in short supply in rural community hospitals.

Obstacles to recruitment of new physicians to serve communities and rural community hospitals are numerous. Many of the critical issues that impact rural physician recruitment and retention are summarized below.

- **Lifestyle**—Many physicians and their families prefer the amenities available in larger, more metropolitan or suburban areas. Recruitment to a rural community is particularly difficult when neither the physician nor his/her family has any experience living or practicing outside of an urban area.
- **Unintentional medical school bias**—Many physicians that choose to practice in rural communities relate that there is an informal, but visible, bias communicated in their medical school and residency training against practicing in rural areas. Most of this subtle bias focuses on the absence of medical technology, lack of research, professional isolation, and fewer continuing education opportunities available in rural areas.
- **Call coverage**—Call coverage for both the practice and the rural hospital can be a particularly thorny issue for specialty physicians practicing in rural areas. Typically, surgical subspecialties may be solo practitioners or small group practices. It is essential that rural hospitals establish a reasonable call schedule for physicians practicing in specialties with only a few physicians on the call panel.
- **Payor mix**—As demonstrated earlier, payor mix issues can present a significant financial barrier for both rural physicians and rural hospitals. There is a tendency for well-insured

patients to seek care in urban or suburban environments. These patients have the ability to travel easily and bypass their local hospital and physician, leaving behind uninsured patients and poor citizens who are dependent on government insurance to receive adequate health care.

Potential Solutions

Physician recruitment to rural communities is not always a frustrating process. There are certain attractive features for a rural community that the astute physician can understand and may often prefer. For example, there tends to be little or no managed care in rural North Carolina communities due to low population densities. Most rural community hospitals are underserved for physician supply in nearly every specialty, thus, there is very little competition between groups or physicians. In addition, physician productivity is better awarded through seeing and treating a larger number of patients.

Furthermore, the cost of living is usually more reasonable and affordable in rural communities. This is particularly noticeable in the cost of housing and land. The camaraderie of the medical staff tends to be a reinforcing factor in rural community hospitals. There is a great sense that “we are all in this together.” Perhaps the greatest physician recruitment advantage rural community hospitals have is the ability to use financial incentives to attract new physicians to rural communities. Federal and state regulatory guidelines governing inducements offered to new physicians permit hospitals in rural underserved areas to offer financial incentives to attract new physicians in return for their service to the community and hospital. The approved financial inducements may include a start-up bonus, income guarantees, medical school loan repayment, and the marketing of the new physician’s practice in the service area of the hospital. Successful rural hospitals will have to build upon these advantages and work closely with programs throughout the state that offer recruitment and retention assistance. **NCMJ**

Location, Location, Location: North Carolina Faces a Shortage of Primary Care and Specialty Practitioners in Rural and Underserved Counties

Erin P. Fraher, MPP

It was a downturn in the overall supply of physicians per 10 000 population that prompted the North Carolina Institute of Medicine (NC IOM) to examine the emerging physician shortage in North Carolina. However, what will ultimately matter, and what presents the most pressing policy challenge, is whether we will be able to get the right mix of practitioners in the right places to meet the health care needs of North Carolina's citizens.

Health workforce researchers have long debated how to define a workforce shortage (ie, how many practitioners are too few?), what constitutes the right mix of primary care and specialist physicians to meet population needs, and what is the ideal balance of physician and nonphysician practitioners such as physician assistants, nurse practitioners, and certified nurse midwives in a particular health care setting. While these are important topics to discuss and debate, we must make policy decisions now based on our best understanding of the information currently available.

The objective of this commentary is to use data from the North Carolina Health Professions Data System (HPDS) to summarize what we know about the supply and distribution of primary care

practitioners, practitioners who deliver babies, general surgeons, and psychiatrists and to suggest what might be done to address shortages and maldistribution of practitioners in these specialties.^a

Primary Care Practitioners

Primary care practitioners (PCPs)^b are those providers who see patients with the most common medical problems. Primary care practitioners serve as the entry point into the medical system for most patients, and they coordinate care for patients requiring

“Rural counties that have traditionally fared poorly in the competition for practitioners appear to be worse off now than in the past and the existing maldistribution will be exacerbated as the overall physician supply tightens.”

specialty services. While there is some evidence that fewer practitioners are selecting primary care specialties,¹ North Carolina continues to have more primary care physicians relative

a Undoubtedly shortages of other specialty providers exist but data and resource limitations prevent a fuller examination of all specialty areas. For example, although we know that North Carolina's rapidly aging population has increased the demand for geriatric care, in 2005 only 293 physicians reported a primary or secondary specialty in geriatrics or family practice, geriatrics. Physicians in other specialties (ie, internal medicine) are providing geriatric care, but without information on the physician's patient panel there is no way to assess the adequacy of supply.

b Primary care practitioners are defined as physicians, nurse practitioners, and physician assistants who indicate a primary specialty in general practice, family practice, internal medicine, obstetrics and gynecology, or pediatrics. All certified nurse midwives are considered to be in primary care.

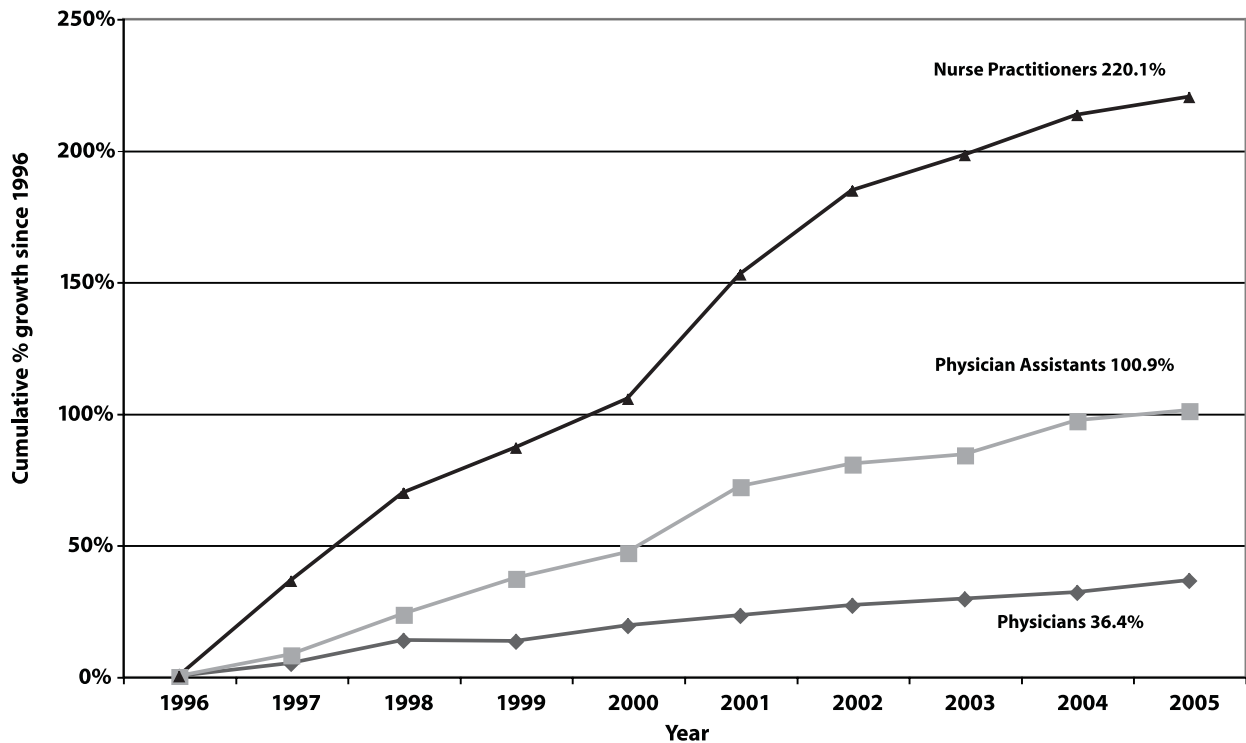
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to population size than the United States average.² Nurse practitioners (NPs) and physician assistants (PAs) make up an increasingly important component of North Carolina's primary care workforce. Over the past decade, the supply of primary care NPs and PAs outstripped physician growth. While physician supply grew by 36.4% between 1996 and 2005, NPs increased by 220.1% and PAs grew by 100.9%. (See Figure 1.) The rapid growth of PA and NP supply has been especially important in rural areas of the state. Between 2001 and 2005, almost half (47%) of the 264 primary care practitioners gained in rural counties were either NPs or PAs. Despite these gains, North Carolina has faced an increasing shortage of primary care practitioners in the state's most underserved counties. Between 2001 and 2005, 30 counties experienced a decrease in primary care practitioners to population ratios compared to 11 counties between 1996 and 2001. Fourteen of the 30 counties where supply declined relative to population have been designated as primary care health professional shortage areas in 6 of the past 7 years.¹ The net result of these trends is that while the overall supply of primary care practitioners is not yet problematic, there is a maldistribution of practitioners across the state.

Practitioners Who Deliver Babies

An important component of primary care is access to obstetric care services. Despite significant anecdotal evidence that fewer providers are delivering babies in North Carolina due to rising malpractice rates, the number of obstetricians/gynecologists and family physicians who reported delivering babies rose between 2000 and 2005. Concomitantly, the number of births per delivering physician declined from 139.3 in 2000 to 125.7 in 2005.^c The supply of certified nurse midwives also increased over the period from 167 in 2000 to 195 in 2004. An important caveat to this generally good news about the supply of obstetric care practitioners is that between 2003 and 2004 there was a 12% decline in the number of family physicians (FPs) delivering babies, and of the 101 physicians who stopped providing deliveries between 2003 and 2004, 56 (56%) were FPs. This represents a disproportionate share since family physicians comprise just 10% of total physicians delivering babies. This trend does not bode well for the distribution of obstetric care in rural areas because family physicians provide 26% of delivery services in rural counties. If their numbers continue to decline at such a rapid rate or action is taken on the

Figure 1.
Cumulative Percent Growth in Primary Care Physicians, Physician Assistants, Nurse Practitioners, and Certified Nurse Midwives, Relative to 1996



^c There was a slight decrease in the supply of physicians delivering babies between 2004 and 2005, but it is unclear whether this decrease reflects a true trend or a data aberration caused by a change in the way the Medical Board collects this information from physicians.

currently debated question of removing obstetrical training from FP training programs, the supply of practitioners who deliver babies in rural areas may be further compromised. As it is, there are 19 counties in North Carolina without a physician who delivers babies;^d 12 of these counties have not had a physician deliver a baby in the last 5 years. While there is evidence that the average distance traveled by women delivering babies has not increased,³ it is not known whether birth outcomes are worse for mothers in counties with no or limited access to obstetrical care.

General Surgeons

Workforce patterns for surgeons echo that of other specialties with an adequate, but poorly distributed, supply. With 0.75 general surgeons per 10 000 population, North Carolina has more general surgeons than the US average (0.60) or other southern states (0.64), but between 2000 and 2005 more than half (53) of North Carolina counties experienced a decrease in the supply of surgeons relative to population, and 5 counties lost all their general surgeons. Seventeen counties had no general surgeons in either 2000 or 2005. General surgeons are a difficult specialty to study from a workforce planning perspective because although they are trained to provide a wide range of surgical services, general surgeons tend to narrow their scope of practice over time in response to the demands exerted by the rapid growth of medical knowledge, patients in their practice, and personal factors.⁴ More research is needed to better understand and monitor the supply of general surgery services in the state.

Psychiatrists⁵

North Carolina is currently in the process of redesigning the way mental health services are delivered. As the provision of mental health services is divested from centralized agencies to community settings, it is crucial to know whether there will be practitioners to care for patients at the community level. While a broad range of professionals treat individuals with mental health disorders, a subset of patients requires consultation and pharmacological treatment by psychiatrists. The overall supply of psychiatrists in the state has been keeping pace with population, and North Carolina ranks 20th in the nation with a ratio of 1.05 psychiatrists per 10 000 population. However, two-thirds of North Carolina counties lost psychiatrists relative to population growth or had no psychiatrists between 1999 and 2004.

Examining the supply of psychiatrists relative to primary care physicians is another important perspective from which to examine the issue because in the absence of psychiatrists the burden of diagnosing and managing mental illness will likely fall on primary care physicians who may also be in shortage. In 2004, 19 counties in North Carolina faced a persistent shortage of primary care physicians; 11 of these 19 counties also had a psychiatrist shortage.

Of more concern than the overall supply of psychiatrists is the shortage of child psychiatrists in the state. A recent study of North Carolina pediatricians found that about 15% of children had a behavioral disorder such as attention deficit disorder, anxiety, or depression.⁶ While PCPs can diagnose and treat many common childhood mental illnesses, a child psychiatrist is needed for more complex cases. In 1995, the state had 102 physicians reporting a primary specialty in child psychiatry, but this number dropped to 91 in 2005. During the same period, the population 18 years and younger grew by 21%. The net effect of these trends was that the ratio of child psychiatrists per 10 000 population aged 18 years and younger dropped 26% (from 0.55 to 0.41). Distribution is also a problem—in 2004, 43 counties had no child psychiatrists and another 42 counties had fewer than one full-time-equivalent.^e

So What? Crafting Policies to Address Shortage Issues

The shortage of child psychiatrists is acute and action needs to be taken to increase supply and improve distribution. The long-term ramifications of not taking action will be deleterious for North Carolina's health care system. As children who receive suboptimal or no psychiatric care mature, they are likely to require even more mental health services than if they had been treated earlier. Lack of access to mental health services will also have personal costs that are borne by children and their parents and societal costs if children are not able to reach their potential due to a lack of access to mental health services. Options include increasing the number of child psychiatry positions in North Carolina residency training programs and placing these positions in community-based teaching sites in rural and underserved communities. The thorny issue of reimbursement must also be addressed. Given that many North Carolina rural communities face both a shortage of primary care and psychiatric physicians, private and public payers need to reimburse for face-to-face and telemedicine consultations between the two practitioner groups. Resources also need to be devoted to developing innovative models of interdisciplinary care that do a better job incorporating nurse practitioners and physician assistants with mental health competencies into the psychiatric workforce team.

With the exception of child psychiatrists, North Carolina's current supply of primary care and specialty practitioners is adequate to meet population needs, but there is a maldistribution of practitioners across the state. Rural counties that have traditionally fared poorly in the competition for practitioners appear to be worse off now than in the past, and the existing maldistribution will be exacerbated as the overall physician supply tightens. To reverse this trend, decision makers must focus attention not only on high visibility options such as developing new or satellite medical schools, but must also

d These data include physicians' reported primary, secondary, and tertiary practice locations.

e Data include primary, secondary and tertiary practice locations for physicians reporting a primary specialty in psychiatry.

consider a broad range of policy interventions to encourage and support rural practice. Strategies that address the maldistribution by increasing overall supply rely on a “trickle down” assumption that practitioners will diffuse across geographic areas. Although research supports a general diffusion of practitioners from urban to rural areas,^{7,8} past experience has shown that more direct policy action is needed to locate practitioners in underserved areas. Resources need to be invested in placing training programs and clinical rotations in underserved areas of the state because practitioners are more likely to settle near where they train.

Financial incentives need to be crafted that not only encourage physicians to move to rural areas but to remain there as well. Loan repayment has proven an effective tool in recruiting physicians to rural areas,⁹ but longer-term strategies to reduce professional isolation and workload need to be implemented to address rural physician retention. North Carolina has a well-established history of collaborative action between health workforce stakeholders that makes it well positioned to both digest, and act upon, shortages of primary care and specialty practitioners. **NCMJ**

REFERENCES

- 1 North Carolina Institute of Medicine. Primary Care and Specialty Supply Task Force Report. Durham, NC. In press.
- 2 Data from the North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research. University of North Carolina at Chapel Hill.
- 3 Felter K. Analysis conducted using hospital discharge data.
- 4 Stitzenberg KB, Sheldon GF. Progressive specialization within general surgery: Adding to the complexity of workforce planning. *J Am Coll Surg.* 2005;201(6):925-932.
- 5 Fraher E, Swartz M, Gaul K. *The Supply and Distribution of Psychiatrists in North Carolina: Pressing Issues in the Context of Mental Health Reform.* 2006. http://www.shepscenter.unc.edu/hp/Psychiatrist_Brief.pdf Accessed April 15, 2006.
- 6 Williams J, Klinepeter K, Palmes G, Pulley A, Foy JM. Diagnosis and treatment of behavioral health disorders in pediatric practice. *Pediatrics.* 2004;114(3):601-606.
- 7 Ricketts TC, Randolph R. Urban-Rural Flows of Physicians. Presented at the International Medical Workforce Conference; March 2007; Vancouver, BC.
- 8 Newhouse JP. Geographic Access to Physician Services. *Annual Review of Public Health.* 1990;11:207-230.
- 9 Pathman DE, Konrad TR, Taylor DH, Koch GG. Outcomes of states' scholarship, loan repayment, and related programs for physicians. *Med Care.* 2004;42(6):560-568.

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Doctors recommend exclusive breastfeeding for the first six months. After that, breastfeed and give your baby iron-rich foods until baby's first birthday.

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Increasing Minority Representation in the Health Professions: One Student at a Time

Patrena N. Benton, MS

Beyond sporadic trips to the clinic for immunization shots, they have limited opportunity to communicate with a physician. A majority of these individuals have never crossed the threshold of a dental office, and they may not understand what the man behind the counter at the local drug store really does. Who are “they” you ask? “They” are the many minority and disadvantaged students who have had limited contact with adequate health care and little to no exposure to any health care practitioners who mirror their image. It is important to understand some of the contributing factors to this harsh reality.

Health Disparities

Many Americans are living longer, and their overall health is improving. However, despite a steady improvement in the overall health of the US population, racial and ethnic minorities, with few exceptions, experience higher rates of morbidity and mortality than nonminorities.¹ This holds true for the citizens of North Carolina. Over the past few decades, enormous strides have been made to enhance the health status and quality of life of all North Carolinians. However, in spite of these gains, a large segment of the state’s racial and ethnic minorities, particularly African Americans, American Indians, and Hispanics, continue to experience a disproportionate burden of poor health and premature mortality compared to their white counterparts.² Several studies have shown that even with equivalent levels of access to care, racial and ethnic minorities experience a lower quality of health services and are less likely to receive even routine medical procedures than white Americans.¹

In addition to examining this epidemic through national discourse, states are addressing the impact of health disparities

on their local home fronts. North Carolina has a long-standing tradition of caring for the health of its citizens. Since 1968, the North Carolina Area Health Education Centers Program (AHEC) Medical Air Operations has transported health science faculty, medical residents, health science students, and university officials to the most remote areas of the state in dire need of health services.³ In 2001, shortly after Governor Mike Easley appointed her as Secretary of the Department of Health and Human Services (DHHS), Carmen Hooker Odom declared eliminating health disparities a priority for the department. The Secretary charged the Office of Minority Health and Health Disparities (OMHHD) with lead responsibility for developing the DHHS Call to Action to Eliminate Health Disparities.² NC OMHHD and the State Center for Health Statistics released the Racial and Ethnic Disparities in North Carolina Report Card 2006. This document reveals some leading health indicators for broad racial and ethnic population groups

“To a great extent, efforts to diversify health care fields have been hampered by gross inequalities in educational opportunities for students of minority racial and ethnic groups.”

for the state, provides supporting data for those health indicators, and assigns a letter grade that ranks the health status of those groups. For instance, the 2000-2004 prostate cancer death rate shown for African Americans (73.0) was divided by the prostate cancer death rate for whites (25.1): $73.0 \div 25.1 = 2.9$. This ratio shows that the prostate cancer death rate for African Americans was 2.9 times as high as the rate for the white population. According to the disparity ratio grading scale, this 2.9 receives a grade of “D.”⁴

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As the state continues to aggressively focus on this health dilemma, it must also address the shortage of health care practitioners with specific emphasis on increasing the percentage of minority practitioners. Empirical evidence is mounting that compared to whites minorities are more likely to serve the underserved.⁸

Underrepresented Minorities (URMs) Missing from Health Careers

America is experiencing a “browning effect.”⁵ Due to the rapid increase in minority populations, the country is becoming increasingly more diverse. Unfortunately, the same cannot be said for the diversification of the health care professions. To a great extent, efforts to diversify health care fields have been hampered by gross inequalities in educational opportunities for students of minority racial and ethnic groups. The supply of URM students who are well-prepared for higher education and advanced study in health professions fields has thus suffered.⁶ As stated in the Sullivan Commission’s Missing Person’s Report, increasing diversity in the health care professions will improve health care access and quality for minority patients and assure a sound health care system for all of our nation’s citizens. It will also strengthen health care delivery systems at multiple levels, enhance educational experiences for all health professions students, promote relevant research and needed changes in health policy, and prepare our nation for the emerging and culturally dynamic health care challenges of tomorrow.⁷ Therefore it is not difficult to surmise that increasing the diversity of our health care professionals is of immense benefit to all citizens. Consequently, health preparation programs are vital vehicles for developing this pool of future practitioners.

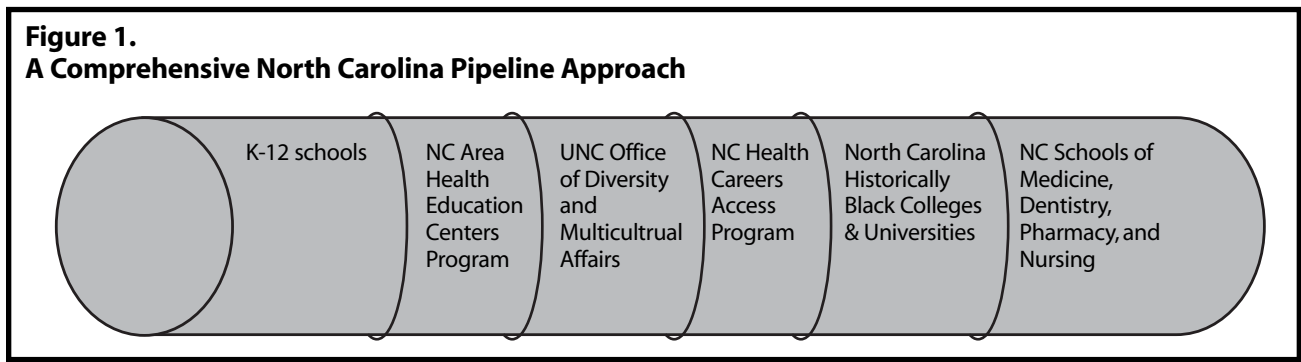
Over the years, various academic and enrichment programs have been established at universities across the country to address the shortage of minority and disadvantaged students entering into graduate and health professional programs. These programs have mainly focused on preparing students at the undergraduate and postgraduate levels. However, in order to increase the percentage of matriculants to a more significant level, students must be exposed to health careers at an earlier age.

A North Carolina Comprehensive Pipeline Approach

In theory, a pipeline from primary to secondary to postsecondary education and finally to professional training channels the flow of a diverse and talented stream of individuals into the nation’s health care workforce. However, in reality, not all students flow equally through the pipeline to the health care professions. Instead, race and ethnicity often substantially influence an individual’s forward motion at every stage of the pipeline.⁷

Through years of effective collaboration, many North Carolina institutional partners have worked to create seamless pipeline approaches to increasing opportunities for minority and disadvantaged students pursuing health careers. Collaborators from various sectors of the state such as the K-12 public schools, statewide centers, historically black college and universities, and private and public higher educational schools have created a notable comprehensive pipeline approach.

Over the last three decades, several North Carolina programs were created to address the underrepresentation of minority and disadvantaged students in the health professions. Founded by Dr. Cecil G. Sheps in 1971, the North Carolina Health Careers Access Program (NC-HCAP) is one such program. Together with the North Carolina AHEC Program, NC-HCAP’s 4 campus-based centers have exposed thousands of North Carolina’s K-12 students to health career offerings. Precollege students also benefit from additional structured programs that AHEC offers throughout the year. As students progress through their undergraduate careers, strong recruitment support is rendered by the University of North Carolina (UNC) Office of Diversity and Multicultural Affairs as well as health science advisors at minority serving institutions within the state. Undergraduate students with interests in various health professions apply for entry into NC-HCAP’s Science Enrichment Preparation (SEP) Program. SEP is an 8-week, honors-level academic enrichment program for disadvantaged undergraduate students seeking to increase their level of competitiveness for admissions into graduate/health professional programs. Since its inception in 1979, 834 students have completed the SEP Program. Of that number, currently 86% of these participants are either practicing in a health care field, enrolled in health professions training programs, or completing undergraduate prerequisites for these programs.⁹ Freshman and sophomore



college students interested in medicine or dentistry can apply to the Summer Medical Dental Education Program (SMDEP) at Duke University School of Medicine. For rising seniors and postgraduates with an interest in medicine or dentistry, the natural choice is the Medical Education Development (MED) Program sponsored by the UNC Schools of Medicine and Dentistry. MED offers a structured summer curriculum at the level of professional education to increase the ability of advanced preprofessional candidates, especially those who are disadvantaged, to compete successfully for admission to health professional schools. Since 1974, 88% of the 1886 students who have attended the MED summer program decided to apply to health profession schools. Ninety percent gained admission with 80% matriculating into medical or dental school; the remainder entered other health professional schools.¹⁰ Clearly, this approach has successfully assisted many in becoming the health practitioners they are today. Yet, despite this history of success, the majority of these programs are in constant jeopardy of being eliminated.

Federal Budget Cuts

In addition to the support received by their host institutions, pipeline programs have existed due to the support of federal funding. However, when the federal administration's priorities shift so does the funding. Such a shift occurred in 2006 when the Bush administration enacted drastic cuts to the Health Resources and Services Administration's Title VII Health Professions Education Programs, which supports facilities, initiatives, and individuals engaged in health professions training with an emphasis on recruiting practitioners for rural and other medically underserved areas.¹¹ The President's 2008 budget has proposed a complete elimination of Title VII and nearly a 30% reduction in Title VIII Nursing Education Programs. This action has dire implications for the future workforce supply. These two funding streams are the only federal programs designed to train practitioners in multidisciplinary settings to meet the needs of special and underserved populations as well as increase the minority representation in the health care workforce. Graduates of these programs are 3 to 10 times more likely to practice in underserved areas and are 2 to 5 times more likely to be minorities.¹²

This federal action has in fact reduced and/or eliminated numerous health professional preparation programs across the country despite their long-standing successes. These programs must recognize their vulnerabilities and the need to validate their continued existence.

Future Direction: Data, Development, Discourse

Pipeline programs have been the saving grace for many minority and disadvantaged students aspiring to be health care practitioners. In light of funding woes, many of these pipeline programs forge ahead, recognizing that in order to create sustainability three areas must become a priority: (1) data collection, (2) development initiatives, and (3) discourse.

Institutional and policy-level strategies for increasing diversity in health professions, however, have been relatively understudied. This lack of emphasis may lead to a void of strategies should future policy changes erode efforts to increase diversity.⁶ These programs are attempting to validate their existence through increased efforts to collect data on program graduates. This data collection will assist in demonstrating how many of their program participants completed additional pipeline programs, gained admissions into graduate or health professional programs, and ultimately graduated from these degree programs. Additionally, many of the above programs are striving to evaluate the total impact made not only on increasing the percentage of minority practitioners nationwide but also on how many have remained in North Carolina to serve the people of the state.

With the cyclical nature of federal funding and the economic reality of sparse institutional support, pipeline programs are forced to look in new directions for fiscal resources. One such direction is from their alumni base. The successful impact these pipeline programs have made on the lives of these individuals is evidenced by their willingness to give back. Alumni are demonstrating commitment of support through the development of scholarships and assisting in the creation and funding of program endowments. Additionally, foundations' attention to addressing health disparities and workforce shortages has been unwavering. Historically, they have allocated major funding to support efforts in these areas. As these health disparities and workforce shortages remain on the agenda of the state and nation, philanthropic institutions' interest and dedication to these pressing issues will not dissipate.

Pipeline program accomplishments must no longer be confined within their program walls but shared with the community at large. The disclosing of program outcomes through publications and presentations will assist in creating sustainability and the sharing of best practices and successful models for replication throughout the country.

As North Carolinians, we must continue to recognize that work still remains to be done and continue to be diligent in our commitment to the health of all of our citizens. It is imperative that the pathway to becoming a health professional is open to every student of our great state. Ultimately, we all benefit from a future health care workforce that is reflective of the growing diversity of our society.

REFERENCES

- 1 Smedley BD, Stith AY, Nelson AR, eds. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, DC: National Academies Press; 2003:29.
- 2 *From Disparity to Parity in Health Eliminating Health Disparities Call to Action*. Raleigh, NC: NC Department of Health and Human Services, Office of Minority Health and Health Disparities; 2003:19.
- 3 Medical Air Operations. NC Area Health Education Centers Program Web site. <http://www.ncahec.net/about/airop.htm>. Accessed April 25, 2007.
- 4 *Racial and Ethnic Health Disparities in North Carolina Report Card 2006*. Raleigh, NC: NC Department of Health and Human Services, Office of Minority Health and Health Disparities and State Health Center for Statistics; 2006:4-5. <http://www.schs.state.nc.us/SCHS/pdf/ReportCard2006.pdf>. Accessed April 25, 2007.
- 5 Rodriguez R. *Brown: The Last Discovery of America*. New York NY: Viking; 2002.
- 6 Smedley BD, Stith Butler A, Bristow LR, eds. In the Nation's Compelling Interest. Washington, DC: National Academies Press; 2004:24.
- 7 Missing Persons: Minorities in the Health Professions. A Report of the Sullivan Commission on Diversity in the Healthcare Workforce; 2004:72.
- 8 North Carolina Minorities are Underrepresented in the Health Professions. NC IOM Task Force on Primary Care and Specialty Supply, 2007.
- 9 The Science Enrichment Preparation Program. North Carolina Health Careers Access Program Web site. <http://nchcap.unc.edu/sepworks.html>. Accessed April 25, 2007.
- 10 The Medical Education Development Program. North Carolina Health Careers Access Program Web site. <http://www.med.unc.edu/oed/med/>. Accessed April 25, 2007.
- 11 AAMC Reporter: April 2006. American Association of Medical Colleges Web site. <http://www.aamc.org/newsroom/reporter/april06/titlevii.htm>. Accessed April 25, 2007.
- 12 Abreu JC. 2007. Statement to the House Labor-HHS-Education Appropriations Subcommittee on the FY 2008 Funding Recommendations for the US Public Health Services Agencies and Programs. Advisory Committee on Training In Primary Care Medicine and Dentistry: Evaluating The Impact of Title VII Section 747.

The Area Health Education Center's Role in North Carolina's Health Workforce Development

Thomas J. Bacon, DrPH; Samuel Cykert, MD

The North Carolina Area Health Education Centers (AHEC) Program was founded in the early 1970s to address critical shortages of health professionals, with a particular focus on the primary care needs of rural communities in the state. From the outset, AHEC was designed as a comprehensive workforce development program to augment the work of the academic health centers in preparing health professionals to meet the needs of these underserved communities. The AHEC Program was created under the premise that the state would only successfully improve the supply and distribution of health practitioners if it put in place a comprehensive, multidisciplinary set of regionally-based programs to influence all stages of the health professions education and practice pipeline. As a result, AHEC's core services include:

- Programs to recruit young people into health careers, with a special focus on underrepresented and disadvantaged students.
- Comprehensive community-based experiences for health professions students in communities across North Carolina.
- Primary care residencies to prepare physicians to meet the needs of underserved communities in the state.
- Continuing education programs for all types of health professionals to improve the environment for practice and strengthen the quality of health care.
- Library and information services to provide the latest health information for students, residents, and health professionals.

In order to increase the supply of primary care physicians in the state, primary care residency programs were established in 5 AHECs in the state in the 1970s. They were developed in collaboration with the large community teaching hospitals in Charlotte, Greensboro, Asheville, Wilmington, and Fayetteville. In addition, a substantial rotational site for University of North Carolina at Chapel Hill residents was created at WakeMed/Wake AHEC. These residency programs in family medicine, general internal medicine, pediatrics, and obstetrics and

gynecology have graduated nearly 2000 graduates since the late 1970s. Of these, over 1100 are now practicing in North Carolina, providing vitally needed primary care services to communities across the state. Without these physicians, a substantially higher number of North Carolina counties would currently be categorized as health professional shortage areas than is currently the case.

In addition to primary care, since 1985 the AHEC Program has partnered with the 4 departments of psychiatry at the medical schools in the state. Through AHEC, psychiatry residents from all 4 schools receive rotations in community settings across North

“The AHEC Program was created ... to influence all stages of the health professions education and practice pipeline.”

Carolina, many of these in rural and small towns. These rotations are designed to give residents experiences in community and public psychiatry and to expose them to opportunities for practice upon graduation. Although the evidence is antidotal, it appears that these experiences have increased the number of graduates choosing careers in the public mental health field.

The Area Health Education Centers Program has also been a partner in the dramatic growth in the numbers of students and graduates in the physician assistant, nurse practitioner, and

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nurse midwifery programs in the state. The Area Health Education Centers Program's support for community primary care experiences for these students has contributed to the schools' abilities to expand enrollments and further impact the availability of primary care services in the state. The number of primary care nurse practitioners (NPs) and physician assistants (PAs) has nearly doubled during the past 10 years to approximately 1300 NPs and 1100 PAs actively practicing in the state.

The mission to support North Carolina's health care workforce remains active and the North Carolina AHEC Program is addressing the state's primary care practitioner needs in several ways. First, the program continues its support for educational opportunities in the state's communities for medical, physician assistant, nurse practitioner, and nurse midwifery students at every level of training by recruiting preceptors, providing nominal preceptor payments, and arranging housing and library services for participating students from all schools in the state.

Second, AHEC-supported primary care residency programs, with a robust 65% North Carolina retention rate, continue to serve as an efficient reservoir of new primary care doctors in the state. These residencies produce approximately 50 graduates in family practice, 24 in internal medicine, 6 in pediatrics, and 12 in obstetrics and gynecology annually.

Third, AHEC has been working in close collaboration with the Office of Rural Health and Community Care, the Division of Mental Health, Developmental Disabilities, and Substance Abuse Services, the professional associations, and others to develop a series of community-based initiatives to build on the existing infrastructure of primary care with integration of psychiatric clinical care and consultation to simultaneously meet patients' physical and mental health needs. These model programs are being developed in a number of communities across the state by building on the unique characteristics and assets of each community.

Ongoing efforts have been productive, but AHEC will have to do more to address looming practitioner shortages and ongoing concerns of maldistribution and lack of diversity in our health care professions. If we are truly to create a strong and stable primary care workforce for all communities in the state, though, it must be acknowledged that more comprehensive solutions need to be forthcoming. For instance, there will never be an adequate pool of primary care physicians or psychiatrists without payment reform at the national level that narrows the income gap between specialties. Such reform should place appropriate value on primary care as well as other cognitive services. We will not draw large numbers of graduates to rural areas without selectively admitting rural students to medical school, alleviating heavy medical school debt, and providing monetary incentives and systems of care that make rural practice more attractive to future practitioners.

Similar issues and solutions apply to the recruitment of underrepresented and disadvantaged students as well. Our pipeline programs to support students must be better connected at all levels of the educational process. Additional scholarship funding is essential, and strong academic and social support services are critical if all students are to thrive and reach their full potential.

Given these caveats and limitations, what more can AHEC

do? One step is to leverage the success of our primary care residencies. We can increase the number of residency slots. By simply maintaining current retention rates, we will produce more doctors in needed specialties for North Carolina. One of the recommendations of the North Carolina Institute of Medicine Primary Care and Specialty Supply Task Force is to create 100 new residency positions in North Carolina, and AHEC is prepared to play a lead role to assure that the state's investment gives us the return we need by producing doctors in specialties most needed by the state's communities.

In the same vein, we are prepared to expand training opportunities for students of all types and to create stronger incentives for moving training into rural and underserved sites. We also must track our pipeline programs better and identify strategies that most effectively direct talented young people to the health professions of our state.

In addition and most importantly, simply adding students and residents to the educational pipeline will not keep pace with the escalation of services needed for the anticipated pace of population growth and aging. Improving and organizing systems of care, especially for chronic illness, will be crucial to improving access to care and health outcomes for North Carolinians. Given AHEC's strong ties to the health profession schools, its faculties on and off campus, and practitioners in local communities, it is in a unique position to coalesce and disseminate novel approaches to care in rural and underserved regions in collaboration with the nationally recognized Community Care Networks across the state. These approaches can use new options for technology support, regional on-call systems, and multidisciplinary teams to create and monitor coordinated systems of care that achieve excellence in health care milestones. With such innovation, we will build teams that make rural health care more rewarding and relieve the imponderable stress on harried practitioners in small practices who want to but cannot muster the resources to provide such comprehensive care. It will be crucial for residents and students to venture away from large medical centers and fully participate in these new styles of care so that they can embrace careers in these communities and serve as leaders in the transition toward innovative approaches.

Increasing the number of trainees at every level will inevitably increase the cost of medical education. We will need new teachers that include AHEC-based faculty and dedicated community preceptors. Sites for comprehensive care models will need to be recruited and created. If we want quality sites and quality teachers, we will need to pay for them. We will also have to finance the informatics systems and other innovative changes required to achieve new paradigms for educational and chronic care work. Finally, residency positions, traditionally supported by the Medicare program, are frozen, so we will have to pay directly for any new AHEC residency slots until federal policy changes. The reward for this investment will be better care for all North Carolinians garnered through prevention of practitioner shortages, improved distribution of care, and use of more efficient, more organized, and more effective systems of care. **NCMJ**

The Impact of Primary Care and What States Can Do

Barbara Starfield, MD, MPH; Leiyu Shi, DrPH, MBA

Despite the availability of evidence on the benefits of primary care on population health, little has been done to incorporate this evidence into planning for and evaluation of health services in the United States. In contrast, many industrialized nations have undergone major health system reform to make primary care the essential infrastructure of their health system. Some of these reforms resulted from legislation, as was the case in Spain and Australia, and others have entailed policy decisions to strengthen the practice of good primary care, as has occurred in the United Kingdom (UK) and is now occurring in various aspects of primary care in Sweden, France, and Germany. The reasons the US has not embraced primary care are complex and get to the heart of the characteristics of the US health services system, particularly its increasing dominance by special interest groups such as the academic medical establishment and specialty orientation, medical device manufacturers, and fee-for-service reimbursements that favor specialty practice.¹

In this paper we briefly review the evidence for the impact of primary care in improving health, increasing equity, and reducing total health system costs; discuss the rationale for benefits of a primary care orientation within health services systems; and conclude with a discussion of needed additional research and policy attention.

Benefits of Primary Care

The first systematic study of the benefits of primary care on health and costs of care consisted of an international comparison of 11 western industrialized nations using data from the mid-1980s.² The study was repeated a decade later with 13 countries including Japan.³ Both studies rated

countries on policy characteristics encouraging primary care and practice characteristics reflecting primary care organization: first contact care; person-focused care over time; degree of comprehensiveness within primary care; and coordination of care. The studies were consistent in showing that some countries rated very poorly on primary care whereas others rated better. Those in the former group had poorer health on many population health measures including but not limited to life expectancy at various ages, age-adjusted mortality, and infant mortality (neonatal and postneonatal separately). They also were more costly health systems. These findings were robust and persisted even after controlling for various health-related characteristics of the population (such as extent of risky behaviors in the population). Confidence in the findings was provided by a pooled time series analysis of 18 Organization for Economic Co-operation and Development (OECD) countries that controlled for additional health and health system-related characteristics (such as percent

“Analyses of the impact of access to primary care, and to different levels of quality of primary care services, are all consistent in showing that the greater the access to primary care and the better the quality of primary care, the better the health—regardless of the measure of health”

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elderly, gross domestic product, and total number of physicians). This analysis showed that life expectancy in countries with weak primary care was lower than that in countries with stronger primary care and that this difference had been widening over time.⁴

Although there is additional evidence of similar benefits of primary care from other studies,⁵ in this paper we focus primarily on findings from studies of US states because of the particular interest of North Carolina in the physician workforce. In all studies we included family physicians and general practitioners, general internists, and general pediatricians as primary care physicians because earlier evidence showed that these “specialties” rated higher on primary care characteristics than did other specialties.⁶

Primary Care in US States

In the 1990s, a series of studies examined and found a significant and positive relationship between the supply of primary care physicians and a variety of measures of health including all-cause mortality; mortality from heart disease, cancer, and stroke; infant mortality; low birth weight; and self-reported health. This relationship existed even after controlling for personal and environmental characteristics at the state level including education, income, environmental pollution, unemployment, percentage elderly, percentage urban, minority composition, and lifestyle factors including seatbelt use, obesity, and smoking.^{7,8,9}

Consequent to the appearance of new literature on the relationship between income inequality at the state level and some health outcomes,^{10,11} a series of analyses was designed to examine the relationship between primary care physician supply and health measures at the state level, while also considering the influence of income inequality in the state. In 1999, Shi and colleagues¹² showed that both income inequality and primary care physician supply had strong relationships with life expectancy, all-cause mortality, stroke mortality, and postneonatal mortality. They also found that smoking rates were related to these outcomes, but the influence of primary care physician supply persisted after controlling for smoking rates.

Subsequent studies refined the analysis to take account of possible other influences on population health levels including the supply of other specialists. In both time-lagged as well as contemporaneous studies, the supply of primary care physicians was associated with lower all-cause mortality whereas a greater supply of specialists was associated with higher rates of all-cause mortality. Furthermore, the beneficial influence of primary care physicians was entirely due to the supply of family physicians (rather than general internists and pediatricians).¹³ Additional confirmation of these positive impacts of primary care physicians came from studies of mortality from stroke, using 11 years of state-level data and adjusting for degree of income inequality, educational level, unemployment rates, racial/ethnic composition, and percentage of the population living in urban areas.¹⁴ The benefit on stroke mortality of better access to primary care is consistent with hypothesized mechanisms by which better primary care is associated with earlier and better control of common risk factors for stroke (especially hypertension). Similarly, the reduction

in low birth weight and infant mortality (especially postneonatal mortality), even after one-, three-, and five-year lag periods, is associated with primary care physician supply,¹⁵ a finding that is consistent with better maternal health before pregnancy and better availability of resources to deal with infections—a common cause of death in the postneonatal period.

Analyses of the impact of access to primary care and to different levels of quality of primary care services are all consistent in showing that the greater the access to primary care and the better the quality of primary care, the better the health—regardless of the measure of health—whether at the aggregate or individual level of analysis. These benefits have also been quantified. Macinko and colleagues¹⁶ identified 10 studies that met the criteria for adequacy of study of the relationship between primary care physician supply and all-cause mortality; cancer, heart disease, stroke, and infant mortality; low birth weight; life expectancy; and self-rated health. The relationship held regardless of the year studied (from 1980-1995) and geographic level of analysis. Pooled results for all-cause mortality indicated that an increase of one primary care physician per 10 000 population was associated with an average mortality reduction of 5.3%, or 49 deaths per 100 000 population per year.

Additional analyses within some of these studies indicate that the beneficial impact of primary care on African Americans was even greater than for the majority population—evidence of an equity-producing effect of primary care.⁵

A wide variety of other studies conducted at different levels of geographic aggregation (metropolitan, county, urban, rural areas), both in the US and in the UK, support the conclusions of the US state-level analyses, with a few exceptions. For example, Ricketts and Holmes,¹⁷ using pooled 1996-2000 US county data, found that the association between primary care physician supply and mortality was not uniformly observed and that strong regional patterns may explain the lack of a consistent national association based on their county-level data. Primary care physician supply was associated with decreased mortality on the East Coast and in the upper Midwest, but that correlation disappeared or was reversed in the west (with the exception of Washington state) and south central states. Further study is needed to understand these regional differences and the policy alternatives to address them because it is likely that the balance between the supply of primary care and specialist physicians and the influence of major medical centers (with their strong specialty focus) have an influence on people's use of primary care rather than specialty care. Overall, these empirical analyses (particularly at the state level, where there is less of a “cross-over” effect, ie, people seeking medical care across state borders) are consistent with theoretical considerations as to why primary care should have a beneficial impact on population health. Primary care is more accessible than specialty care, and its individual features (first contact care, person-focused care over time, comprehensiveness of care, and coordination of care) have all been shown to produce better outcomes.^{5,18} International comparisons of countries show that, of the 4 features just mentioned, comprehensiveness of the package of services offered in primary care practices is the practice characteristic most consistently

associated with better primary care overall.³ That is, the more aspects of health care that are covered in primary care, the better the health outcomes, at least partly due to fewer unnecessary referrals to specialists. Common problems belong in primary care; less common or rare ones belong in specialty care because the training of specialists in tertiary medical centers better suits them to care for people who have been filtered by primary care and thus have a higher likelihood of serious or more uncommon illness. When patients go directly to specialty care, much of their care is inappropriate, as they are suffering from illnesses that are common in the population and thus better dealt with by physicians with training in how illness presents in the community, ie, primary care practitioners. As a result, US studies show that higher ratios of specialists to population are often associated with worse outcomes for common causes of mortality and morbidity.¹⁹

Popular belief that specialist care is superior to primary care is contradicted by the results of a variety of studies in which the outcomes are generic, ie, not specific to particular diseases. In this category are life expectancy, all-cause age-adjusted mortality, self-reported health, and low birth weight. In fact, for common causes of death, such as acute myocardial infarction, the outcomes are equally good for family physicians as for cardiologists, once a variety of patients' characteristics are taken into account.²⁰ The fact that generalists' patients are usually sicker than the patients of specialists in studies of this type provides clues about why direct access to specialists leads to worse population outcomes. Because of where specialists are usually trained, they are unaccustomed to seeing patients other than those with problems clearly in their field of specialty; these patients are not representative of patients in the community because the general population of patients has more comorbidity and a more complex pattern of illnesses, even though any given problem seen in a specialty clinic is more likely to be serious than the same problem in the community. Specialists thus learn to do more testing than would be necessary in generalist practice, with consequently more false positive results, adverse effects from the resulting cascade of tests, and with much higher costs.

What Can States Do to Maximize Population Health Through Workforce Policy?

In the absence of federal efforts to reform health care financing and to enable either a single payer system or more uniform health insurance policies through regulation of the many insurance programs, states have a limited number of options to encourage greater and better provision of primary care. At the very least, they can initiate policies to target state funding of medical teaching programs to institutions focusing on primary care training and provide greater financial support (as through loan forgiveness) to physicians who specialize in primary care. They also can encourage or mandate lower payments to specialists for patient visits NOT made by referral from a primary care practitioner. Additionally, they can increase reimbursement rates to providers who demonstrate that they deliver primary care in ways to achieve its benefits; instruments are available to document the primary care orientation of practices.¹⁸

States could also encourage professional collaboration to develop guidelines for referral or at least to examine the nature of the relative contributions of primary care practitioners and specialists in the care of people with particular health problems or combinations of health problems. The important characteristics of primary care are well known; the same is not the case for specialist practice.¹⁹ As licensing of medical practitioners is in the jurisdiction of states, new licenses could be granted to practice in the state only for areas needing physicians, thus enabling more equitable distribution of both primary care and specialist physicians. Where states have jurisdiction over reimbursement for services, they can use this power to better equalize professional earnings of primary care and specialist physicians. States could also, through their support of medical training programs, require that physicians in training evaluate their own practices with regard to the costs of care that they generate, improvement of the patients' problems (not only biomedical markers for the disease of particular interest) as a result of their interventions, and occurrence of adverse effects consequent to their interventions. And, through the National Governors Conference, states could bring pressure on the federal government to develop a workforce policy that is better informed with evidence on population health needs and maldistribution of the physician workforce.

State efforts to use existing evidence to develop their own workforce policies could be key in improving the poor position of the US, relative to other industrialized countries, with regard to the population's health. **NCMJ**

REFERENCES

- 1 Bodenheimer T, Berenson RA, Rudolf P. The primary care-specialty income gap: why it matters. *Ann Intern Med.* 2007;146(4):301-306.
- 2 Starfield B. Primary care and health. A cross-national comparison. *JAMA.* 1991;266(16):2268-2271.
- 3 Starfield B, Shi L. Policy relevant determinants of health: an international perspective. *Health Policy.* 2002;60(3):201-218.
- 4 Macinko J, Starfield B, Shi L. The contribution of primary care systems to health outcomes within Organization for Economic Cooperation and Development (OECD) countries, 1970-1998. *Health Serv Res.* 2003;38(3):831-865.
- 5 Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. *Milbank Q.* 2005;83(3):457-502.
- 6 Weiner JP, Starfield B. Measurement of the primary care roles of office-based physicians. *Am J Public Health.* 1983;73(6):666-671.

- 7 Shi L. The relationship between primary care and life chances. *J Health Care Poor Underserved*. 1992;3(2):321-335.
- 8 Shi L. Primary care, specialty care, and life chances. *Int J Health Serv*. 1994;24(3):431-458.
- 9 Vogel RL, Ackermann RJ. Is primary care physician supply correlated with health outcomes? *Int J Health Serv*. 1998;28(1):183-196.
- 10 Kennedy BP, Kawachi I, Prothrow-Stith D. Income distribution and mortality: cross sectional ecological study of the Robin Hood index in the United States. *BMJ*. 1996;312(7037):1004-1007 (Erratum: *BMJ*. 1996;312(7040):1194).
- 11 Kaplan GA, Pamuk ER, Lynch JW, Cohen RD, Balfour JL. Inequality in income and mortality in the United States: analysis of mortality and potential pathways. *BMJ*. 1996;312(7037):999-1003.
- 12 Shi L, Starfield B, Kennedy BP, Kawachi I. Income inequality, primary care, and health indicators. *J Fam Pract*. 1999;48(4):275-284.
- 13 Shi L, Macinko J, Starfield B, Wulu J, Regan J, Politzer R. The relationship between primary care, income inequality, and mortality in US states, 1980-1995. *J Am Board Fam Pract*. 2003;16(5):412-422.
- 14 Shi L, Macinko J, Starfield B, Xu J, Politzer R. Primary care, income inequality, and stroke mortality in the United States. A longitudinal analysis, 1985-1995. *Stroke*. 2003;34(8):1958-1964.
- 15 Shi L, Macinko J, Starfield B, et al. Primary care, infant mortality, and low birth weight in the states of the USA. *J Epidemiol Community Health*. 2004;58(5):374-380.
- 16 Macinko J, Starfield B, Shi L. Quantifying the health benefits of primary care physician supply in the United States. *Int J Health Serv*. 2007;37(1):111-126.
- 17 Ricketts TC, Holmes GM. Mortality and physician supply: Does region hold the key to the paradox? *Health Serv Res*. 2007; in press.
- 18 Starfield B. *Primary Care: Balancing Health Needs, Services, and Technology*. New York, NY: Oxford University Press; 1998.
- 19 Starfield B, Shi L, Grover A, Macinko J. The effects of specialist supply on populations' health: assessing the evidence. *Health Aff*. 2005 March 15;W5:97-107. <http://content.healthaffairs.org/cgi/reprint/hlthaff.w5.97v1>. Accessed April 12, 2007.
- 20 Hartz A, James PA. A systematic review of studies comparing myocardial infarction mortality for generalists and specialists: lessons for research and health policy. *J Am Board Fam Med*. 2006;19(3):291-302.

The Impact of Health Care and the Allied Health Workforce on North Carolina's Economy

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Program Description

This symposium is designed to educate policy and decision makers about the relationship between economic development and allied health workforce development efforts in the state. We will discuss the challenges confronting allied health workforce educators and employers, and profile some best practice models. The conference will also create an opportunity for networking and building collaborations among the many folks from the allied health workforce and economic development groups who are working on these issues every day.

There will also be an important announcement made by the National Governors Association Allied Health Sector Strategy Initiative team regarding a future RFP for regional planning grants.

Objectives:

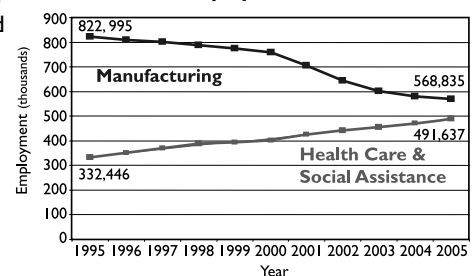
- Discuss the relationship between economic development and allied health workforce development efforts in the state.
- Describe the challenges confronting allied health workforce educators and employers.
- Identify best practice models used to meet these challenges.

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Manufacturing and Health Care & Social Assistance Employment, NC, 1995-2005



Source: North Carolina Employment Security Commission, 2006.

Critical Connections Between Health Care and Economic Development in North Carolina

Aaron McKethan

This issue of the *Journal* opens with a discussion of how the supply and distribution of health professionals in North Carolina is important to access to care. As the authors point out, policy action is necessary to ensure the right mix of health care professionals in the right locations to meet the state's current and future health care needs. Moreover, current and future health workforce shortages have important implications that go beyond the specific health care needs of individuals and communities. By providing important health care services, health care professionals also play an increasingly important but often underappreciated role in creating and sustaining vibrant economies.

The Health Care Industry as a Growing Source of Jobs

By now every policymaker in North Carolina is keenly aware that the state's economic landscape is changing. This transition is from a largely goods-producing manufacturing-based economy to an economy and workforce increasingly oriented around service industries. A prime example of the latter is the expansion of the number of health service occupations and the number of jobs in those occupations in recent decades.

Job growth in health services at all skill and wage levels has taken place in both rural and metropolitan areas of the state. In 1990, there were about 261 000 health care and social assistance workers in North Carolina, representing about 9% of the state's total workforce. By 2006, that figure had nearly doubled to 509 000 workers, accounting for 13% of the state's total workforce (roughly the same size, in terms of total employment, as the manufacturing industry).¹

Growth in health service jobs has been particularly rapid in rural parts of the state. As the state's total economy changes, the growing health care industry has helped to sustain local economies, particularly in rural areas where plant closings and

business downsizing have eliminated jobs and transformed communities. This growth is likely to continue. As the issue brief points out, growing demand for health care professionals and other workers will be driven by demographic changes, population growth, and epidemiological trends as well as new advances in medicine.

“Ensuring an optimal supply of health care professionals to ensure a region’s health care needs can also have important spillover effects on a region’s attractiveness for new or existing businesses.”

The Flow of Health Care Money

To view the health services industry through the lens of economic development, it is important to understand the health care system's complex (some would say “Byzantine”) third-party financing structure. Public and private health care expenditures typically flow not to patients who receive health care services, but directly to health care institutions and medical providers supporting health care jobs. Additionally, some regions are more dependent on government health care spending than others. In Avery County in rural northwest North Carolina, Cannon Memorial Hospital is the largest employer. Cannon receives about 70% of its inpatient revenue from the Medicare program and another 10% from Medicaid. Thus, the county's largest employer receives a substantial portion of its income from federal and state health care programs.² This suggests the importance for economic developers and policymakers to

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understand the flow of health care dollars in different parts of the state and to observe how public and private health care dollars trickling through the economy are connected to growth in health care jobs.

Health Care and Business Competitiveness

Ensuring an optimal supply of health care professionals to ensure a region's health care needs can also have important spillover effects on a region's attractiveness for new or existing businesses.

First, businesses seeking new areas in which to locate facilities must ensure, among other things, that the local health care infrastructure is adequate to meet the needs of its employees. *Expansion Management*, a publication that disseminates information for businesses seeking to identify the best locations to establish new plants and other facilities, recently developed a "Health Quotient" ranking of regions. This was done partly in response to business demand for information to evaluate the availability of health care providers and other health-related issues at a regional level. Like information about tax rates, local schools, transportation infrastructure, and crime rates, business executives making site selection decisions may consider health care infrastructure and provider supply measures in their research of prospective regions.

Second, access to health care professionals can also have an important impact on the health and productivity of a region. This may play a role in businesses' site selection decisions as well. Bob Greczyn, chief executive officer of Blue Cross and Blue Shield of North Carolina, has suggested that promoting a healthy population can serve as a competitive advantage for corporations considering relocating to the state. Greczyn argued that a "a healthier work force [would] be more productive, have a significantly lower absenteeism rate and probably generate lower workers' comp costs," which could help North Carolina "stand out from the pack in the competition for new jobs."³ Of

course, regional health care status and worker productivity are also key issues affecting the bottom lines of existing firms as well. This includes some of the state's leading firms in the biotechnology, medical devices, and other health-related industries that are providing an increasing supply of high-tech jobs in the state.

To be sure, healthy regions depend on, among other things, an adequate supply of health care professionals including physicians, physician assistants, nurse practitioners, and others.

Moving Forward

In sum, the growing health care sector has created new jobs in a state undergoing a profound economic transition. Adequate access to health care professionals can increase quality of life and worker productivity through healthier individuals and communities.

Policy choices governing health care supply and provider reimbursement issues should be based on meeting the state's health care needs, not explicitly on job creation or achieving other economic benefits. However, it is important for policy makers and economic developers to understand the numerous connections between health care infrastructure, provider reimbursement, and regional economic attractiveness and productivity.

Of course, the health care community should be willing to embrace change and innovation as well. Given very high health care costs and uneven quality outcomes in the health care arena, health care professionals themselves can play a lead role in improving the economic value their profession confers on individuals and local communities.

On balance, the connections between health care and economic development are indeed critical for North Carolina. **NCMJ**

REFERENCES

- 1 Author's analysis of data provided by the North Carolina Employment Security Commission.
- 2 From author's previous conversation with Eddie Greene, then-CEO of Avery Health Care System (11/10/05).
- 3 Bob Greczyn. November 26, 2005. An Edge in Worker's Health. *News and Observer* (Raleigh). <http://www.newsobserver.com/559/story/371179.html>. Accessed April 16, 2007.



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Running the Numbers

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

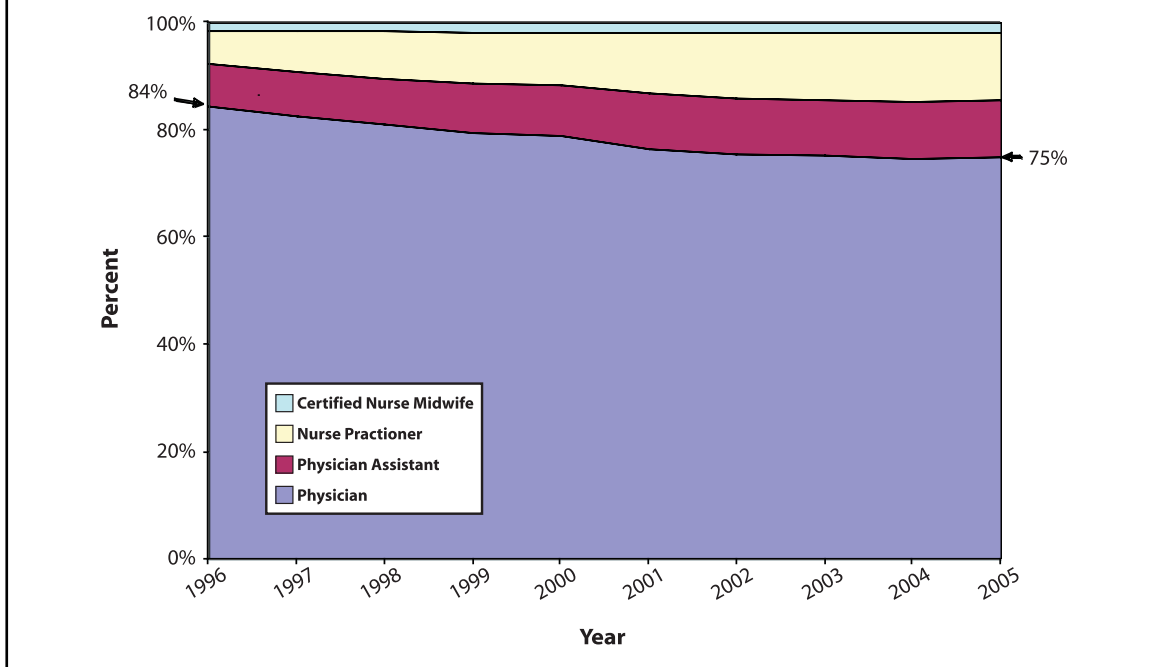
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Supply of Primary Care Practitioners by Profession

As highlighted in this issue's commentary by Barbara Starfield and Leyiu Shi, primary care practitioners are important to the overall health of populations. Historically, the primary care practitioner from whom most individuals received care was their local general practice physician. However, over time factors have changed the landscape of primary care practice. Today, many individuals receive primary care from nurse practitioners, physician assistants, and certified nurse midwives as well as from physicians. This section will evaluate how the composition of primary care practitioners has changed over time and may vary in communities across North Carolina. For the purposes of this analysis, primary care practitioners are defined as those practitioners who self-designated in their license application a specialty in family and general medicine, obstetrics/gynecology, pediatrics, or internal medicine. However, specialists also may provide particular aspects of primary care such as blood pressure checks and cholesterol screenings.

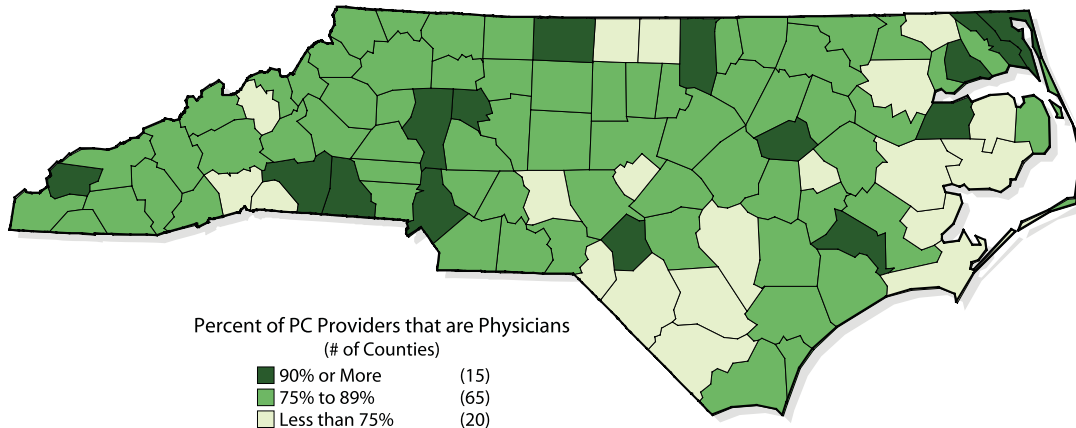
Data from the North Carolina Health Professions Data System show the composition of the primary care practitioner supply from 1996 to 2005. In 1996, 84% of primary care practitioners were physicians. By 2005, physicians accounted for only 75% of all primary care practitioners. (See Figure 1.) This indicates the proportion of nonphysician primary care practitioners increased over 50% during that time period, from 16% to 25% of all primary care practitioners.

Figure 1.
Composition of North Carolina Primary Care Practitioner Workforce, by Practitioner Type



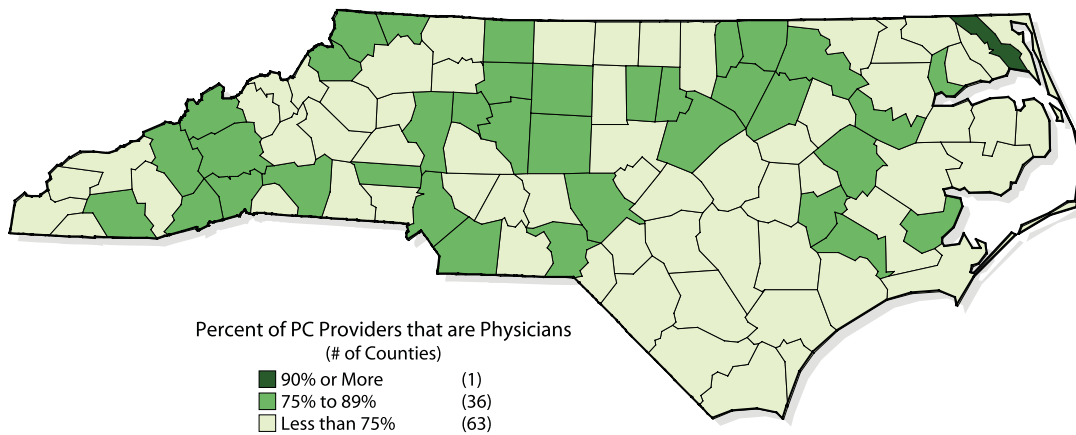
continued on page 212

Map 1.
Percent of Primary Care Practitioners that Were Physicians in 1996, by North Carolina County



Data include active, instate, nonfederal, nonresident-in-training physicians, PAs, NPs, and CNMs indicating a primary specialty of family practice, general practice, internal medicine, obstetrics/gynecology, or pediatrics. Source: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with data derived from the North Carolina Medical Board and the North Carolina Midwifery Joint Committee.

Map 2.
Percent of Primary Care Practitioners that Were Physicians in 2005, by North Carolina County



Data include active, instate, nonfederal, nonresident-in-training physicians, PAs, NPs, and CNMs indicating a primary specialty of family practice, general practice, internal medicine, obstetrics/gynecology, or pediatrics. Source: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, with data derived from the North Carolina Medical Board and the North Carolina Midwifery Joint Committee.

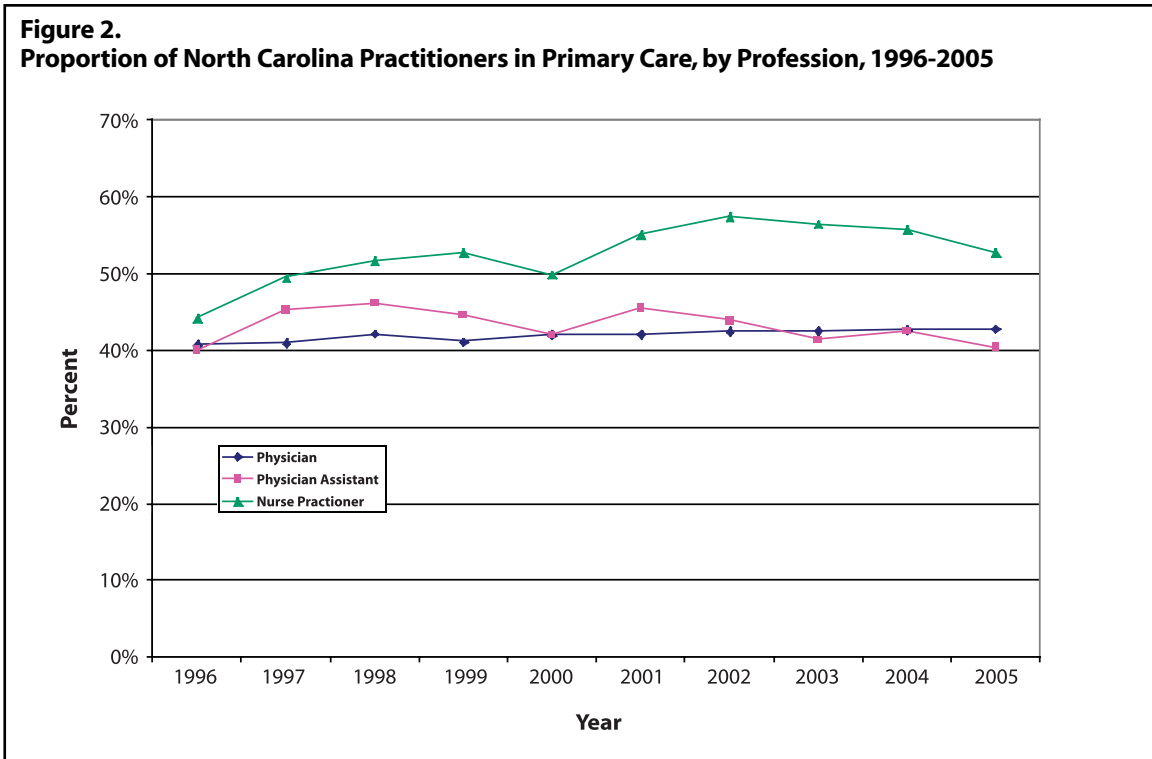
The main factor contributing to this change in the composition of the primary care practitioner workforce is the rapid increase in the number of primary care physician assistants and nurse practitioners relative to the growth in primary care physicians. While the number of primary care physicians grew 36% from 1996 to 2005, the number of primary care physician assistants doubled and primary care nurse practitioners grew 220%.

The distribution of primary care practitioners provides valuable information for policy makers. Data indicate that primary care nurse practitioners, physician assistants, and certified nurse midwives are 50% more likely than primary care physicians to practice in rural areas. Furthermore, these practitioners are playing an increasing role in providing primary care services across the state. In 1996, physicians accounted for 75% or more of the primary care practitioner workforce in 80 of North Carolina's 100 counties. By 2005, the same was true in less than half (37) of those counties. (See Map 1 and Map 2.)

The tendency of each discipline to practice primary care changed slightly between 1996 and 2005 (all certified nurse midwives, using the HPDS definition of primary care, practice primary care). The percent of physicians practicing primary care increased slightly from 41% to 43%. Whereas the tendency of physician assistants to practice primary care increased during the late 1990s, the percent in primary care (40%) was the same in 2005 as it was in 1996. The proportion of nurse practitioners practicing primary care generally increased from 1996 to 2002 but declined in more recent years. (See Figure 2.)

Given the increased reliance of populations in rural areas on nonphysician practitioners for their primary care, trends suggesting a declining tendency of nurse practitioners and physician assistants to practice primary care portend a possible decrease in access to primary care in such communities.

Figure 2.
Proportion of North Carolina Practitioners in Primary Care, by Profession, 1996-2005



Contributed by Katie Gaul, MA, Jennifer King, and Erin Fraher, MPP at the North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, The University of North Carolina at Chapel Hill

Smart Partnerships: KBR Uses Resources Wisely to Encourage Health Care System Innovations

John H. Frank, MBA; Julie E. Alexander, RN, MSN

In fulfilling its mission to improve the quality of life and health for future generations of North Carolinians, the Kate B. Reynolds Charitable Trust often partners with health care innovators at the local and state level. Last year, the Trust announced a strategy to invest resources in addressing the root causes of poverty and disease, promote innovation through best practices, and increase influence on behalf of those it serves by expanding its role as an educator, convener, and advocate.

The ICARE Partnership, a statewide initiative supported by the Trust, is one example of a collaboration that fulfills KBR's strategy. ICARE represents a broad spectrum of public and private stakeholders committed to integrated care, a collaborative approach that comprehensively addresses physical and behavioral health care needs. ICARE's vision is ambitious—a health care system that is Integrated, Collaborative, Accessible, Respectful and Evidence-Based (ICARE). As a funding partner for ICARE, the Trust is leveraging the support and energies of a broad network of health care leaders and organizations.

The Trusts' strategic plan also includes a commitment to support prevention and provide treatment in several target areas, including mental health services. Integrated care shows promise as an effective approach to care of mind and body, and the Trust has previously funded successful local integrated care projects. ICARE provides an opportunity for the Trust to extend these approaches to more people across North Carolina.

ICARE's vision is being implemented through three projects targeting practice, training, and process and policy. Like a "three-legged" stool, each project supports ICARE's central objectives, which aim to improve patient outcomes by increasing collaboration and communication between primary care and mental health, developmental disabilities, and substance abuse service providers and to increase their capacity to provide appropriate, evidence-based care. Although separate, ICARE's three projects interact to create a whole greater than the sum of its parts.

The Local Model Development Project addresses practice by developing replicable integrated care systems in four North Carolina pilot sites. Local implementation partners, representing different facets of the health care community, advise and support each site's model development. Each pilot uses a common

approach to organize, but has chosen a locally-relevant focus area.

The Trust is funding two pilots in the western and eastern regions of the state. The western site (Buncombe and Henderson counties) is focusing on care for citizens with severe and persistent mental illness. The eastern site (New Hanover and Pender counties) is expanding community capacity by placing part-time psychiatrists in four primary care practices and promoting the use of patient care algorithms for anxiety and attention-deficit/hyperactivity disorder. Two additional pilots, a northcentral site (Vance, Warren, and Granville counties), and a southeastern site (Robeson County) are targeting addictive disease and crisis management, respectively.

The Statewide Education and Assistance Project addresses training by developing provider tools, education, and opportunities for relationship building across the state. Based on an initial needs assessment, a variety of training venues are offered including regional conferences, office-based training and technical assistance, and web-based resources. Among others, collaborators included the North Carolina Area Health Education Centers Program, North Carolina Academy of Family Physicians, and North Carolina Association of Psychiatry. A website (www.icarenc.org) serves as a clearinghouse of information on integrated care in North Carolina. As ICARE progresses, the training component will disseminate new information and best practices through its programs.

The Process and Policy Change Project addresses the final component of ICARE. The project aims to remove barriers and promote implementation of integrated care. Key process and policy change targets have been identified and are being tracked by two groups including public and private health care leaders. As these groups advocate for a more favorable environment, their efforts will be informed by feedback from participants in ICARE's local pilot sites and training programs.

The ICARE Partnership represents a broad collaboration between public and private stakeholders dedicated to creating a new paradigm for health care in North Carolina. The Kate B. Reynolds Charitable Trust, through its strategic investment, is a key partner in fulfilling this bold vision. **NCMJ**

John H. Frank, MBA, is Director of the Health Care Division for the Kate B. Reynolds Charitable Trust.

Julie E. Alexander, RN, MSN, is a health care consultant. She coordinated the development and initial launch of the ICARE Partnership on behalf of the NC Foundation for Advanced Health Programs.

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Spotlight on the Safety Net

*A Community Collaboration
Kimberly M. Alexander-Bratcher, MPH*

Gaston County Collaboration

Gaston Family Health Services (GFHS) was created by the Gaston County Health Department (GCHD) to help provide comprehensive medical care to indigent citizens. Today the two organizations collaborate to ensure the Gaston County safety net remains intact. Together, they provide primary care for adults, children, and special populations including HIV positive and mentally ill patients; pediatric and adult dental services; hospital care; reproductive health services; immunizations; behavioral health services and case management; and access to specialty providers.

The Gaston County collaboration, developed in 1989, brought these two safety net health care providers, under the same roof. This proximity allows them to share many of the same resources such as lab and billing staff and enables the provision of unduplicated comprehensive health care to the uninsured, low-income community. The GCHD primarily serves women and children whereas GFHS tries to fill in the gaps by providing primary care, acute care, and treatment for chronic diseases in populations who do not receive care at the health department.

Both GFHS and GCHD have physicians on staff to care for patients. In addition, GFHS has volunteer clinics staffed by specialists, such as ophthalmologists and podiatrists, as well as volunteers who work on pharmaceutical medication assistance programs for patients. Case management also is provided and is primarily targeted to chronic disease or HIV positive patients. There are no eligibility criteria for patients desiring to be seen by GFHS or GCHD; however, patients must reside within county lines for some health department programs. Both GFHS and GCHD use a sliding fee scale, although some services at the Health Department are provided free of charge. Together, the Gaston County collaboration sees about 78 000 patients annually—60 000 through the health department and 18 000 through GFHS. Approximately 55% of the patients seen at GFHS are uninsured, while the remaining 45% are covered by Medicaid (22%), Medicare (18%), or private insurance (5%).

Colleen Bridger, MPH, Gaston County Health Director, shared several valuable lessons for other communities considering this type of collaboration. Colocation is ideal because it facilitates the flow of information and communication between providers and patients. Preventing duplication of services is important because competition for insured patients can weaken care to uninsured, indigent consumers. Collaborations should utilize the strengths of each collaborating organization to best serve the patients' needs. By working together, organizations can fill in gaps in the services that are provided and the populations that are reached—frequently neither organization receives enough funding to provide all needed services to indigent patients. Collaborators should advocate for one another because doing so can build confidence in the community and in the collaboration. Finally, partners should communicate openly and honestly. Incorporating these lessons can help develop a tight knit environment for the collaboration and strengthen the work and success of both organizations.

*Contributions from Colleen Bridger, MPH, Gaston County Health Director, and Morgan Jones, MSPH,
North Carolina Institute of Medicine Research Assistant.*