

Running the Numbers

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

The Maldistribution of Health Care Providers in Rural and Underserved Areas in North Carolina

Throughout the ongoing implementation of the Patient Protection and Affordable Care Act of 2010, policy makers have questioned whether North Carolina will have an adequate supply of health workers to meet the increasing demand generated by expanded health insurance coverage. Some organizations have suggested that the state will face a shortage of health professionals, particularly primary care providers [1, 2]. However, more nuanced scrutiny of the data suggests that the critical concern is not an overall shortage of providers, but rather a maldistribution of health professionals relative to population health needs.

Our analysis draws on data from the North Carolina Health Professions Data System, which contains information about the education, employment, and geographic characteristics of health professionals in the state. Data are compiled from annual licensure files from the North Carolina Medical Board and the North Carolina Board of Nursing. In this report, we include data for all licensed physicians actively practicing in North Carolina, except for those who are currently in training or are employed by the federal government. Due to space limitations, we concentrate on the physician workforce in 3 specialties that are facing shortages—primary care, general surgery, and psychiatry [3]. Because numerous studies have suggested that a more flexible deployment of health care workers in new models of care could alleviate workforce shortfalls [4, 5], we also include data on licensed nurse practitioners (NPs) and physician assistants (PAs) actively practicing in the state.

While we cannot perfectly forecast the number of physicians who will be needed in the future, benchmarking the relative supply of physicians in various geographic areas and different health care markets can be useful [6]. Along with the use of national measures of underservice, such as health

professional shortage area (HPSA) designations, benchmarks provide a relative indicator of supply and can help to identify areas of the state that lag behind the average. Lagging counties are often rural and are often contiguous with other counties that face persistent health professional shortages. Shortfalls in the supply of health professionals in rural areas are a concern because rural populations tend to be in poorer health relative to metropolitan populations, with higher rates of obesity as well as higher rates of mortality from chronic diseases such as diabetes and chronic obstructive pulmonary disease [7]. Rural populations are also more likely to encounter barriers to accessing health care—such as longer driving distances and limited access to transportation [8].

To identify underserved areas in North Carolina, we designated certain counties as persistent primary care health professional shortage areas (PHPSAs). PHPSAs are counties that have met federal HPSA criteria in 6 of the last 7 lists released by the Health Resources and Services Administration [9]. If an area has less than 1 primary care physician for every 3,500 people, it meets HPSA criteria. In whole-county HPSAs, the entire county qualifies as a HPSA based on the physician-to-population ratio; in part-county HPSAs, a group or geographic area within the county meets the HPSA designation status, even though the county as a whole does not.

Figure 1 shows the counties in North Carolina that qualified as whole-county or part-county

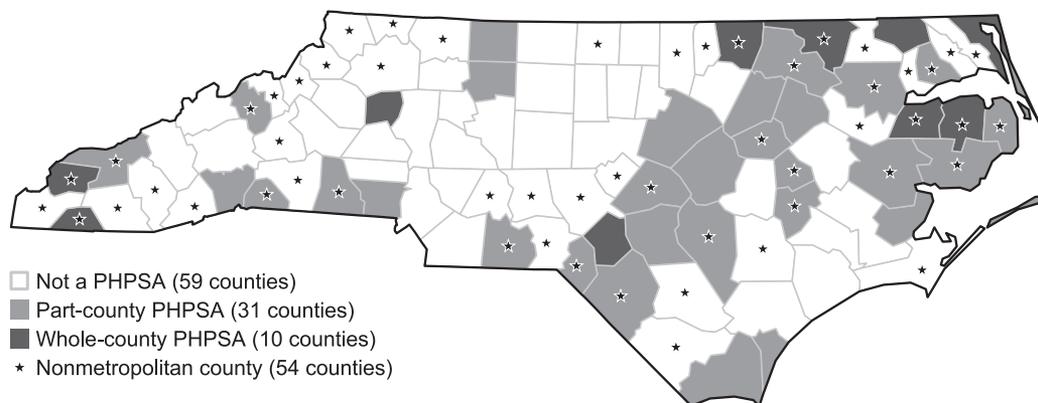
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FIGURE 1.
Persistent Primary Care Health Professional Shortage Areas (PHPSAs) in North Carolina, 2010



Note: PHPSAs are those areas that were designated as Health Professional Shortage Areas (HPSAs) by the Health Resources and Services Administration (HRSA) from 2004–2010 or in 6 of the last 7 releases of the HPSA definition. Nonmetropolitan counties, whose designation is based on Core Based Statistical Area (CBSA) information from the February 2013 update, are counties that have micropolitan areas (an urban core with a population of more than 10,000 but less than 50,000) or are outside of CBSAs [10]. Sources of data: 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 Area Resource File, HRSA, US Department of Health & Human Services, various years; US Census Bureau, 2013.

PHPSAs in 2010. Stars denote nonmetropolitan counties, based on the February 2013 Office of Management and Budget designations for metropolitan and micropolitan [10].

Concerns about a national shortage of primary care physicians have been raised in both the aca-

demical literature [11-14] and in the popular press [15, 16]. Between 1991 and 2010, however, North Carolina's primary care physician workforce grew at a rate of 42%, compared with a growth rate of only 35% for the state's physician workforce as a whole. Although the overall supply of primary care

FIGURE 2.
Primary Care Physicians in North Carolina per 10,000 Population by Persistent Health Professional Shortage Area (PHPSA) Status, 1979–2010

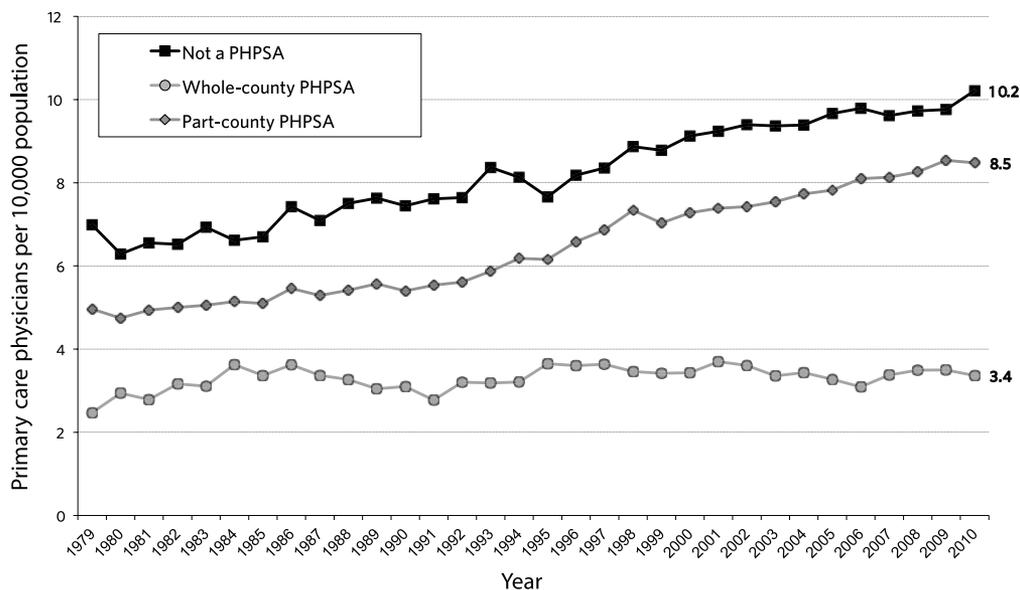
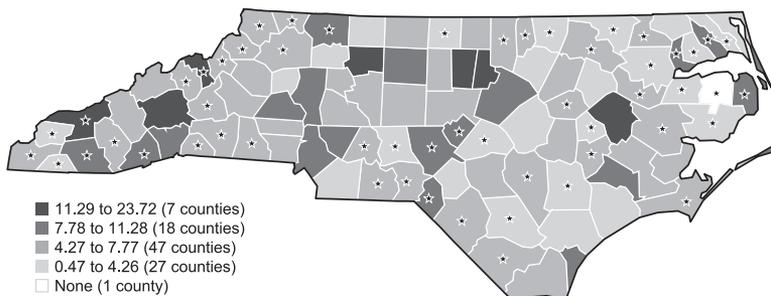


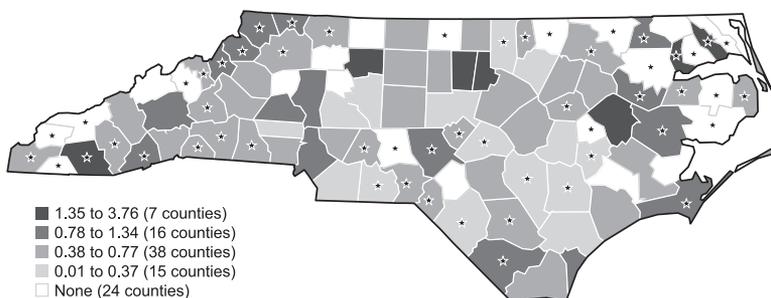
FIGURE 3.
Primary Care Physicians, General Surgeons, and Psychiatrists in North Carolina in 2011,
Based on Primary Practice Location

Map A. Number of Primary Care Physicians per 10,000 Population



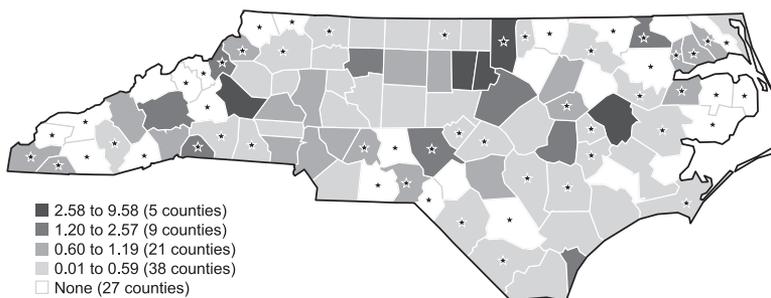
Note. The state as a whole had 7,520 primary care physicians (7.78 per 10,000 population). Primary care physicians included those who listed their primary area of practice as family practice, general practice, internal medicine, obstetrics and gynecology, or pediatrics. Stars denote the state's 54 nonmetropolitan counties.

Map B. Number of General Surgeons per 10,000 Population



Note. The state as a whole had 759 general surgeons (0.78 per 10,000 population). General surgeons included physicians who listed their primary area of practice as general surgery, abdominal surgery, trauma surgery, vascular surgery, surgical critical care, surgical oncology, bariatric surgery, or transplant surgery. Stars denote the state's 54 nonmetropolitan counties.

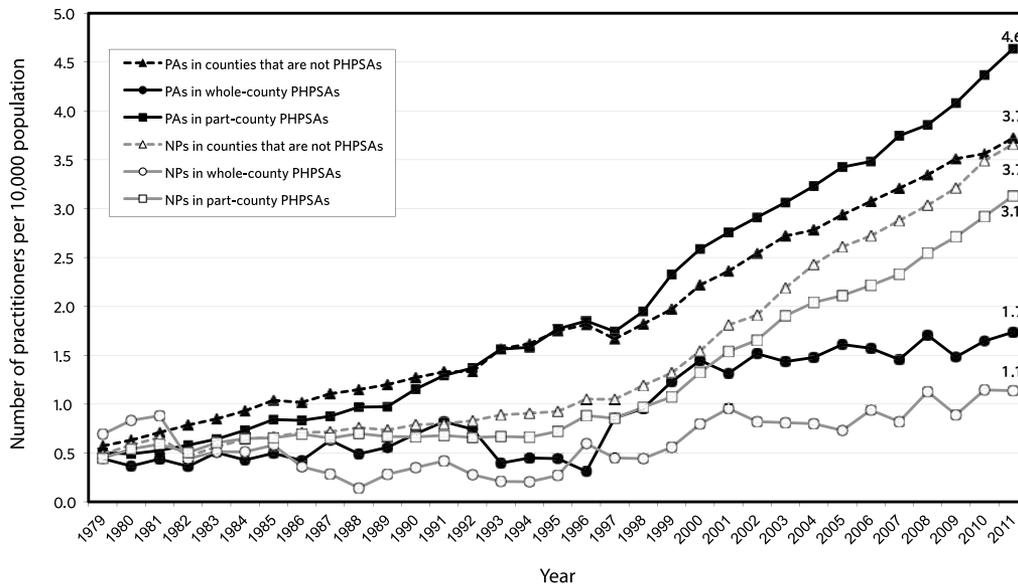
Map C. Number of Psychiatrists per 10,000 Population



Note. The state as a whole had 1,164 psychiatrists (1.20 per 10,000 population). Psychiatrists included physicians who listed their primary area of practice as psychiatry, child psychiatry, psychosomatic medicine, addiction/chemical dependency, medicine/psychiatry, forensic psychiatry, addiction psychiatry, alcohol/drug abuse, psychiatry/geriatric, or hypnosis. Stars denote the state's 54 nonmetropolitan counties.

Sources of data: 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, 2011. Data on physicians include active, in-state, nonfederal, non-resident-in-training MDs and DOs licensed in North Carolina as of October 31, 2011. Population data are from the US Census Bureau, 2013. Nonmetropolitan counties, whose designation is based on Core Based Statistical Area (CBSA) information from the February 2013 update, are counties that have micropolitan areas (an urban core with a population of more than 10,000 but less than 50,000) or are outside of CBSAs [10].

FIGURE 4. Physician Assistants (PAs) and Nurse Practitioners (NPs) in North Carolina, by Persistent Primary Care Health Professional Shortage Area (PHPSA) Status, 1979–2011



Sources of data: Practitioner data are from the North Carolina Health Professions Data System, 1979 to 2010; North Carolina Office of State Planning. Figures include all licensed, active, in-state PAs and NPs. North Carolina population data are smoothed figures based on the 1980, 1990, 2000, and 2010 US Censuses. Health Professional Shortage Areas (HPSAs) are from the Area Resource File of the Health Resources and Services Administration (HRSA). Persistent HPSAs are those designated as HPSAs by HRSA during at least 6 of the most recent 7 designation periods (from 2002 through 2010). HPSA designations are not available for 2006 and 2007.

physicians grew steadily from 1991 to 2010, supply has remained stagnant in the state's most underserved areas. Figure 2 shows that the gap between well-supplied and underserved counties is increasing. Between 1979 and 2010, the number of primary care physicians per capita increased in non-PHPSA counties and in those designated as part-county PHPSAs, but it remained stagnant in whole-county PHPSAs. In 2011, just 18% (n = 1,327) of primary care physicians had a primary practice location in a rural county, even though 2010 census estimates indicated that 45% of North Carolinians lived in a rural county [17].

Figure 3 shows the distribution of primary care physicians, psychiatrists, and general surgeons in North Carolina by primary practice location in 2011. Not surprisingly, physicians who practice in these specialties are most concentrated in counties with academic health centers, while PHPSA counties face a shortage of all of these professionals. These data may underestimate coverage, because 27% (n = 2,026) of primary care physicians, 35% (n = 264) of general surgeons, and 41% (n = 473) of psychiatrists practice in more than one location, but

due to limitations in how the data are collected, we are unable to estimate the percentage of time that these primary care physicians, general surgeons, and psychiatrists spend in secondary or tertiary practice locations.

General surgeons are often omitted from many discussions about workforce shortages, but they play a critical role in providing residents of rural areas with acute care and trauma services and treatment for other urgent medical conditions [18]. General surgeons are also a necessary referral resource for the management of critical care, obstetric, endoscopic, and pre- and postsurgical care issues. From a health systems perspective, general surgeons in rural areas also provide an important revenue stream for small hospitals, which can face difficulties remaining open if they are unable to provide surgical services [18-21]. In 2011, 83% (n = 630) of the state's general surgeons had a primary practice location in a metropolitan area, and only 17% (n = 129) were practicing primarily in a rural area. Only 1 general surgeon had a primary practice location in a whole-county PHPSA (in Washington County), and 17 counties did not

have any general surgery coverage. Addressing the maldistribution of general surgeons is of critical importance in ensuring that rural citizens have access to surgical care for urgent conditions such as appendectomies and trauma.

Prior studies have suggested that many North Carolinians who need mental health services have not been able to receive such care [22]. Mental health resources and services are overburdened in rural areas of the state [23]. In 2011, 27 counties maintained services only as psychiatrists' secondary or tertiary practice locations, and 13 counties had no psychiatrist coverage at all. Just 13% (n = 149) of the state's psychiatrist workforce has a primary practice location in a rural county, and only 5 psychiatrists have a primary practice location in a whole-county HPSA. Rural counties with a shortage of psychiatrists often rely on primary care professionals for provision of mental health services, but these same counties also lag behind in terms of their supply of primary care providers [24].

PAs and NPs also play a critical role in the provision of health services for North Carolinians. Between 1990 and 2010, North Carolina's NP workforce had a cumulative rate of growth of 383%, and its PA workforce had a cumulative growth rate of 214%; in comparison, the cumulative growth rate of North Carolina's physicians was only 35%. The majority of growth in these professions occurred in non-PHPSA counties and in those with a part-county PHPSA designation (Figure 4). National data indicate that NPs and PAs are increasingly subspecializing [25, 26]. Thus, the question of whether NPs and PAs can ameliorate workforce shortfalls by substituting or supplementing the care historically provided by physicians likely varies by specialty, geography, and employment setting.

Prior research has documented the state's maldistribution of primary care providers, general surgeons, and psychiatrists [27]. Our analysis shows that this maldistribution has persisted. Several initiatives are under way to diffuse the education of health professionals to underserved areas of the state, with the goal of then retaining those providers in areas where population health needs are greatest. Routine monitoring of the North Carolina health professional workforce and continued benchmarking will allow policymakers to determine the success of these training initiatives, as well as that of loan repayment and other rurally focused policies and programs. **NCMJ**

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