

The State of Racial/Ethnic Diversity in North Carolina's Health Workforce

Victoria McGee, Erin Fraher

BACKGROUND Increasing the racial and ethnic diversity of the health care workforce is vital to achieving accessible, equitable health care. This study provides baseline data on the diversity of health care practitioners in North Carolina compared with the diversity of the state's population.

METHODS We analyzed North Carolina health workforce diversity using licensure data from the respective state boards of selected professions from 1994-2009; the data are stored in the North Carolina Health Professions Data System.

RESULTS North Carolina's health care practitioners are less diverse than is the state's population as a whole; only 17% of the practitioners are nonwhite, compared with 33% of the state's population. Levels of diversity vary among the professions, which are diversifying slowly over time. Primary care physicians are diversifying more rapidly than are other types of practitioners; the percentage who are nonwhite increased by 14 percentage points between 1994 and 2009, a period during which 1,630 nonwhite practitioners were added to their ranks. The percentage of licensed practical nurses who are nonwhite increased by 7 percentage points over the same period with the addition of 1,542 nonwhite practitioners to their ranks. Nonwhite health professionals cluster regionally throughout the state, and 79% of them practice in metropolitan counties.

LIMITATIONS This study reports on only a selected number of health professions and utilizes race/ethnicity data that were self-reported by practitioners.

CONCLUSION Tracking the diversity among North Carolina's health care practitioners provides baseline data that will facilitate future research on barriers to health workforce entry, allow assessment of diversity programs, and be useful in addressing racial and ethnic health disparities.

I ncreasing the racial and ethnic diversity of the health care workforce is vital to achieving high-quality health care that is accessible, equitable, and culturally competent [1,2,3,4]. Cultural competence is defined by the Office of Minority Health as "a set of congruent behaviors, attitudes, and policies . . . that enables effective work in cross-cultural situations" [5]. The provision of culturally competent health care requires a health care workforce that is prepared to interact with the variety of cultures represented in North Carolina's population and is also representative of the population and of the communities that it serves.

An adequate pipeline of workers from all racial and ethnic backgrounds will be needed to fill projected health workforce shortages [6-9]. It is projected that nonwhite racial/ethnic groups will constitute 54% of the US population by 2050 [10], and research has shown that practitioners who themselves belong to underrepresented minorities (African American/black, Hispanic/Latino, and Native American/Alaska Natives) disproportionately serve minority and underserved populations [3, 11, 12]. Increasing diversity among the health professions could, among other benefits, increase access to and use of health care services by underserved populations, lead to greater trust in the health care system, and improve patient health outcomes [3].

National figures show that health care practitioners are less racially and ethnically diverse than is the patient population [12]. There are some caveats to this generalization: in some health care professions, Asian/Pacific Islander prac-

tioners have greater representation among health professionals than in the patient population; and levels of diversity vary from profession to profession [13]. Although the racial/ethnic diversity of the workforce has increased over time, a lack of national data makes it difficult to compare North Carolina with the nation.

In response to the lack of diversity among health professionals, a wide variety of pipeline programs have been implemented that are aimed at increasing the racial and ethnic diversity of the health professions. There are federally funded and state-funded programs, such as those run by the Health Careers Opportunity Program and by the North Carolina Area Health Education Centers Program, as well as other programs sponsored by the schools that train health professionals and by private donors [14]. Even though data highlight the need to increase the diversity of the health care workforce in North Carolina [14], and steps have been taken to increase the number of health care professionals in the state from minority groups, there are significant barriers to evaluating the success of diversity programs; the most important of these is the lack of regular and systematic data

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collection and reporting on the supply of health professionals at the national, state, and local levels. This study begins to fill this gap by providing baseline data on the diversity of health care practitioners in North Carolina compared with that of the state's population.

Methods

We analyzed North Carolina health workforce diversity using data from state licensure boards that are stored in the North Carolina Health Professions Data System. The data used in this analysis were self-reported by health professionals at the time of their initial licensure to practice in North Carolina or at the time of their subsequent renewal of that license. The data for a given year includes all health professionals licensed to practice as of October 31 of that year.

The following health care professions were included in the study: physicians (categorized as all physicians, primary care physicians, and surgeons), physician assistants, nurse practitioners, certified nurse midwives, certified registered nurse anesthetists, registered nurses, licensed practical nurses, physical therapists, physical therapy assistants, occupational therapists, occupational therapy assistants, respiratory therapists, dentists, dental hygienists, and pharmacists. Data include all active physicians working in North Carolina who are not residents in training and are not employed by the federal government, and all active practitioners in the other professions who are working in North Carolina. Physicians categorized as primary care physicians were those in general practice, family practice, general internal medicine, pediatrics, or obstetrics and gynecology.

North Carolina population data were obtained from the North Carolina Office of State Planning, and US population data were obtained from the US Census Bureau. Population data are dependent on the year and are corrected census counts (as of April 1, 1970, 1980, 1990 or 2000) or are estimates or projections from the data source (as of April 1, 2010, or as of July 1, for other years).

The status of an area as metropolitan or nonmetropolitan is based on the Office of Management and Budget's Core Based Statistical Areas (CBSA) as of the November 2008 update. Nonmetropolitan counties include not only those that are outside of any CBSA but also those that are considered micropolitan statistical areas because they contain an urban core of at least 10,000 but have a total population of less than 50,000.

Results

North Carolina's health care practitioners are less diverse than is the state's population. Compared with the state's population, North Carolina's health professionals are not very diverse. Only 1 in 6 health professionals is nonwhite, compared with 1 in 3 North Carolina residents. There are 28,648 nonwhite health professionals. For purposes of this analysis, nonwhite practitioners are defined as those who self-identify as African American/black, American Indian/

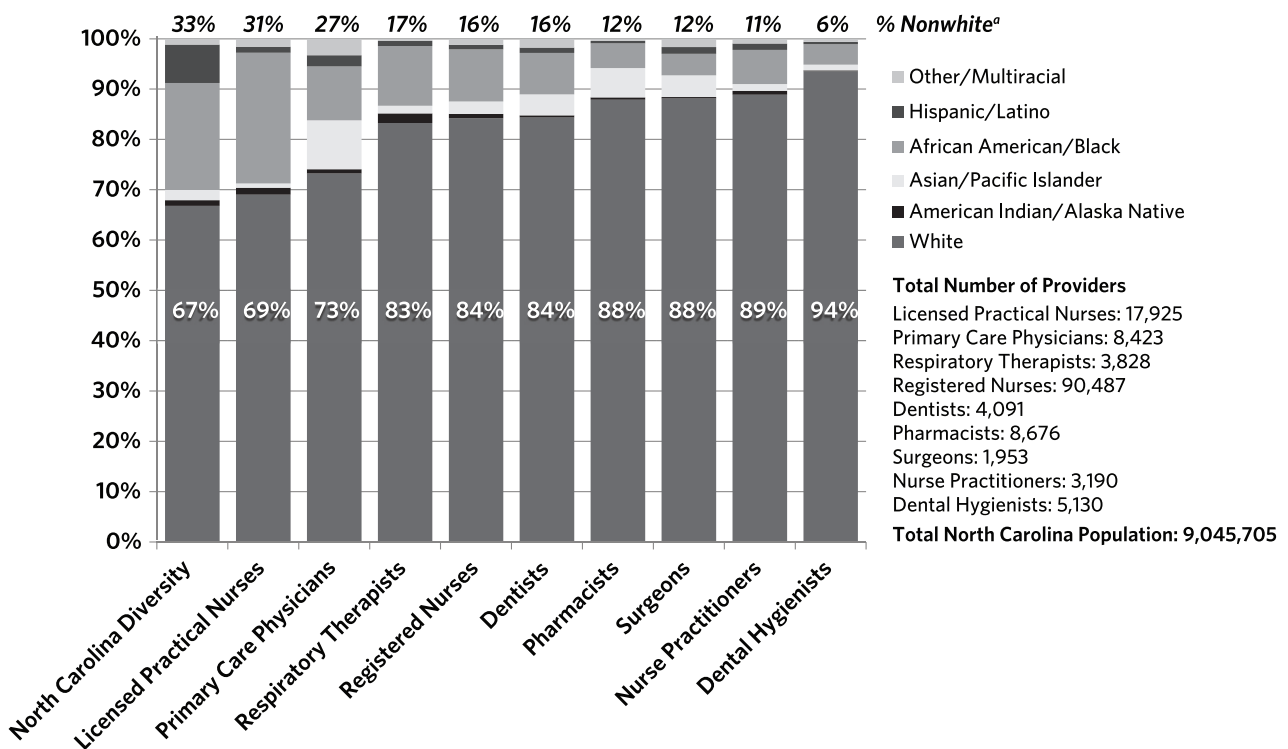
Alaska Native, Asian/Pacific Islander, Hispanic/Latino, multiracial, or other, rather than as Caucasian. Although Hispanic/Latino is considered an ethnic designation and not a race, data from North Carolina licensure boards classify Hispanic/Latino as a racial group, making it necessary to consider it as such in this analysis.

Despite the fact that health workforce diversity in North Carolina has not caught up with population diversity, there are a couple of professions that could be considered "best practice" professions with regard to their diversity, based on the relatively high percentage of their members who are nonwhite practitioners: licensed practical nurses (31% of whom are nonwhite) and primary care physicians (27% of whom are nonwhite). Figure 1 shows a sample of professions with high, moderate, and low levels of diversity in North Carolina in 2009.

Table 1 shows the diversity of North Carolina's health professions compared with the diversity of the state's population. Relative to their presence in the state's population, whites are overrepresented in all of the health care professions except among licensed practical nurses. Although Asian/Pacific Islander practitioners are overrepresented among physicians, pharmacists, dentists, registered nurses, physical therapists, and occupational therapists, they make up less than 2% of the workforce in each of the remaining professions. American Indian/Alaska Native health professionals are underrepresented among all types of practitioners except respiratory therapists, certified nurse midwives, licensed practical nurses, and physician assistants; in each of the other professions, they make up less than 1% of the practitioner population. It is striking that the 2 largest nonwhite racial/ethnic groups in North Carolina—Hispanic/Latinos and African American/blacks—are underrepresented in all professions, with only 1 exception: African American/blacks are well represented among licensed practical nurses.

North Carolina's health professions are diversifying at different rates. Longitudinal trends show that North Carolina's health care professions are diversifying slowly over time and at different rates. The population of the state has also slowly been diversifying, with the proportion of residents who are nonwhite increasing from 26% in 1994 to 33% in 2009—an increase of 7 percentage points. Figure 2 shows the percentage of the workforce that was nonwhite for a selection of health care professions from 1994-2009. Of the professions that had the highest level of diversity in 2009, the percentage of the state's workforce made up of nonwhite practitioners increased the most among primary care physicians, going from 13% in 1994 to 27% in 2009 (+14 percentage points) with the addition of 1,630 nonwhite practitioners. Of the professions high in diversity, the percentage of licensed practical nurses who were nonwhite increased by the second greatest amount, going from 24% to 31% (+7 percentage points) with the addition of 1,542 nonwhite practitioners. Note that if a profession did not have reliable race data for any given year, it was excluded from analysis.

FIGURE 1.
Racial/Ethnic Diversity of North Carolina's Population Versus Selected Health Professions, 2009



Note. Data include all active, in-state health care professionals and active, in-state, non-residents in training, non-federal physicians working in North Carolina who were licensed in the state as of October 31, 2009.

^aThe term "nonwhite" refers to those who self-identify as African American/black, Asian/Pacific Islander, American Indian/Alaska Native, Hispanic/Latino, multiracial, or other.

^bData for this profession were collected beginning in 2004, but 2007 was the first year for which reliable race data were available.

^c2004 data for physical therapy assistants interpolated due to high percentage of missing data.

Sources: North Carolina Health Professions Data System, with data derived from the North Carolina Boards of Medicine, Nursing, Pharmacy, Dentistry, Physical Therapy, Occupational Therapy, and Respiratory Therapy in 2010; and US Census Bureau, American Factfinder, <http://factfinder.census.gov>, accessed August 24, 2011. Produced by North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Among those professions with moderate levels of diversity in 2009, dentists saw the greatest gain—the proportion of dentists who were nonwhite increased from 7% (+9 percentage points) with the addition of 434 nonwhite practitioners. The proportion of registered nurses who were nonwhite increased from 10% to 16% (+6 percentage points) with the addition of 8,194 nonwhite practitioners. (Because registered nurses are such a large workforce, they saw the largest gain in the number of nonwhite practitioners of any profession examined.) Reliable data about the proportion of respiratory therapists who were nonwhite were not available until 2007, but between 2007 and 2009 that proportion increased by 2 percentage points, going from 15% to 17% with the addition of 132 nonwhite practitioners.

Among the professions with low to moderate levels of diversity in 2009, pharmacists saw the largest increase in the proportion of practitioners who were nonwhite, going from 4% to 12% (+8 percentage points) with the addition of 796 nonwhite practitioners. The main factor contributing to that sharp increase was a big jump in the number of Asian/Pacific Islander pharmacists; removing those practitioners

from each year's count reduces the change in the proportion of pharmacists who were nonwhite to an increase of 3 percentage points (from 3% to 6%). Surgeons had the next-largest increase—the proportion of surgeons who were nonwhite went from 9% to 12% (+3 percentage points) with the addition of 96 nonwhite practitioners. The percentage of physical therapy assistants who were nonwhite was the same in 2009 (12%) as it had been in 1994, despite a temporary drop to 9% in 1999. Reliable data about the proportion of occupational therapy assistants who were nonwhite were not available until 2007. That proportion decreased from 12% in 2007 to 11% in 2009 (-1 percentage point) with the departure of 5 nonwhite practitioners from the workforce.

Among the professions that were least diverse in 2009, the percentage of the workforce made up of nonwhite practitioners increased the most among dental hygienists, going from 3% to 6% (+3 percentage points) with the addition of 238 nonwhite practitioners. The proportion of certified registered nurse anesthetists who were nonwhite increased from 4% to 6% (+2 percentage points) with the addition of 74 nonwhite practitioners.

Where were these nonwhite health care practitioners educated? Examining whether nonwhite health care practitioners were educated within the state or outside it is a valuable step in determining whether North Carolina is “importing” or “growing” diversity in the workforce. Among the best-practice professions, licensed practical nurses have the highest percentage of nonwhite practitioners graduating from North Carolina schools (65%, 3,578), whereas only 18% (397) of nonwhite primary care physicians completed their undergraduate medical education in a North Carolina school. Of the 397 nonwhite primary care physicians educated in North Carolina medical schools, 202 (51%) graduated from the School of Medicine at the University of North Carolina at Chapel Hill; 88 (22%) graduated from the Brody School of Medicine at East Carolina University, 67 (17%) graduated from Wake Forest School of Medicine, and 40 (10%) graduated from Duke University School of Medicine.

Although primary care physicians have the second-highest percentage of nonwhite practitioners, the majority of them were educated outside the state: 946 (42%) of them graduated from international medical schools (those outside the United States), and 832 (37%) graduated from medical schools elsewhere in the United States. The largest numbers of nonwhite primary care international medical graduates

in North Carolina completed their medical school training in India (349, 36%), Nigeria (98, 10%), the Philippines (74, 8%), or Pakistan (64, 7%). The high percentage of international medical graduates among North Carolina’s primary care physicians indicates that, despite high levels of diversity, the racial/ethnic makeup of this group does not reflect that of the state’s population.

In 2009, among the professions with moderate levels of diversity, registered nurses had the highest percentage of active, in-state, nonwhite practitioners educated in North Carolina. Of the 12,549 nonwhite registered nurses for whom there are both race/ethnicity data and school data, 8,948 (71%) were educated in North Carolina programs. Of these, 4,363 (49%) were educated in the North Carolina Community College System, and another 2,245 (25%) were educated at historically black colleges or universities. Other professions with moderate levels of diversity were respiratory therapists and dentists. Respiratory therapists had the highest percentage of practitioners educated in North Carolina (63%, 393), followed by dentists (37%, 232). Almost all nonwhite North Carolina-educated respiratory therapists graduated from a school in the North Carolina Community College System. Respiratory therapists also have one of the highest percentages of American

TABLE 1.
Diversity Scorecard for North Carolina Health Professions, 2009: Proportion of Practitioners Belonging to Various Ethnic or Racial Groups

Racial or ethnic group	Percentage of state population	Type of Practitioner																	
		Physical therapists	Physical therapy assistants	Occupational therapists	Occupational therapy assistants	Respiratory therapists	Nurse practitioners	Certified nurse midwives	Certified registered nurse anesthetists	Dentists	Dental hygienists	Registered nurses	Licensed practical nurses	Physician assistants	Physicians (all)	Surgeons	Primary care physicians	Pharmacists	
White																			
American Indian/Alaska native																			
Asian/Pacific Islander																			
African American/black																			
Hispanic/Latino																			
Multiracial/other																			

Key to shading:

White: Percentage of people belonging to this racial or ethnic group is higher in this profession than in the state’s population.

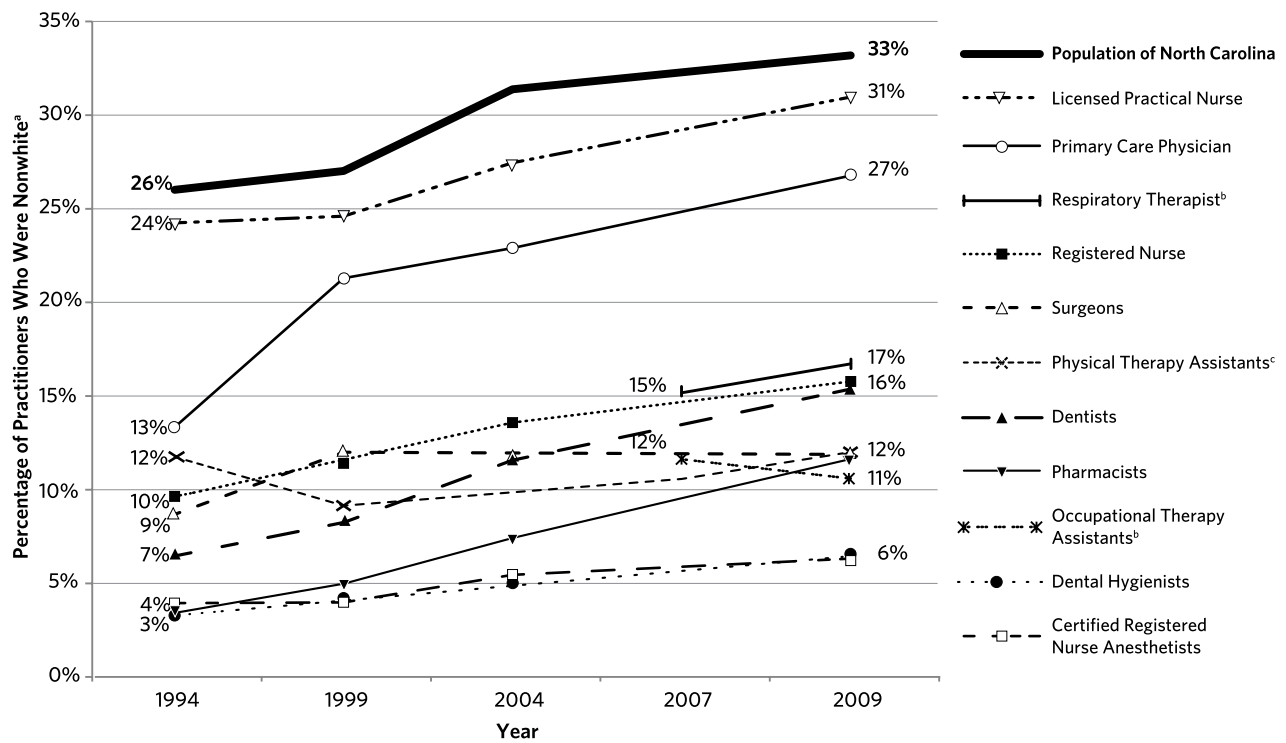
Light Gray: Percentage of people belonging to this racial or ethnic group is lower in this profession than in the state’s population.

Dark Gray: Percentage of people belonging to this racial or ethnic group is about the same in this profession as in the state’s population.

Note. Data include all active, in-state health care professionals and active, in-state, non-residents in training, non-federal physicians working in North Carolina who were licensed in the state as of October 31, 2009.

Sources: North Carolina Health Professions Data System, with data derived from the North Carolina Boards of Medicine, Nursing, Pharmacy, Dentistry, Physical Therapy, Occupational Therapy, and Respiratory Therapy in 2010; and US Census Bureau, American Factfinder, <http://factfinder.census.gov>, accessed August 24, 2011.

FIGURE 2.
Percentage of North Carolina Practitioners in Selected Professions Who Were Nonwhite, 1994-2009



Note. Data include all active, in-state health care professionals and active, in-state, non-residents in training, non-federal physicians working in North Carolina who were licensed in the state as of October 31, 2009.

^aThe term "nonwhite" refers to those who self-identify as African American/black, Asian/Pacific Islander, American Indian/Alaska Native, Hispanic/Latino, multiracial, or other.

^bData for this profession were collected beginning in 2004, but 2007 was the first year for which reliable race data were available.

^c2004 data for physical therapy assistants interpolated due to high percentage of missing data.

Sources: North Carolina Health Professions Data System, with data derived from the North Carolina Boards of Medicine, Nursing, Pharmacy, Dentistry, Physical Therapy, Occupational Therapy, and Respiratory Therapy in 2010; and US Census Bureau, American Factfinder, <http://factfinder.census.gov>, accessed August 24, 2011. Produced by North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Indian/Alaska Native practitioners (2%, 73) of all of North Carolina's health professions, and more than half (58%, 42) of the American Indian/Alaska Native respiratory therapists were educated at Robeson County Community College. Of the 635 nonwhite dentists currently in active practice in North Carolina in 2009, 127 (20%) were educated at a historically black college or university, 232 (37%) were educated at the University of North Carolina School of Dentistry, and 276 (43%) were educated at other dental schools in the United States. Although the percentage of North Carolina's African American/black dentists who had been educated at historically black colleges or universities remained relatively high in 2009, that percentage had been steadily declining, from 54% in 1994 to 36% in 2009.

Professions found to have low to moderate levels of diversity were pharmacists, surgeons, nurse practitioners, physical therapy assistants, and occupational therapy assistants. Of these, physical therapy assistants had the highest percentage of nonwhite practitioners who had been educated in North Carolina schools (71%, 186), followed by nurse practitioners (70%, 250), occupational therapy assistants

(63%, 69), pharmacists (32%, 332), and surgeons (16%, 37). Among nonwhite nurse practitioners educated in North Carolina schools, 25% (62) were educated at the University of North Carolina at Chapel Hill, 20% (51) were educated at Duke University, and 18% (46) were educated at Winston-Salem State University. Of North Carolina's nonwhite pharmacists, 45% (476) were imported from other parts of the United States, and 23% (242) came from outside the United States. Asian/Pacific Islanders are the largest subgroup of nonwhite North Carolina pharmacists (48%, 505), followed by African American/black pharmacists (41%, 427); 43% of those in each subgroup were educated in North Carolina. Surgeons had the lowest proportion of nonwhite practitioners educated in North Carolina (16%, 37). Of the 37 nonwhite surgeons educated in the state, 16 (43%) received their undergraduate medical education at Duke University School of Medicine, 9 (24%) received it at University of North Carolina School of Medicine, 7 (19%) received it at Brody School of Medicine at East Carolina University, and 5 (14%) received it at Wake Forest School of Medicine.

In 1 of the least diverse professions, dental hygienists,

84% (279) of nonwhite practitioners had graduated from a program in North Carolina, making dental hygiene the profession with the highest proportion of North Carolina-educated nonwhite practitioners. About 39% (108) of North Carolina-educated dental hygienists received their education at the University of North Carolina at Chapel Hill, and the remaining 61% (171) graduated from a school in the North Carolina Community College System. Among certified registered nurse anesthetists, a profession that is also very low in diversity, only 40% (44) of nonwhite practitioners graduated from North Carolina schools.

Where do North Carolina's health practitioners belonging to underrepresented minorities practice? Nonwhite health care professionals in North Carolina tend to cluster regionally. In 2009, half were located in Mecklenburg, Wake, Durham, Guilford, Forsyth, Pitt, and Cumberland counties, and 79% were located in metropolitan counties. Higher concentrations of underrepresented minority practitioners were found in counties that had higher population concentrations of people who were of the same race or ethnicity as the practitioner.

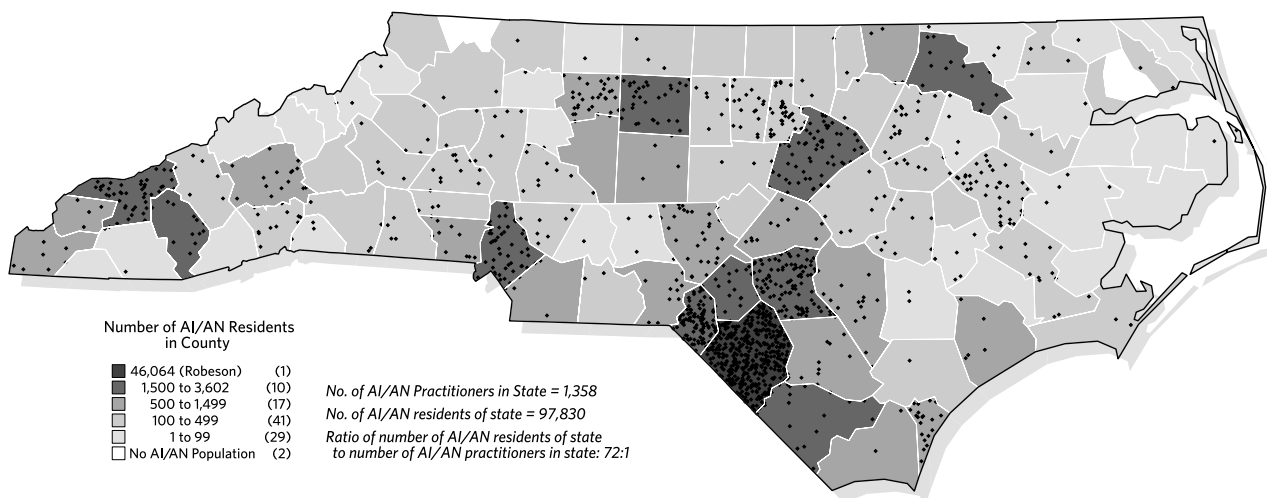
Figures 3, 4, and 5 show the geographic distribution of health care practitioners of a particular race or ethnicity among North Carolina's counties in 2009, along with the number of residents of that race or ethnicity in each county, with darker shading of a county representing a higher number of residents of the race or ethnicity in question. Practitioner locations are indicated by dots.

Figure 3 shows the geographic distribution of American Indian/Alaska Native health care practitioners in the state and the number of American Indian/Alaska Native residents in each county. A little more than half (51%) of American Indian/Alaska Native practitioners were located in 1 of 4 counties—Robeson, Scotland, Swain, or Cumberland—and 57% of North Carolina's American Indian/Alaska Native population lived in those 4 counties; nearly a third (32%, 437) of the state's American Indian/Alaska Native health care practitioners were located in Robeson County, where the proportion of residents who were American Indian/Alaska Natives (36%) was higher than in any other county in the state.

Figure 4 shows the geographic distribution of African American/black health care practitioners in the state and the number of African American/black residents in each county. Fifty-eight percent (10,372) of African American/black practitioners were located in counties with major urban areas (Mecklenburg, Forsyth, Guilford, Durham, Wake, and Cumberland counties). However, the counties with the highest percentages of African American/black practitioners and the greatest number of African American/black residents were located in the northeastern and south-east central regions of the state.

Figure 5 shows the geographic distribution of Hispanic/Latino health care practitioners and the number of Hispanic/Latino residents in each county. In 2009, Hispanic/Latino practitioners made up the second smallest percentage of

FIGURE 3. Geographic Distribution of American Indian/Alaska Native (AI/AN) Healthcare Practitioners and Number of AI/AN Residents in North Carolina Counties, 2009

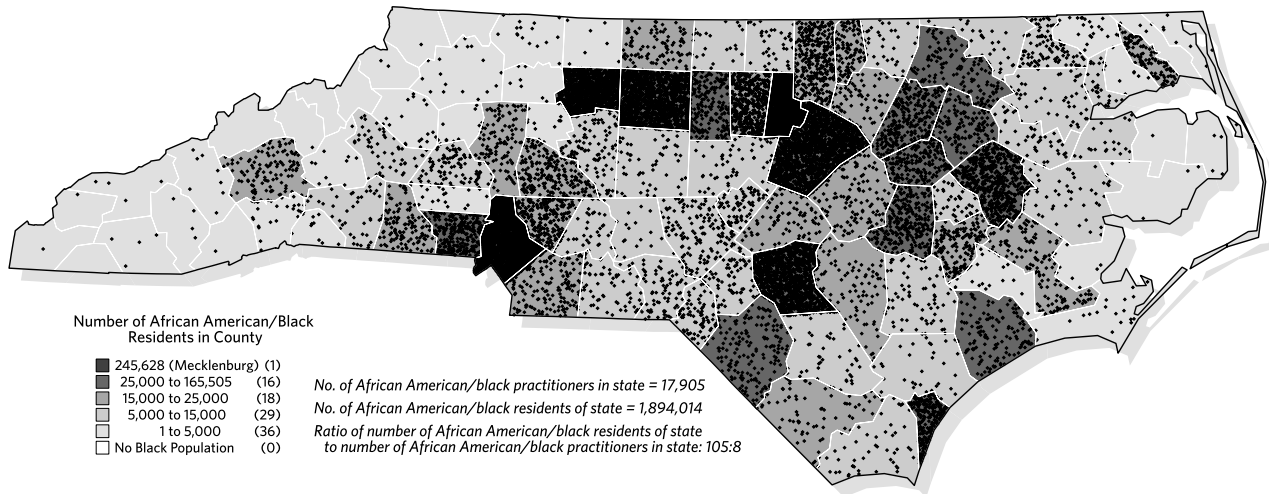


Note. Each dot represents an active health care professional working in North Carolina who self-reported his or her race/ethnicity as American Indian/Alaska Native and was licensed in the state as of October 31, 2009. The following professions were included: physicians (with the exception of those who were residents in training or were federal employees), nurse practitioners, registered nurses, certified nurse midwives, licensed practical nurses, physical therapists, physical therapy assistants, occupational therapists, occupational therapy assistants, respiratory therapists, dentists, dental hygienists, and pharmacists.

Sources: North Carolina Health Professions Data System, with data derived from the North Carolina Boards of Medicine, Nursing, Pharmacy, Dentistry, Physical Therapy, Occupational Therapy, and Respiratory Therapy in 2010; and US Census Bureau, American Factfinder, <http://factfinder.census.gov>, accessed August 24, 2011.

Produced by North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

FIGURE 4.
Geographic Distribution of African American/Black Healthcare Practitioners and Number of African American/Black Residents in North Carolina Counties, 2009



Note. Each dot represents an active health care professional working in North Carolina who self-reported his or her race/ethnicity as African American/black and was licensed in the state as of October 31, 2009. The following professions were included: physicians (with the exception of those who were residents in training or were federal employees), nurse practitioners, registered nurses, certified nurse midwives, licensed practical nurses, physical therapists, physical therapy assistants, occupational therapists, occupational therapy assistants, respiratory therapists, dentists, dental hygienists, and pharmacists.
 Sources: North Carolina Health Professions Data System, with data derived from the North Carolina Boards of Medicine, Nursing, Pharmacy, Dentistry, Physical Therapy, Occupational Therapy, and Respiratory Therapy in 2010; and US Census Bureau, American Factfinder, <http://factfinder.census.gov>, accessed August 24, 2011.

Produced by North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

North Carolina's health care workforce of any racial or ethnic group, despite being the second largest nonwhite population group in the state and the fastest-growing population group in the state. About half (54%, 984) of the state's Hispanic/Latino practitioners were in counties with major urban areas: Mecklenburg, Forsyth, Guilford, Durham, Wake, and Cumberland. Even in these areas, however, the percentage of practitioners who were Hispanic/Latino practitioners fell well short of matching the percentage of residents who were Hispanic/Latino in either the county or the state.

Discussion

This study found that North Carolina's health workforce has been slowly diversifying over time but still lags behind the state's population in diversity. African American/blacks make up the largest nonwhite racial/ethnic group in the state, but they are not well represented in the health professions. Hispanic/Latinos are the second largest nonwhite racial/ethnic group; they are fastest-growing ethnic group in the state but are present in smaller numbers in the health workforce than are members of other nonwhite groups. Considering that North Carolina's Hispanic/Latino population increased more than 111% between 2000 and 2010 [15], the state's very low numbers of Hispanic/Latino health care practitioners may be problematic in the context of achieving the cultural and linguistic competence required to meet patients' health care needs.

North Carolina's health care professions are diversifying

at different rates. It is striking that physical therapy assistants and occupational therapy assistants have relatively low levels of diversity and that these have remained stagnant longitudinally, especially since the job market in the allied health professions is rapidly growing [16]. A deeper investigation into the question of why some professions (eg, licensed practical nurses) have diversified more quickly than others (eg, dental hygienists and other allied health professions) might help to identify which programs and strategies aimed at increasing workforce diversity have been successful and might help to further identify barriers preventing nonwhite professionals from entering the health workforce. Research could focus on such factors as the effect of low matriculation rates and high attrition rates [17], limited career awareness, program cost, and inadequate K-12 preparation. Tracking underrepresented minorities during and after their educational careers would also be helpful in identifying best-practice programs and strategies for increasing the racial and ethnic diversity of North Carolina's health professions.

Education patterns among nonwhite practitioners vary from profession to profession. Among North Carolina's primary care physicians, a large number of racially/ethnically diverse practitioners are international medical graduates or graduates of out-of-state US schools. Although importing these professionals may seem to be a viable way of increasing health workforce diversity, these practitioners may not be familiar enough with the varieties of cultures

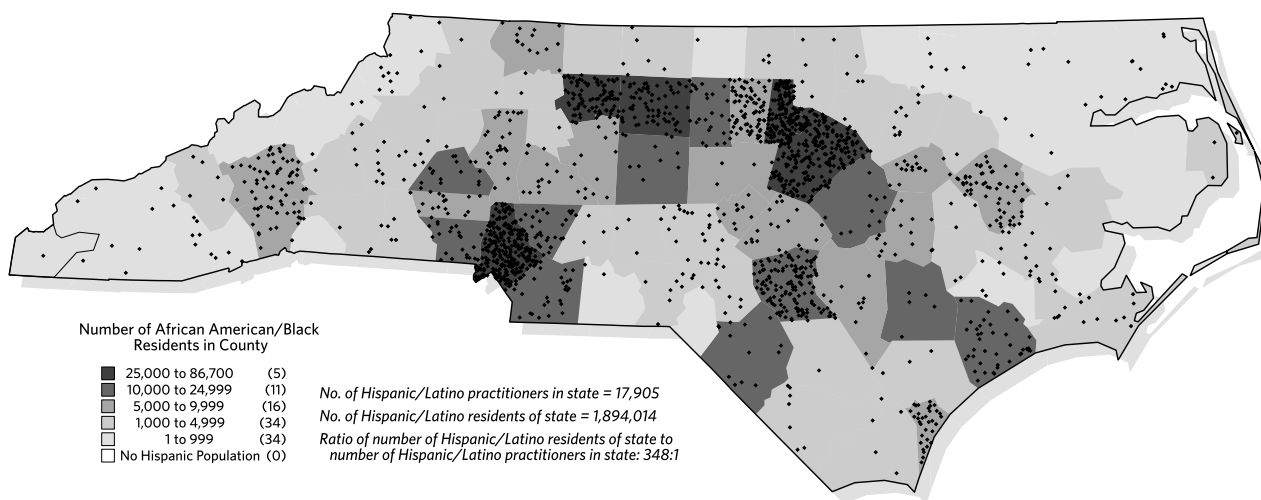
and customs present among North Carolina's diverse citizens, and thus they may struggle to provide the culturally competent care called for by new and emerging models of care. By contrast, large percentages of North Carolina's nonwhite registered nurses, nurse practitioners, licensed practical nurses, respiratory therapists, and dental hygienists are educated at in-state schools. In particular, the state's historically black colleges and universities and the schools in the North Carolina Community College System have educated a large number of the state's nonwhite health care workforce, as exemplified by the large number of American Indian/Alaska Native respiratory therapists graduating from Robeson County Community College and by the large numbers of nonwhite registered nurses and African American/black dentists graduating from historically black colleges or universities in the state. Valuable lessons may be gleaned in examining why and how these programs have been able to graduate so many individuals who have stayed in the state and joined the North Carolina workforce. Useful investigations might include an examination of the organizational structure and distribution of funding among diversity initiatives in these programs, as well as an examination of how they connect with K-12 pipeline programs and provide support for practitioners once they are in the workforce.

In North Carolina, studies have shown that underrepresented-minority practitioners are more likely to serve in areas that have chronic shortages of health care practitioners [18], most of which are predominantly rural areas. In

our analysis, the majority of nonwhite health care practitioners (79%) were found to be practicing in metropolitan counties, which is characteristic of the state's health care workforce as a whole. Outside major urban centers, underrepresented-minority practitioners cluster in regions with high percentages of citizens of the same race or ethnicity. Areas where there are higher levels of concordance in numbers of underrepresented-minority practitioners and nonwhite citizens would be prime locations in which to examine the success or failure of patient/practitioner racial and ethnic concordance in encouraging use of health care services or helping to reduce health disparities [19].

Increasing the numbers of nonwhite health care practitioners may help ease impending workforce shortages, increase patient trust in the health care system, and decrease health disparities between different racial/ethnic groups. Studies have shown that there is greater use of health care services and greater satisfaction with care when there is racial/ethnic concordance between the patient and practitioner [20-24]. This does not mean that racial/ethnic concordance is the only possible solution to the issues of racial/ethnic health disparities or impending health workforce shortages. Education that focuses on improving practitioner cultural competence is also important [25], because increased cultural competence of practitioners, regardless of their race or ethnicity, has been shown to be positively linked with patient satisfaction with care [26] and may translate into higher rates of use of health care services by underserved

FIGURE 5.
Geographic Distribution of Hispanic/Latino Healthcare Practitioners and Number of Hispanic/Latino Residents in North Carolina Counties, 2009



Note. Each dot represents an active health care professional working in North Carolina who self-reported his or her race/ethnicity as Hispanic/Latino and was licensed in the state as of October 31, 2009. The following professions were included: physicians (with the exception of those who were residents in training or were federal employees), nurse practitioners, registered nurses, certified nurse midwives, licensed practical nurses, physical therapists, physical therapy assistants, occupational therapists, occupational therapy assistants, respiratory therapists, dentists, dental hygienists, and pharmacists.

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populations. Practitioners of all races and ethnicities who were exposed to patients from a variety of racial/ethnic and socioeconomic groups during their training felt better prepared to care for patients later on in their careers [27]. This finding reinforces the utility of this type of education, which prepares the health care workforce to provide care to an increasingly diverse patient population. With the recent increase in focus on patient-centered care and on racial/ethnic health disparities, tracking the diversity of North Carolina's health care practitioners will provide baseline data that facilitates future research on barriers to workforce entry, assessment of diversity programs, and reduction of racial/ethnic health disparities. **NCMJ**

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