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Primary Care in Tennessee: The Gap between Demand and Physician Supply

I. What is the Problem?

> The availability of excellent primary care is central to high performing health care and favorable patient outcomes. Unfortunately, in many regions of the country, residents cannot find the care they want and need. While federal and state programs have made considerable progress in addressing the primary care needs of underserved populations, high quality primary care remains out of reach for many.[1]

The demand for primary care in Tennessee, as in many other parts of the country, exceeds the availability of needed services. The Robert Graham Center has estimated that 56 million Americans currently lack adequate access to primary care.[2] This unmet health care demand is expected to increase substantially over the next few years as a result of population growth, the aging of the population, and the impacts of the Affordable Care Act and other forces on health insurance availability and health system functions.[3]

The purpose of this report is to provide information on the health and economic consequences and extent of the current and future shortage of primary care physicians in Tennessee as a basis for considering evidence-based, effective public policy initiatives.

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[1] National Association of Community Health Centers and the Robert Graham Center, *Access Denied: A Look at Americans Medically Disenfranchised* (Washington, DC: The Robert Graham Center, March 2007).

[2] Ibid.

[3] Bureau of Health Professions, *Projecting the Supply and Demand for Primary Care Practitioners Through 2020* (Washington, DC: Health Resources and Services Administration, Department of Health and Human Services, November 2013).

II. What is the Current Status of the Primary Care Physician Workforce in Tennessee?

Who provides primary care? Primary care has traditionally been provided by physicians, including both medical physicians (MDs) and osteopathic physicians (DOs). These include physicians designated as general practitioners (GPs) and physicians with training in family medicine, general internal medicine, general pediatrics, and, in some states including Tennessee, general obstetrics-gynecology. A growing volume of primary care is also being provided by nonphysician clinicians, including nurse practitioners, physician assistants, and clinical pharmacists; the roles of these providers will be considered in subsequent reports on this site. In addition, a limited (less than 8.0% of primary care visits) and declining amount of primary care services is provided by medical and surgical specialists.[4]

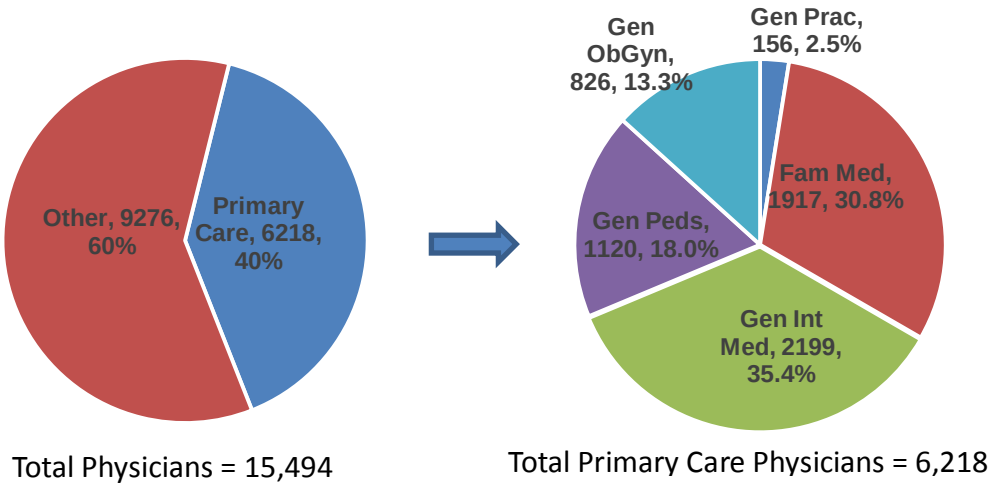
Exhibit 1 provides basic information about the current supply of primary care physicians (including both allopathic and osteopathic physicians) in Tennessee. Of the 15,494 active, office-based, nonfederal physicians engaged chiefly in patient care in 2012, 6,218 (40.1%) were in the primary care specialties of general practice (156, 2.5%), family medicine (1,917, 30.8%), general internal medicine (2,199, 35.4%), general pediatrics (1,120, 18.0%), and general obstetrics-gynecology (826, 13.3%).[5]

Adequacy of current physician supply. Although Tennessee as a whole has a relatively high number of primary care physicians per capita as compared to other

[4] T. Edwards, J. N. Mafi, and B. E. Landon, "Trends and Quality of Care in Outpatient Visits to Generalist and Specialist Physicians Delivering Primary Care in the United States, 1997-2010," *Journal of General Internal Medicine* 29(6):947-55, 2014.

[5] Physician supply data are derived from the AMA Physician Masterfile database as reported in the *Area Health Resources File*, 2014-15 ed. (Washington, DC: Health Resources and Services Administration, U.S. Department of Health and Human Services).

Exhibit 1: The Distribution of Physicians and Primary Care Physicians in Tennessee, 2012



Source: *Area Health Resources File,* 2014-15 ed. (Washington, DC: Health Resources and Services Administration, U.S. Department of Health and Human Services).

states,[6] large regional differences and many areas of shortage exist. The number of primary care physicians per county ranged from zero in three counties (Lake, Moore, and Van Buren) to 1,087 (in Shelby County). The population per primary care physician in the 92 counties with one or more primary care physicians ranged from 135 to 14,104.

One approach to assessing the adequacy of the primary care physician supply in a county was developed by the State Health Access Data Assistance Center (SHADAC), a research unit of the University of Minnesota.[7] In this scheme, a county was designated as having an "*adequate*" primary care workforce if there were fewer than 1,500 residents per primary care physician, as having a "*moderately inadequate*" supply

[6] E. Hing and C. J. Hsiao, *State Variability in Supply of Office-based Primary Care Providers: United States, 2012* (Atlanta, GA: Centers for Disease Control and Prevention, National Center for Health Statistics Data Brief #151, May 2014).

[7] State Health Access and Data Assistance Center, http://www.shadac.org.

if there were between 1,500 and 3,499 residents per primary care physician, and "*low inadequate*" if there were 3,500 or more residents per primary care physician.

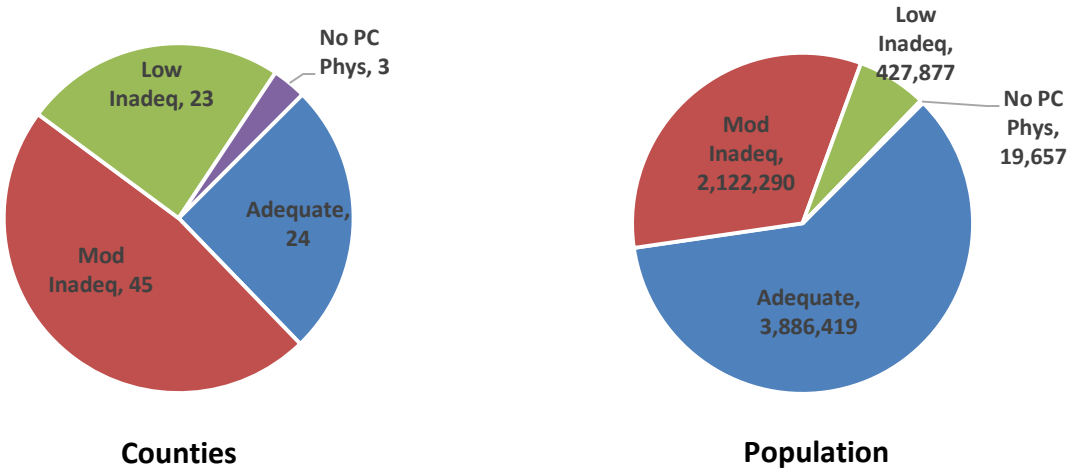
The distribution of Tennessee's 95 counties based on the SHADAC model is shown in Exhibit 2. In 2012, only 24 counties (25.3%) in Tennessee met the criterion for an adequate supply of primary care physicians, 45 counties (47.4%) were deemed to have a moderately inadequate workforce, and 23 counties (24.2%) met the criterion for a low inadequate supply. As noted above, three counties (3.2%) had no primary care physicians.

The data shown in Exhibit 2 also demonstrate that almost 40.0% of the state population (2,583,762 residents) lived in counties with an inadequate supply of primary care physicians. Counties with an adequate physician workforce were the largest in average population size (155,457 residents per county), followed by those with moderately inadequate (49,665 per county) and low inadequate supplies (17,857 per county); counties with no primary care physicians were the smallest in population size (6,538 per county).

Rural counties predominated among those with less than adequate supplies. Only one rural county had an adequate primary care physician workforce. In contrast, 14 of 42 metropolitan counties and 9 of 20 micropolitan counties were among the 24 counties with adequate levels.[8] Counties with moderately inadequate or low inadequate primary care physician supply had relatively high proportions of residents in typically underserved or vulnerable populations and, hence, were likely in need of primary care services. These include older persons over 65 years of age, persons living in poverty, uninsured persons, and unemployed persons.

[8] County designations were based on criteria of the U.S. Census Bureau and the Office of Management and Budget 2013 definitions of Core Based Statistical Areas (CBSA): (a) *metropolitan counties* contain an urban core with a population of 50,000 or more; (b) *micropolitan counties* include an urban core with a population of 10,000 to 50,000; and (c) *rural counties* do not fit either criteria.

Exhibit 2: Number of Tennessee Counties (Left Panel) and Population Size (Right Panel) by Adequacy of Primary Care (PC) Physician Workforce, 2012



Source: *Area Health Resources File,* 2014-15 ed. (Washington, DC: Health Resources and Services Administration, U.S. Department of Health and Human Services).

The County Health Rankings Project of the Robert Wood Johnson Foundation[9] summarizes the differences in health and socioeconomic status for the SHADAC subgroups (Exhibit 3). Each cell reports the average rank of the counties in each group among all 95 counties in Tennessee for measures of quality of life, health behaviors, clinical care, and social and economic environment. The rankings indicate the composite of several measures for each domain that reflect, together, the general health and socioeconomic conditions in a county in relation to the other 94 Tennessee counties. Higher rankings indicate less favorable measurements. The data indicate that health and socioeconomic conditions were best for the group of counties with an adequate primary care physician workforce and worst for counties with low inadequate workforce levels.

[9] *County Health Rankings*, 2015 edition (Washington, DC: The Robert Wood Johnson Foundation), http://www.countyhealthrankings.org.

Exhibit 3: Average Ranking of Counties in Each Primary Care Physician Workforce Category

	Adequate	Moderately Inadequate	Low Inadequate	No Primary Care Providers
No. of Counties	24	45	23	3
Quality of Life Ranking	41.0	45.3	60.3	50.0
Health Behaviors Ranking	35.3	44.2	65.5	73.3
Clinical Care Ranking	24,1	50.4	67.9	50.7
Social and Economic Environment Ranking	38.7	42.9	66.3	58.3

Source: Data from the County Health Rankings Project of the Robert Wood Johnson Foundation, 2015 edition.

III. Why is a Shortage of Primary Care Providers Important?

The health care literature provides compelling evidence of the values of effective primary care and, hence, the problems that the existing gap between the demand for and the supply of primary care providers can create. The positive values of primary care include the following:

- *Access to primary care improves personal and population health.* Studies have repeatedly demonstrated that regions with higher numbers of primary care physicians have improved health outcomes, including all-cause, heart disease, cancer, and stroke mortality rates; self-reported health status; low birth-weight births; life expectancy; and use of preventive care.[10,11] For example, an increase of one primary care physician per 10,000 population has been associated with a

[10] J. Macinko, B. Starfield, and L. Shi, "Quantifying the Health Benefits of Primary Care Physician Supply in the United States," *International Journal of Health Services* 37(1):111-126, 2007.

[11] L. Blewett, P. J. Johnson, B. Lee, and P. B. Scal, "When a Usual Source of Care and Usual Provider Matter: Adult Prevention and Screening Services," *Journal of General Internal Medicine* 23(9):1354-1360, 2008.

5.3 percent reduction in all-cause deaths, potentially averting as many as 127,617 deaths in the United States each year.[12]

- *Primary care reduces health care utilization and costs.* Higher levels of primary care have been shown to be associated with lower numbers of avoidable hospitalizations,[13] early hospital readmissions,[14] and emergency department utilization for nonurgent conditions.[15] In one report, the addition of one primary care physician per 10,000 population was associated with a reduction in 30-day post-hospital discharge readmissions for pneumonia, myocardial infarction, and congestive heart failure of 7.0 percent, 5.0 percent, and 8.0 percent, respectively; adding one primary care physician per 100,000 population was estimated to reduce the cost of these readmissions by $1.7 million. The preponderance of data also document an inverse relation between primary care services and overall health care costs; for example, Michael Chernew and associates reported that in 2005 a ten percentage point increase in the proportion of physicians practicing primary care was associated with a 9.2 percent reduction in Medicare spending per beneficiary.[16]
- *Expanded primary care reduces racial and socioeconomic disparities in health care.* The impacts of primary care on health are greater among socioeconomically-deprived, at-risk populations than among the general population. For example, the impact of added primary care physicians on all-cause mortality is four times greater among African-American populations than among whites.[17] Similarly, the impact may be greater in rural than in nonrural

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[12] Macinko *et al., "*Quantifying the Health Benefits of Primary Care Physician Supply in the United States."

[13] A. Rosano, C. A. Loha, R. Falvo *et al*., "The Relationship Between Avoidable Hospitalization and Accessibility to Primary Care: A Systematic Review," *European Journal of Public Health* 23(3):356-360, 2012.

[14] V. K. Chetty, L. Culpepper, R. L. Phillips *et al*., *FPs Lower Hospital Readmission Rates and Costs* (Washington, DC: The Robert Graham Center, May 2011).

[15] T. Y. Kim, K. Mortensen, and B. Eldridge, "Linking Uninsured Patients Treated in the Emergency Department to Primary Care Shows Some Promise in Maryland," *Health Affairs* 34(5):796-804, 2015.

[16] M. E. Chernew, L. Sabik, A. Chandra, and J. P. Newhouse, "Would Having More Primary Care Doctors Cut Health Spending Growth?" *Health Affairs* 28(5):1327-1335, 2009.

[17] Macinko *et al., "*Quantifying the Health Benefits of Primary Care Physician Supply in the United States."

areas[18] and in areas with higher levels of income inequality than in other areas.[19] In each case, the greater effect in the vulnerable population would reduce the disparity in health and health care as contrasted with the remaining population.

The positive benefits of primary care described above also identify opportunities for improvement with more adequate access to primary care. These include the following:

- *Chronic conditions amenable to primary care are common and undertreated in Tennessee.* According to the Centers for Disease Control, 11.0 percent of adult Tennesseans have been diagnosed with diabetes, 34.0 percent have elevated cholesterol levels, 37.1 percent have hypertension, and 7.7 percent have asthma.[20] Tennessee also ranks 47th among the states in the rate of obesity.[21] Thus, the opportunities for better treatment through primary care are substantial.

- *The health care costs of these chronic conditions are high*. It has been estimated that if every American utilized primary care, health care costs could be reduced by as much as $67 billion per year.[22] A 5.0 percent reduction in the prevalence of only diabetes and hypertension, a change achievable by enhanced primary care that emphasizes prevention and lifestyle modification, could save $9 billion in the short term and over $24 billion over the longer term; estimates for savings in Tennessee are $199 million in the short term and $621 million longer term.[23]

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[18] L. Shi, J. Macinko, B. Starfield *et al.,* "Primary Care, Social Inequalities and All-Cause, Heart Disease and Cancer Mortality in U.S. counties: A Comparison Between Urban and Non-Urban Areas," *Public Health* 119(8):699-710, 2005.

[19] L. Shi, B. Starfield, R. Pulitzer, and J. Regan, "Primary Care, Self-Rated Health, and Reductions in Social Disparities in Health," *Health Services Research* 37(3):529-550, 2002.

[20] Centers for Disease Control and Prevention, *Chronic Disease Indicators* (Atlanta, GA: Centers for Disease Control and Prevention, 2015), http://www.cdc.gov/cdi/. Accessed June 5, 2015.

[21] United Health Foundation, *America's Health Rankings, 2014* (Minnetonka, MN: United Health Foundation, 2015).

[22] B. Starfield, S. Leiyu, and J. Macinko, "Contributions of Primary Care to Health Systems and Health," *Milbank Quarterly* 83(3):457-502, 2005.

[23] B. A. Ormond, B. C. Spillman, T. A. Waldman, K. K. J. Caswell, and B. Tereshchenko, "Potential National and State Medical Care Savings from Primary Disease Prevention," *American Journal of Public Health* 101(1):157-164, 2011.

The high prevalence of obesity in Tennessee has been estimated to add $3.7 billion to statewide health care costs.[24]

- *Undertreatment leads to avoidable hospitalizations*. The current limits of primary care are reflected in the state's high number of avoidable hospitalizations. These include hospital admissions for conditions that could be avoided by effective primary care (termed "ambulatory care-sensitive admissions") including, as examples, admissions for asthma, diabetes, hypertension, and pneumonia. Among Medicare recipients, Tennessee ranks 46th among the states in the rate of avoidable hospitalizations, with a rate of 73.1 admissions per 1,000 Medicare enrollees—a rate that is 1.6 times that of the state with the lowest rate.[25] These avoidable hospitalizations cost approximately $330 million each year nationally, with each avoidable hospitalization raising health care costs by over $8,700.[26,27]

- *Gaps in primary care also lead to high emergency department (ED) use*. Over 40.0 percent of nonurgent ED visits are associated with deficiencies in primary care access, including long wait times, inconvenient office hours, and inability to find a primary care provider.[28] The health care costs of preventable ED visits total approximately $72 million yearly, or 42.1 percent of all ED charges.

- *Primary care benefits the general economy*. It has been estimated that each additional primary care physician added to a rural shortage area supports almost

[24] J. G. Trogdon, E. A. Finklestein, C. W. Feagin, and J. W. Cohen, "State- and Payer-Specific Estimates of Annual Medical Expenditures Attributable to Obesity," *Obesity* 20(1):214-220, 2012.

[25] Centers for Disease Control and Prevention, *Chronic Disease Indicators.*

[26] K. E. Joynt, A. A. Gawande, E. J. Orav, and A. K. Jha, "Contribution of Preventable Acute Care Spending to Total Spending for High Cost Medicare Patients," *JAMA* 309(24):2572-2578, 2013.

[27] M. Segal, E. Rollins, K. Hodges *et al*., "Medicare-Medicaid Eligible Beneficiaries and Potentially Avoidable Hospitalizations," *Medicare and Medicaid Research Review* 4(1):E1-E10, 2014.

[28] J. L. Hefner, R. Wexler, and A. S. McAlearney, "Primary Care Access Barriers as Reported by Nonurgent Emergency Department Users: Implications for the U.S. Primary Care System," *American Journal of Medical Quality* 30(2):135-140, 2014.

$900,000 (in 2005 dollars) and adds 23 jobs to the local economy.[29] Expanding local physician supply also reduces the outsourcing of care and related revenues to other places with more health care resources; this redistribution may amount to over $1 million for each primary care physician shortage position. In addition, reduced health status related to primar care system shortages reduces labor market productivity and family income, with high levels of both presenteeism and absenteeism, and diverts public funds to health care and away from other communal needs, impedes outside investment, and reduces savings and capital available for investment.[30] Thus, primary care shortages and the subsequent health impacts have negative impacts on the entire community, not just those who are ill.

IV. What Will the Future Bring?

Inadequate Supply. The information summarized above demonstrates that the primary care physician workforce is currently inadequate to meet the health care needs of many Tennesseans and that this shortfall can have substantial health and economic consequences. Almost 40.0 percent of the state's residents live in counties with less than adequate supplies of primary care physicians. Counties with the least adequate supply are those with the greatest potential need—they are predominantly rural, have a disproportionately high prevalence of poverty, and have health and socioeconomic measures substantially lower than those of the other counties.

Although we focus here on numbers of primary care physicians, other factors are critical to providing optimal primary care. These include the actual use of primary care services by patients, the comprehensiveness and the quality of those services, and the effective

[29] F. C. Eilrich, G. A. Doeksen, and C. F. St. Clair, *The Economic Impact of a Rural Primary Care Physician and the Potential Health Dollars Lost to Out-migrating Health Services* (Stillwater, OK: National Center for Rural Health Works, Oklahoma State University, 2007).

[30] D. M. Mirvis and D. E. Bloom, "Population Health and Economic Development in the United States," *JAMA* 300(1):93-95, 2008.

integration of primary and other health services such as hospital inpatient and outpatient care and access to prescription medications within the health care system.[31]

Rising Demand. The demand for primary care services will grow. Almost 40 million Americans live in areas in which projected primary care needs will exceed 5.0 percent of current levels.[32] The main drivers of this rising demand include the increasing size and average age of the population, with the attendant increases in the need for primary care and ongoing management of chronic diseases. Tennessee's population is projected to increase by over 12.0 percent by 2030, and the proportion of Tennesseans 65 years old or older increased by 7.6 percent between 2010 and 2012.[33] Related to these demographic changes, the burden and costs of chronic diseases amenable to primary care management are projected to rise substantially. The number of cases of diabetes mellitus and hypertension in Tennessee are projected to rise by 45.0 percent and 35.0 percent, respectively.[34]

The expansion of insurance coverage through the Affordable Care Act (ACA), even in states such as Tennessee that have (so far) elected not to expand Medicare coverage, will also be significant and will expand access to and increase utilization of primary care services. As of March 31, 2015, 183,000 Tennesseans had enrolled in health plans through the federal Health Insurance Exchange, and total monthly enrollment in TennCare and the State Children's Health Insurance Program (SCHIP) in Tennessee had increased by 17.0 percent from pre-ACA levels.[35] Although the magnitude of the

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[31] D. C. Goodman, S. Brownlee, C. H. Chang, and E. S. Fisher, *Regional and Racial Variation in Primary Care among Medicare Beneficiaries* (Hanover, NH: The Dartmouth Institute for Health Policy and Clinical Practice, September 2010).

[32] E. S. Huang and K. Finegold, "Seven Million Americans Live in Areas Where Demand for Primary Care May Exceed Supply by More than 10 Percent," *Health Affairs* 32(3):614-621, 2013.

[33] E. J. Middleton and M. N. Murray *Population Projections for the State of Tennessee, 2010-2030* (Knoxville, TN: The University of Tennessee Center for Business and Economic Research, June 2009).

[34] The Milken Institute, *An Unhealthy America: Economic Burden of Chronic Disease* (Santa Monica, CA: The Milken Institute), http://www.milkeninstitute.org. Accessed June 24, 2015.

[35] State Health Facts, The Kaiser Family Foundation, http://www.kff.org. Accessed June 22, 2015.

resulting increase in primary care services is unclear,[36] it is likely to be significant. The ACA's mandate for first-dollar coverage of preventive services will also increase the number of primary care visits in Tennessee by over 348,000 per year with a parri passu need for providers.[37]

Increasingly Larger Gap. It is also clear that the gap between the supply of and the demand for primary care physicians will continue to increase. National estimates of the need for additional primary care practitioners to provide projected services vary from approximately 12,500 to over 50,000[38,39] by 2025. Though the magnitude of these estimates varies and is subject to many assumptions about future utilization patterns, health care delivery systems, disease trends, development of new treatments and technologies, and public policies,[40] it is generally agreed that many thousands of additional primary care providers will be needed to meet future demand.

The Robert Graham Center reported that to maintain the current rates of service utilization, Tennessee will need an additional 1,107 primary care physicians by 2030, a 27.0 percent increase compared to the state's workforce in 2010.[41] The Center estimates that 64.0 percent of the overall increase will result from population growth and 22.0 percent from increased utilization related to aging; the remaining 13.0 percent will result from expanded insurance coverage.

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[36] S. Gleid and S. Ma, *How Will the Affordable Care Act Affect the Use of Health Care Services?* (Washington, DC: The Commonwealth Fund, February 2015).

[37] A. Burke and A .Simmons, *Increased Coverage of Preventive Services with Zero Cost Sharing Under the Affordable Care Act* (Washington, DC: Department of Health and Human Services, ASPE Issue Brief, June 27, 2014).

[38] Association of American Medical Colleges, *The Complexities of Physician Supply and Demand: Projections from2013 to 202*5 (Washington, DC: Association of American Medical Colleges, March 2015).

[39] S. M. Petterson, W. R. Liaw, R. L. Phillips *et al., "*Projecting U.S. Primary Care Physician Workforce Needs: 2010-2025," *Annals of Family Medicine* 10(6): 503-509, 2012.

[40] Bureau of Health Professions, *Projecting the Supply and Demand for Primary Care Practitioners Through 2020* (Washington, DC: Health Resources and Services Administration, Department of Health and Human Services, November 2013).

[41] S. M. Petterson, A. Cai, M. Moore, and A. Bazemore, *State-level Projections of Primary Care Workforce, 2010-2030* (Washington, DC: The Robert Graham Center, September 2013).

These drivers of demand occur at a time when fewer new physicians are choosing careers in primary care. Projections by the Health Resources and Services Administration of the U.S. Department of Health and Human Services suggest that whereas the primary care physician workforce is expected to increase by 8.0 percent between 2010 and 2020, the demand for primary care services will increase by 14.0 percent, with a consequent increase in the supply-demand gap.[42] Between 2001 and 2010, the percentage of all medical residents expecting to enter primary care fell by 6.3 percent despite a 13.6 percent increase in the overall number of resident positions.[43,44]

When Tennessee faced a similar challenge with the onset of TennCare in the early 1990s, the state's four medical schools agreed upon a unified approach to increase the number of graduates entering primary care training programs.[45] The problem has persisted, and relying principally on increasing the number of practicing primary care physicians seems an improbable solution, at least in the near future.

Suggested Solutions. Thus, under current delivery and education models, Tennessee will likely be unable to provide enough primary care physicians to meet the primary care needs of its residents in the near future. New and innovative models of health system organization, health care delivery and financing, and health professional training will be needed. Suggestions to ameliorate this problem include, among others:

- increasing the number of primary care physicians through financial and other incentives;
- increasing the role of nonphysician providers such as advanced practice registered nurses, physician assistants, and clinical pharmacists;

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[42] Bureau of Health Professions, *Projecting the Supply and Demand for Primary Care Practitioners Through 2020.*

[43] M. D. Schwartz, "Health Care Reform and the Primary Care Workforce Bottleneck," *Health Affairs* 2;27(4):469-472, 2012.

[44] P. Jolly, C. Erikson, and G. Garrison, "U.S. Graduate Medical Education and Physician Specialty Choice," *Academic Medicine* 88(4):468-474, 2013.

[45] R. C. Walton, D. M. Mirvis, and M. A. Watson, "The TennCare Graduate Medical Education Plan: Ten Years Later," *Journal of General Internal Medicine* 22:1365-1369, 2007.

- increasing the efficiency of primary care providers by changing delivery models and health information technology, and advancing patient self-care; and
- implementing large-scale health system changes, including decentralization of care and reducing the focus on specialty and procedure-based care.[46,47]

Unless the current and rising demand is met with a proportionate increase in the health care system's capacity to deliver effective primary care, the imbalance between supply and demand will significantly impact the health and economic well-being of our communities. None of the approaches for addressing this challenge will be easy. Much work lies ahead, but the reward can be huge. It can lead to a more coordinated and efficient primary care workforce that is better able to meet the current and—most importantly—the coming needs for health care in our state. Now, ahead of the growing demand, is the time to begin.

[46] M. V. Pauly, M. Naylor, and J. Weiner, *Primary Care Shortages: It's More Than Just a Health Count* (Philadelphia, PA: The Leonard Davis Institute for Health Economics, The University of Pennsylvania, November 2014).

[47] T. S. Bodenheimer and M. D. Smith, "Primary Care: Proposed Solutions to the Physician Shortage Without Training More Physicians," *Health Affairs* 32(11):1881-1886, 2013.

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