

Fourth Biennial Report

Health Issues for the State of North Dakota

2017



Photo by North Dakota Tourism/Jim Gallop

SCHOOL OF MEDICINE & HEALTH SCIENCES
ADVISORY COUNCIL



Center *for*
Rural Health

The University of North Dakota
School of Medicine & Health Sciences

UND SCHOOL OF MEDICINE
& HEALTH SCIENCES
UNIVERSITY OF NORTH DAKOTA



SCHOOL OF MEDICINE & HEALTH SCIENCES

ADVISORY COUNCIL

This *Report* was prepared by the UND School of Medicine and Health Sciences Advisory Council

David Molmen, MPH

Grand Forks (Chair)

John M. Kutch, MHSA

Minot

Joshua Wynne, MD, MBA, MPH

Grand Forks (Executive Secretary)

Craig J. Lambrecht, MD

Bismarck

Maggie D. Anderson, MM

Bismarck

Sen. Tim Mathern, MPA

Fargo

Thomas F. Arnold, MD

Dickinson

Kevin Melicher, OD

Fargo

Stephen Tinguely, MD

Fargo

Rep. Jon O. Nelson

Rugby

Rep. Lois Delmore, BS

Grand Forks

Shari L. Orser, MD

Bismarck

Terry Dwelle, MD

Bismarck

Breton M. Weintraub, MD, FACP

Fargo

Sen. Robert S. Erbele

Lehr

Courtney M. Koebele, JD

Bismarck (Ex Officio)

Gary Hart, PhD

Grand Forks

Disclaimer

This *Biennial Report* represents the good-faith effort of the UND School of Medicine and Health Sciences and its Advisory Council to provide current and accurate information about the state of healthcare in North Dakota. Numerous sources were used in gathering the information found in this *Report*. We welcome corrections, which we will incorporate in subsequent editions of the *Biennial Report*.

Acknowledgement

We acknowledge the exceptional contributions of the following individuals in the preparation of the *Report*: Brad Gibbens, Mandi-Leigh Peterson, and Dr. Gary Hart of the Center for Rural Health; Jessica Sobolik and Denis MacLeod of the Office of Alumni and Community Relations; and Laura Cory of Information Resources. In addition, we thank Abdi Ahmed, Patrick Bright, Nate Fix, Dr. Shawnda Schroeder, and Lynette Dickson of the Center for Rural Health; Dr. Rashid Ahmed, associate dean of research, of the College of Nursing and Professional Disciplines; and Shelly Peterson, president, North Dakota Long Term Care Association for their contributions.

Suggested reference

University of North Dakota School of Medicine and Health Sciences Advisory Council. (2017). Fourth Biennial Report: Health Issues for the State of North Dakota 2017. Retrieved from http://www.med.und.edu/biennial-report/_files/docs/fourth-biennial-report.pdf

INTRODUCTION AND UPDATE

The *First Biennial Report: Health Issues for the State of North Dakota* was prepared in the fall of 2010 by the University of North Dakota School of Medicine and Health Sciences (SMHS) Advisory Council, a legislatively mandated group of 15 stakeholders in the North Dakota healthcare enterprise. It was published in 2011 to coincide with the 62nd Legislative Assembly of North Dakota and was produced with the cooperation of the senior leadership team of the SMHS. The primary stimulus for the preparation of the *Report* was a revision in the North Dakota Century Code (NDCC) that was instituted in 2009 by the 61st Legislative Assembly in which the duties of the SMHS Advisory Council were modified. The modified duties included a requirement to submit a report biennially. The duties of the SMHS Advisory Council as specified in NDCC Section 15-52-04 are as follows:

1. *The advisory council, in consultation with the school of medicine and health sciences and the other agencies, associations, and institutions represented on the advisory council, shall study and make recommendations regarding the strategic plan, programs, and facilities of the school of medicine and health sciences.*
2. *Biennially, the advisory council shall submit a report, together with its recommendations, to the agencies, associations, and institutions represented on the advisory council, to the University of North Dakota, and to the legislative council.*
- 3.a. *The report must describe the advisory council's recommendations regarding the strategic plan, programs, and facilities of the school of medicine and health sciences as developed under subsection 1. The recommendations for implementing strategies through the school of medicine and health sciences or other agencies and institutions must:*
 - (1) *Address the healthcare needs of the people of the state*
 - (2) *Provide information regarding the state's healthcare workforce needs*
- b. *The recommendations required under subdivision 3a may address:*
 - (1) *Medical education and training*
 - (2) *The recruitment and retention of physicians and other healthcare professionals*
 - (3) *Factors influencing the practice environment for physicians and other healthcare professionals*
 - (4) *Access to healthcare*
 - (5) *Patient safety*
 - (6) *The quality of healthcare and the efficiency of its delivery*
 - (7) *Financial challenges in the delivery of healthcare*
4. *The council may consult with any individual or entity in performing its duties under this section.*

The *First Biennial Report* provided the first comprehensive analysis of the existing state of health in North Dakota and its healthcare delivery enterprise. The *Report* found that rural depopulation, out-migration of the young from the state, an increasingly older adult population, low population density,

and localized population growth in the major cities and in the Oil Patch would result in an increasing imbalance between the demand for healthcare and the supply of providers that would necessitate the need for more physician and nonphysician providers in North Dakota and better healthcare delivery systems. The *Report* concluded that North Dakota had a paradox regarding its healthcare workforce, characterized as shortages amid plenty. The size of the physician workforce in North Dakota was found to be at or better than national norms for most specialties, including all the primary-care disciplines. Despite this, there was a significant distribution problem, with the greatest number of providers located in the urban regions of the state and a shortage (especially primary-care providers) in the rural areas.

The *Report* also offered an analysis of what the future was likely to hold, and concluded that the current shortage of physicians was only going to increase as the population aged and grew in the future. It also found that the shortage of workers in the healthcare field over the next 15 years would not be limited to physicians. The *Report* determined that an entire cadre of additional healthcare providers—from nurses to physician assistants to occupational and physical therapists to medical laboratory specialists and others—would be needed to ensure that effective, efficient, and appropriate healthcare would be available to all North Dakotans.

The *Report* concluded with a proposal for a multifaceted plan to address the healthcare needs of North Dakota, emphasizing necessary steps to reduce disease burden, increase the healthcare workforce through enhanced retention of graduates as well as expansion of class sizes, and improve the state's healthcare delivery system through more cooperation and coordination of the various healthcare delivery facilities.

Coincident with the release of the *Report*, the SMHS Advisory Council prepared and released its plan for addressing the identified healthcare workforce needs of North Dakota. Called the Healthcare Workforce Initiative (HWI), the plan identified specific steps to reduce disease burden and increase the provider workforce through programs designed to increase provider retention for practice within the state as well as expand the provider network through class size increases. The HWI received strong support from University of North Dakota leaders, the SMHS Advisory Council, and a wide variety of constituencies around the state. During the subsequent 62nd session of the North Dakota Legislative Assembly, it was determined that the HWI would be implemented in two phases. The first phase was implemented immediately following the end of the 62nd Legislative Assembly in the summer of 2011, and consisted of a variety of programs to reduce disease burden (including the initiation of a Master of Public Health training program as a joint undertaking by the University of North Dakota and North Dakota State University, and a program to address geriatric patient needs), increase retention of healthcare professional graduates, and partially increase class sizes.

The *Second Biennial Report: Health Issues for the State of North Dakota* was an update on the developments and changes



A view from the southeast side of the new UND School of Medicine and Health Sciences building.

that occurred between 2011 and 2013. It reanalyzed the health of the citizens of North Dakota and the status of our healthcare delivery systems, utilizing updated data and more refined projection tools. The *Report* was similar to the first report in its organizational approach—analysis of the current state of affairs, projections for the future, and proposed plans to deal with the identified healthcare delivery challenges. The *Report* summarized the most up-to-date statewide healthcare data available, and it carefully analyzed the data to extract the most salient and informative implications regarding healthcare and healthcare delivery within the state. The *Report* contained a more robust analysis of the healthcare challenges associated with the oil boom, and proposed approaches to ensure that adequate healthcare was available not only in the Red River Valley but particularly in the rapidly growing and challenging areas in the western part of the state that were most affected by the oil boom. The *Report* contained a more complete analysis of the status of nonphysician healthcare workers, and a greatly expanded section analyzing quality and value indicators in the state. The *Report* concluded with a reemphasis of the importance of fully adopting the HWI by the 63rd Legislative Assembly, along with a call to adequately address the associated physical plant needs of the SMHS to accommodate the attendant growth in the number of healthcare students.

Following the release of the *Second Biennial Report*, North Dakota's 63rd Legislative Assembly endorsed full implementation of the second phase of the HWI. Authorization and funding were forthcoming to permit complete implementation of the four core strategies of the HWI: reduce disease burden, retain more graduates for direct patient care in North Dakota, increase class sizes, and improve the efficiency of healthcare delivery in the state. Accordingly, medical student class size subsequently was increased by 16 students per year, health sciences students by 30 students per year, and a variety of rural-focused residencies

added. Coincident with the growth in class sizes, construction began on a new SMHS building designed to accommodate the increased class sizes. The building was completed on time and on budget, and opened during the summer of 2016 to welcome the incoming medical school Class of 2020 and the health sciences classes that started later that fall.

The *Third Biennial Report: Health Issues for the State of North Dakota*, released in 2015, used updated data to assess the status of health and healthcare delivery throughout North Dakota. It incorporated the results of a statewide survey of all major healthcare providers that was completed during 2014 to assess healthcare workforce needs. The *Report* provided updated information on healthcare needs and delivery in the Oil Patch in particular. It also analyzed in greater depth the use of nonphysician providers throughout the state. And it looked in greater detail than prior reports at a variety of related healthcare challenges, including oral health, and behavioral and mental health needs.

This latest version, the *Fourth Biennial Report: Health Issues for the State of North Dakota*, updates the previous three editions with the latest available demographic and census data and incorporates the results of several recent healthcare workforce surveys, especially a comprehensive study of nursing facility workforce in North Dakota that was compiled and completed in September 2016. The study analyzed the responses obtained from 81 rural and urban nursing facilities and assessed such issues as vacancy rates, recruitment issues, and retention strategies. Along with a study of the hospital workforce in North Dakota that was completed in September 2014, the two studies provide a comprehensive overview of the status of the nonphysician healthcare workforce throughout the state that complements the updated data available in the latest *Report* regarding the physician workforce.

TABLE OF CONTENTS

Introduction and Update.....	ii
Executive Summary	vi
Chapter 1: The Population of North Dakota and Attendant Healthcare Needs.....	1
Chapter 2: The Health of North Dakota.....	17
Chapter 3: Physician Workforce in North Dakota.....	37
Chapter 4: Primary Care and Specialty Physician Workforce in North Dakota.....	45
Chapter 5: Nonphysician Healthcare Workforce in North Dakota	55
Chapter 6: Healthcare Organization and Infrastructure in North Dakota Hospitals ...	77
Chapter 7: Quality and Value of Healthcare	107
Chapter 8: Conclusion	133
Chapter 9: Healthcare Workforce Development	137
Chapter 10: Recommendations: Healthcare Planning for North Dakota.....	145
Appendix	150

EXECUTIVE SUMMARY

North Dakota, like the rest of the country, is facing a major healthcare delivery challenge—how to meet a burgeoning need for healthcare services now and especially in the future with a supply of physicians and other providers that has not always kept pace with the growing demand. The problem is particularly acute in rural and western parts of North Dakota, where there has been a chronic shortage especially of primary care providers dating back for many decades and probably since the start of statehood. Part of the problem in North Dakota is an inadequate number of providers, but a larger portion of the problem is a maldistribution of providers who are disproportionately located in the larger urbanized areas of the state. Without direct intervention, the difficulty of providing adequate healthcare in North Dakota will worsen over the coming decades from the combination of aging of the population (including aging and eventual retirement of the healthcare workforce) along with localized population growth in the Oil Patch and the cities, both of which will increase the demand for healthcare services.

However, unlike most of the rest of the country, North Dakota is directly addressing its healthcare delivery challenges through its implementation of a well-vetted plan for healthcare workforce development and improved healthcare delivery. That plan, the Healthcare Workforce Initiative (HWI), was an outgrowth of both the *First* and *Second Biennial Reports on Health Issues for the State of North Dakota*. Phase I of the HWI, which began by increasing medical and health sciences class sizes along with increasing residency slots, has already been fully implemented. Phase II of the plan is being implemented at present. When fully implemented, the HWI should decrease North Dakota's healthcare delivery challenges through attainment of its four goals: reducing disease burden, retaining more healthcare provider graduates for care delivery within the state, training more healthcare providers, and

improving the efficiency of the state's healthcare delivery system. To accommodate the substantial class size expansions associated with the HWI, a new University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) facility has been completed on UND's Grand Forks campus, and is now up and running. It was completed on time and on budget.

In accordance with the expectations specified in the North Dakota Century Code (NDCC 15-52-04), this *Fourth Biennial Report on Health Issues for the State of North Dakota (Report)* updates the first three *Reports* with an assessment of the current state of health of North Dakotans and their healthcare delivery system, along with an analysis of the steps that need to be taken to ensure that all North Dakotans have access to high-quality healthcare at an affordable cost—now and in the future.

The *Report* begins with an updated analysis of the population demographics in North Dakota, utilizing the most recently available data. Standardized definitions are used to define the state's population—*metropolitan* to denote areas with a core population of 50,000 or more; *micropolitan* (or large rural) to denote areas with core populations of 10,000 to 49,999; and *rural* to denote areas with less than 10,000. About half (49%) of North Dakota's current population reside in metropolitan areas, with a little more than a quarter (26%) located in rural areas. This represents a dramatic change, since only a few decades ago, more than half of the state's population was located in rural areas. North Dakota is one of the least densely populated states in the country, ranking 49th in population density. Also unlike the rest of the country, we have more males than females (51% versus 49%), and we are older on average; North Dakota, for example, is tied for fourth in the country in the percentage of its state population that is 85 years of age or older. Because demand for healthcare increases proportionally with age, demand for healthcare services is especially pronounced in

North Dakota. That demand will only increase as the state's citizens grow older. People in rural regions of North Dakota are generally older, poorer, and have less or no insurance coverage than people in non-rural areas, all of which are challenges to providing adequate healthcare. Rural regions continue to experience depopulation, except for significant population growth in those western regions associated with the recent oil boom; the cities continue to grow and prosper. Predictions for population growth in the future are controversial and are tempered by the knowledge that another "boom-and-bust" cycle that has been seen before has occurred again. But even conservative estimates predict a population of about 800,000 by 2040 (a nearly 20% increase compared with 2010), with a further reduction in the rural portion of the population by about one-third.

The *Report* next considers the health of North Dakotans, which in comparison with the rest of the United States is generally good. North Dakotans have a slightly lower problem with diabetes than the rest of the United States and are less likely to report fair or poor health. However, North Dakotans tend to have a higher risk of cancer and a mortality rate that exceeds the national average. Across North Dakota, behavioral risks tend to increase as population density decreases; thus rural areas have the worst behavioral risk, with an increased frequency of obesity, smoking, and drinking, especially in males.

The physician workforce is considered next in the *Report*, which finds that North Dakota has somewhat fewer physicians per 10,000 population than the United States as a whole or the Midwest comparison group, and although the gap had narrowed over the past three decades, it recently has widened. Our physicians are older and more likely to be male than elsewhere in the United States. About one-fourth of the physician workforce is made up of international medical graduates, a little higher than the rest of the country. The UND SMHS is an important source of physicians for the state, accounting for nearly half of the more than 1,000 physicians practicing in North Dakota who graduated from a U.S. medical school.

Of all the physicians in the state, about 44% received some or all of their medical training (medical

school or residency or both) in-state. As is the rule for the rest of the United States, there is a striking gradient of patients per physician depending on geographic region; micropolitan areas (large rural) have about twice as many patients per physician as metropolitan areas, while rural areas have about five times as many. Predictions of an inadequate physician supply leading to further increases in the number of patients per provider, especially in rural areas, have helped buttress support for the HWI that is intended to address those concerns. Without the effects of the HWI, current estimates indicate a shortage of some 260 to 360 physicians by 2025, primarily the consequence of the heightened need for healthcare services as the Baby Boom generation ages but also from retirements in the similarly aging physician workforce (one-third of the physicians in North Dakota are 55 years of age or older). Even more physicians will be needed if the population grows as recently predicted. If the population of North Dakota increases to 800,000 people, around 500 additional physicians will be needed.

The state's primary care physicians (family medicine, general internal medicine, and general pediatrics) are considered next in the *Report*. Compared with the rest of the country, North Dakota has more primary care physicians when normalized to the population size. Their density is significantly higher than either comparison group in metropolitan regions; it is only in rural areas that North Dakota significantly lags the Midwest comparison group. Primary care physicians in North Dakota are more likely to practice in rural areas compared with specialist physicians, but they still are twice as likely to be found in urban regions rather than rural areas after correcting for population. Residency training in North Dakota is an especially important conduit of primary care physicians, since nearly half (45%) of them have completed a residency within the state; more than half went to medical school at UND, completed an in-state residency, or did both.

North Dakota has relatively fewer specialists than the Midwest or the rest of the United States in certain specialties, including obstetrics-gynecology. We have about the same relative number of psychiatrists as other Midwest states, although two-thirds of them

work in the eastern part of the state, leaving the western parts of North Dakota with a shortage.

Similar trends are found with other nonphysician providers. While nurse practitioners (NPs) and physician assistants (PAs) are much more likely to be female than their physician counterparts, they, too, are distributed more in the metropolitan than rural areas in a proportion similar to primary care physicians. This is particularly true for NPs; PAs are the most evenly distributed across North Dakota of any healthcare provider group. Compared with U.S. figures, North Dakota has about 7% fewer NPs but 37% more PAs. North Dakota has significantly more licensed practical nurses (LPNs), registered nurses, and pharmacists than the national average, and they, too, are distributed particularly in the metropolitan areas. In the case of pharmacists, their relative scarcity in rural areas is balanced by pharmacy techs and by a robust telepharmacy program spearheaded by North Dakota State University. North Dakota has fewer dentists than the United States as a whole, but more physical therapists. When looking at the entire North Dakota healthcare provider workforce, there is a consistent finding of a relative shortage of providers especially in rural and micropolitan (large rural) areas compared with metropolitan regions, but with important variations across the state depending on the particular provider type.

The *Report* then analyzes the findings of two surveys conducted by UND's Center for Rural Health that collated the number of unfilled hospital-based nonphysician healthcare worker positions ("vacancies") across the state. The *North Dakota Hospital Workforce Study* looked at a wide spectrum of 25 different categories of healthcare workers (from nurses to lab technicians to dietitians to business personnel) and found, perhaps somewhat surprisingly, that hospitals are reporting significant worker shortages in only three of the 25 categories (12%), and even in those areas, the vacancy rates are not much above national norms. The *North Dakota Nursing Facility Workforce Study* assessed the nonphysician healthcare workforce status of 24 employee categories in 81 rural and urban nursing facilities. The survey, performed in September 2016, found that vacancy

rates were not excessively high for most employee categories, although rates tended to be higher in rural compared with urban institutions. The highest vacancy rates were found for PAs and NPs, followed by registered nurses, LPNs, and certified nurse assistants. However, there were significant regional differences across North Dakota in vacancy rates. Barriers to successful recruitment of needed employees included the rural location of facilities, a small pool of candidates, and salary limitations.

The *Report* next analyzes the healthcare delivery system in North Dakota, which consists of hospitals—36 smaller critical access hospitals (CAHs) with 25 or fewer acute-care beds, six larger general acute-care hospitals located in the four largest cities, three psychiatric hospitals, two long-term acute-care hospitals, two Indian Health Service hospitals, one Veterans Affairs (VA) hospital, and one rehabilitation hospital—and about 300 ambulatory care clinics. Although their financial performance has improved since the *Third Biennial Report*, they still struggle to make ends meet so that they can provide needed care in their communities. Outpatient care is augmented by 52 federally certified rural health clinics, eight community-based outpatient VA clinics, and five federally qualified health centers. There are 43 trauma centers across the state, with each of the "Big Six" hospitals home to a Level II trauma center. Most emergency medical service support in the state is ground-based and provides basic services; it is under duress because of its dependence on volunteers and a problematic funding stream. There has been an expansion across the state in the deployment and use of electronic health records, but financial and other barriers to full implementation remain. Long-term care in the state is provided by 80 skilled-nursing, 68 basic-care, and 72 assisted-living facilities. There are 28 independent local public health units. There are 25 facilities or programs statewide that provide mental health services, but there are ongoing challenges to providing adequate services especially in the more rural regions of the state.

The statewide problem of unmet mental and behavioral health needs, especially related to the burgeoning opioid abuse issue, is highlighted in the

current *Report*. One approach already implemented through the HWI is to bring the often rural patient to the provider (rather than the other way around) through the use of telepsychiatry. The UND Department of Psychiatry and Behavioral Science has implemented training in telepsychiatry for all of its residents so that they will be able to utilize this effective modality once they get out into clinical practice.

Another problem area for the state is oral health. The *Report* summarizes the results of an extensive study undertaken by UND's Center for Rural Health in 2014 of North Dakota's oral health needs and attendant policy implications. That study promulgated five policy recommendations for decision-makers to consider to address the substantial oral health needs of the state that are particularly pronounced in rural areas and in Indian Country.

The *Report* then analyzes the quality of healthcare delivered in North Dakota and found in general that it is as good as or better than much of the United States, but there appears to have been a decline in several measures in the past few years, particularly in the delivery of certain acute-care services. North Dakota (along with other upper Midwest states) generally provides high-quality care at relatively lower cost than other states in the United States; North Dakota ranked 26th in the country in one recent assessment undertaken by the Commonwealth Fund (but down from 9th in 2009).

The *Report* concludes with a strong ongoing endorsement of the HWI and a recommendation to continue its funding by the 65th Legislative Assembly. One component of the HWI—the RuralMed medical school scholarship program—is cited in particular for its positive results in rural physician recruitment. An important issue for consideration by the 65th Legislative Assembly is the effect of the state's current financial status on funding for the HWI. Because of the required budget allotment process during the 2015–2017 biennium that amounted effectively to more than a 10% budget reduction, 19 approved residency slots (post-MD degree training) could not be funded. The budget submitted by the UND SMHS for the 2017–2019 biennium, while conforming to the required 90% budget request model required by the

governor, has been structured to permit full funding of the HWI (including the currently approved but unfunded 19 residency slots). Thus, it will be up to the 65th Legislative Assembly to weigh the merits of full funding of the HWI in relation to the other funding priorities in the state. The UND SMHS Advisory Council strongly supports full funding of the HWI if at all feasible.

CHAPTER ONE:

The Population of North Dakota and Attendant Healthcare Needs

INTRODUCTION: STRUCTURAL DESIGN AND PUBLIC POLICY

The U.S. healthcare system is a complex structure. It can be characterized as an array of nationally based, regional, and local systems that provide access to health services. The health provider arrangements and structures follow a gamut of options from single provider in a clinic to a multistate, managed-care structure. Reimbursement and payment methods rely on both private market forces (individual and employer health insurance purchases) and public instruments that can both complement and conflict with private insurance. It is a multifaceted and intricate system that can be, at times, difficult to navigate, understand, and improve. However, it is our system. For better or worse, the already-complicated U.S. healthcare system has become even more complicated with the continued implementation of the Affordable Care Act (ACA).

The healthcare workforce is influenced by a number of contextual or environmental factors that shape the scope of the supply and demand for health providers: public policy (federal, state, and sometimes local); demographic and economic conditions; quality of care, health outcomes, and health information technology; state and national certification and oversight boards; and healthcare reform intended to improve the delivery of care, health status, and funding and payment systems. According to the U.S. Department of Health and Human Services, health status refers to one's medical conditions (both physical and mental health), claims experience, receipt of healthcare, medical history, genetic information, evidence of insurability, and disability.

Public policy sets the ground rules governing much of the organization, payment methods, and formalized structure of the U.S. health system. Public payments also influence the educational framework for the training of health professionals (e.g., federal graduate medical education payments, support of Area Health Education Centers, state and federal support for scholarships and loan repayment).

Health providers rely on both public payment mechanisms and private health insurance, which is most commonly an employer-supported insurance system. However, employer-sponsored insurance financing has steadily declined since 2000.¹ The delivery of healthcare through predominantly private markets is affected by public payment structures such as Medicare and Medicaid that in turn must conform to the dynamic nature of federalism, which influences the changing roles for federal and state policy formulation. This tends to set the boundaries for responsibility and decision-making in public policy; however, it is a fluid process that is subject to the changing tone of the American electorate and the overall political process. While Medicare is a federal initiative, Medicaid receives both federal- and state-based funding. Federal and state policymakers set the rules for Medicaid with regard to eligibility, covered services, and provider reimbursement. There is a give-and-take between the federal government and individual states concerning Medicaid policy. At times, other branches of government (e.g., the U.S. Supreme Court) intercede as in the June 2012 court ruling on the ability of the federal government to mandate increased Medicaid coverage under the Affordable Care Act. Medicare is a significant payer for hospitals, medical and health centers, clinics, and health professionals. Medicaid, which constitutes a smaller level of funding for some providers, is still very important. If states adopt

the new Medicaid expansion as North Dakota did in January 2014 (i.e., under the ACA, states can increase coverage up to 133% of the federal poverty level in an effort to insure more Americans), Medicaid will become even more important as both a provider funding source and as a public policy platform to increase insurance coverage. Rural hospitals in North Dakota commonly have a Medicare inpatient base of about 60% (for the state's urban hospitals, it is closer to 50%).² Medicaid's base is significantly less; however, it is still important. Policies affecting payers such as Medicare and Medicaid have a profound effect on the financial bottom line of healthcare organizations. This in turn is a factor that affects healthcare workforce issues. Both public and private reimbursement streams create the foundation for the ability of a health system to provide and even expand services to meet local needs, hire and pay employees, and to secure the continuation of a system of care. In rural North Dakota, the viability of many local health systems is tenuous, which creates an environment in which it is more difficult to recruit, pay, and retain providers, and offer a sense of employment security for employees.

Healthcare delivery systems such as hospitals and medical clinics increasingly operate in either informal or formalized provider networks, and further consolidation of healthcare provider organizations is likely in the future. These networks afford providers the opportunity to better meet local health needs, address operational concerns, and secure greater cooperation. Provider networks are a growing trend in healthcare and will be accelerated under healthcare reform related to the ACA, particularly in the development of accountable care organizations (ACOs). ACOs are healthcare delivery organizations that utilize payment and care delivery models that link provider reimbursement to quality outcome measures and a reduction in the overall cost of care for a specified population of patients. Even in a rural state such as North Dakota, the 36 critical access hospitals (CAHs) participate in nine provider network arrangements with either larger hospital systems or other provider-type networks to address the common issues of quality improvement, technology, education and training, and other needs. Hospitals can belong to multiple networks, so for example, the 36 CAHs participate in 38 quality improvement network arrangements and 37 health information technology (HIT) arrangements, while 34 participate in staff education collaborations and 18 address local health professional recruitment and retention concerns via networks.³ Overall, CAHs in North Dakota have formed collaborative relationships with other providers (e.g., urban hospitals, rural hospitals, clinics, emergency medical services, public health districts, and long-term care facilities) to address common organizational and community needs to achieve greater efficiencies, standardize cost structures, share resources and skills, and improve organizational performance. The CAHs also serve as local healthcare hubs in that most (30 of 36 or 83%) also own the local primary care clinic and 14 CAHs (39%) own the local nursing home; thus that local integration is critical in maintaining local access to essential services for the public. A total of 33 CAHs own another non-acute-care healthcare organization or business (92% of all CAHs).⁴ Networks, partnerships, or collaborative efforts affect the healthcare workforce in that they can contribute to stronger, more viable health systems; be mechanisms to address recruitment and retention; and operate as educational and skill development platforms. For example, while all CAHs work in

collaborative arrangements with area tertiary hospitals, they also created the North Dakota CAH Quality Network in 2007, where staff, training opportunities, process tools and protocols, patient outcome records for benchmarking data, and practice experience and best practices are shared within the network. The CAH Quality Network contributes not only to the development of rural-based solutions and systems but also to optimizing health professional staff skills and resources.

Payment incentives and disincentives have been gradually introduced to influence patient decision-making (purposely to produce more constructive behavior and better outcomes) and provider treatment decisions (increasingly relying on evidence-based practices to affect patient outcomes), and will over time emphasize outcome-based payment over fee-for-service or a system based principally on encounters. A national focus developed in the early 2000s to address quality of care improvement and patient safety issues following the study and reporting of shortcomings in the U.S. health delivery system, especially a much-quoted report from the Institutes of Medicine. A developing interest and need within the healthcare community to address system inequities and inefficiencies combined with public policy incentives to identify and implement approaches to improve care quality and to assure a higher level of patient safety have come to dominate much of the discussion associated with healthcare reform. A rapidly developing HIT infrastructure has been considered an essential element to address quality of care concerns, improve health provider communication (both within the provider community and with patients), and develop a higher level of patient awareness and control in matters concerning their own health involvement and status, although the demonstrated success of HIT to date has been modest at best in achieving these desired goals. While Prospective Payment System (PPS) hospitals (i.e., hospitals that receive a flat-rate-per-case Medicare payment based on a payment schedule associated with a set of diagnosis-related groups; in North Dakota, the “Big 6” hospitals located in Bismarck, Fargo, Grand Forks and Minot) receive Medicare payment incentives to measure and record specific quality metrics specified by the Centers for Medicare and Medicaid Services (CMS), CAHs do not receive such incentives and are reimbursed on an allowable cost basis. Nevertheless, many CAHs collect and report quality-related data. One of the focal points of the North Dakota CAH Quality Network is to facilitate an understanding of how to improve medical outcomes for patients. Thus, in 2012, North Dakota became one of the few states where all of the CAHs report some quality-performance measures to the national CMS quality database called Hospital Compare. By improving the health delivery system both in terms of addressing quality of care issues and incorporating HIT tools, particularly in rural areas, North Dakota is engaged in a process that should result in higher quality and lower cost care as well as produce an environment that is more conducive and attractive for healthcare systems and medical providers.

Educational institutions and their associated academic health centers, as crucial supply-side agents, respond to the needs for healthcare providers in the health delivery system (i.e., the demand side). Academic centers are also subject to the vagaries of the market and adjust supply based on demand change. For example, healthcare reform likely will produce even more demand for primary care medical providers and public health specialists. New organizational arrangements such as ACOs will begin to

operate and be combined with outcome-based payment through value-based purchasing, bundling payments or both to align with patient-centered care. The ACA as an instrument of healthcare reform may encourage and facilitate many of the changes to be found in how care is delivered, how it is financed and reimbursed, and the allocation of resources, although it is clear that many of these changes already are underway and predated the implementation of the ACA. The attendant resource allocation will influence the number of health providers and professionals produced, the types of disciplines to be supported in new health organization structures, and the geographic distribution of providers throughout North Dakota and the country. However, the future of the ACA and the degree to which it may be implemented in the future remains uncertain at present, and is part of a highly charged political debate.

DEMOGRAPHICS

Dynamic population characteristics, including specific income-related associations, are contextual influences affecting not only the healthcare workforce but also the overall health delivery system. Gradual (but sometimes rapid) changes can portend trends that influence societal conditions that frame policy discussions and decisions. Health policy at both a national and state level responds to changes in the environment (e.g., declining rural population and stagnant rural economies) that affect the ability of individuals and employers to purchase health insurance, which can influence health status. As the nation or a state, county, or healthcare provider service area experiences demographic changes, the demands for certain types of health services are impacted, the ability of the health delivery system to respond is affected, and even the relationship between the community (individuals, organizations, employers, and others) and health systems and provider groups can be transformed.

A geographic area (such as many rural areas of North Dakota) that experiences the aging of its population will see more demand for chronic care services, home care, and geriatric-focused care with related concerns for transportation services and housing options. The payer-mix for providers will become more dependent upon public payers, particularly Medicare. The demand for health professionals may be modified by attracting professionals with a natural inclination to serve a more geriatric population, but it may be more difficult to attract professionals with an interest in a multigenerational population. Healthcare systems must contend with keeping up with demand for more services, including more diversified services, than previously provided. There are economic impacts on healthcare systems to secure capital improvements for physical plant expansion and technology improvements, and to meet salary demands. Such an upturn in population and economic conditions will likely affect individuals, families, and employers as it relates to the purchasing of healthcare insurance. This can be positive for local health systems and providers if the growth in income and economic conditions translates into a higher rate of insurance coverage; however, if it does not expand coverage, then the negative consequences for the provider base can threaten the survivability of area providers.

Areas weathering depopulation must contend with conditions that threaten the ability of the local health system to maintain existing services, for which the overall demand may decline but for which there still is a need. Even in remote areas,

there are legitimate needs for access to primary and emergency care as well as public health functions, and reasonable access to acute and specialty services. In rural North Dakota, depopulation tends to be associated with an older adult population base. Areas of population decline tend to see a loss in families with children and adolescents, as well as younger working-age populations, with an older adult population staying in the area. Thus some rural areas simultaneously experience a loss of population coupled with a relatively larger older-adult population. The overall population decline affects the local health system with corresponding service demand change (i.e., declining for some services while expanding for others, which in turn affects the financial conditions of the system and influences the payer-mix). Some rural health systems respond to such changes by offering satellite clinic services in more remote communities in their service area in which the clinic may be open only two or three days a week as opposed to offering a full-week clinic. The coalescing of population decline and a growing presence of an aged patient base places many rural health systems at financial risk because as overall service demand declines, demand for more specialized services related to an older adult population increases, and the reliance on Medicare and Medicaid increases. In much of rural America—including North Dakota—significant concerns exist regarding the survivability of local health systems given these considerations.

Demographic factors, economic conditions, and public policy decisions have amalgamated to create a complicated and, in many cases, inhospitable environment for maintaining access to essential healthcare services. A series of community dialogues and meetings conducted by the Center for Rural Health at the University of North Dakota School of Medicine and Health Sciences found concern among rural North Dakotans on measures associated with community dynamics (e.g., local population, local economics, community growth, ability to retain or recruit youth, and housing access) and health system factors (e.g., financial issues facing rural hospitals, health system reform, healthcare workforce, access and availability of care, and emergency medical services).⁴ Rural North Dakotans recognize the barriers and threats to community institutions and the very community or town itself. The maintenance of rural institutions and organizations is essential to solidify a healthcare service base, a foundation that is necessary to meet local access-to-care needs, improve population health status, and contribute to local economic and community development.

Metropolitan, Micropolitan, Rural, and Frontier Counties

North Dakota is composed of a mixture of several larger cities and clusters of population, many smaller towns, and large areas with low population density. The distribution of its population is another challenging issue for efficient healthcare delivery. Since its inception, the state has experienced low population density overall. North Dakota ranks 49th in population density when compared nationally, with 9.7 people per square mile. But it pales in comparison with the District of Columbia, with more than 1,000 times our population density at 9,859 people per square mile.⁵

Until recently, North Dakota has experienced muted population growth. North Dakota is unique in the nation in experiencing negative population growth for four of the last 10 decennial censuses.⁵⁻⁸ The growth of the Oil Patch in western North Dakota has healthcare delivery implications. In the

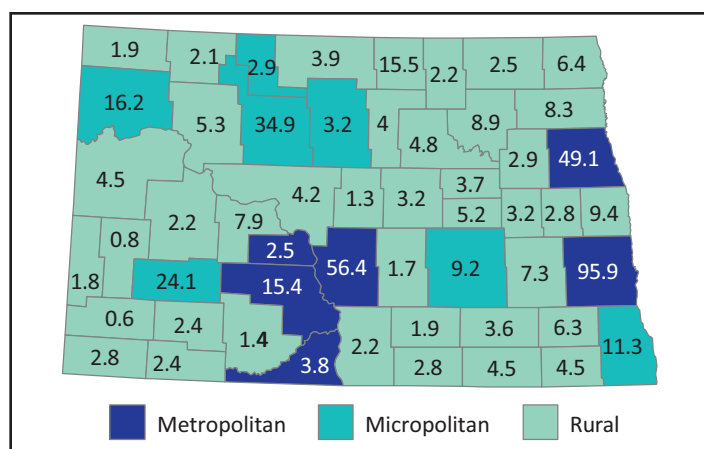


Figure 1.1. Population densities of metropolitan, micropolitan (large rural), and rural counties in North Dakota.^{10, 11}

- According to the 2015 census estimate, North Dakota is slightly less rural than was determined following the 2010 census. The metropolitan population has increased as has the number of counties so designated. Now six counties are classified as metropolitan (Burleigh, Cass, Grand Forks, Morton, Oliver, and Sioux). The metropolitan population accounts for 49% of the state's population. In the 2010 census, metropolitan accounted for four counties and 49% of the population. Oliver and Sioux counties were added to the Bismarck metro area. As in 2010, there are seven counties (24% of the population) classified as micropolitan. Rural as a percentage of population has declined from 29% to 26%, and the number of rural counties has declined from 39 to 37.

national census completed in 2010, North Dakota experienced a 4.7% population growth after years of slow decline or trivial growth. The growth has continued with the population increasing by 12.5% from 2010 to 2015, based on the most recent U.S. Census estimate. North Dakota had the fastest growth rate in the country over that period, primarily from the rapid growth in the energy sector.⁵ The national growth rate, in comparison, was 3.9%.⁹ North Dakota's growth mainly occurred in two locations: the cities (Fargo, Grand Forks, and Bismarck), and western counties (related to oil drilling in the Bakken Formation). This rapid population growth has no doubt abated with the downturn in the Oil Patch, but has been substantial. The healthcare delivery implications of the western growth are significant. None of the six major hospital systems is located in the western counties, although several are expanding their outreach to the region; however, most of the current healthcare is delivered through clinics and CAHs. The region is already suffering from a disproportionate shortage of physicians and other healthcare workers.

To better define the population dispersion across North Dakota, standardized descriptions are used to facilitate comparison with other regions of the country. *Metropolitan* describes a population cluster or area with a core population of 50,000 or greater. The state's three largest cities (Fargo, Bismarck, and Grand Forks) are located in metropolitan areas as are their surrounding rural areas. *Micropolitan* (or large rural) describes areas with population cores from 10,000 to 49,999.

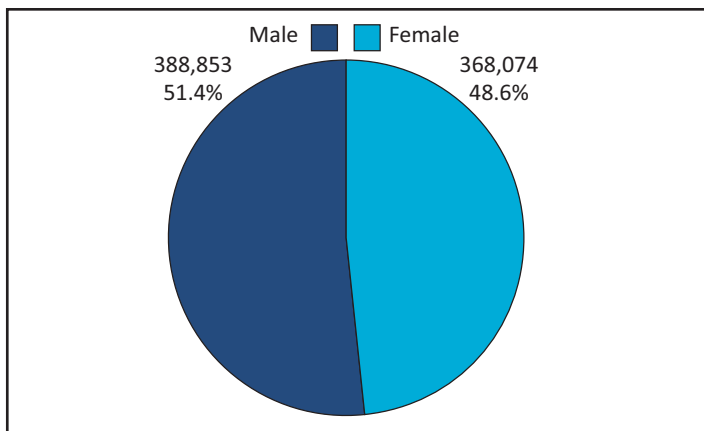


Figure 1.2. Gender of North Dakota¹⁰

- Just over half of North Dakota's population is male.

This includes Minot, Dickinson, Williston, and Jamestown. For our purposes, rural constitutes areas with a population cluster of less than 10,000. Both micropolitan and rural are considered nonmetropolitan. Historically, more than 50% of North Dakota's population has been designated as rural, although more recently the percentage has fallen to about 49%.^{10, 11} Depending on the definition of rural, North Dakota is among the five states with the largest component of rural areas.¹¹

Frontier is defined as a county with a population density of six or less people per square mile. Thirty-three of the state's 53 counties are classified as frontier. Only nine of 53 counties have population densities above the state's average density of 9.7 people per square mile. The lowest density is found in Slope County (0.6 people per square mile) and the most densely populated is Cass County (96 people per square mile). The population density of the United States as a point of comparison is 87.4 people per square mile.⁵

Gender

Unlike the nation as a whole, a little more than half (51.4%) of the population of North Dakota is male.¹⁰

Age

Older populations use dramatically more healthcare resources than do younger populations. North Dakota's population is among the oldest in the nation. It is tied for fourth in the country in the percentage of its state population that is 85 years or older. This greatly influences the need for providers. For example, nationally 1,000 15- to 24-year-olds on average generate 1,700 ambulatory office visits annually, while 1,000 75-and-older Americans would make 7,200 annual visits (over four times as many). If we assume a family physician provides 5,500 office visits a year, 1,000 15- to 24-year olds would take up 31% of one physician's practice, while it would take 1.3 family physicians to treat a similar number of older patients. Thus, simply comparing the number of North Dakota physicians per 100,000 persons can be misleading unless the age of the populations being compared is taken into account.

As shown in Figure 1.4, rural North Dakotans are significantly older than their counterparts in micro- or metropolitan areas, and that disparity is increasing over time. The higher average age in rural North Dakota likely is the consequence of the continuing depopulation of the rural areas,

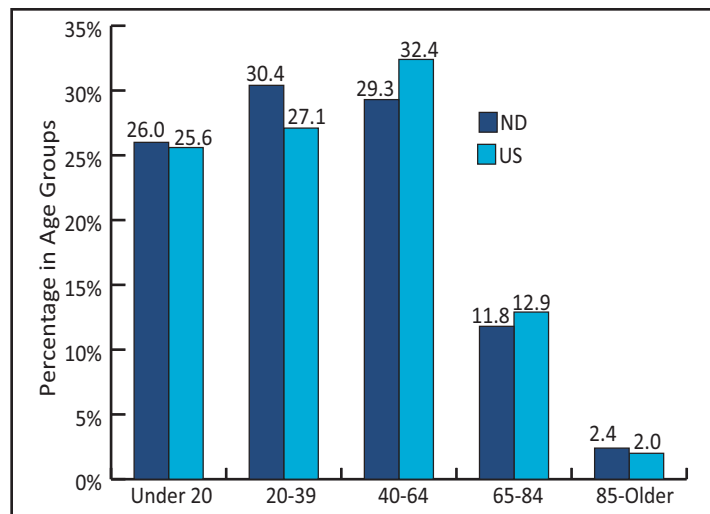


Figure 1.3. Age of people in North Dakota compared with U.S. in 2015.¹¹

- There are more North Dakotans 85 and older compared with the U.S. population (tied for fourth highest).
- North Dakota compared with the U.S. has 1.2 times the population age 85 and older.
- There are fewer North Dakotans between the ages of 40 to 64 and 65 to 84 relative to the U.S. population.

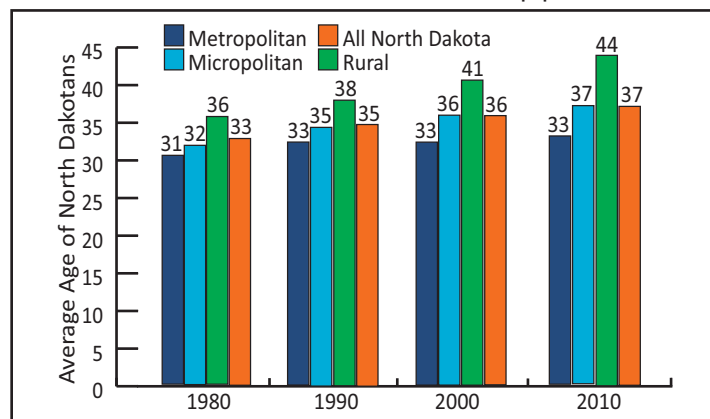


Figure 1.4. Average age of North Dakota residents from 1980 to 2010 by metropolitan, micropolitan (large rural), and rural counties.⁵⁻⁸

- The average age for the state has increased from 33 years in 1980 to over 37 years in 2010 (about two years every 10-year census). This trend is projected to increase as the baby boomer population ages.
- Rural North Dakotans are older than either micropolitan or metropolitan North Dakotans. This was true in all four census periods (1980, 1990, 2000, and 2010).

with younger people moving elsewhere. This effect is evident in the agrarian sector, where the increase in average age has been particularly apparent in farmers (see Figure 1.5). Since most rural counties have continued to see a decline in overall population, that decline is commonly associated with a loss of young individuals and families or difficulty in recruiting and retaining young individuals and young families. Older adults are less likely to leave an area where they have spent their entire lives. The effect is one where the overall population declines and the average age of the area increases.

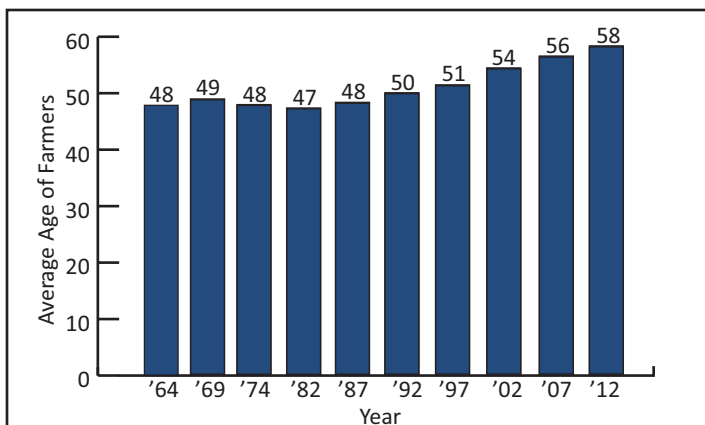


Figure 1.5. Average age of farmers from 1964 to 2012.¹²

- The increase in average age has been especially pronounced in North Dakota farmers, whose average age has risen from 47.3 to 58.3 from 1982 to 2012, or an increase in average age of 2.6 years every 10 years.

INCOME FACTORS

Poverty

People in poverty tend to have a lower health status. Poor housing, sanitation, and water supply can contribute to disease and ill health. Access to adequate and quality food sources is limited. Poverty is associated with greater rates of illness and shorter life spans. People at the 200% or less of the federal poverty level are more likely to have only fair or poor health status and to have sought care through the emergency room as opposed to a clinic setting. Access to health services is affected by income level in other ways. Lower-income households have a lower rate of health insurance coverage and have less frequent contact with a health provider.¹³

Poverty rates vary based on age, race, geography (Figure 1.6), and household composition. Poverty has been increasing in urban areas and now exceeds that in rural North Dakota (about 15% compared with 11%). About 17% of North Dakota's children (less than 18 years of age) are in poverty, which compares to about 8% of people in the state who are 65 years and older (nationally the rates are 27% and 13%, respectively).¹⁴ Children up to four years of age living with single mothers in rural areas are more likely to be affected by poverty than those in urban areas of the state. Three-fourths of children from newborn to four years old living with single mothers in rural North Dakota were living in poverty in 2008, compared with 55% of children living with single mothers in urban areas.¹⁵

The distribution of poverty across the counties of North Dakota is shown in Figure 1.7. The highest poverty rates are in rural counties and those with a higher proportion of American Indians.

INSURANCE COVERAGE

Rural Areas

North Dakota's rural areas have a lower level of health insurance than other more populated areas.¹⁸ A greater number of farmers purchase health insurance as individuals as opposed to a group market and incur higher premiums and out-of-pocket costs. A study of farmers in seven rural states, including North Dakota, found that 17% of farmers or farm family members had delayed seeking care because of high out-of-pocket costs. In

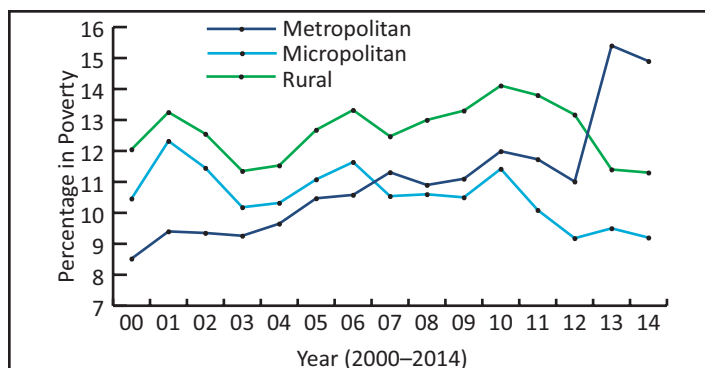


Figure 1.6. Poverty in North Dakota by rural, micropolitan (large rural), and metropolitan areas.^{11,16}

- Any person or family whose income falls below a threshold set by the federal Office of Management and Budget (OMB) is considered poor. In 2014, for a family of two this was \$15,379 and for a family of four it was \$24,008.
- In 2014, 11% of North Dakota residents were in poverty (U.S. had 14.8% in poverty) and lived in all regions of North Dakota.
- Poverty has risen from 8.5% to 14.9% in metropolitan areas since 2000, and in rural areas it decreased from 12% to 11.3%.
- The poverty rate from 2000 to 2012 was higher in rural North Dakota than either micropolitan (large rural) or metropolitan areas.

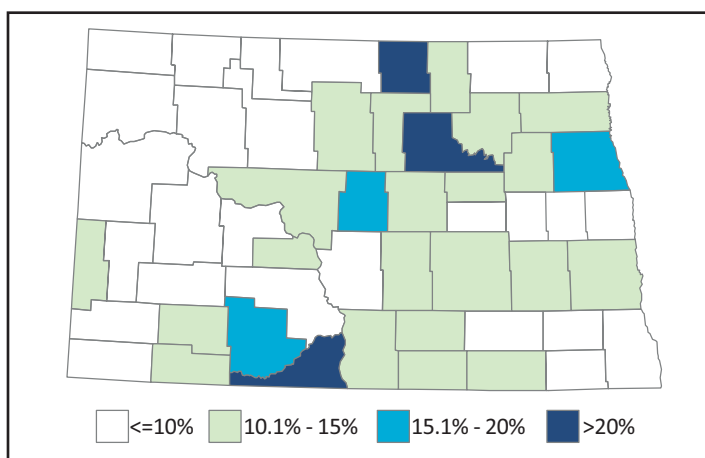


Figure 1.7. Poverty in North Dakota by counties.¹⁶

- Poverty in North Dakota counties has ranged from 6.7% to 41.4% from 2000 to 2014.
- Three counties in North Dakota have more than 20% of their population in poverty and have been classified under federal guidelines as persistent poverty counties: Rolette County (poverty rate in 2014 of 31.6%), Benson County (29.9%), and Sioux County (33.6%).⁹ These three counties have a significant American Indian population. A persistent poverty county is one in which 20% or more of the population was in poverty in three consecutive census periods (currently 1990, 2000, and 2010).
- Six counties in North Dakota have more than 15% in poverty.
- There are 26 counties with poverty rates less than 10%, based on 2014 data. In 2010, there were 14 counties.

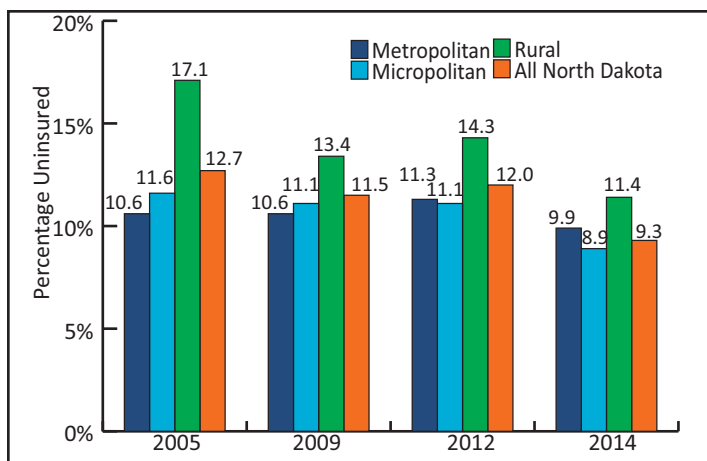


Figure 1.8. Percentage of North Dakota residents who had no health insurance in 2005, 2009, 2012, and 2014.¹⁷

- 9.3% of North Dakotans were uninsured in 2014, while 14.2% of the U.S. was uninsured in 2014.
- The percentage of uninsured North Dakotans dropped from 2005 to 2009 but rose slightly by 2012. The rural rate in 2014 was lower than the previous 10 years.
- The percentage of uninsured in metropolitan areas dropped by less than 1 percentage point from 2005 to 2014.
- In 2014, the micropolitan rate of uninsured was below the statewide, rural, and metropolitan (urban) rates.

North Dakota, 15% of farmers were in this situation. Forty-nine percent of North Dakota farmers spent more than 10% of their income on healthcare, in comparison with 44% overall for farmers in the seven states. The median amount spent out-of-pocket for medical and dental care and prescription drugs was about 15% more in North Dakota in comparison with other states.¹⁹

Uninsured

A lack of health insurance or inadequate coverage (e.g., high deductibles and copayments or service limitations) lessens access to care for the individual or family and contributes to worsening financial standings for health facilities and providers. A 2011 survey of North Dakota critical access hospital administrators found that more than 90% said a lack of insurance or having inadequate coverage was a problem, which was an increase from about 75% in a similar survey in 2008.²⁰ As shown in Figure 1.8, rural areas have a significantly higher level of uninsured population compared with micro- or metropolitan areas.

The Institute of Medicine estimated that a lack of health insurance accounted for about 18,000 deaths per year in the United States. Less medical care and less timely care are received by the uninsured. Overall, the uninsured get about half as much care as those privately insured and receive fewer preventive services and screenings, and on a less timely basis.

This includes lower numbers of the uninsured receiving blood pressure and cholesterol checks, which can result in higher rates of heart disease, cancer, and diabetes. Pregnant women who are uninsured have fewer prenatal checks. The uninsured have worse health outcomes; conversely, those with health insurance have better health outcomes. The death risk for certain chronic diseases is estimated to be about 25% higher for those without

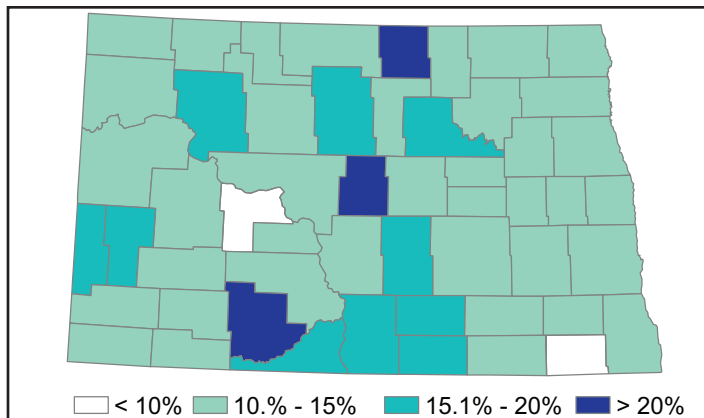


Figure 1.9. Percentage of uninsured by North Dakota counties.¹⁷

- Three counties had more than 20% of their population uninsured.
- Twenty-six counties had less than 10% of their population uninsured.

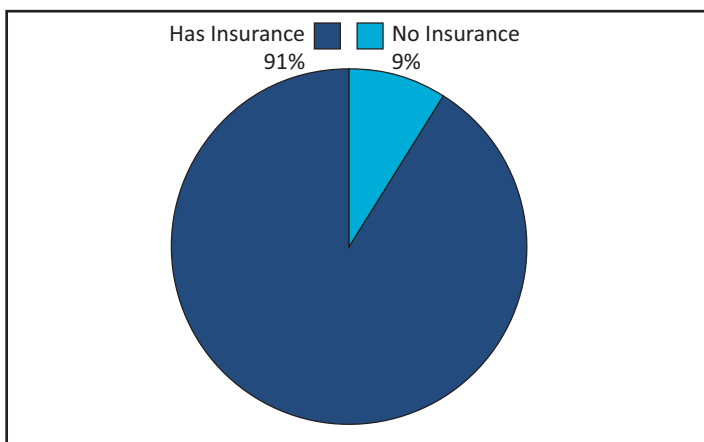


Figure 1.10. Percentage of uninsured North Dakotans.¹⁷

- Most North Dakotans (91%) have insurance.

insurance.²¹

One of the strongest predictors of whether a person is uninsured is residence in a rural area. Figure 1.9 shows the distribution of the uninsured across North Dakota; high levels of uninsured are limited to rural areas.

The impact of the ACA on the rate of under- or uninsured North Dakotans is still to be determined, since implementation of its various components is staggered over time. Enrollment in federal exchanges began in 2014, but implementation of all of the provisions of the law is not expected until 2018.

DEMOGRAPHICS SUMMARY

Demographic characteristics as discussed contribute to rural health disparities and highlight the access-to-care and health status issues found in rural North Dakota. In general, the people in the most rural areas in North Dakota are older, poorer, and have less insurance coverage (see Table 1.1), although recently there has been an increase in urban poverty. Each of these factors has been shown to influence the ability of a person to seek care when it is necessary, maintain a regular relationship with a physician or other health professional, better manage health conditions, and ultimately realize a higher status of health. Sociodemographic factors such as poverty, income disparity, insurance coverage, education, and even culture—including rural

culture—can serve as social determinants of health. The health condition of the individual may regress because of lower income, less health insurance, and greater age. Rural North Dakotans face more constraints in accessing care and achieving an acceptable health outcome, especially for rural American Indians. Health access and health status are typically worse on reservations.

Other chapters will address the unique issues facing health providers and health organizations, particularly rural health providers; however, demographic and economic issues in rural North Dakota, when combined with already financially strapped and workforce-challenged rural hospitals, clinics, and emergency medical services units, make the delivery of appropriate healthcare particularly challenging. There is added pressure on rural health systems to be responsive in an environment where the population base presents significant and continuing challenges.

POPULATION

Historical Changes

North Dakota has been significantly influenced by its agricultural history and the role agriculture has played economically, socially, and culturally. North Dakota benefited from federal statutes such as the Homestead Act, a rich productive

land base, early immigration, the proliferation of railroad expansion to move agricultural products (and move in settlers), and changes in agricultural technology. The state's population growth from 1910 to 1930 (see Figure 1.11) likely was influenced by the continuing development and growth in agriculture. While the Great Depression officially began with the stock market crash in 1929, a depression in North Dakota started in the early 1920s following a significant decline in agricultural markets and overall U.S. economic deflation after the end of World War I. Even though land values and prices declined and farm debt increased, the number of farms and the acreage seeded in North Dakota grew during the 1920s. The full effect of the Depression in the 1930s and World War II precipitated a population decline. At one point in 1934, one-third to one-half of North Dakotans were “on relief” and receiving government assistance. In 1939, 75% of the population in Billings County was on relief. During the 1930s, there was an out-migration of more than 120,000 people. Even during this period, there was a rural-urban dichotomy with population shifts. During the 1930s, farm and small-town populations declined; however, larger, more urban areas of the state actually grew.²²

From 1930 to 1950, the state's population declined from about

Table 1.1. Summary of demographics in North Dakota's population by metropolitan, micropolitan (large rural), and rural areas.^{11, 16-17, 21}

	Metropolitan		Micropolitan		Rural	
	N	%	N	%	N	%
Total—2015	371,945	49%	184,767	24%	200,215	26%
Gender—2015						
Male	188,335	51%	97,828	53%	102,690	51%
Female	183,610	49%	86,939	47%	97,525	49%
Age—2015						
Under 20	95,775	26%	49,240	27%	52,095	26%
20-39	125,179	34%	60,155	33%	45,066	23%
40-64	104,976	28%	52,346	28%	64,814	32%
65-84	38,734	10%	18,893	10%	31,568	16%
85 and Older	7,281	2%	4,133	2%	6,672	3%
In Poverty—2014						
Yes	40,720	12%	14,171	8%	23,742	12%
No	308,696	88%	156,434	92%	168,767	88%
Uninsured—2014						
Yes	25,905	8%	13,197	9%	18,066	12%
No	282,237	92%	136,608	91%	139,333	89%

- Almost half the state's population (49%) lives in a metropolitan area, and almost 26% are in a rural area of less than 10,000.
- Gender distinctions are slight with males outnumbering females in all three population classifications.
- A much smaller percentage of rural residents are young adults (age 20–39) at 23% in comparison with micropolitan (33%) and metropolitan (34%).
- A higher percentage of rural residents are older adults (65–84), and the percentage of rural people who are 85 and older is almost 1.5 times that found in metropolitan areas.
- A higher percentage of rural residents live in poverty.
- A higher percentage of rural residents do not have health insurance.
- Nationally, rural residents tend to be poorer, older, and have less insurance coverage than those residing in non-rural regions. North Dakota data conform to that assessment because a higher percentage of rural North Dakotans are over 65 years of age and over 85 years of age, live in poverty, and are uninsured. Each of these factors is a detriment to achieving a higher level of health status.
- North Dakotans living in metropolitan and micropolitan areas tend to be younger in comparison with rural areas, but the micropolitan areas have the lowest levels of poverty and have a lower percentage without health insurance.

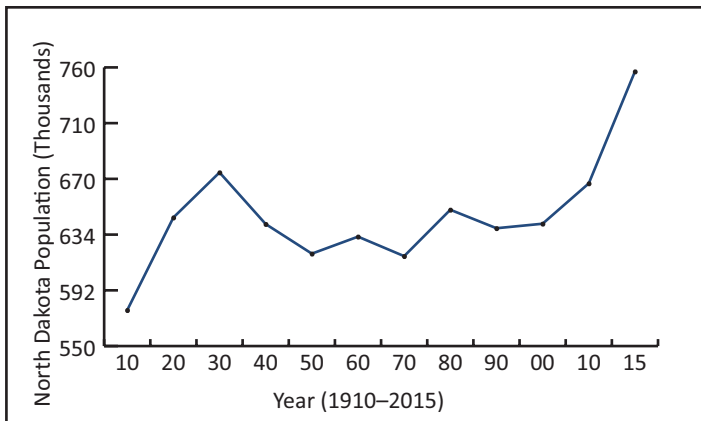


Figure 1.11. Population of North Dakota from 1910 to 2015.¹⁰

- Population increased from 577,056 in 1910 to 680,845 in 1930. It then decreased to 617,761 in 1970 (lowest census number in this period) and then increased to 672,591 in 2010.
- North Dakota's highest population was recorded in the 1930 census; however, the U.S. Census Bureau estimated population projected for the state in 2015 was 756,927, which potentially is a state record. North Dakota has gained more than 100,000 residents since 2003, when the population was 632,809. The state potentially has gained almost 100,000 residents since the 2010 census (16%), which is approximately twice the rate of increase found for the country (4%).¹⁰

681,000 to 620,000, increasing by about 13,000 to 632,000 in 1960, and then dipping again by 15,000 to 618,000 in 1970. By 1980, a significant increase of roughly 35,000 people pushed the population to 653,000. The rapid increase in the late 1970s likely was a result of significant energy expansion (oil and coal) during that period and a trend toward urbanization. The state's urban population grew steadily from 17% in 1930 to 49% in 1980; conversely, the rural population declined from 83% to 51%.²³ Following the "oil bust" in the 1980s, the state's population once again declined and was accompanied by continuing rural depopulation. Since 2003, the population has rebounded.

Figure 1.12 shows the change in population by county from 2000 to 2015. The counties with the most significant increases from 2000 to 2015 were McKenzie, Mountrail, and Williams.

The data indicate unique trends in county population: gradual urbanization, decline in the most rural areas, growth in the American Indian population, and a resurgence of population associated with energy development.

The three most urban counties—Burleigh, Cass, and Grand Forks, home to the state's three largest cities—have had consistent growth dating back to 1930. The two fastest-growing cities through births and migration over the past decade—West Fargo and Horace—demonstrate that urban expansion is not solely concentrated within the geographical boundaries of the major cities.^{5, 8} This is also an indicator that, while the state may still rely economically on land-based economies (e.g., agriculture and energy), there is a more diversified economic structure under development (e.g., health infrastructure, regional service and retail, government, manufacturing, and education). The healthcare industry, for example, accounted for eight of the

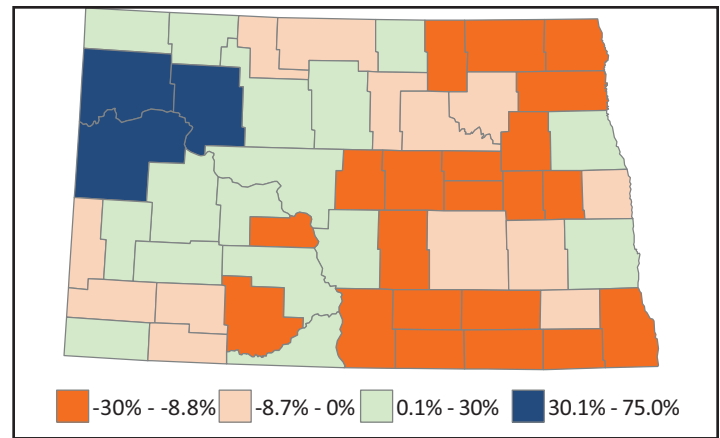


Figure 1.12. Percentage change in county population from 2000 to 2015.^{5, 10}

- Nine counties have increased their population by an average of 10% or more from 2000 to 2015.
- Ten counties had population gains of less than 10%. From 2000 to 2013, 34 counties have lost population. The largest gains seen from 2000 to 2015 were Williams, McKenzie, and Mountrail.

10 largest employers in the state in 2010, and these private businesses were headquartered in the three largest cities, not only demonstrating the growing importance of health as a business activity but also underscoring the diversification of the state's economy, particularly when it is associated with the continuing urbanization of the state.^{24, 25}

While the more urbanized areas continued to grow, the most rural and remote areas continued to decline in population. About one-third of the counties—all rural—had experienced average decennial population losses of 10% or greater since 1930. Three counties, for example (Emmons, Sheridan, and Towner), witnessed a continual population decline of more than 40% in two census periods from 1990 to 2000 and 2000 to 2010. Sheridan County, in the central part of the state, has actually lost 53% of its population since 1980.^{5, 6} The changing economic face of the state has spurred much of this change. While agriculture still dominates the state, other economic sectors have grown faster. In 1960, agriculture accounted for 17% of the state's gross domestic product (GDP, a standard measurement of the total value of all goods and services produced in either the nation or at a state level), but declined to about 6% in 2010.²⁵ In 2013, agriculture combined with forestry, fishing, and hunting had increased and accounted for 13% of the state's GDP. Healthcare in 2010 accounted for 8.6% of the state's economic activity and had shrunk slightly to 6% in 2013, likely a consequence of the growth in the oil-related economy.²⁶ In much of rural North Dakota, the health sector is a significant driver of the local economy; communities with hospitals, clinics, or nursing homes report that the local health industry is the largest area employer. However, while the importance of the healthcare sector to the rural economy increases, changes in agriculture (fewer farms but with more acreage) and other economic conditions, including the out-migration of young adults and young families, have helped to shift population to the more urban centers. The economic importance of agriculture is unquestioned; however, today it is performed with a smaller number of farmers and farm employees, which has an effect on out-migration.

Growth of the American Indian population has been a

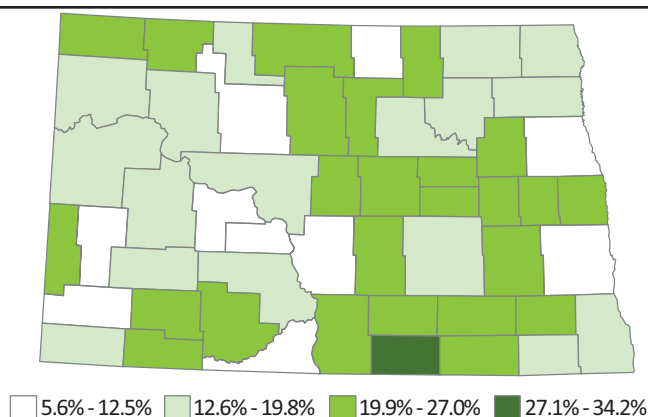


Figure 1.13. Percentage of 1980 population aged 65 and older.
 • McIntosh County is over 27% older adults.

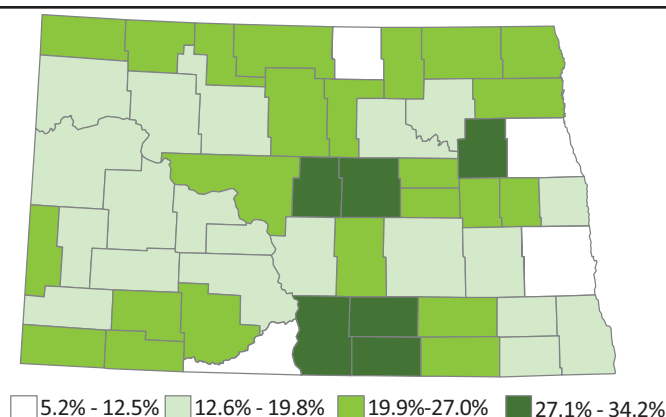


Figure 1.15. Percentage of 2000 population aged 65 and older.
 • McIntosh, Nelson, Sheridan, Wells, Logan, and Emmons counties are over 27% older adults.

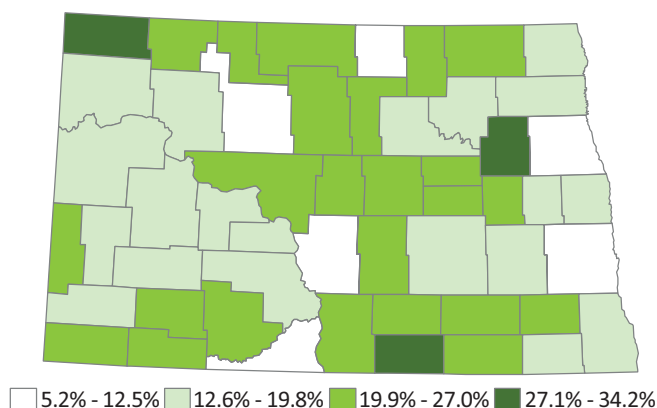


Figure 1.14. Percentage of 1990 population aged 65 and older.
 • McIntosh, Nelson, and Divide counties are over 27% older adults.

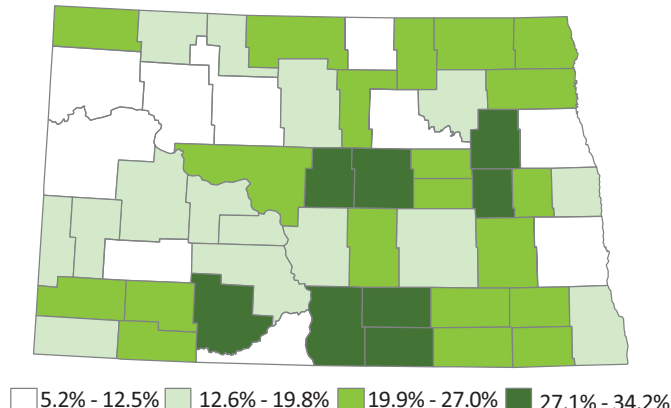


Figure 1.16. Percentage of 2010 population aged 65 and older.
 • Nelson, Griggs, Sheridan, Wells, Emmons, Logan, McIntosh, and Grant counties are over 27% older adults.

positive indicator for the state, particularly during periods of slower overall population growth. For example, the 2000 census indicated that the white population of North Dakota declined by 2% from 1990 to 2000; however, the American Indian population of the state increased by about 21%. During that period, North Dakota's population increased by a trivial 0.05% and was the smallest state increase recorded for any of the 50 states.^{7, 10} The 2010 census found that the white population increased by 2%, while the American Indian population grew by about 17% (nationally, the American Indian population increased by more than 18%). North Dakota's Hispanic population, while small at only about 13,400, witnessed a significant increase over the decade of about 73% (nationally, the Hispanic population increased by 43%).

Change in Population by County and Age

Figures 1.13–1.16 show the progression of population change for people age 65 and older at four census periods (1980, 1990, 2000, and 2010). There has been a continual increase in the proportion of older adults in the rural counties. In 2010, the eight counties with 27% or more of their population age 65 or older were all rural; in fact, they are some of the most remote counties because all are classified as frontier.

North Dakota's median age has steadily increased over the past 50 years. The state's median age was 26.2 in 1960, 26.4 in 1970, 28.1 in 1980, 32.4 in 1990, 36.2 in 2000, and 37 in 2010. The

state's median age increased by 11 years from 1960 to 2010. In 2010, the U.S. median age was 37.2.⁵

The median age in 40 counties exceeds the state's median age. Twelve counties have a median age of 45 and older, while McIntosh County has a median age of over 50.

In 2010, a noteworthy trend that does not necessarily conform to the common view that rural North Dakota is aging was recorded in 41 of the state's 53 counties, where the 65-and-older population actually declined numerically from 2000 to 2010. These were all rural counties. There were, however, significant increases in the metropolitan counties (e.g., Burleigh's older adult population increased by 24%, Cass by 19%, and Grand Forks by 6%).^{5, 8} The significance found in the demographic shift in rural counties is that while the older adult population is shrinking, the overall older adult population is increasing as a percentage of the counties' population because the rate of overall rural population decline (in all age groups) exceeds the loss in the older adult population. Thus, the rural older adult population takes on an even heightened importance in these rural counties. This has significant implications for access to health services, the payer mix for providers, tax base for health services funding, and health workforce.

There has been a significant increase in the number of the state's oldest citizens. People age 85 and older constitute 2.4% of the state's population (North Dakota is tied for fourth in the country for states with the highest percentage of older adults).

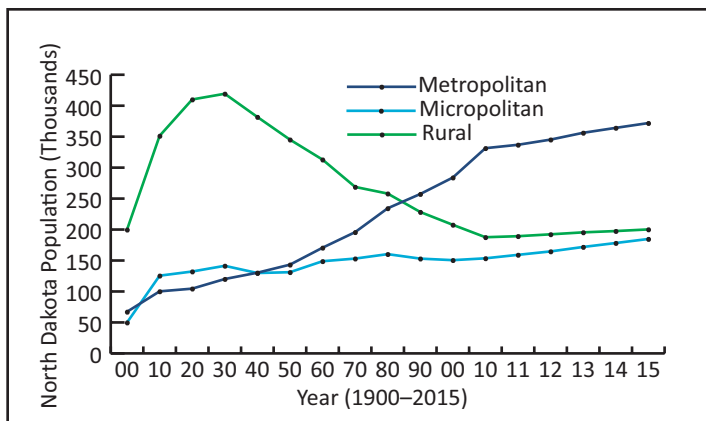


Figure 1.17. Population in North Dakota from 1900 to 2015 by metropolitan, micropolitan (large rural), and rural counties^{5, 10}

- Rural population decreased from 1930 to 2010 but has remained stable since then.
- Since 1990, metropolitan population has been higher than rural population.
- Population in rural North Dakota counties was up to three times as high as metropolitan or micropolitan populations into the 1940s. Then a sharp increase in metropolitan populations and decrease in rural populations caused the rural counties' populations to become less than the metropolitan counties by the 1980s.

Nationally, 1.8% of Americans are age 85 and older.⁵ It is the state's second-fastest-growing cohort, with the most substantial growth being 28% for people 45 to 64 years old.

A final issue relates to participation in the workforce. The dependency ratio establishes a statistical framework to describe the financial responsibility of those who are economically active (i.e., working and making an income) to those who are inactive (i.e., people who are less than 16 years of age or 65 and older).¹⁰ The 2010 census found a dependency ratio of 53 in North Dakota, or for every 100 working-age residents, there were 53 nonworking-age residents. It is predicted that by 2020 the dependency ratio will increase to 71.

It is anticipated that there will be 18 counties (all rural) where there will be more people in a nonworking category than working-age residents. In 1990, a majority of nonworking-age residents were children younger than 16; however, by 2020, the majority will be people 65 and older. The implications for rural areas are compelling: the ability of communities to plan for and pay for services for an aging population will present challenges for community and state leaders. It will have a significant effect on health status, healthcare delivery structures, healthcare costs and payments structures, and healthcare workforce.

Change in Population by Metropolitan Status

Changes in the state's economy, primarily the number of people engaged in agriculture, account for some of the change in rural population over the years. The number of North Dakota farms has declined by roughly 50,000 since the 1920s. At the same time, there has been the trend, as shown in Figure 1.17, of progressive urbanization of the state. In 1990, North Dakota became an urban state with more residents in metro areas than in rural. The out-migration from rural to urban has resulted in a

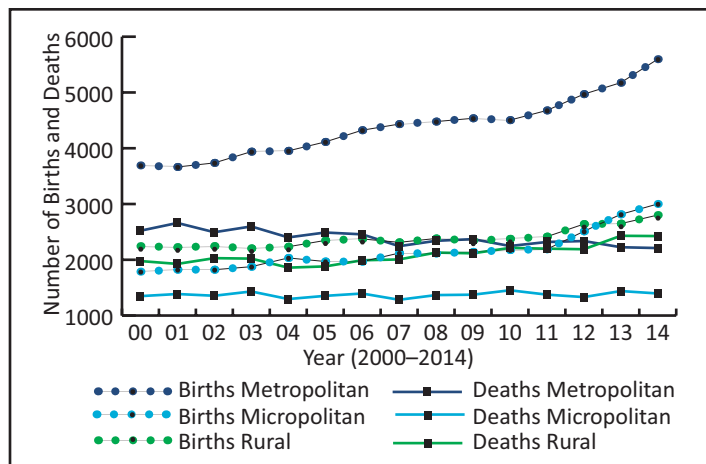


Figure 1.18. Number of births and deaths in North Dakota from 2000 to 2014 by metropolitan, micropolitan (large rural), and rural counties^{5, 11, 27}

- Metropolitan births have been rapidly increasing.
- Rural births have been increasing slightly.
- Rural, micropolitan, and metropolitan deaths have slightly decreased.

decline in younger adults and families in those rural areas. While the 18-to-24 age cohort grew overall by about 11% from 2000 to 2010, 24 counties saw this population decline. The next cohort, 25 to 44, saw a decline of 5%, with 47 counties experiencing a population loss of this economically vital age group. All of the 24 counties losing 18- to 24-year-olds were rural; all of the 47 counties losing 25- to 44-year-olds were rural with the exception of Grand Forks. The UND School of Medicine and Health Sciences Center for Rural Health (CRH) conducted surveys that asked rural North Dakotans to assess a series of rural community issues. The CRH found that a high number are concerned about their ability to retain or recruit young people and about population issues in general.

Change in Population by Births and Deaths

A large part of the increase in metropolitan population is the result of an increase in births. The number of births in North Dakota has increased from 7,676 in 2000 to 9,088 in 2010. Deaths have also increased, though more slowly, from 5,846 in 2000 to 5,913 in 2010. Metropolitan areas have experienced the sharpest increase in births and a decrease in deaths. Micropolitan areas have the steadiest numbers from 2000 to 2015 (see Figure 1.18).

One reason for the gradual increase in rural births, despite an aging population, is the higher fertility rate in rural areas compared with metropolitan. In 2000, there were 65.3 births per 1,000 females of childbearing age in rural areas, and 56.4 in metropolitan areas.

Metropolitan areas had 2,294 more births than deaths on average from 2000 to 2014. Micropolitan (large rural) areas had on average 617 more births than deaths. Rural areas have on average 784 more births than deaths. As a consequence of these two factors alone (apart from any migration effect), metropolitan population has increased more than micropolitan population has.

Another factor that affects rural North Dakota is the American Indian fertility rate. Roughly 55% to 60% of North Dakota American Indians live in rural areas. The American Indian birth rate is 1.8

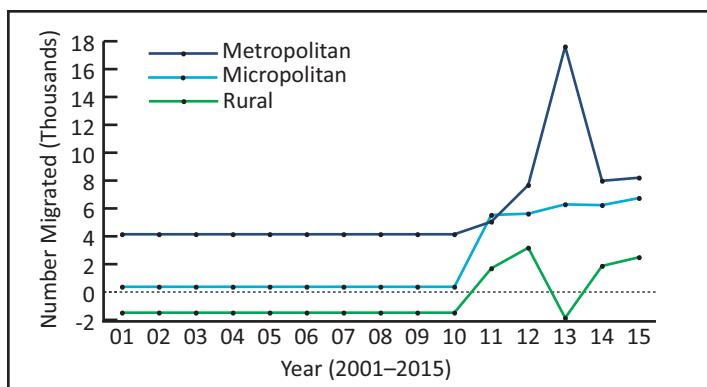


Figure 1.19. Net number of in- and out-migrations for metropolitan, micropolitan (large rural), and rural North Dakota.^{5, 10, 11}

- Metropolitan areas have highest in-migration, averaging 5,552 people a year.
- Rural areas out-migrate an average of 907 people a year.

times greater than the rate for the United States as a whole.²⁸ Thus some of the change in the rural fertility rate is attributable to the American Indian population, and the number of rural births to whites is much below the average for all of North Dakota.

Change in Migration Patterns

Metropolitan and micropolitan (large rural) areas have been experiencing a steady in-migration over time, while rural areas have had an out-migration. Overall, North Dakota has had an average in-migration of 5,582 people per year (see Figure 1.19).

The changing rural and urban economies (e.g., decline in the number of farms, loss of young adults and young families, increased economic opportunity in metropolitan and micropolitan areas) play substantial roles in shaping population. The availability of well-paying jobs, the types of jobs and career growth available, and the opportunities for dual-career families are all factors.

A significant change in the economy of rural North Dakota is energy, specifically oil and natural gas. Coal and oil have played important roles in North Dakota's economy, dating back to the early 1950s, and another boom cycle began in the mid-2000s. The effect is felt most acutely in the 17 oil-producing counties. This will continue to change in-migration patterns for rural North Dakota. The oil industry has had an effect on metropolitan Bismarck and will likely push Minot into metropolitan status by 2020 (pushing its 2011 population of around 43,000 above 50,000).^{10, 11}

PROJECTED POPULATION

Population changes in North Dakota typically are tied to economic changes. Thus, predicting future population trends and changes presumes the ability to correctly predict future economic conditions. Because the ability to predict those economic conditions has not always been particularly accurate, North Dakotans typically view population predictions with some skepticism. Nevertheless, there is a pressing need to have predictive models regarding state population trends so that planning for healthcare and other services can be accomplished.

Projection to 2045, total and age groups (stable-growth model)

The gradual aging of North Dakotans will place renewed

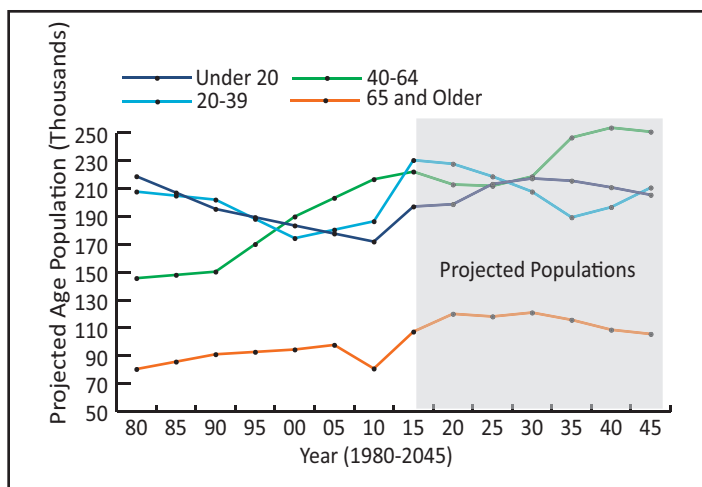


Figure 1.20. Projected population in North Dakota to 2045 by age groups.¹⁰

- The 40-to-64 age group shows the highest increase from 222,136 to 250,748.
- The decline in the 65-and-older population in 2005 and then increasing to 2030 reflects the baby boomer generation reaching retirement age, and resulting in the increase in older population from 2010 to 2030.
- The 20-to-39 age group is projected to continue decreasing but then increase by 2035.

pressure on both the public and private sectors as well as on the corresponding institutions and organizations involved in assessing older adults' needs and allocating appropriate resources. It not only will continue to affect the response of the healthcare system but also will have an impact on the overall health of the population. There will be a corresponding need to control and manage chronic disease, and to identify better ways of encouraging patients to care for themselves. In addition, there will be corresponding effects on healthcare spending and costs, health organizations viability (particularly in the rural areas), and health system redesign.

The stable-growth projection indicates that while the 65-and-older cohort will peak by 2030 and then decline, the next oldest cohort (40 to 64) will be increasing from 2030 to 2045; thus the effect of an aging population will continue (see Figure 1.20).

The population trends and projections present unique challenges to institutions and the capacity of the state and communities to respond. Regardless of community size (from a rural community to the state's largest metropolitan areas), there will be significant effects on a range of sectors: education, health, business/economic development, housing, transportation (including roads and physical improvements), government, and social/civic organizations such as faith-based and service organizations. Even a more conservative model projects population growth that will test the ability of systems and sectors to plan for the effects of the expected change, organize resources, coordinate with others, and mobilize the citizenry to respond accordingly.

OIL PATCH IMPACT

Countries by Oil Production

The recent oil boom has propelled North Dakota to being

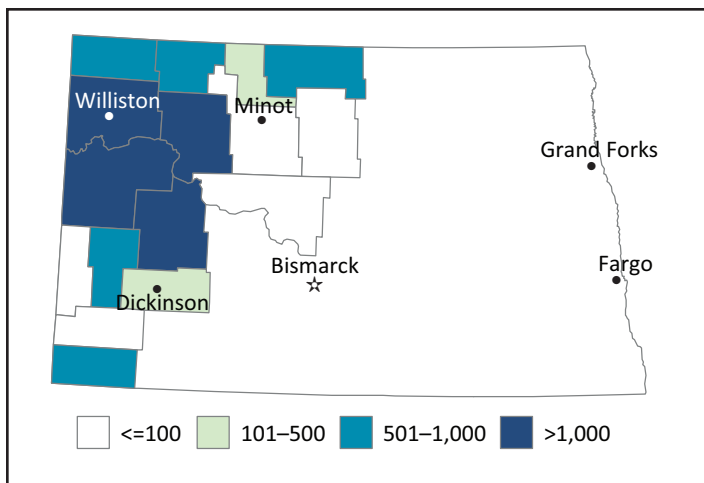


Figure 1.21. Oil Patch counties by number of active rigs.²⁹

- Seventeen counties in North Dakota are considered active in oil production by the North Dakota Department of Mineral Resources. These counties have had oil well production in 2012. The highest producing counties are McKenzie and Williams with a combined 38% of statewide production of oil.

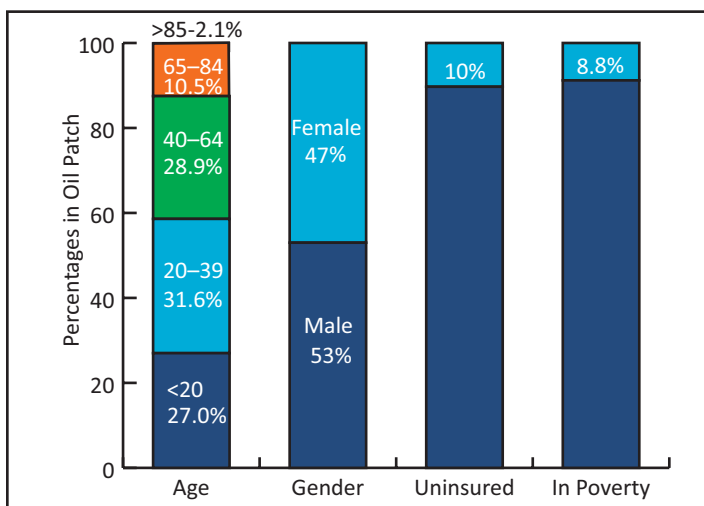


Figure 1.22. Age, gender, uninsured, and poverty in the Oil Patch.^{10, 17, 20, 31}

- With the oil boom, the Oil Patch is expected to become younger (older adults migrating out, younger workers moving in), more male, and with fewer in poverty.

the second-largest oil-producing state; it was in ninth place in 2006. This boom has produced an economic impact of over \$13 billion and has produced roughly 30,000 jobs with expectations of adding 7,000 to 10,000 a year for about five years.²⁸ All of the oil production is focused in the western half of the state, especially the far west counties (see Figure 1.21).

Demographics: Age, Gender, Insurance Status, Poverty

As shown in previous sections, people in the Oil Patch are comparable to the rest of North Dakota for age, gender, uninsured, and poverty status, although relative to rural North Dakota overall, the older adult population is not as large.

Based on current data, the age composition of the Oil Patch has not changed dramatically. If there is an ongoing bust to the

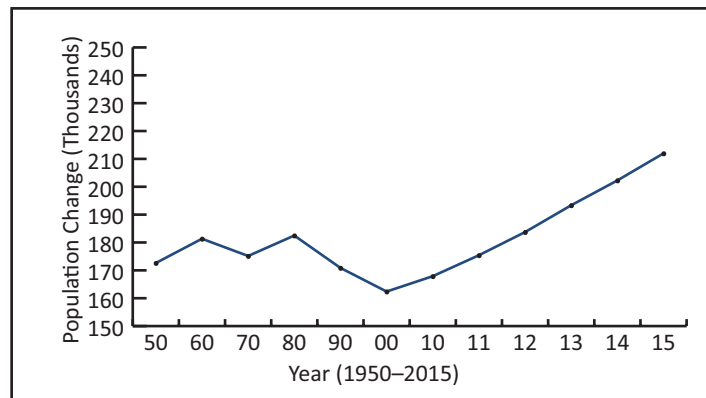


Figure 1.23. Change in population from 1915 to 2015.¹⁰

- Population in the Oil Patch is rapidly increasing and exceeds previous oil boom levels.

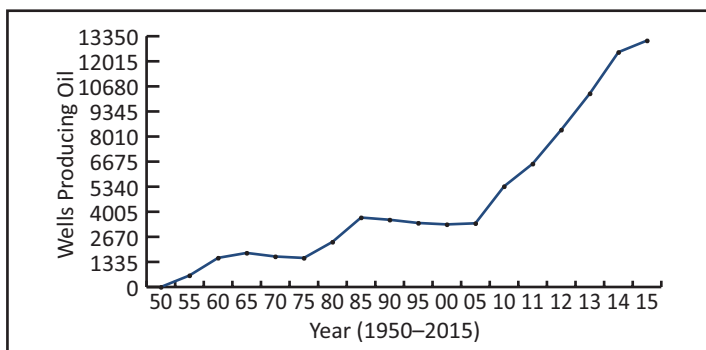


Figure 1.24. Number of wells producing oil in the Oil Patch since 1951.³³

- The number of wells producing oil has nearly quadrupled since 2005.

energy expansion, the 17 oil-producing counties will likely return to a past demographic: slowly developing micropolitan (large rural) areas and declining rural areas. As was stated previously, though, if the oil boom resumes, then the younger working-age population moving in will seek not only energy-related jobs but also employment in supportive industry or business, along with the more traditional needs in retail, service, schools, health facilities, government, transportation, and other key sectors. The resulting housing crunch or changes in the nature and culture of the area would likely compel some older people to move to other areas of the state.

Population and Oil Production

The economy and population of the Oil Patch counties has followed a roller-coaster pattern in the past, and now the cycle has repeated itself. Figure 1.23 shows the boom-and-bust pattern over the past several decades. The recent growth, however, dwarfs prior boom cycles, as shown in Figure 1.24.

The increase in population in the oil counties since 2000 is impressive, especially since about 2006. From the 2000 census to the 2015 census estimate, there has been an increase of about 49,591 people in the 17 primary oil-producing counties.¹⁰

The projection for continued oil production is at least 15 to 20 years using current technologies with anticipation for many years after that as new extraction technologies are introduced.³¹ Thus the population growth and the corresponding effect on the area infrastructure, including health systems, likely will continue for many years.

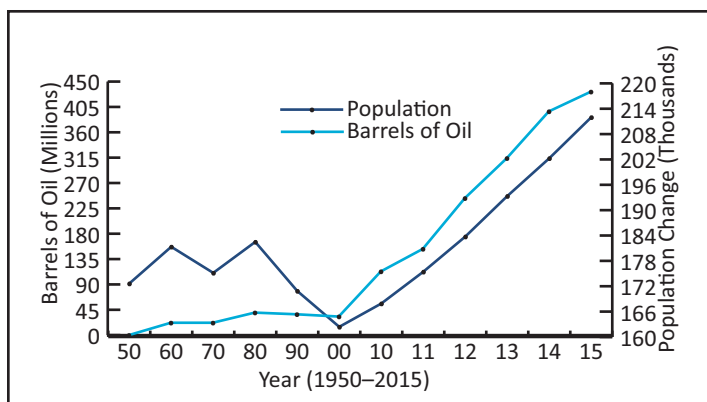


Figure 1.25. Barrels of oil produced and population from 1951 to 2015 for all counties in the Oil Patch.^{10, 33}

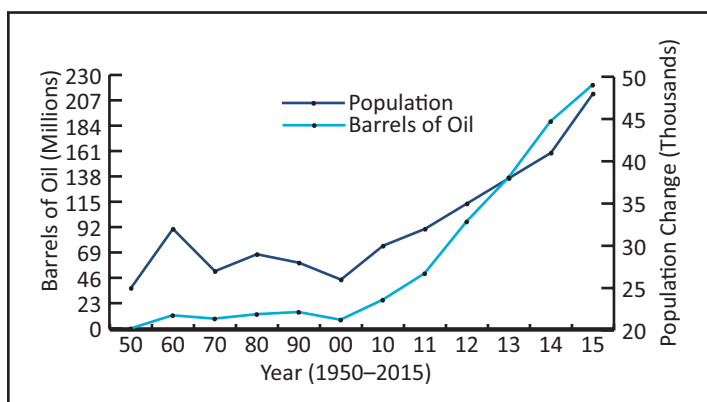


Figure 1.26. Barrels of oil produced and population from 1951 to 2015 for counties with a history of high production of oil (McKenzie and Williams).^{10, 33}

North Dakota produced more than 32 million barrels of oil in May 2016. This is an increase of 3.9% from the previous month, but a decrease of 12.9% from May 2015. Similarly, the number of oil and gas wells increased to 13,167 in May 2016, a 3.8% increase from May 2015. Natural gas production increased as well by 5% from 2015 to 2016. The four core oil and gas counties (Dunn, McKenzie, Mountrail, and Williams) account for 92% of all oil and gas produced in North Dakota.³²

Figures 1.25 and 1.26 show that oil production and population follow nearly identical patterns. This reinforces how closely intertwined are economic activity and demographic characteristics. As oil production is forecast to continue to grow over several decades, it is expected that population will follow accordingly.

There are regions, however, where the tight relationship between oil production and population is not found (see Figure 1.27). Counties such as Ward have seen a high increase in population without a high increase in oil production. This suggests the county supports oil production from nearby counties. Counties such as Divide and McLean have had dramatic increases in oil and moderate increases in population, suggesting the population is living in nearby counties.

As the largest micropolitan (large rural) community in the Oil Patch, Minot (Ward County) is emerging as a major economic hub for the region. It is the state's fourth-largest city and is benefiting from the centralization of oil-supportive business activity. Ward County had a population increase from 2000 to 2013 of almost 10,000 people (9,105) or a 16% increase.

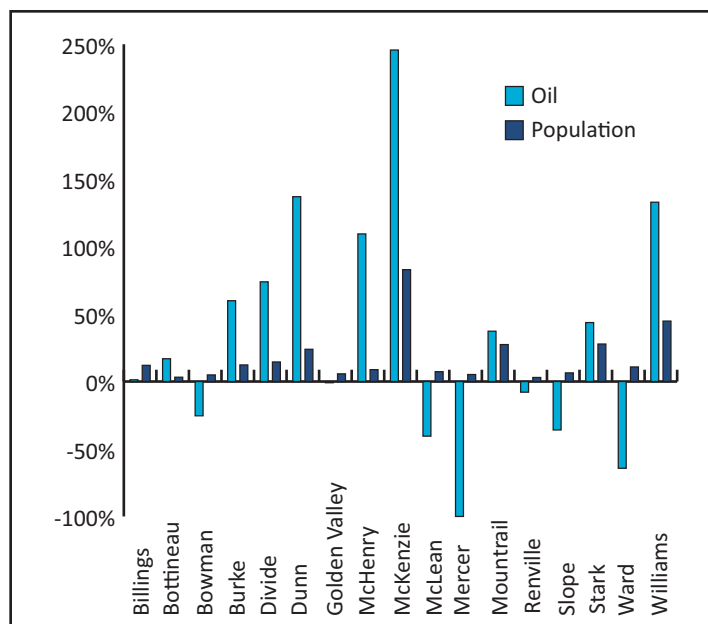


Figure 1.27. Percentage change in barrels of oil and population from 2008 to 2015 for counties in the Oil Patch.^{10, 33}

Other micropolitan communities (Dickinson and Williston) are in the heart of oil country and have seen growth in their oil production, but because they are core population centers, they are experiencing even more population growth. Stark County (home to Dickinson) had a population increase of 25% over the past 13 years, while Williams County (Williston) had the largest increase in population (9,834 people or 50%). Stanley (Mountrail County), Tioga (Williams County), and Williston (Williams County) also benefit in that they are either on or very close to U.S. Highway 2 that sweeps east–west across the northern tier of the state. McKenzie County (Watford City) had an increase since the year 2000 of 3,577 people and the largest percentage increase (62%). Divide and McLean counties have seen significant increases in oil activity; however, their population growth is smaller. Conversely, Divide County, north of Williams County and Williston, had its population increase by less than 40 people.

SUMMARY AND OBSERVATIONS

The experienced changes in population have had an effect on the North Dakota healthcare system. Increases in urban areas will lead to a larger patient base, and health systems will need to respond accordingly to meet new demands for services. This will lead to pressures on healthcare workforce supply. Combined with new expectations from the ACA for primary care providers and the predicted rapid development of ACOs as network delivery systems to facilitate higher-quality care and better medical outcomes, there will be pressure to produce more medical, nursing, and ancillary personnel, especially in the primary care specialties. The continuing decline in the rural population will also produce health system pressures. Already slim and even negative operating margins for CAHs, the ability to financially maintain federally certified rural health clinics and federally qualified health centers, and the complications associated with an aging population on rural emergency medical services (e.g., ability to identify volunteers) and long-term care centers will be magnified by depopulation. If more rural health systems cease

operations, this will exacerbate already complicated access-to-care issues faced by rural North Dakotans. Workforce supply will be affected because of mounting competition for providers, particularly in primary care; competitive salary packages; and the overall issue of attracting providers willing to live and practice in declining environments. In addition, depopulation is commonly associated with economic decline because smaller populations translate into less demand for retail and other services. This in turn affects the population base for other essential community services such as school systems, health systems, governments (e.g., lower tax base), faith communities, and overall economic and community development. In rural communities in particular, each community sector (e.g., health, education, business) is interdependent and relies heavily on the other sectors to maintain viability. As one sector declines or improves, this has a residual effect on all other sectors.

The projected population changes will pressure communities and health systems to respond in a proactive manner. Assessment and planning activities may consider new provider arrangements such as more comprehensive networks involving rural- and urban-based providers. One example already in operation is the collaboration of the 36 CAHs in North Dakota that work together through nine quality-focused networks that address quality improvement, HIT, and staff education. The demands for these types of services and the ability to use network arrangements to meet those needs will likely only increase. As ACOs develop, combined with new payment methods based on the principles of bundled payments and value-based purchasing, they will likely affect larger urban-based providers first; however, over time, to secure viable rural health delivery systems, new urban and rural networks may be contemplated. Both formal and informal organizational connections may be considered to address healthcare workforce issues. Currently, 18 CAHs participate in some form of recruitment and retention network. The workforce supply issue will likely be affected by new provider payment structures such as bundling payments. If more networks develop that are inclusive of rural health systems and providers, there will be new opportunities for collaboration, improved patient outcomes and satisfaction, and reduced healthcare costs.

References

- Gould, E. (2012, July 5). *Public Insurance Helps Blunt Effects of Declining Employer-Sponsored Coverage*. Economic Policy Institute. Retrieved September 15, 2012, from <http://www.epi.org>.
- Gibbens, B. (personal communication discussing North Dakota Medicaid with North Dakota Hospital Association, 2014).
- Center for Rural Health. (2014, September). *CAH Survey* (Data set).
- Medicare Rural Hospital Flexibility Program. (2014). CRH Flex Internal Program Data.
- U.S. Census Bureau. (2015). *2010 Decennial Census* (Data file). Retrieved from <http://factfinder2.census.gov>.
- U.S. Census Bureau. (2015). *1980 Decennial Census* (Data file). Retrieved from <http://factfinder2.census.gov>.
- U.S. Census Bureau. (2015). *1990 Decennial Census* (Data file). Retrieved from <http://factfinder2.census.gov>.
- U.S. Census Bureau. (2015). *2000 Decennial Census* (Data file). Retrieved from <http://factfinder2.census.gov>.
- Mather, M., & Jarosz, B. (2014). *U.S. Energy Boom Fuels Population Growth in Many Rural Counties*. Population Reference Bureau. Retrieved on August 8, 2014, from <http://www.prb.org/Publications/Articles/2014/us-oil-rich-counties.aspx>.
- U.S. Census Bureau. (2016). *Current Population Estimates Data*. Retrieved from <http://www.census.gov/popest/data/>.
- U.S. Census Bureau. (2013). *Metropolitan and Micropolitan Statistical Areas and Definitions* (Data file). Retrieved from <http://www.census.gov/population/metro/>.
- U.S. Department of Agriculture. (2012). *2012 Agricultural Census*. Retrieved on August 1, 2014, from <https://www.agcensus.usda.gov/Publications/2012/>.
- Schiller J. S., Lucas, J. W., Ward, B. W., & Peregoy, J. A. (2012). *Summary Health Statistics for U.S. Adults: National Health Interview Survey, 2010*. National Center for Health Statistics. *Vital Health Statistics*, 10, 252.
- North Dakota Department of Health. (n.d.). *North Dakota Five-Year Needs Assessment (2011–2015) for the Maternal and Child Health Services Title V Block Grant Program*. Retrieved on September 15, 2012, from <http://www.ndhealth.gov/familyhealth/publications/NDNeedsAssessment2011-2015.pdf>.
- U.S. Department of Agriculture Economic Research Service. (2015). *County-Level Poverty*. Retrieved from <http://www.ers.usda.gov/data-products/county-level-data-sets/poverty.aspx>.
- U.S. Census Bureau (2016). *Small Area Health Insurance Estimates*. (Data file). Retrieved from <http://www.census.gov/did/sahe/>.
- Cogan, J., Knudson, A., Baird, J., Muus, K., & Kruger, G. *Health Insurance Coverage in North Dakota* [Presentation Slides].
- The Access Project. (2008, September). *2007 Health Insurance Survey of Farm and Ranch Operators* (Issue Brief). Boston, MA: Author.
- Gibbens, B., & Miller, M. (2012). *North Dakota CAH Administrator's Attitudes Toward Issues Facing Rural Hospitals* (Fact Sheet). Retrieved from https://ruralhealth.und.edu/pdf/attitudes_2012.pdf.
- U.S. Census Bureau. (2015). *Small Area Income and Poverty Estimates* (Data file). Retrieved from <http://www.census.gov/did/www/saie/>.
- Bovbjerg, R. R., & Hadley, J. (2007). *Why Health Insurance Is Important* (Policy Brief). The Urban Institute. Retrieved from http://www.urban.org/UploadedPDF/411569_importanc_e_of_insurance.pdf.
- Robinson, E. B. *History of North Dakota*. (1966). Lincoln: University of Nebraska Press.
- Zimmerle, D. M., & Rathge, R. W. (n.d.). *Recent Trends in North Dakota's Population*.
- United States Department of Labor Bureau of Labor Statistics. (2015). *Quarterly Census of Employment and Wages*. Retrieved from <http://www.bls.gov/eag/eag.nd/gov>.
- U.S. Bureau of Economic Analysis. (2015). *Gross domestic product (GDP) by state (billions of current dollars)*. Retrieved from <http://www.bea.gov/regional/index.htm>.

26. North Dakota Department of Health, Vital Records. (2015). *North Dakota Resident Vital Event Summary Data 2000-2014*. (Data file). Retrieved from <http://ndhealth.gov/vital/pubs/2014VES>.
27. Parker, S. (2012). *Native Americans: The Facts*. Health Guidance. Retrieved from <http://www.healthguidance.org/entry/6323/1/Native-Americans-the-Facts.html>.
28. Kansas Corporation Commission. (2011). *Summary of North Dakota Fact Finding Mission*. Retrieved from <http://www.kansascommerce.com/DocumentCenter/Home/View/1057>.
29. North Dakota Department of Mineral Resources. (2016). Historical Drilling Statistics. Author. <https://www.dmr.nd.gov>.
30. Henry J. Kaiser Family Foundation. (2014). *Poverty Rate by Age*. Retrieved on May 9, 2016 from <http://kff.org/other/state-indicator/poverty-rate-by-age/>.
31. Kringstad, J. (2012). *North Dakota Pipeline Authority: North Dakota Petroleum Council Annual Meeting* (Presentation slides). Retrieved from http://www.ndoil.org/image/cache/J_Kringstad_NDPC_Sept_2012.pdf.
32. Job Service North Dakota– North Dakota Workforce Intelligence Network. (2016). *North Dakota's Oil and Gas Economy*. Retrieved from https://www.ndworkforceintelligence.com/admin/gsipub/htmlarea/uploads/lmi_ndoilandgaseconomy.pdf.
33. North Dakota Department of Mineral Resources, Division of Oil and Gas. (2016). *Oil and Gas Production Report*. Retrieved from <https://www.dmr.nd.gov/oilgas/stats/statisticsvw.asp>.

CHAPTER TWO:

The Health of North Dakota

INTRODUCTION

Health disparities are significant differences between one population and another, including the incidence, prevalence, mortality, and burden of disease, as well as other adverse health effects.¹ A number of determinants contributing to health disparities found in a population include individual behaviors or characteristics (e.g., smoking); biology and genetics (e.g., family history, gender, race, and high blood pressure); social environment (e.g., income, education, and discrimination); physical environment (e.g., distance to care, transportation, and weather); and the health system (e.g., access, availability, quality, and insurance).²

Health disparities are a significant public policy concern. The federal government's Healthy People initiative has for three decades created national 10-year objectives designed to improve the health of all Americans. In each of those decades, health disparities were a primary focus. For Healthy People 2020, health disparity is one of four principal health measures that serve as progress indicators in meeting the national goals. The other three are general health status, health-related quality, and determinants of health.^{3,4}

The condition of individual health is of paramount concern to the individual, family, and even employers who directly pay the majority of healthcare costs; however, the aggregate of health concerns for individuals and families has significant implications for the overall healthcare system and its ability to design a model of delivery to improve health status. (It should be noted that although employers typically pay health insurance premiums directly, most economists consider the payment of such insurance premiums as forgone wages, and thus actually are paid indirectly by the employee.)

Health policy and the healthcare system must contend with a number of key factors associated with population health. These factors are drivers that shape and shade the environment in which healthcare is delivered, how it is delivered and paid for, and how it is structured for future generations. The factors driving or influencing population health and health disparities include the following: access, cost, quality and outcomes, and availability of healthcare and health services.

Access to care refers to the ability to gain entry into the health system. This can include the availability of health professionals and institutional access points such as hospitals, public health units, clinics, and services for emergency medical care, long-term care, behavioral and mental health, oral health, pharmacies, and others. Access is a fundamental issue because it directly addresses the ability of people to maintain or improve their health status. First, people need to be able to meet and talk with health and medical providers and have physical access to a clinic or hospital in order to be able to address any type of health episode. Limitations on access can lead to unmet health needs and medical outcomes, and eventually adds to healthcare costs. A number of factors can restrict access to care, including an individual's ability to purchase health services (e.g., level of income, insurance coverage, employer-sponsored health insurance, and current health); the supply of health professionals and the types of providers and medical specialties available; financial viability of health organizations and health systems; the location of health facilities; in North Dakota, natural barriers such as distance, weather, and road conditions; and ethnicity or race (e.g., American Indian access to care in North Dakota is hindered

by income, employment, availability of services and providers, and location). All of these are important dynamics, factors to which North Dakota is not immune. Later chapters will address, in more detail, specific North Dakota access issues (i.e., healthcare organization and infrastructure).

The *cost of care* is another influence on individual health. North Dakota has been described as a low-cost, high-quality state in which the cost of care, relative to other states, is lower; importantly, the quality of care delivered is considered high. It thus is a higher-performing state.⁵ Even in a relatively low-cost state like North Dakota, cost has been and remains a dominant concern within public policy discussions, particularly within the framework of healthcare reform. For example, the Community Health Needs Assessments (CHNA) that are required of all nonprofit hospitals under the Affordable Care Act, found that the high costs of healthcare to consumers was the fifth-most common health need identified by community members out of a list of 21 items. The finding was based on data from 39 of the 41 hospitals in the state (2011–2013); thus this is strong evidence of concern. The No. 1 health issue was healthcare workforce shortages (addressed in more detail in the following chapters).⁶

In general, healthcare costs in the United States are high in comparison with other countries, accounting for about 18% of gross domestic product (GDP), which is a common and accepted measure of economic production and activity.⁷ In comparison, healthcare in the next most expensive countries of the Netherlands and Switzerland accounts for approximately 11.1% of GDP. In looking at the average for the 34 countries of the Organization for Economic Cooperation and Development (OECD), the United States is about 9 percentage points higher than the OECD average of only 8.9%. Healthcare spending in the United States is expected to top 20% by 2021. In terms of per-capita spending, the United States spent \$8,713 in comparison with the highest countries of Switzerland (\$6,325) and Norway (\$5,862) in 2013 (most recent data year). Per capita health spending in the United States is roughly 2.5 times greater than the OECD average (\$3,453).⁸ At the same time, our high costs do not necessarily translate into the best health outcomes, because the United States ranked 43rd in life expectancy (224 countries compared) and 58th in infant mortality (224 countries compared).^{9,10} In comparison with 1970, when the United States had a life expectancy rate that was one year above the OECD average, in 2013 the United States had a life expectancy that was more than one year below the OECD countries.^{10,11} Both life expectancy and infant mortality have worsened in the United States since the *Third Biennial Report* in 2015. The United States is ranked 41st today for life expectancy, but in the last *Report*, the country was ranked 33rd. For infant mortality, the United States is ranked 55th according to most recent data; however, in the last *Report* the United States was ranked 48th.

The United States is a higher user of healthcare services too. For example, 25% of Americans take four or more prescription drugs regularly compared with a median of 17% for people in OECD countries.¹² Thus, the subject of healthcare costs is germane to a general discussion of population health and health disparities. As a country, we spend a great deal of money that does not seem to contribute positively to key health outcomes.

The *quality of care* that is delivered in a healthcare system relates directly to population health. According to the Institute of Medicine, there are six principal aims to improving health that

should be followed: safety, effectiveness, patient centeredness, timeliness, efficiency, and equity.¹³ In general, by making improvements within each of the six aims, the healthcare system performs better by being more responsive to the needs of the patient, improving the safety of patients, basing care on the science of best practices to be more effective, reducing delays in the delivery of care, and increasing the degree of equity to provide adequate access and improved quality to all patients regardless of socioeconomic status, geographical location, race, and gender. Each of these is a challenge in the current arrangement of care access and delivery. While some healthcare systems have national reputations (e.g., Mayo Clinic and the Geisinger Medical Center) for how they provide quality care in more seamless structures, other systems are less developed with regard to system transformation. Elements of national health reform (e.g., patient centeredness, research-driven best practices, prevention focus, and outcomes) were based on the experiences of the more developed healthcare systems that were motivated to restructure their delivery systems to ultimately improve performance and quality. A number of pivotal publications called attention to the need for change in the U.S. healthcare system. The Institute of Medicine in its seminal work, *To Err is Human: Building a Safer Health System*, found that each year somewhere between 44,000 and 98,000 people die in U.S. hospitals as a result of medical errors.¹⁴ This groundbreaking document, along with a subsequent work titled, *Quality Through Collaboration: The Future of Rural Health*, signaled a challenge to healthcare providers, health sector industries, and policymakers to seriously rethink the U.S. health system to address the systemic issues plaguing our country.¹⁵

The fourth primary driver of health policy for improved population health is the *availability of healthcare providers*. This issue is a central subject of this *Fourth Biennial Report* and will be discussed in more detail in Chapters 3–5. The supply and demand of healthcare professionals and providers is fundamental to health improvement. There is a long-standing maldistribution of most provider disciplines, particularly in medicine, and particularly in rural areas of North Dakota. Patient-centered coordinated-care models under the Affordable Care Act (ACA) are dependent upon a well-prepared and adequate supply of healthcare professionals to improve health. In addition, the ACA supports the training of 16,000 new primary care providers over five years and calls for a number of either new or expanded policy instruments to address the healthcare workforce.¹⁶ For example, there is a significant expansion of the National Health Service Corps (NHSC); creation of state healthcare workforce development grants and rural physician training grants; support for additional nursing training, allied health recruitment and retention, and public health training; mental and behavioral health support; and a number of other initiatives.¹⁷ All of these efforts are intended to increase the availability of health providers.

The remainder of this chapter will look at specific issues associated with behavioral risk factors and population health. It is intended to help the reader better understand the issues that affect not only the population at hand but also to serve as a general context for subsequent discussions of access to care, availability of providers, quality of care, and cost factors.

BEHAVIORAL RISKS

Table 2.1 shows the percentage of adults in North Dakota who have in common the behavioral risk factors of smoking,

drinking alcohol, binge drinking, drinking and driving, not wearing a seat belt, and not exercising at least moderately, categorized by age and gender for metropolitan, micropolitan (large rural), and rural areas. Note that males have worse behavior profiles than women in all domains. Overall, this conforms to the *Third Biennial Report*, except at that time, females in a metropolitan area had a higher rate of not exercising moderately. Rural women have higher rates for drinking and driving, not wearing a seat belt, and not exercising moderately than women in either metropolitan or micropolitan areas. Rural males exceed metropolitan and micropolitan males for not wearing a seat belt and drinking and driving. Metropolitan women have higher rates of drinking alcohol and binge drinking than micropolitan and rural women. The rate of smoking is higher for women in micropolitan areas than the other two geographical categories. Metropolitan men in comparison with other males have the highest rates for smoking, drinking, and binge drinking. The percentages for most adverse health behaviors tend to decrease with age, except for lack of exercise. Although trends show generally improving behavior for most (comparing current data with data in the last *Report*), the drinking and driving behavior is a continuing problem. Data from the 2011 Behavioral Risk Factor Surveillance System, reported in the *Third Biennial Report*, showed that the overall rate for drinking and driving was 3.2 percent, which did not change in the 2014 data. Metropolitan areas experienced a slight increase (3.0% to 3.1%) with rural experiencing a larger increase (3.2% to 3.8%). However, the greatest change was found in the large rural or micropolitan areas of the state, which experienced a full percentage point decline (3.8% to 2.7%).¹⁸ Males drink and drive at a much higher rate than females, 5.2% and 1.2%, respectively. Rural males have the highest rates, 5.6%. However, there are some data that suggest that North Dakota is witnessing some improvement with alcohol use. The number reporting drinking alcohol in 2011 was 59.1% with a slight decrease noted for 2014 (57.2%). Binge drinking in 2011 was 23.2% and decreased to 22.3% in 2014. This may be borne out in the number of DUI arrests as they decreased by 5.8% from 2013 to 2014 (7,117 to 6,705), according to the North Dakota attorney general's office.²⁰

There are certain associations that portend a particularly high risk of adverse health-related behaviors, including the following:

- Drinking in younger (< 65) males in metropolitan and micropolitan (large rural) areas and drinking and driving by younger rural males.
- Binge drinking in younger (< 40) males (see Figure 2.1) in metropolitan areas (see Table 2.1).
- Smoking in younger (< 40) males in micropolitan (large rural) areas (see Figure 2.2).
- Drinking and driving in younger (< 40) males and those in metropolitan and rural areas.
- Not wearing a seat belt in younger (< 40) and rural males and females.
- Not exercising moderately in older (> 65) males in rural and micropolitan areas.

BEHAVIORAL TRENDS

Binge drinking has declined slightly in rural and micropolitan areas, but increased for the metropolitan areas. Males binge drink more than females, and it is a phenomenon associated more with the younger (under 40) age group. Adults in North Dakota tend to

Table 2.1.
Percentage of adults reporting behaviors^{18,19}

N=()	Total (583,766)	Female (287,302)	Male (296,464)	18-39 (227,828)	40-64 (225,917)	65-80 (80,585)	80+ (32,817)
Smokes	18.8	15.3	22.3	23.2	19.5	11.3	3.4
Metro	18.1	13.0	23.4	23.1	16.8	11.2	1.9
Micro	20.5	17.9	23.0	24.6	22.4	10.9	2.9
Rural	18.6	16.8	20.5	22.5	21.0	11.7	5.2
Drinks Alcohol	57.2	51.4	62.9	65.1	58.2	47.5	32.7
Metro	61.4	56.4	66.7	68.6	62.5	51.0	38.5
Micro	58.9	51.6	66.2	66.9	60.1	49.7	33.0
Rural	50.8	44.3	56.4	58.8	51.9	42.4	26.8
Binge Drinks	22.3	16.5	27.9	34.5	19.3	6.1	1.5
Metro	24.8	18.7	31.0	39.5	19.1	4.7	1.6
Micro	19.8	15.5	24.1	28.9	20.0	3.2	0.8
Rural	20.5	13.9	26.4	30.7	19.3	9.3	1.9
Drinks & Drives	3.2	1.2	5.2	4.3	3.7	1.0	0.0
Metro	3.1	0.9	5.3	3.6	3.8	0.9	0.0
Micro	2.7	1.0	4.4	4.9	1.8	1.1	0.1
Rural	3.8	1.6	5.6	4.9	4.6	0.9	0.0
Doesn't Always Wear a Seatbelt	28.4	20.7	35.9	30.3	28.7	26.2	18.3
Metro	23.8	17.1	30.7	27.2	23.6	18.2	8.9
Micro	29.3	20.6	38.0	32.2	28.7	27.8	21.2
Rural	33.7	25.6	40.7	33.8	34.8	34.1	26.1
Doesn't Exercise Moderately (2013)	59.7	57.7	61.8	58.0	60.7	57.9	61.9
Metro	57.3	55.6	59.0	56.5	57.6	56.8	57.1
Micro	63.2	59.3	66.9	64.3	63.6	56.1	58.2
Rural	60.8	59.5	62.0	55.7	62.9	60.3	68.2

Data for adults are from the CDC's 2014 Behavioral Risk Factor Surveillance System survey in North Dakota with the exception of exercise, which is from the 2013 survey.

- The prevalence of smoking in North Dakota is the same as the national prevalence (18.8%).
- Adults in North Dakota drink more on average than the nation (57.2% compared with 53.3%) and binge-drink more (22.3% compared with 16.0%).

drink more than found nationally.¹⁸

Over the past decade, smoking has decreased in metropolitan populations but has remained essentially unchanged elsewhere across North Dakota. This trend is seen in both men and women, although men continue to smoke in greater frequency than women (see Figure 2.2). Nevertheless, the gap between the two groups is narrowing over time.

Behavioral health is a critically important aspect of any health discussion. It has components that operate at the most basic individual level (e.g., individual decisions on health choices such as smoking and alcohol consumption); at a social level (e.g., changing attitudes and social norms toward risky health behaviors, media campaigns on the dangers of certain behaviors, and a greater recognition of both the personal costs and financial costs for negative decisions); and at a more global public policy level (e.g., incentives and disincentives that translate into health insurance and payment plan options, publicly funded media campaigns, and emphasis on health promotion and disease prevention strategies in local government health policy, state policy, and federal policy such as the Affordable Care Act).

According to the World Health Organization, the 10 leading behavioral causes of death worldwide (e.g., high blood pressure,

tobacco use, high blood glucose, physical inactivity/overweight, alcohol use, high cholesterol) account for 33% of all deaths, and global healthy life expectancy would be extended by five to 10 years if individuals, communities, health providers and health systems, and the private and public sectors initiated processes to better address, influence, and control such actions.^{21, 22}

GENERAL HEALTH

Table 2.2 shows the percentage of adults in North Dakota who have common general health issues of disabilities, overweight or obesity, fair or poor general health, one or more days in the past month with poor health, poor physical health, and poor mental health by age and gender for metropolitan, micropolitan (large rural), and rural areas.

Comparison with National Benchmarks

Part of the explanation for the relative good health and health outcomes in North Dakota may relate in part to more healthful lifestyles. For eight of 10 general health measures, North Dakotans are relatively healthier than the country as a whole (e.g., fair/poor health, high cholesterol, high blood pressure, diabetes, cholesterol screen, influenza immunization, asthma, and sigmoidoscopy/

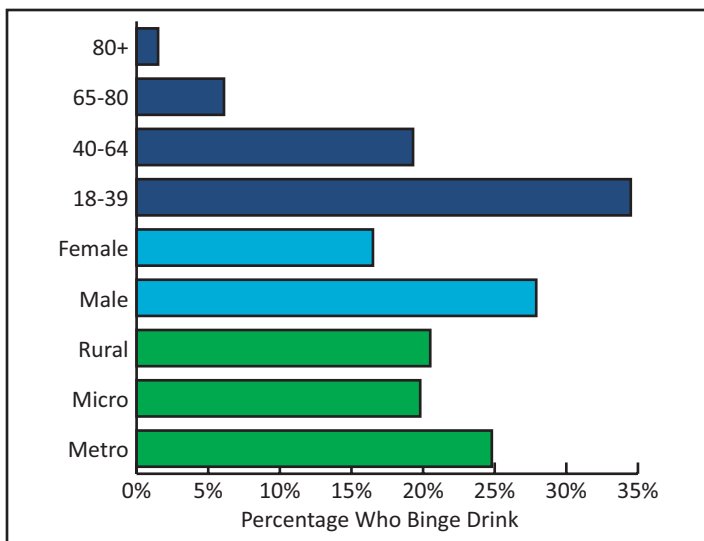


Figure 2.1. Binge drinking in North Dakota.¹⁸

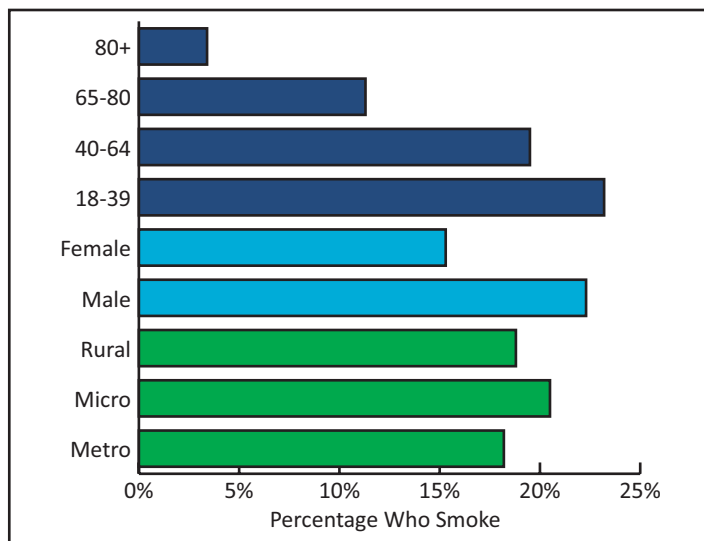


Figure 2.2. Smoking in North Dakota.^{17,18}

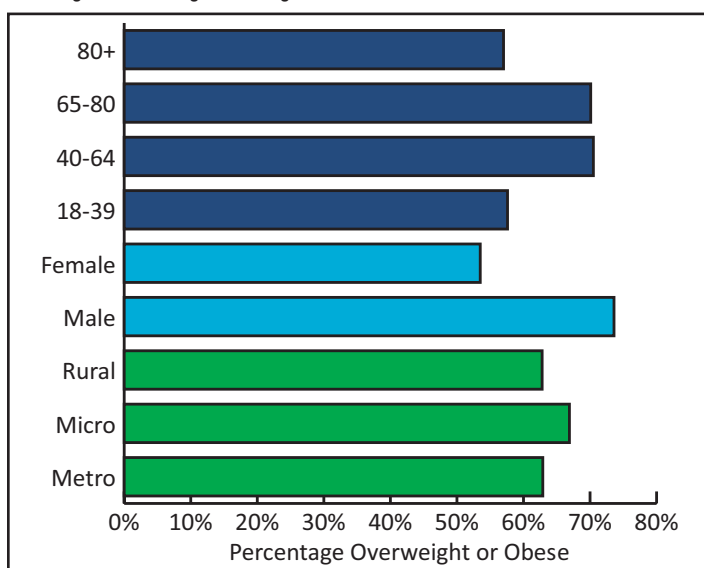


Figure 2.3. Overweight/obese in North Dakota.¹⁸

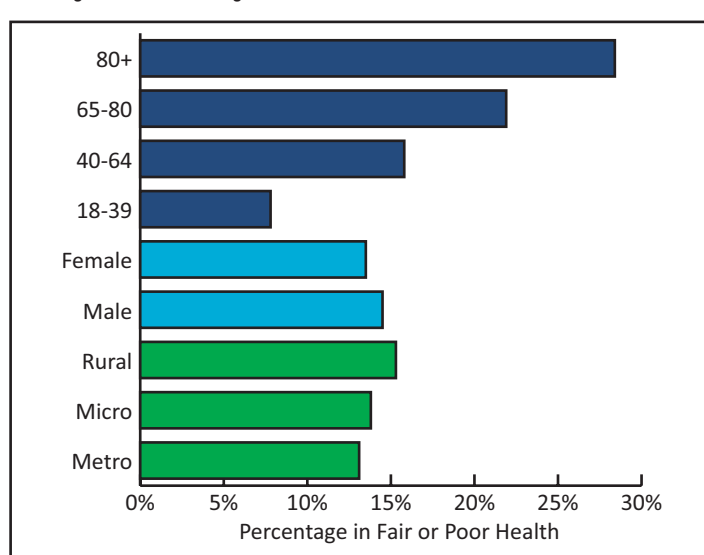


Figure 2.4. Fair/poor health in North Dakota.¹⁸

colonoscopy). Recently, in North Dakota, the number of people who are overweight and obese was reported lower (63.7% versus 65.0%), and the state has a lower pneumonia immunization rate (24.9% versus 25.4%). In the *Third Biennial Report*, it was reported that North Dakota scored slightly worse on overweight/obesity by having 62% of the population so classified versus a national rate of about 60%. Thus, for both the state and the nation the obesity rate is increasing; however, the rate for the country as a whole is increasing at a faster rate. The struggle with obesity and being overweight is a health problem that contributes to many health conditions: cancer, diabetes, heart disease, and others. In a similar manner, the percentage of North Dakotans viewing themselves as having only fair or poor health has increased over the past two years: 12% in 2014 to 14% in 2016; however, the U.S. rate in 2016 was higher than the state rate (at 16%).²³

Health Promotion

Although generally less of a problem in North Dakota than nationally, obesity has been increasing over time, especially in rural regions and in males (see Figure 2.3). The primary goals of the Healthy People 2020 initiative are to (1) attain high-quality,

longer lives free of preventable disease, disability, injury, and premature death; (2) achieve health equity, eliminate disparities, and improve the health of all groups; (3) create social and physical environments that promote good health for all; and (4) promote quality of life, healthful development, and healthful behaviors across all life stages. The Centers for Disease Control and Prevention (CDC) uses Health-Related Quality of Life (HRQOL) process metrics to better determine the burden of preventable diseases, injuries, and disabilities. This involves both self-reported chronic diseases such as diabetes, arthritis, breast cancer, and hypertension; and risk factors such as body mass index, physical inactivity, and smoking status. According to the CDC, the measurement of HRQOL indicators can assist in establishing the relationship between the burden of preventable diseases, injuries, and disabilities with risk factors. The measurement also is part of the national process in achieving national health objectives such as those found in Healthy People 2020. A related set of measures are Healthy Days metrics, which assess an individual's perceived sense of well-being (e.g., self-rated health, number of recent days when physical health was not good, number of recent activity limitation days because of poor health). While these may be proxy measures, they are an accepted means to establish

Table 2.2.
Percentage of adults reporting health conditions.^{18, 19}

<i>N</i> = //	Total (583,766)	Female (287,302)	Male (296,464)	18-39 (228,401)	40-64 (230,439)	65-80 (80,584)	80+ (32,817)
Disabled	15.4	16.3	14.6	7.2	18.7	25.2	26.2
Metro	15.5	17.1	13.9	8.5	18.4	25.1	29.3
Micro	18.0	16.9	19	6.7	22.3	27.5	32.4
Rural	13.8	14.8	12.8	5.8	16.9	23.9	20.5
Overweight/Obese	63.7	53.5	73.6	57.6	70.5	70.1	57.0
Metro	62.9	53.8	72.4	56.1	71.4	68.7	61.5
Micro	66.9	53.5	80.1	61.8	72.3	76.2	57.4
Rural	62.8	53.1	71.3	57.6	68.3	68.2	52.1
General Health Fair/Poor	14.0	13.5	14.5	7.8	15.8	21.9	28.4
Metro	13.1	14.3	11.9	7.7	14.9	19.6	30.1
Micro	13.8	11.1	16.6	7.5	14.4	24.5	29.0
Rural	15.3	13.9	16.4	8.3	17.8	22.8	26.3
1+ Days Poor Health	16.4	19.1	13.8	16.7	17.4	14.0	13.8
Metro	17.3	18.9	15.6	18.3	18.2	14.1	11.8
Micro	16.0	18.8	13.3	15.5	17.3	12.9	18.5
Rural	15.6	19.6	12.0	15.1	17.0	14.6	13.1
1+ Days Poor Physical Health	31.2	33.5	29.1	29.5	32.3	32.1	34.5
Metro	31.3	32.7	29.8	28.7	34.0	32.4	34.3
Micro	31.3	35.0	27.7	30.1	31.4	30.5	39.3
Rural	31.1	33.5	29.0	30.3	31.0	32.7	31.9
1+ Days Poor Mental Health	30.5	36.0	25.2	36.2	30.3	20.1	16.2
Metro	32.2	37.1	27.0	35.1	34.0	22.3	17.2
Micro	32.9	38.7	27.0	45.8	28.2	18.0	10.4
Rural	27.0	32.7	22.1	31.8	27.0	19.0	18.5

Note. Data for adults are from 2014 Behavioral Risk Factor Surveillance System survey in North Dakota.

Certain populations are at high risk for a variety of adverse health conditions, including the following:

- Disability—older individuals (>65), males, and those living in micropolitan (large rural) areas.
- Overweight/Obese—40- to 84-year-olds, males (see Figure 2.3), and those living in micropolitan areas.
- Fair/Poor Health—older males in rural areas (see Figure 2.4).
- Days with Poor Health—females ages 40-64 and those living in metropolitan areas.
- Days with Poor Physical Health—older individuals, females, and those living in micropolitan areas.
- Days with Poor Mental Health—younger individuals, females, and those living in metropolitan and micropolitan areas.

It is striking that, for example, nearly 3 out of 4 males are overweight or obese.

a measure of health status. Health organizations and public programs use Healthy Days metrics to identify health disparities, track population trends, and build coalitions or health-provider and community-based networks around ideas to solve health disparities. The analysis of HRQOL data can be used to determine public policy options for community solutions affecting both individuals and society. The North Dakota data (in Table 2.3) once again indicate concern for a specific subpopulation that rests in micropolitan areas and to some extent metropolitan areas. Age appears to be a factor (particularly being middle-aged or older). In some cases, being a male presents more problems (e.g., overweight, being disabled, general fair or poor health, one-plus days of poor health), while under different measures, being female is associated with negative health factors (e.g., one-plus days poor physical health and one-plus days mental health). Geographical location (e.g., micropolitan) is a common issue. These data do not isolate race, but considering that American Indian reservations are rural, one can assume this distinct

subpopulation should be considered when evaluating policy options associated with HRQOL or Healthy Days-related data.

HEALTH CONDITIONS

Health conditions that are not directly tied to behavioral issues also show gender, geographic, and age gradients. It is likely that obesity is a common, but indirect, cause of many of these associations. For example, high cholesterol, high blood pressure, arthritis, and diabetes all are more common in obese patients. Thus it should come as no surprise that many of these conditions show similar prevalence gradients as does overeating with obesity. As shown in Table 2.3, there are some clear associations between health conditions and various demographics.

Compared with national benchmarks, North Dakotans have a lower prevalence of various nonbehavioral health conditions than in other states, no doubt contributing to our better state of overall health. North Dakotans have a lower prevalence of high cholesterol (27.3% compared with 38.4%), high blood pressure

Table 2.3.
Percentage of adults reporting chronic health conditions^{18,19}

<i>N</i> = //	Total (583,766)	Female (287,302)	Male (296,464)	18-39 (228,401)	40-64 (230,439)	65-80 (80,584)	80+ (32,817)
High Cholesterol (2013)	27.3	28.7	25.9	8.1	34.8	53.3	47.6
Metro	26.8	26.4	27.3	3.7	34.8	55.7	43.6
Micro	25.6	27.2	24.1	6.0	34.5	46.9	47.4
Rural	28.9	32.8	25.1	7.1	35.1	54.7	51.1
High Blood Pressure (2013)	29.7	27.5	31.8	10.3	34.3	59.0	63.8
Metro	29.5	26.6	32.4	11.3	35.5	59.5	69.2
Micro	29.3	26.8	31.7	10.4	31.5	60.4	64.4
Rural	30.1	29.2	31.0	8.6	34.5	57.7	58.8
Arthritis	24.9	28.8	21.1	5.6	31.7	49.5	56.5
Metro	22.3	27.9	16.6	4.6	30.0	48.5	54.6
Micro	27.2	30.1	24.3	6.7	33.1	50.3	61.0
Rural	37.2	29.2	24.4	6.3	33.0	50.2	55.9
Asthma	12.1	14.2	10.1	14.6	9.7	11.9	11.3
Metro	11.4	13.4	9.4	12.8	10.1	9.8	14.7
Micro	13.1	16.9	9.3	16.1	10.1	13.4	8.2
Rural	12.5	13.7	11.5	16.3	9.0	13.4	9.8
CVD	4.0	3.1	5.0	0.2	3.5	12.1	15.8
Metro	4.0	3.0	5.1	0.2	3.0	14.1	19.6
Micro	4.2	2.8	5.7	0.0	4.6	11.0	12.6
Rural	4.0	3.4	4.5	0.3	3.5	10.5	13.8
Diabetes	8.6	7.8	9.3	2.2	10.4	20.2	16.1
Metro	7.2	7.3	7.0	1.6	8.9	15.6	0.8
Micro	8.8	6.9	10.6	2.0	9.6	20.9	21.0
Rural	10.3	9.1	11.3	3.0	12.7	21.5	14.0

Data for adults with asthma, cardiovascular disease (CVD), and diabetes are from 2014 BRFSS survey in North Dakota. Data on cholesterol, blood pressure, and arthritis are from 2013 survey.

The following list shows the associations found in North Dakota between various health conditions and certain demographic characteristics:

- High Cholesterol—older individuals (65–80), females, and those living in rural areas.
- High Blood Pressure—older individuals (65+), males, and those living in rural areas.
- Arthritis—older individuals (65+), females, and those living in rural areas.
- Asthma—younger individuals (18–39), females, and those living in micropolitan (large rural) areas.
- Cardiovascular disease—older individuals (65+), males, and those living in micropolitan areas.
- Diabetes—older individuals (65+), males, and those living in rural areas.

(29.7% compared with 31.4%), asthma (12.1% compared with 13.8%), and diabetes (8.6% compared with 10.0%) than nationally. Nevertheless, the frequency of specific conditions (e.g., high blood pressure and asthma) varies substantially in different age groups. High blood pressure is mainly a disease of older adults, for example (see Figure 2.5), while asthma is somewhat more common in younger patients (see Figure 2.6).

Chronic Disease

An important issue when examining the dynamics of health status is chronic disease. Chronic disease is commonly associated with aging, but people of all ages can experience it. Common chronic diseases include the following: cancer, heart disease, stroke, diabetes, chronic obstructive pulmonary disease (COPD), and arthritis. Significant health risk factors include smoking, lack of physical activity, and poor nutrition. Engaging in healthful behavior reduces the risk for illness. Chronic disease causes 7 in 10 deaths each year in the United States, and heart disease and

cancer together account for about 48% of all deaths. About 117 million Americans (roughly half of all adults) live with at least one chronic condition. About one-fourth of the people with a chronic disease have experienced significant limitations in daily activities. More than 86% of the cost of healthcare in the United States is related to chronic disease.^{24, 25}

High blood pressure, a risk factor for cardiovascular disease, is a highly prevalent condition that contributes to premature death, heart attack, stroke, diabetes, and renal disease.²⁶ High cholesterol, a risk factor for cardiovascular disease, diabetes, and other diseases can be controlled to some degree by diet, exercise, and weight. High blood pressure and high cholesterol found together in the same patient create more medical problems, placing that patient at even greater risk. The Affordable Care Act will require new health plans to cover preventive services for certain populations, including testing for high blood pressure and cholesterol.²⁷ Newer concepts such as patient-centered medical homes and health system delivery and payment channels such as

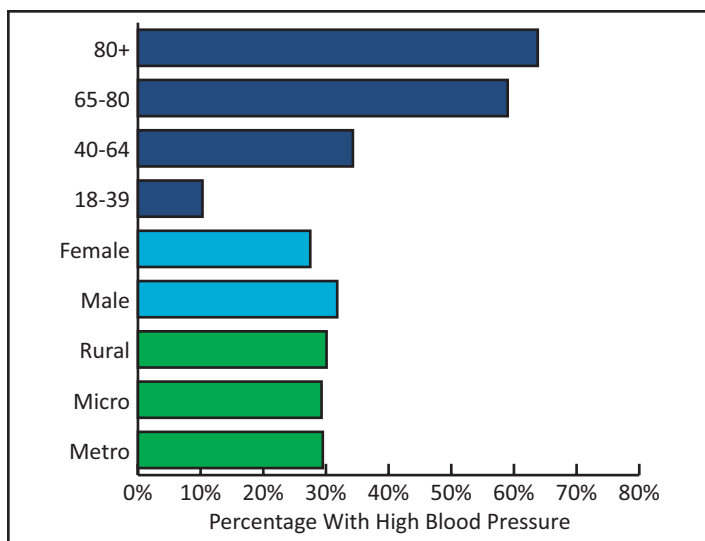


Figure 2.5. Prevalence of high blood pressure.¹⁸

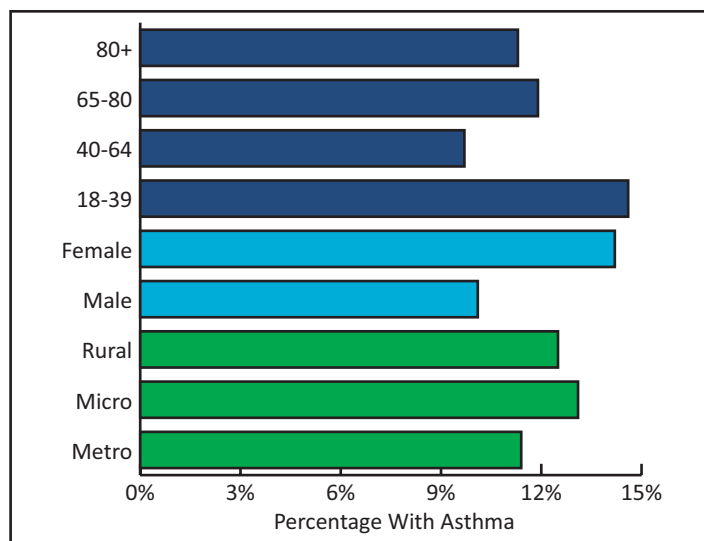


Figure 2.6. Prevalence of asthma.¹⁸

accountable care organizations (ACOs), bundled payment models, and pay for performance will be used to facilitate better care coordination and disease management (see Chapter 7 for more on health reform and ACOs). Figures 2.7A–F are cartograms of common health conditions. The cartograms show the state divided into four regions: northwest, northeast, southeast, and southwest. The sizes of the regions have been adjusted according to their population. Darker regions have higher prevalence of health conditions.

High cholesterol values are most prevalent (> 20%) for the southwest region of the state. High blood pressure is prevalent (> 17%) in all four parts of the state with the highest level (over 21%) also in the southwest section. Diabetes has the lowest prevalence in the southeast part of the state (5.0%). It is most prevalent (> 6.9%) in the northwest part of the state. Cardiovascular disease strikes the northeast area of the state the hardest (> 3%). Asthma is most prevalent in the southwest (> 10.2%). And finally arthritis is also most prevalent (> 19.3%) in the southwest.

Chronic disease is both a national and statewide concern. Under the Affordable Care Act (ACA), all nonprofit hospitals must conduct a community health needs assessment (CHNA) every three years and develop an action or implementation plan. In the *Third Biennial Report*, discussion focused on the identification of obesity and physical inactivity and chronic disease management as high priorities at the community level. That covered the 2011–2013 period. At this time, a second round of assessments are underway. Preliminary analysis of 13 rural communities finds that obesity and physical inactivity are still identified as community health issues; however, chronic disease management has not emerged. The most prevalent issue is related to behavioral and mental health. Throughout the state, community coalitions have been initiated to develop solutions to address CHNA needs, such as obesity and physical inactivity and related issues. Some of these have been supported through funding from the Medicare Rural Hospital Flexibility Program or the Blue Cross Blue Shield of North Dakota Rural Health Grant Program. The focus of the Blue Cross Blue Shield of North Dakota grants is on physical activity and wellness.

Children's Health

Children's health (birth to 18 years) is critically important because what we experience growing up can affect our health, attitudes about health, and our ability to change or manage our behavior. There are family genetic traits that can either act as barriers or serve to steer our health in positive directions; however, our attitudes and behavior as we mature are significant factors as well. Our early experiences as we mature have been shown to affect healthful development cognitively, socially, emotionally, and physically. How a child behaves, learns, and adjusts in school and society is affected by health. How they interact with others and learn to interact relates to their health. How they move through life—education, work, having children—has a connection to their health status when they were in early and middle childhood. This can be referred to as “pre-disease

Table 2.4.
Youth risk behaviors.²⁸

N = ()	Total (43,385)	Female (21,335)	Male (22,050)
Smokes	16.3	13	19.5
Drinks	30.8	29.9	31.9
Drinks & Drives	7.8	5.5	9.9
Doesn't Always Wear a Seat Belt	8.5	6.9	10.1
Doesn't Always Exercise Moderately	48.7	57.1	40.7
Overweight/Obese	28.6	25.2	31.8
Has Long-Term Health Problems	14.7	16.2	13.1

Data for children high school age are from 2015 Youth Risk Behavior Survey in North Dakota. Data for long-term health problems are from 2013 Youth Risk Behavior Survey in North Dakota

- Females under 18 are more likely to not exercise and have chronic health problems.
- Males under 18 are more likely to smoke, drink alcohol, drink and drive, not wear a seatbelt, and be overweight.

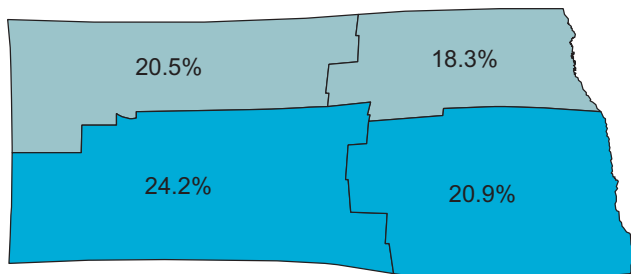


Figure 2.7A. High Blood Pressure.¹⁸

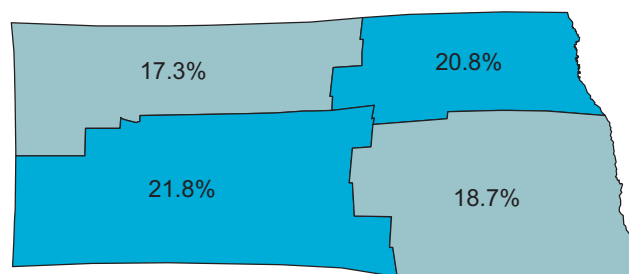


Figure 2.7B. High Cholesterol.¹⁸

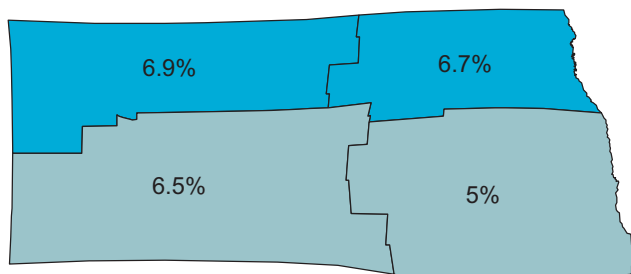


Figure 2.7C. Diabetes.¹⁸

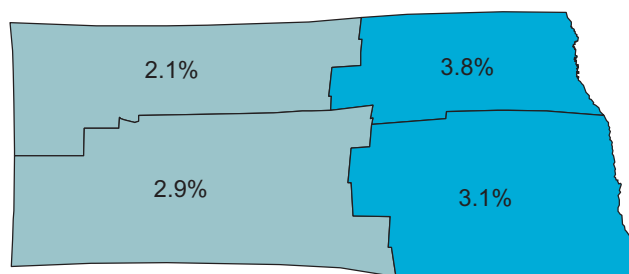


Figure 2.7D. Cardiovascular Disease.¹⁸

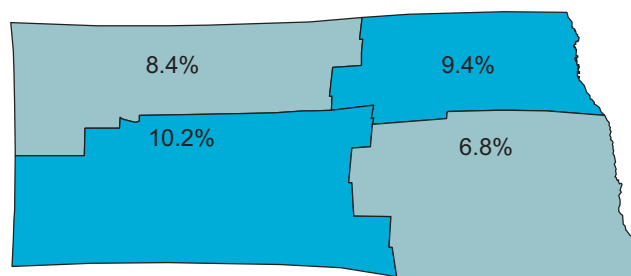


Figure 2.7E. Asthma.¹⁸

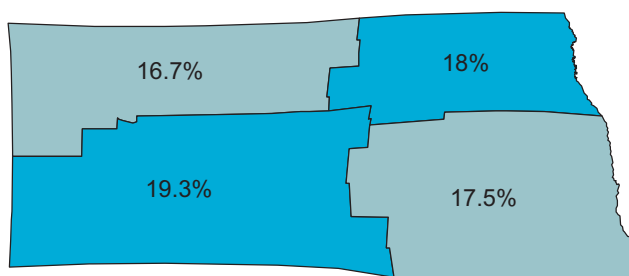


Figure 2.7F. Arthritis.¹⁸

pathways,” which can manifest as medical conditions and adult health issues later.³ Healthy People 2020 developed seven topic areas covering more than 60 adolescent health objectives. One of the topic areas is prevention of adult chronic diseases. This includes the following:³

- Reduce the proportion of adolescents ages 13–15 years with untreated dental decay in their permanent teeth.
- Reduce tobacco use by adolescents (9th- through 12th-grade students).
- Reduce the proportion of children and adolescents who are obese (12- to 19-year-olds).
- Increase the proportion of adolescents who engage in daily school physical activity.
- Reduce pregnancies among adolescent females (ages 15–19).
- Reduce the proportion of adolescents engaging in binge drinking (ages 12–17).

As shown in Table 2.4, adolescent females have a generally poorer behavioral risk profile than do adolescent males for having long-term health problems and not exercising moderately; however, adolescent males have greater issues with tobacco use, drinking, drinking and driving, not wearing a seat belt, and being overweight and obese.

Cancer

Cancer is the second-leading cause of death among adults in the United States (second only to heart disease and stroke) and affects an estimated 1 in 3 individuals in their lifetime, either

through their own diagnosis or that of a loved one. Increasing innovations in medical technology have led to earlier diagnoses and improved treatment of many cancers, resulting in more people diagnosed with cancer surviving each year. Currently, approximately 14.5 million Americans with a history of cancer were alive in 2014.²⁹

An estimate from the American Cancer Society is that in 2016 about 188,800 cancer deaths (out of an estimated 595,690 cancer deaths) will be caused by tobacco use, which increased from the 176,000 reported for 2015 in the *Third Biennial Report*. Overweight and obesity have been found to contribute to about 14% to 20% of all cancer deaths. There is also evidence that being overweight increases the risk for cancer recurrence and decreases the likelihood for survival. Some researchers have postulated that the continuing public health problem of obesity will actually contribute to either a leveling off or actual decline in life expectancy in the United States. These deaths could be prevented. The five-year relative survival rates for cancer have improved significantly over the past 30 years, from 49% between 1975 and 1977 to 68% between 2003 and 2009.^{29, 30} This improved survival rate clearly is a consequence of earlier diagnosis. Yet it should be noted that earlier diagnosis does not necessarily change the natural history of the disease. Thus, while the survival rate (i.e., people alive despite a diagnosis of cancer) has gone up substantially, the cancer mortality rate has fallen only a little.²⁵ The American Cancer Society estimates that in 2016 there will be more than 1.6 million new cases of invasive cancer in the United

Table 2.5.
Cancer rates per 100,000 people.³²

Age	All North Dakota		Males		Females	
	Rate	Cases Per Year	Rate	Cases Per Year	Rate	Cases Per Year
0-4	22.1	10	-	-	-	-
5-9	-	-	-	-	-	-
10-14	-	-	-	-	0.0	0.0
15-19	29.3	14	-	-	-	-
20-24	32.7	20	36.7	12.0	-	-
25-29	68.2	35	54.6	15.0	83.9	20.0
30-34	115.1	50	113.1	26.0	117.4	24.0
35-39	140.9	52	83.0	16.0	204.4	36.0
40-44	224.1	86	101.3	20.0	354.2	66.0
45-49	362.0	160	268.9	60.0	356.8	100.0
50-54	638.3	322	566.1	144.0	711.7	178.0
55-59	911.8	435	950.6	233.0	870.8	202.0
60-64	1,323.1	507	1,512.8	297.0	1,123.8	210.0
65-69	2,026.2	545	2,289.8	304.0	1,769.2	241.0
70-74	2,007.0	421	2,572.5	252.0	1,511.5	169.0
75-79	2,497.5	456	3,223.4	260.0	1,923.1	196.0
80-84	2,521.5	387	3,386.3	211.0	1,930.5	176.0
85+	2,039.4	350	2,577.1	147.0	1,771.7	203.0
All ND	488.2	3,857	543.0	2,019.0	449.9	1,838.0

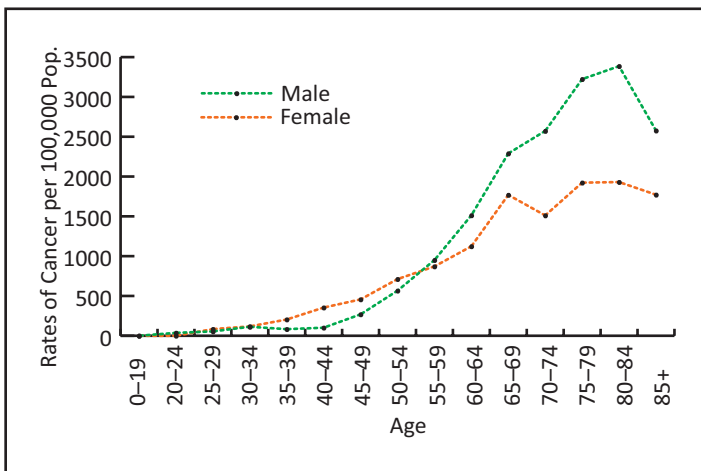


Figure 2.8. Rates of cancer per 100,000 people in North Dakota by age.³²

- Females have higher rates of cancer in the 15- to 54-year-old age range. Male cancer rates are dramatically higher than females by age 65.

States.²⁹

Age is a primary risk factor for most cancers, with about 86% of all cancers diagnosed among individuals ages 55 or older. Men have about a 1 in 2 lifetime risk of developing cancer whereas for women the risk is about 1 in 3. While virtually anyone can experience cancer, some groups are more likely than others to be diagnosed with certain types of cancer; cancer incidence varies by race and ethnicity.²⁹

According to the American Cancer Society, the disparities in the cancer burden among racial and ethnic minorities are the results of obstacles to prevention, early detection, and high-quality treatment. In addition, poverty is a serious factor. African Americans are more likely than any other group in the United States to develop and die from cancer. Hispanics have the lowest

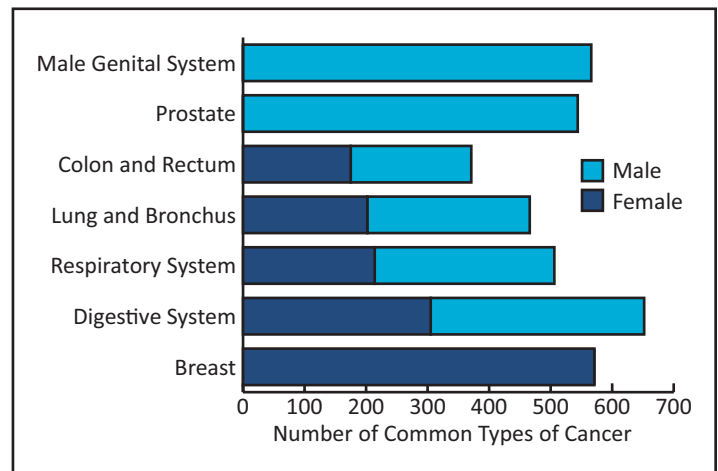


Figure 2.9. Incidence of most common types of cancers in North Dakota.³²

- Digestive system cancer is the most common type in North Dakota.

incidence and mortality rates for lung cancer; however, for liver, stomach, and uterine cervix cancers, they have the highest rates. The American Indian and Alaska Native populations have the highest kidney cancer incidence and mortality rates.²⁹ Available data indicate that cancer incidence for American Indians is lower than the U.S. population as a whole; however, the American Indian population is much younger (about 28 years versus 36 years for the United States) and cancer tends to be more prevalent in older populations. Over the past 30 years, the incidence and death rates have been rising; cancer survival rates for American Indians are the lowest of any ethnic group.³¹

As the second-leading cause of death in the country, cancer and cancer control command a place in U.S. health objectives. Healthy People 2020 presents 20 separate cancer targeted

Table 2.6
Most common cancer rates.^{18, 19}

Type	All North Dakota		Males		Females	
	Rate	Cases	Rate	Cases	Rate	Cases
Digestive System	80.2	652	93.4	347	67.6	305
Breast	75.8	579	0	0	145.1	571
Male Genital System	69.6	566	146	566	0	0
Prostate	66.7	544	140.2	544	0	0
Respiratory System	63.8	506	80.8	292	50.8	214
Lung Bronchus	58.6	466	73.4	264	47.8	202
Colon Rectum	46.1	371	53	196	39.4	175

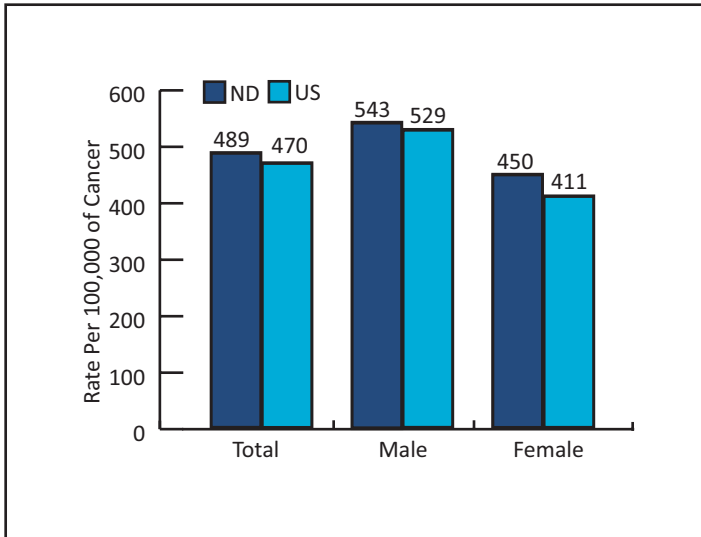


Figure 2.10. Rates of cancer in North Dakota and the United States by gender.^{32, 33, 34}

- North Dakota has higher cancer rates than the United States for both males and females.

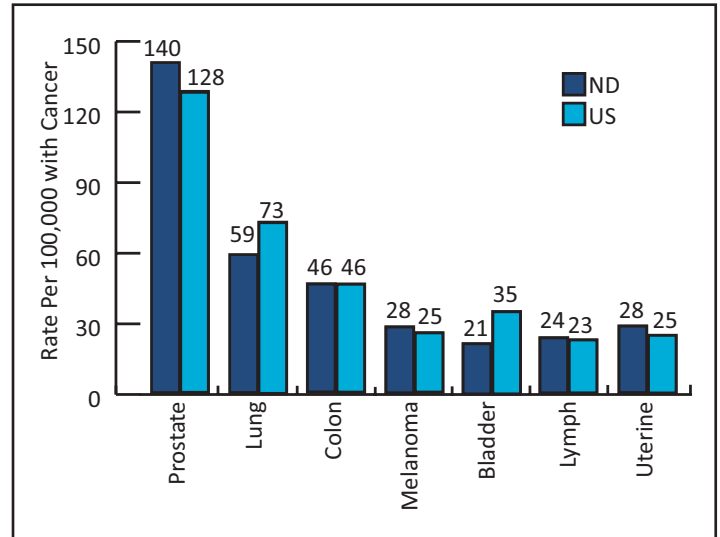


Figure 2.11. Rates of all cancers in North Dakota by cancer type.^{32, 33, 34}

- North Dakota has higher cancer rates than the United States for prostate, lymph and uterine cancer; and melanoma.

objectives. For example, one objective is to reduce the overall cancer death rate by 10% (from 179.3 deaths per 100,000 to 161.4 deaths per 100,000).³

In North Dakota, females are more likely to encounter cancer than men up to the age of 55, but thereafter the incidence of cancer in men markedly increases relative to women (see Table 2.5 and Figure 2.8).

Digestive system cancer is the most commonly diagnosed cancer in North Dakota (see Table 2.6 and Figure 2.9), followed by breast cancer. Conversely, lung cancer is the most common cause of cancer death, and although prostate cancer is more common in men, it causes fewer deaths since many men die with their prostate cancer, rather than from it.

Importantly, the risk of cancer in North Dakota is somewhat higher than in the rest of the nation overall (see Figure 2.10), although it is higher for bladder and lung cancer nationally (see Figure 2.11).

Screenings and Immunizations

Table 2.7 shows the percentage of adults in North Dakota who have had screenings for high cholesterol (past five years), prostate-specific antigen (PSA), blood stool test (ever), sigmoidoscopy/colonoscopy (ever), mammogram (ever), Pap

smear (ever), flu vaccine (past year), or pneumonia vaccine (ever) by age and gender for metropolitan, micropolitan (large rural), and rural areas. Females and people ages 65–84 were more likely to have screenings and immunizations. Screenings and immunizations were generally more prevalent in the northeast and southeast parts of North Dakota.

- People in North Dakota were more likely to have blood stool screening compared with the United States (15.5% to 15.2%), Pap smear tests than the United States (88.7% to 81.3%), and flu (38.5% to 34.4%).
- Screenings were lower in North Dakota than the United States: cholesterol (75% compared with 77.0 %), sigmoidoscopy (27.4% compared with 28.3%), and mammograms (61.6% compared with 62.7%).
- Immunizations for pneumonia (24.9% compared with 25.4%) were lower in North Dakota.³⁵

According to Healthy People 2020, people in the United States continue to develop diseases that are preventable. The increase in life expectancy (from about 49 years in 1900 to 78.8 years in 2012) is the result in part to a significant reduction in infectious disease mortality associated with the development of immunizations.³

The development of a public health infrastructure has played

Table 2.7.
Screenings

<i>N</i> = (/)	Total (493,396)	Female (247,538)	Male (248,859)	18-39 (197,809)	40-64 (202,152)	65-84 (84,650)	85+ (11,785)
Cholesterol	75.0	78.7	71.3	52.2	88.6	95.6	92.0
Metro	75.4	80.0	70.8	54.3	89.0	95.9	92.6
Micro	74.0	76.9	71.6	51.4	89.3	95.1	95.0
Rural	74.9	78.2	71.8	49.9	87.9	95.5	89.9
PSA	31.3	-	31.3	-	44.0	77.4	71.5
Metro	31.0	-	31.0	-	47.1	71.8	52.9
Micro	34.9	-	34.9	-	48.6	80.5	65.4
Rural	29.8	-	29.8	-	38.2	79.1	82.5
Blood Stool	15.5	18.4	12.7	-	17.1	44.0	41.8
Metro	15.0	16.5	13.4	-	18.0	45.4	45.0
Micro	16.6	19.4	13.7	-	20.0	42.9	44.0
Rural	15.6	20.1	11.4	-	14.7	43.5	37.9
Sigmoid	27.4	29.7	25.1	-	33.5	72.1	60.1
Metro	27.2	27.0	27.3	-	36.4	76.0	53.9
Micro	29.4	31.6	27.1	-	35.3	77.2	74.1
Rural	26.6	31.7	21.9	-	29.4	66.6	59.1
Mammog.	61.6	61.6	-	13.2	89.0	95.8	92.7
Metro	54.5	35.5	-	10.3	89.1	97.9	97.4
Micro	63.7	63.7	-	18.3	92.0	97.4	100.0
Rural	65.2	65.2	-	14.1	87.3	93.7	83.8
Pap	88.7	88.7	-	79.6	97.0	96.7	76.7
Metro	88.0	88.0	-	79.9	97.3	97.4	78.9
Micro	91.1	91.1	-	85.8	97.1	97.6	82.1
Rural	88.0	88.0	-	74.7	96.6	5.9	71.7
Flu	38.5	45.8	31.4	26.7	40.6	58.5	58.4
Metro	43.5	49.9	36.6	31.7	48.6	63.3	55.5
Micro	36.3	42.9	29.7	25.0	33.9	62.5	61.7
Rural	34.4	42.6	27.1	21.6	35.6	52.6	59.4
Pneumonia	24.9	27.8	22.0	10.6	19.8	63.2	66.8
Metro	23.9	25.5	22.3	9.7	21.0	65.2	69.4
Micro	24.7	28.5	21.3	13.5	16.3	63.4	73.5
Rural	26.0	30.3	22.2	10.1	20.4	62.4	61.6

Data for adults with screenings and immunizations are from 2012 BRFSS survey in North Dakota. Data on cholesterol are from the 2011 survey. Digital rectal screening only males 40 and older. Blood stool and sigmoid scope only people 40 and older. Mammograms and Pap smears only females, and PSA only males.

a major role in improved life expectancy (e.g., focusing on water safety, infectious disease control, safer and more healthful foods, healthier mothers and babies, family planning, tobacco control, vaccinations, motor vehicle safety, more healthful and safer workplaces, and the decline in deaths from coronary heart disease and stroke).³⁰

Vaccines are among the most cost-effective clinical preventive services and are a core component of any preventive service package. Childhood immunization programs provide a particularly high return on investment. According to the CDC, for children born between 1994 and 2013, vaccination will prevent an estimated 322 million illnesses, 21 million hospitalizations, and 732,000 deaths during their lifetime.³⁹

Health screenings are an important way to evaluate risk factors for disease (e.g., cancer, cardiovascular, diabetes). Baseline data are acquired that can assist physicians and other providers to track measures of blood pressure, cholesterol, blood sugars, weight and height, and body fat. It provides the evidence needed both for prevention and disease management. Health screenings

also aid the patient in being more proactive in their own care, and adequate baseline data can spur heightened interest and involvement on the part of the patient.

The importance of various health screenings is discussed in Healthy People 2020. For example, the monitoring and management of weight, blood pressure, and cholesterol can reduce adults' risk for heart disease and diabetes; routine screening can detect certain cancers (e.g., breast, colorectal, and skin) at earlier stages that are then treatable; and regular checkups for adults 65 and older can help to screen for age-related conditions such as eye disease and hearing loss.³

Under the Affordable Care Act (ACA), the concept of prevention is elevated as a means to not only advance health but also to address rising healthcare costs. Certain preventive services are covered (without requiring the patient or client to provide a co-payment or coinsurance).

- Sixteen preventive services for adults, including the following:²⁷
 - o Blood pressure screening.

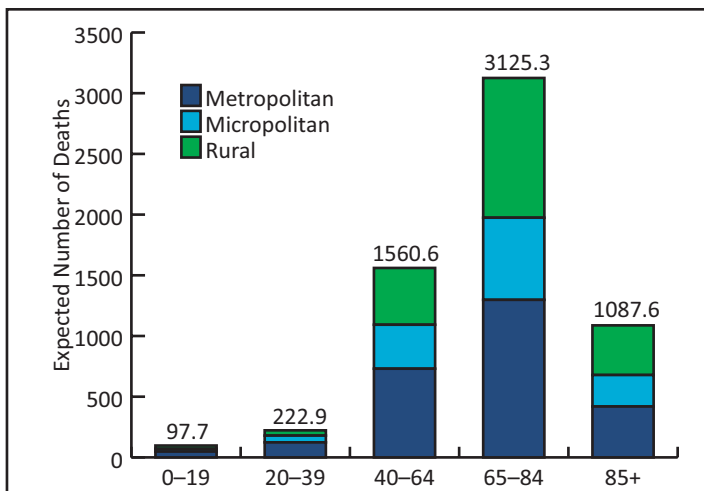


Figure 2.12. Expected number of deaths in North Dakota per age group after adjusting for demographic factors specific to each region.^{19, 36}

- Metropolitan North Dakota had the most deaths in the 65–84 age group.
- Rural areas had the most deaths in the 85 and older age group.
- o Cholesterol screening.
- o Colorectal cancer screening.
- o Diet counseling and obesity screening.
- o Tobacco-use screening.
- o Specific immunizations (e.g., hepatitis A and B, influenza)
- Twenty-two covered preventive services for women, including pregnant women, including the following:
 - o Breast cancer mammography screenings every one to two years for women over 40.
 - o Breast cancer chemoprevention counseling for women at higher risk.
 - o Cervical cancer screening.
 - o Domestic and interpersonal violence screening.
 - o Osteoporosis screening for women over 60.
 - o Tobacco-use screening.
- Twenty-seven covered preventive services for children, including the following:
 - o Autism screening.
 - o Developmental screening for children under the age of 3 years.
 - o Behavioral assessments.
 - o Hearing screenings.
 - o Immunization vaccines.

In North Dakota, health screenings tend to be higher for women than for men, with the highest differential being for influenza (45.8% female versus 31.4% male) (see Table 2.7).

Mortality

Nationally, premature mortality is higher in rural areas than urban areas. The North Dakota data indicate that the state's mortality rates have exceeded the national rates since 2000 (see Figure 2.14). The most recent national data indicate that mortality can vary for rural and urban areas by age. For example, the age-adjusted death rates for people from 1 to 24 years of age indicated that rates for those living in most rural counties was nearly half as much in this age cohort than for those living in most urban

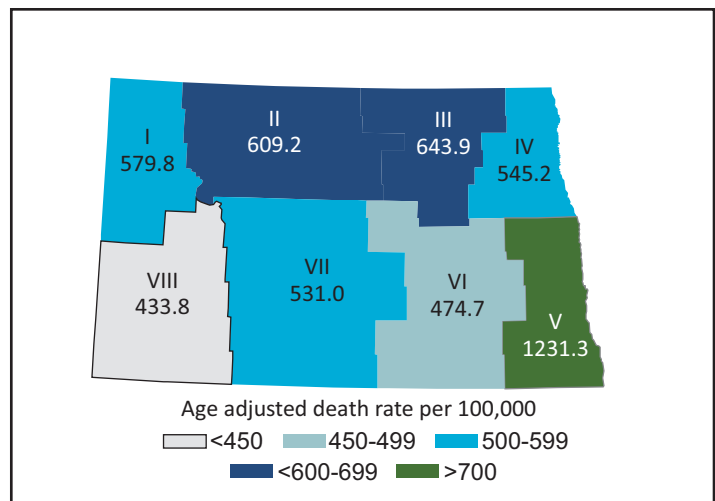


Figure 2.13. Mortality rate in North Dakota regions after adjusting for age.^{37, 38}

- Regions II, III and V have the highest mortality rates.
- Regions VI, VII and VIII have the lowest mortality rates

counties, and 36% higher than people in suburban areas. For the 25-to-64 age cohort, age-adjusted death rates in suburban areas was roughly 15% lower than urban counties and over 30% lower than rural counties. In the oldest age cohort, 65 and older, the rural rate exceeded the urban death rate by about 13%.⁴⁰

U.S. mortality rates have trended lower since the 1960s for both urban and rural areas, although there is an upward trend since 2009. But since the early 1990s, mortality rates in urban and rural areas have diverged somewhat. From 1969 to about 2009 (most recent data), male rural mortality has declined at an average annual rate of 1.09%, which was significantly slower than the 1.40% decline noted for men in urban areas. Similar trends are seen among women in rural and urban areas, 0.68% and 0.98% respectively.⁴¹

Death rates from unintentional injuries, suicide, and chronic obstructive pulmonary disease were higher in rural areas than in urbanized counties and suburban areas. The rural rate exceeded the suburban rate by 86% for unintentional injuries.

Since the *Third Biennial Report*, there has been an increased awareness of the growing problem of opioid addiction and deaths.⁴² Drug overdose is now the leading cause of accidental death in the United States with an estimated 44 people in the country dying from overdose of prescription opioids per day.⁴³ Drug overdose deaths now exceed motor vehicle crashes. Heroin-related mortality rates increased by 28 percent from 2013 to 2014. In 2014, 435,000 people age 12 or older were current heroin users and 4.3 million people who were 12 or older were nonmedical users of prescription pain relievers.⁴⁴ Research establishes that the rural opioid problem is disproportionately higher. Never the less, despite the recent increase in the opioid problem, North Dakota has the lowest rate of drug deaths in the country (see Table 2.8). Some research indicates that rural adolescents are more likely to abuse prescription painkillers than urban adolescents.⁴⁵ Other research studies have found the misuse of nonmedical prescription opioids is concentrated in states with large rural areas.⁴⁶

Motor vehicle crashes are a form of unintentional death and would likely be a contributing factor in geographical comparisons.

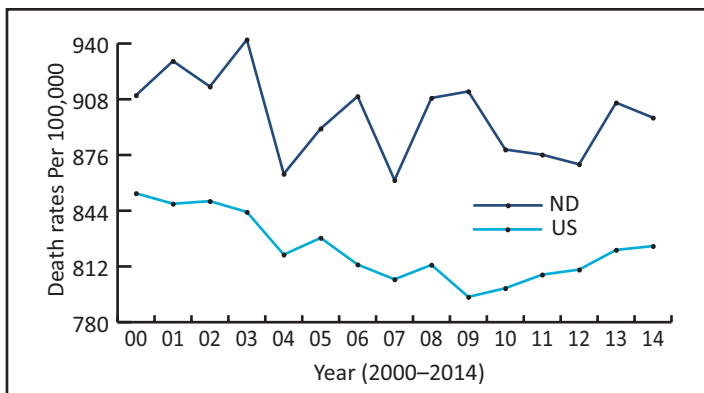


Figure 2.14. Changes in North Dakota mortality rates from 2000 to 2014 compared with the United States.^{36, 47}

- There was an increase in death rates for North Dakota since 2007.
- The age-adjusted death rate for North Dakota in 2014 was 897.43 deaths per 100,000 people. This was higher than the national rate of 823.7 deaths per 100,000 people.

The United States age-adjusted suicide rate was 30% higher in rural areas than in urban regions. Rural males have a 31% higher mortality rate from suicide than urban males. The lower respiratory disease death rate also was higher in rural areas. The rate for rural males was 29% higher than for urban males.³⁴

The rural maternal mortality rate is higher than in urban areas. Likely contributing factors are rural women have less adequate prenatal care, are more likely to be on public health insurance or have no insurance, and have less access to adequate primary care. The latter issue is related to the general lower supply of rural-based primary care combined with less direct access to obstetricians because of fewer obstetricians practicing owing to malpractice and liability concerns.^{38, 39}

Changes in Mortality

Although U.S. mortality rates have shown a steady increase since 2009, mortality rates in North Dakota have been more variable (see Figure 2.14) as they slightly trend up or down depending on the year. However, there has been an overall decline from the year 2000 (910.3) to the year 2014 (897.43). Mortality rates in rural North Dakota have consistently exceeded either the micropolitan or the metropolitan areas of the state. The 15-year period from 2000 to 2014 found the rural mortality rate exceeded the statewide rate in every year. Conversely, the metropolitan rate was lower than the state rate in all 15 years.

The micropolitan rate exceeded the state rate in 10 of 15 years. The rural mortality rate was higher every year than either of the other two population categories.

Elements of the Affordable Care Act over time may have some effect on mortality rates. Improved overall health status, including mortality rates, may be realized by strengthening the primary care supply; emphasizing prevention and health promotion (including more universal coverage via limitations on some co-payments and coinsurance in health plans); creating avenues for better care coordination and management (including movement toward patient-centered medical homes); taking steps to monitor and then improve quality of care; and finally focusing

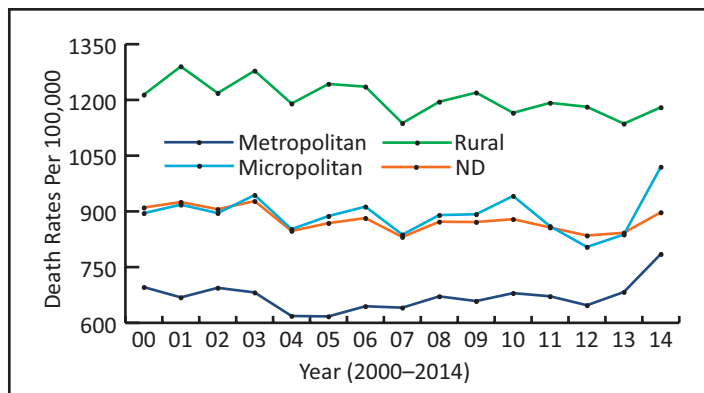


Figure 2.15. Changes in North Dakota mortality rates from 2000 to 2014 for metropolitan, micropolitan (large rural), and rural areas.^{19, 36, 47}

- The metropolitan adjusted rate was 785.17, for micropolitan it was 1,019.71, and for rural it was 1,180.1.

on evidence-based medicine and the strategic linking of quality and medical outcomes to payment.

State Comparisons

A final area of discussion that can help to better understand the health status of North Dakota's population is to compare it with other states. A long-standing and respected state health ranking is the America's Health Rankings by the United Health Foundation. To read more about the America's Health Rankings results and methods, see www.americashealthrankings.org. These state health rankings have been calculated and reported for the past 26 years. Improvements have been made as methods and data sources have improved while care has been taken to make them as comparable across years as possible (personal communication with United Health Foundation Staff, 8/10/2016).

There are 34 components to the overall state health-related United Health Foundation rankings. A list of each of the components and North Dakota's national rank on each are shown in Table 2.8. The individual components are listed by their categories (i.e., behaviors, community and environment, policy, clinical care, and outcomes). North Dakota's 2015 rank for each of these categories are as follows (lower rank is better): behaviors (29th), community and environment (11th), policy (10th), clinical care (18th), and outcomes (5th). If the first four categories are combined (i.e., all determinants), North Dakota's rank is 18th. North Dakota's overall rank is 12th. In addition, there are 25 supplemental measures that are not used in the rankings methods but provide additional relevant information (binge drinking, chronic drinking, cholesterol check, annual dental visit, eating fruits, eating vegetables, insufficient sleep, teen birth rate, youth smoking, youth obesity, heart disease, high cholesterol, heart attack, stroke, high blood pressure, preterm birth, personal income, median household income, unemployment rate, underemployment rate, income disparity, high health status, suicide, injury deaths, and high school graduation).

In Figure 2.16, the overall health rankings for North Dakota and its bordering states are shown for 1990 through 2015. Mississippi is included to illustrate that there are states ranked 47th through 50th across the entire period. As can be seen, Minnesota

Table 2.8.
America's Health Rankings (United Health Foundation):
North Dakota 2015⁴⁸

Components	Rank
Behaviors	
Smoking (% of adult population)	33
Excessive Drinking (% of adult population)	50
Drug Deaths (deaths per 100,000 population)	1
Obesity (% of adult population)	42
Physical Inactivity (% of adult population)	18
High School Graduation (% of students)	5
Behaviors Total	29
Community & Environment	
Violent Crime (offenses per 100,000 population)	16
Occupational Fatalities (deaths per 100,000 workers)	49
Children in Poverty (% of children)	6
Infectious Disease (combined value Chlamydia, Pertussis, Salmonella)	28
Infectious Disease Chlamydia (cases per 100,000 population)	25
Infectious Disease Pertussis (cases per 100,000 population)	31
Infectious Disease Salmonella (cases per 100,000 population)	27
Air Pollution (micrograms of fine particles per cubic meter)	2
Community & Environment Total	11
Policy	
Lack of Health Insurance (% of population)	10
Public Health Funding (dollars per person)	7
Immunizations Children (% of children aged 19 to 35 months)	27
Immunizations Adolescents (combined value of HPV, MCV4, and Tdap)	7
Immunizations HPV Females (% of females aged 13 to 17 years)	20
Immunizations HPV Males (% of males aged 13 to 17 years)	12
Immunizations MCV4 (% of adolescents aged 13 to 17 years)	6
Immunizations Tdap (% of adolescents aged 13 to 17 years)	10
Policy Total	10
Clinical Care	
Low Birthweight (% of live births)	4
Primary Care Physicians (number per 100,000 population)	25
Dentists (number per 100,000 population)	26
Preventable Hospitalizations (discharges per 1,000 Medicare beneficiaries)	23
Clinical Care Total	18
All Determinants	18
Outcomes	
Diabetes (% of adult population)	8
Poor Mental Health Days (days in previous 30)	3
Poor Physical Health Days (days in previous 30)	1
Disparity in Health Status (% difference by education levels)	8
Infant Mortality (deaths per 1,000 live births)	26
Cardiovascular Deaths (deaths per 100,000 population)	17
Cancer Deaths (deaths per 100,000 population)	10
Premature Death (years lost per 100,000 populations)	26
All Outcomes	5
Overall	12

- North Dakota has the highest percentage of excessive drinking among adults in the country.
- North Dakota has the lowest rate of drug deaths in the country.

has consistently been rated highest and Montana lowest. Clearly the ranking trend for Montana and South Dakota have become worse across the 26 years depicted in Figure 2.16. The overall trend across 25 years for North Dakota shows some ranking slippage, according to the United Health Foundation's overall health rankings. North Dakota, from 1990 to 1996, ranked in the top five including being ranked first in 1990; however, from 2011 to 2015, the state slipped and ranked from ninth to 12th.

North Dakota is ranked in the best 10 for drug deaths (1st), poor physical health days (1st), air pollution (2nd), poor mental health days (3rd), low birthweight (4th), high school graduation (5th), children in poverty (6th), meningococcal conjugate vaccine (MCV4) (6th), public health funding (7th), and immunizations (7th). It is ranked in the worst 10 for excessive drinking (50th), occupational fatalities (49th), and obesity (42nd). Regarding smoking behavior, North Dakota is ranked 33rd.

Even though a state's score on a component might improve, its interstate comparative rank can deteriorate and vice versa. A first example for North Dakota is smoking (percentage of population 65 and older who smoke at least 100 cigarettes in their lifetime and currently smoke every day or some days). In 1990, 26.4% smoked, and the interstate rank was 7th (1st being best). By 2015, smoking had decreased to 9.9%, and its interstate rank increased to 33rd. In other words, although North Dakota decreased smoking by 62.5% across 26 years its rank dropped precipitously from 7th best to 33rd (i.e., it lost ground in comparison with much of the rest of the nation). A second example is premature death (number of deaths per 100,000 adults ages 65 through 74). In 1990, North Dakota's rate of premature death was 7,005/100,000 and its interstate rank was 4th (1st being best). By 2015, that rate increased to 7,098/100,000 and its interstate rank was 26th. In other words, although North Dakota had its rate increase by only 1.3%, its rank dropped significantly from 7th best to 33rd (i.e., it lost ground in comparison with much of the rest of the nation). The third and final example is obesity (percentage of adults age 65 and older estimated to be obese based on self-reported height and weight), where the expected rank change occurred. In 1990, 12.1% of elderly North Dakotans were obese, and its interstate rank was 30th (1st being best), and by 2015, obesity had increased greatly to 32.2% (a 166.1% increase), and its interstate rank also increased to 42nd.

It is possible with the United Health Foundation's website to determine partially how influential changes in a component would be to the overall North Dakota summary ranking. Many of the overall ranking components would not change the 2015 ranking of 12th even if North Dakota were ranked 1st (best) in those components. Many others would only lower the overall ranking by one rank. However, a small subset of the components can strongly influence the rankings. For instance, if North Dakota were ranked No. 1 in smoking (moving from rank 33rd to 1st [least] in smoking), its overall rank would move from 12th to 8th. Clearly, the largest gains to health in North Dakota in comparison with other states involve the smoking, obesity, occupational fatalities, and alcohol consumption components. In fact, putting the ranking methods aside, these are the areas of focus from a public health improvement standpoint.

The Robert Wood Johnson Foundation produces comparative intrastate county health rankings (see www.countyhealthrankings.org for rankings, measure scores, maps, and methods). The methods are generally similar to those used in America's Health Rankings. The components are sometimes different and the

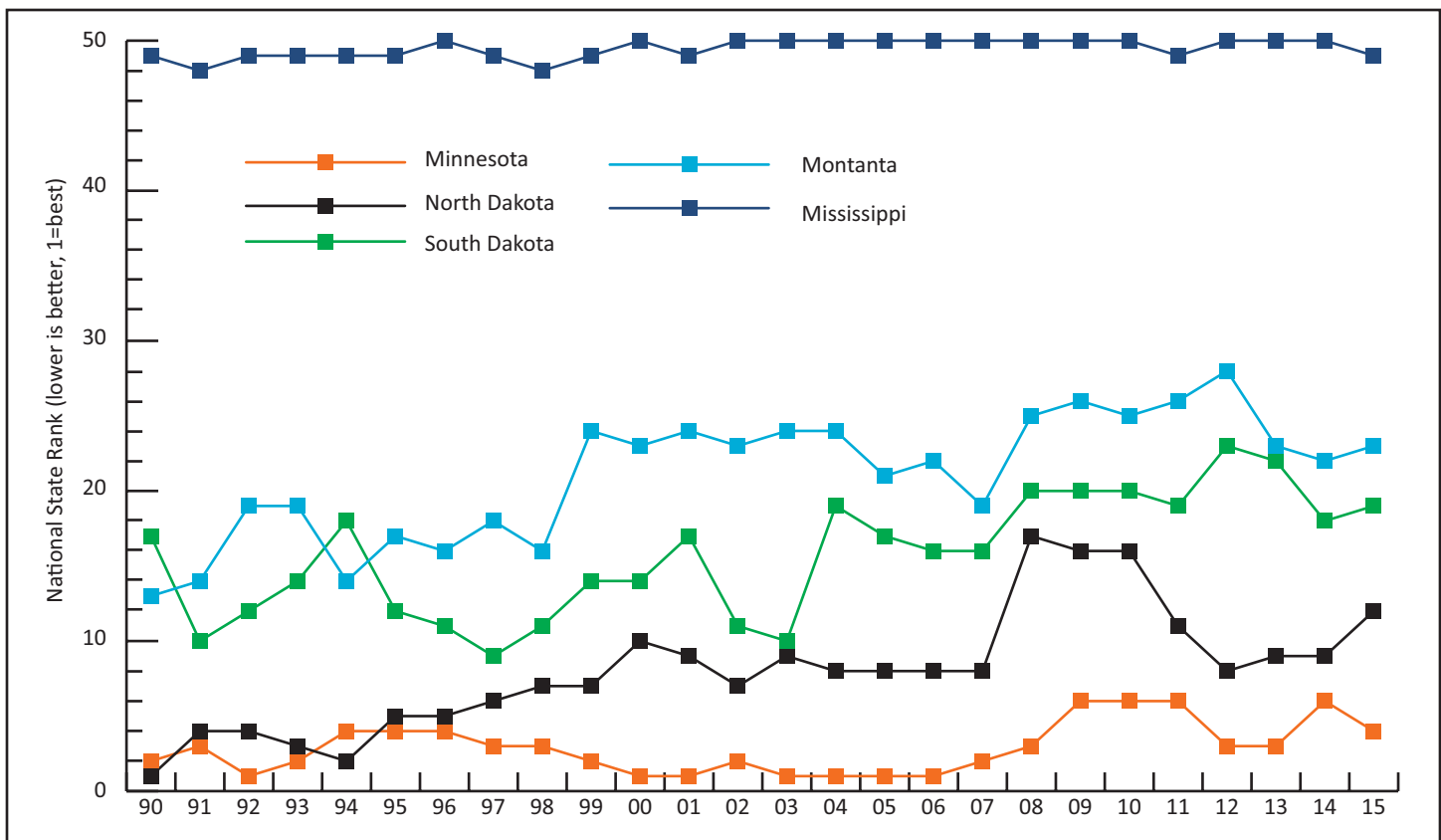


Figure 2.16. State Overall Health Ranking, 2015.⁴⁸

- North Dakota has been in the top level for its overall ranking in the past 15 years.
- Comparable numbers for Montana, South Dakota, and Minnesota.
- Significantly better than Mississippi (near the lowest rank).

methods are not exactly the same. The purpose of the rankings is to make intrastate comparisons. County findings should not be compared across states as a few of the measures are state-specific. In Table 2.9, North Dakota's 53 counties are arrayed from the best rank (1st) to the worst. Four counties are not ranked because needed information was not available or their populations were so small that their data were not stable (personal communication with staff, 8/30/16). As can be seen from Table 2.9, the 10 North Dakota counties ranked best for health in order are Traill (1st), Sargent, Foster, Dickey, Stark, Bottineau, Cass, Cavalier, Burleigh, and Richland, and the 10 counties ranked worst are Sioux (49th), Benson, Rolette, Burke, Mountrail, McKenzie, Dunn, McLean, Eddy, and McIntosh. The counties with North Dakota's three largest cities were ranked as follows: Cass (7th), Burleigh (9th), and Grand Forks (18th).

Finally U.S. health and healthcare status are not nearly the best among the world's countries. According to the 2015 America's Health Rankings annual report, the United States ranks near the bottom among high-income countries. For example, among all countries, the United States ranks 45th for infant mortality rate. This rank is just below Bosnia, Serbia, and Macedonia. The United States ranks 34th in life expectancy. In the larger context, North Dakota currently ranks about 12th among the states in a nation whose ranking among the world's countries on many aspects of health and healthcare is far from the best.

SUMMARY

Males have the highest at-risk behaviors, including smoking,

drinking, drinking and driving, binge drinking, not exercising, and no seat belt use. Not wearing a seat belt, and drinking and driving are most prevalent in rural areas. Not exercising and smoking had the highest rates in the micropolitan areas. And drinking alcohol and binge drinking was highest in the metropolitan areas. The rate of smoking in North Dakota is comparable with the United States, though drinking is higher. Smoking is decreasing in metropolitan areas.

Males in North Dakota tend to have poorer general health, when measured as fair or poor health, especially males residing in rural areas, followed by micropolitan (Table 2.2). However, a greater percentage of North Dakota women than men were disabled, and led in the categories of one or more days of poor health, one or more days of poor physical health, and one or more days of poor mental health. Men had greater problems with being overweight. Weight is a health concern since North Dakota's obesity level has remained steady while the national rate has decreased over the past few years. Rural North Dakotans had more issues with fair or poor health (this is improved for the *Fourth Biennial Report*, as it was found and reported in the *Third Biennial Report* that they, at that time, had worse health status for being overweight and disabled). People in metropolitan areas had greater issues with one day or more of poor health and tied with micropolitan areas for one or more days of poor physical health. A higher percentage of people in the micropolitan areas had higher rates of obesity/overweight and disability. Thus, a difference between two years ago is there is a turnaround for rural and a decline based on some measures in micropolitan areas. Two years ago, rural had the highest negative rates associated

Table 2.9.
County Health Rankings, 2015.⁴⁸

County	North Dakota Ranking	County	North Dakota Ranking
Traill	1	Wells	28
Sargent	2	Griggs	29
Foster	3	Hettinger	30
Dickey	4	Logan	31
Stark	5	Pierce	32
Bottineau	6	Emmons	33
Cass	7	Mercer	34
Cavalier	8	Golden Valley	35
Burleigh	9	Stutsman	36
Richland	10	Grant	37
Bowman	11	Oliver	38
Barnes	12	McHenry	39
Nelson	13	McIntosh	40
Renville	14	Eddy	41
Ward	15	McLean	42
Ransom	16	Dunn	43
Pembina	17	McKenzie	44
Grand Forks	18	Mountrail	45
LaMoure	19	Burke	46
Williams	20	Rolette	47
Towner	21	Benson	48
Morton	22	Sioux	49
Walsh	23	Billings	Not Rated
Adams	24	Sheridan	Not Rated
Ramsey	25	Slope	Not Rated
Kidder	26	Steele	Not Rated
Divide	27		

- Traill County ranks as the top county in North Dakota.
- Sioux County ranks as the lowest in North Dakota.
- Of the 4 counties with the largest cities, Cass was ranked 7th, Burleigh was ranked 9th, Ward was ranked 15th, and Grand Forks was ranked 18th.

with three measures—disability, obesity, and general fair or poor health—in comparison with the two larger population categories: micropolitan and metropolitan. In this *Report*, rural shows higher negative rates for only one measure: general fair or poor health. In contrast, two years ago, micropolitan led on one measure, showing higher rates for days of poor health; conversely, current data show that the micropolitan areas have lower health status on three measures and are tied with metropolitan on one (lowest health status on disability, overweight/obesity, and days of poor mental health; tied on days of poor physical health). It should be noted that of the seven micropolitan counties, five are in the oil region. This may be a contributing factor.

From an age perspective for behavioral health risks, being young (ages 18–39) means more risk for five of the six behavioral risks: smoking, drinking alcohol, binge drinking, drinking and driving, and not wearing a seat belt. Only one, not exercising, was associated with another age group, those 85 and older. In looking at age and location, people 18–39 in micropolitan areas had the highest levels of smoking and tied with rural on drinking and driving, while metropolitan 18- to 39-year-olds contended the most with drinking alcohol and binge drinking. Middle-aged rural (40–64) had the greatest problem with not wearing seat belts, and rural residents 85 and older had the highest rates of not

exercising.

Health conditions are more prevalent in rural areas with the exception of asthma and CVD, which are highest in the micropolitan areas. Many of these conditions are below national norms, though diabetes is rising. Comparing the current North Dakota data with what was reported in the *Third Biennial Report*, of the six chronic health conditions, all (with the exception of CVD) worsened or in the case of diabetes remained the same as last reported. Women have higher rates of high cholesterol, arthritis, and asthma, with men having higher rates of high blood pressure, CVD, and diabetes. With the exception of asthma (which was highest in the 18–39 age bracket), the remaining conditions were associated more with the older population (65 years of age and older).

Cancer is higher for females in the 35- to 54-year-old age range, but male cancer rates are dramatically higher than females from age 65 to 84. Digestive system cancer is the most common cancer in North Dakota, followed by breast cancer. Overall, North Dakota has higher cancer rates than the United States, perhaps because of a larger older adult population. A few cancers, such as lung and bronchus, are lower in North Dakota.

Females in North Dakota do more screenings and have immunizations more than males. People in micropolitan areas tend to do more screenings and immunizations, with the exceptions that rural people have higher levels for mammography and pneumonia, and metropolitan has a higher level of flu shots. Immunizations in North Dakota are below the U.S. rates.

Mortality rates have been higher in North Dakota relative to U.S. rates since 2000. The rural areas of the state have the highest death rates, and the lowest are found in the most urban areas. Metropolitan mortality is higher than rural for people 65 and older; however, the rates are relatively close. When examined by years, the rural areas of the state have had higher mortality rates in all of the 15 years dating back to 2000 when compared with micropolitan and metropolitan. However, the highest spike is noted for the micropolitan areas.

References

1. Minority Health and Health Disparities Research and Education Act of 2000; 42 U.S.C. § 287 (2000).
2. U.S. Health Policy Gateway. (2012). *Health Disparities Overview*. Retrieved from <http://ushealthpolicygateway.com/vi-key-health-policy-issues-financing-and-delivery/k-barriers-to-access/racial-ethnic-and-cultural-disparities/>.
3. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. *Healthy People 2020*. Washington, DC. Retrieved on March 17, 2016, from <http://www.healthypeople.gov/2020/topics-objectives>.
4. U.S. Department of Health and Human Services. *Adolescent Health*. Retrieved on September 3, 2014, from <http://www.healthypeople.gov/2020/topics-objectives/topic/Adolescent-Health>.
5. The Commonwealth Fund Commission on a High Performance Health System. (2009). *The Path to a High Performance U.S. Health System: A 2020 Vision and the Policies to Pave the Way*. Retrieved from <http://www.commonwealthfund.org/publications/fund-reports/2009/feb/the-path-to-a-high-performance-us-health-system>.

6. Becker, K. (2014). *North Dakota's Significant Health Needs as Identified by Community Health Needs Assessments: Aggregate Results for North Dakota Hospitals* (Fact Sheet). University of North Dakota School of Medicine and Health Sciences, Center for Rural Health.
7. Organization for Economic Cooperation and Development. (2015). *Health expenditure in relation to GDP*, in *Health at a Glance 2015: OECD Indicators*. Retrieved at http://dx.doi.org/10.1787/health_glance-2015-60-en8.
8. Organization for Economic Cooperation and Development (2015). *Health expenditure per capita*, in *Health at a Glance 2015: OECD Indicators*. Retrieved from http://dx.doi.org/10.1787/health_glance-2015-59-en.
9. Organization for Economic Cooperation and Development. (2015). *Health at a Glance 2015: OECD Indicators*. Retrieved on Feb. 23, 2016 from http://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance_19991312.
10. Central Intelligence Agency. (2015). *The World Factbook Country Comparisons of Infant Mortality Rates*. Retrieved September 8, 2016 from <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2091rank.html>.
11. Central Intelligence Agency (2015). *The World Factbook Country Comparisons of Life Expectancy at Birth*. Retrieved September 8, 2016 from <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2102rank.html>.
12. The Commonwealth Fund Vol.16. (2011). Issues in International Health Policy. *The U.S. Health System in Perspective: A Comparison of Twelve Industrialized Nations* <http://www.indexmundi.com/g/r.aspx?v=29>.
13. Institute of Medicine. (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century* (Policy Brief). Retrieved from www.nap.edu/html/quality_chasm/reportbrief.pdf.
14. Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (Eds.). (2000). *To Err Is Human: Building a Safer Health System*. Washington, DC: Institute of Medicine, National Academy Press.
15. Committee on the Future of Rural Health Care, Board on Health Care Services. (2005). *Quality Through Collaboration: The Future of Rural Health*. Washington, DC: Institute of Medicine, National Academies Press.
16. Knapp, K. K., Manolakis, M., Webster, A. A., & Olsen, K. M. (2011). Projected Growth in Pharmacy Education and Research, 2010 to 2015. *American Journal of Pharmaceutical Education*, 75(6), 108. <http://doi.org/10.5688/ajpe756108>.
17. MacKinney, A. C., Lundblad, J. P., Coburn, A. F., McBride, T. D., & Mueller, K. J. (2010). *Securing High Quality Health Care in Rural America: The Impetus for Change in the Affordable Care Act*. Retrieved from http://www.rupri.org/Forms/HealthPanel_ACA_De c2010.pdf.
18. North Dakota Department of Health. (2014). *North Dakota Behavioral Risk Factor Surveillance System (ND BRFSS)*.
19. U.S. Census Bureau. (2013). *Metropolitan and Micropolitan Statistical Areas and Definitions* (Data file). Retrieved from <http://www.census.gov/>.
20. Office of Attorney General, Bureau of Criminal Investigation. (2014). *Crime in North Dakota, 2014*. Retrieved from: <https://www.ag.nd.gov/Reports/BCIReports/CrimeHomicide/Crime14.pdf>.
21. Murphy, E. M. (2005). *Promoting Healthy Behavior. Health Bulletin 2*. Washington, DC: Population Reference Bureau.
22. World Health Organization. (2009). *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks*. Geneva, Switzerland.
23. County Health Rankings and Roadmaps. (2016). *County Health Rankings*. Retrieved from <http://www.countyhealthrankings.org/app/north-dakota/2016/measure/outcomes/2/map>.
24. U.S. Centers for Disease Control, National Center for Chronic Disease Prevention and Health Promotion. (2009). *Chronic Diseases: The Power to Prevent, The Call to Control*. Retrieved from <http://www.cdc.gov/chronicdisease/pdf/2009-power-of-prevention.pdf>.
25. U.S. Centers for Disease Control. (2016). *Chronic Disease and Health Promotion*. Retrieved on March 17, 2016, from <http://www.cdc.gov/chronicdisease/overview/>.
26. Agency for Healthcare Research and Quality. (2014). *Cardiovascular Diseases: Patient Brochures and Clinician Fact Sheets*. Retrieved from <http://www.ahrq.gov/research/findings/factsheets/coronary/cardio/index.html>.
27. U.S. Department of Health and Human Services. (2010). *Preventive Services Covered Under the Affordable Care Act* (Fact Sheet). Retrieved from <http://www.hhs.gov/healthcare/facts-and-features/fact-sheets/preventive-services-covered-under-aca/index.html>.
28. Centers for Disease Control and Prevention (CDC). (2015). *1991-2015 High School Youth Risk Behavior Survey Data*. Retrieved on August 9, 2016, from <http://nccd.cdc.gov/youthonline/>.
29. American Cancer Society. (2016). *Cancer Facts and Figures 2016*. Retrieved on March 17, 2016, from <http://www.cancer.org/acs/groups/content/@research/documents/document/acspc-047079.pdf>.
30. Welch H. G., Schwartz, L. M., & Woloshin, S. (2000). Are Increasing 5-Year Survival Rates Evidence of Success Against Cancer? *Journal of the American Medical Association*, 283(22), 2975–2978.
31. Wiggins, C. L., Espey, D. K., Wingo, P. A., Kaur, J. S., Wilson, R. T., Swan J. Lanier, A. P. (2008). *Cancer among American Indians and Alaska Natives in the United States, 1999–2004*. *Cancer* 113(5 Suppl), 1142–1152.
32. University of North Dakota School of Medicine and Health Sciences. (2014). *North Dakota Statewide Cancer Registry* (Data request).
33. U.S. Census Bureau. (2016). *Current Population Estimates Data*. Retrieved from <http://www.census.gov/popest/data/>.
34. U.S. National Cancer Institute. (2014). Surveillance, Epidemiology, and End Results (SEER) Program. Retrieved on March 17, 2016, from <http://seer.cancer.gov/statistics/>.
35. U.S. Centers for Disease Control. (2012). *Behavioral Risk Factor Surveillance System Survey Data*.

36. North Dakota Department of Health, Vital Records. (2015). *North Dakota Resident Vital Event Summary Data 2000-2014* (Data file). Retrieved from <https://www.ndhealth.gov/vital/pubs/2014VES.pdf>.
37. White House, Council of Economic Advisors. (2010). *Strengthening the Rural Economy – The Current State of Rural America*. Washington, DC.
38. Hart, L. G., & Lishner, D. M. (2007). *Rural Maternal and Infant Health*. Retrieved from <http://ruralhealth.und.edu/pdf/hart.pdf>.
39. U.S. Centers for Disease Control and Prevention. (2014). *National, State, and Selected Local Area Vaccination Coverage Among Children Aged 19–35 Months — United States, 2014*. Retrieved on August 1, 2016, from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6433a1.htm>.
40. Meit, M. et al. (2014). *The 2014 Update of the Rural-Urban Chartbook*. Rural Health Reform Policy Research Center
41. Singh, G. K., & Siahpush, M. (2014). Widening Rural–Urban Disparities in All-Cause Mortality and Mortality from Major Causes of Death in the USA, 1969–2009. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 91(2), 272–292. <http://doi.org/10.1007/s11524-013-9847-2>.
42. American Society of Addictive Medicine. (2016). *Opioid Addiction: 2016 Facts & Figures*. <http://www.asam.org/docs/default-source/advocacy/opioid-addiction-disease-facts-figures.pdf>.
43. Center for Disease Control and Prevention. (2015). *Understanding the Epidemic*. <http://www.cdc.gov/drugoverdose/epidemic/index.html>.
44. Hedden SL, Kennet J, Lipari R, et al. (2015). *Behavioral Health Trends in the United States: Results from the 2014 National Survey on Drug Use and Health*.
45. Monnat, S. M. and Rigg, K. K. (2016). Examining Rural/Urban Differences in Prescription Opioid Misuse Among US Adolescents. *The Journal of Rural Health*, 32: 204–218.
46. Keyes KM, Cerda M, Brady JE, Havens JR Galea S. (2014). Understanding the rural-urban differences in nonmedical prescription opioid use and abuse in the United States. *American Journal of Public Health*. 104(2):e52-9.
47. U.S. Census Bureau. (2015). 2000 Decennial Census (Data file). Retrieved on August 9, 2016 from <http://factfinder2.census.gov>.
48. United Health Foundation. (2015). *America's Health Rankings*. Retrieved from <http://www.americashealthrankings.org/>.

CHAPTER THREE:

Physician Workforce in North Dakota*

****Overall limitations with health workforce information and analyses***

The data used in this report have certain limitations. In some cases, provider specialty data are not available. In some cases, only active license data are available. In all cases, full-time equivalent (FTE) work information is not available. FTE physician data provide information on how many hours or patient encounters patient-care physicians produce per period. Another significant limitation of the physician and other healthcare workforce provider data described in Chapters 3, 4, and 5 relates to the North Dakota populations applied in the analyses and descriptions. If available and estimated, North Dakota populations and patients can be weighted by their healthcare needs, which vary dramatically by age, gender, and other characteristics. Because North Dakota has a sizable elderly population when compared with most states, it takes more FTE physicians and other healthcare professionals to adequately care for them. For instance, elderly women require far more physician encounters per capita than do 10-year-old boys and 28-year-old adult men.

PHYSICIAN DISTRIBUTION

Physician distribution in North Dakota varies significantly by geography, with a greater population per physician in rural counties than in counties with larger cities (see Figure 3.1). In fact, 13 of North Dakota's 53 counties, with a combined population of 29,973 (4% of North Dakota's population), have no practicing patient-care physicians.

Parenthetically, many indices of physician supply consider the inverse of the population-per-physician data shown in Figure 3.1 (i.e., physicians per 10,000 population). Regardless of whether the metric is population per physicians or physicians per population, the rural counties of North Dakota have relatively fewer physicians than in U.S. Office of Management and Budget (OMB)-designated metropolitan and micropolitan counties. This is an enduring finding, extending back for decades. Incidentally, the micropolitan designation should not be thought of as generally urban. Historically the counties that are currently designated as micropolitan have been consistently considered rural (i.e., large rural) and are currently treated as such regarding federal healthcare programs and by the Federal Office of Rural Health Policy. These counties could just as well have been designated as "macro-rural" instead of micropolitan. With the exception of Minot (Ward County), all of North Dakota's micropolitan counties are included in this *Report* along with rural counties unless otherwise indicated. Minot is grouped with the urban counties because it is home to one of the state's six tertiary hospitals and because its population growth may necessitate it being reclassified as a metropolitan county in the future.

Supply of Physicians Compared with the Nation

When comparing the availability of physicians to provide healthcare services in North Dakota with regional and national benchmarks, it is important that the comparisons are of similar designations—that is, ensuring that apples are being compared with apples. There are countless ways to select physicians for analyses and data sets, and analyses often are not clear about the exclusion criteria applied. For instance, the following are some of the criteria that can be used either separately or in combinations: patient care (defined different ways), specialty, resident training status (counted in various ways), age, Doctor of Medicine (MD)/Doctor of Osteopathy (DO) status, federal/nonfederal status, practice geography (e.g., metropolitan, micropolitan (large rural), and rural—using many different definitions), gender, primary care status, specific specialty status, patient-care status, practice-type status, medical school of origin, date of data, international medical school status, and so forth. Differences in the employed criteria can result in significant differences in physician counts and in workforce analysis results. Table 3.1 shows the allopathic physicians (MDs) in North Dakota and the United States for the years 1985, 1990, 1995, 2000, and 2012. This table includes all U.S. MD physicians except for those from U.S. possessions (e.g., Puerto Rico). The table shows that across the years, North Dakota has trailed the United States in all physicians per 10,000 population but that the percentage of the national ratio compared with the North Dakota ratio has become closer across the 28 years, though the ratio has been nearly constant from 2000 to 2012. Note that the North Dakota ratio of 28.4 in 2012 is higher than the reported ratio of 24.1 (see Figure 3.2) for 2013. The U.S. ratio is also lower at 27.3 versus 32.3. The differences between Table 3.2 and Figure 3.2 are because the Figure 3.2 data exclude

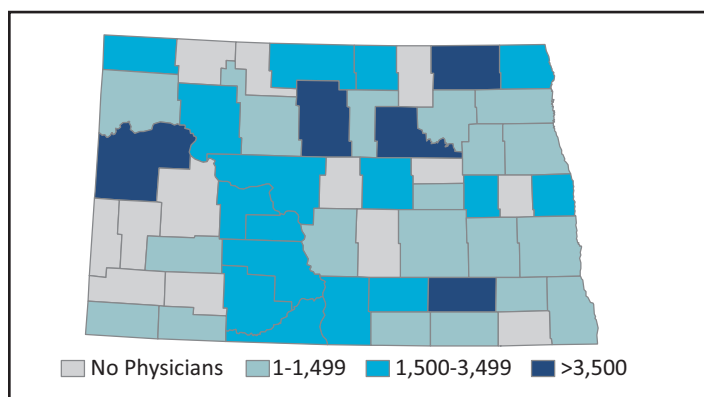


Figure 3.1. County population per physician for all specialties in North Dakota, 2015.^{1,2}

Table 3.1

All medical doctors (MD) per 10,000 population in North Dakota and United States by year.²

	North Dakota	U.S.	% ND of U.S.
1985	17.6	22.8	77.2
1990	19.5	24.2	80.6
1995	23.0	27.0	85.2
2000	25.0	28.4	88.0
2012	28.4	32.3	87.9
2012*	29.4	34.5	85.2

* Doctors of osteopathy (DO) physicians are included (not available for other years).

residents in training, include MDs and DOs (the American Medical Association reports that there are only 73 DOs active in North Dakota), and are for 2013. Because North Dakota has the lowest number of residency (post-medical-school training) slots per medical school student in the country, there are significantly fewer residents (post-medical-school trainees) on a proportional basis than any other state in the nation.

Note that in this *Report*, it sometimes has been impossible to reconcile differences between reported data from different sources. Thus, exact numbers, ratios, and the like from table, figure, and text can vary somewhat from one place in the *Report* to another, though not meaningfully different. However, estimates in any one table and figure have been carefully garnered from the same source in an effort to be sure that the comparison is accurate (comparing apples with apples).

In 2015, North Dakota had more than 1,600 practicing patient-care physicians. Of these physicians, 44% graduated from the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) or a UND residency program or both.² The difference in 2013 physician-to-population ratios per 10,000 population is illustrated in Figure 3.2. The ratio for North Dakota is 11.7% lower than for the United States as a whole and 4.7% lower than in the comparative Upper Midwest states (Iowa, Minnesota, Montana, Nebraska, South Dakota, Wisconsin, and Wyoming).

Regarding gender, overall North Dakota had fewer female physicians per 10,000 population than the Midwest and United States during 2013 (see Table 3.2). Concerning female physicians per 10,000 population overall, North Dakota has 29% fewer female physicians than the United States and 19% fewer female

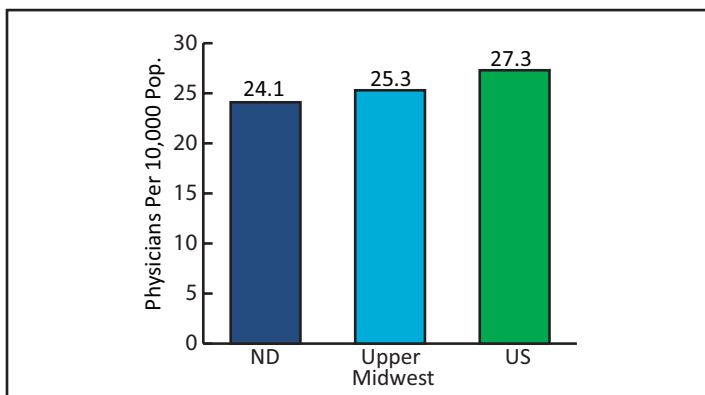


Figure 3.2. Number of physicians per 10,000 population for North Dakota, the Upper Midwest, and the United States (excludes resident physicians), 2013.^{1, 3, 4}

Table 3.2

Male and female physicians per 10,000 population in North Dakota compared with Upper Midwest states and the United States by three metropolitan/nonmetropolitan categories, 2013.^{1, 3, 4}

	ND	Upper Midwest	U.S.
Female	6.7	8.3	9.4
Metropolitan	10.7	10.9	10.5
Micropolitan	4.6	4.3	3.5
Rural	1.5	2.3	1.9
Male	17.4	17.0	17.8
Metropolitan	27.2	21.2	19.5
Micropolitan	11.7	12.0	10.2
Rural	4.3	5.8	5.2

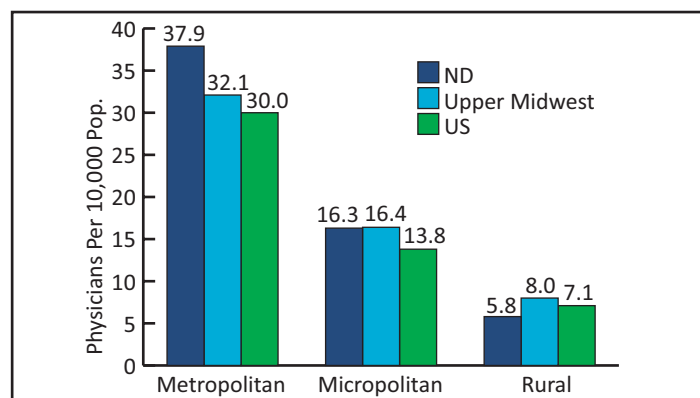


Figure 3.3. Physicians per 10,000 population for North Dakota, the Upper Midwest, and the United States for metropolitan, micropolitan (large rural), and rural county status, 2013.^{1, 3, 4}

physicians than for the Upper Midwest. It will be interesting to observe the trend in the gender ratio of physicians in the future. The UND SMHS, like most medical schools in the country, currently graduates about equal numbers of men and women, so it could be anticipated that the relative number of female physicians in North Dakota will increase over time.

The North Dakota ratio of female physicians per 10,000 population were not very different than for the Upper Midwest and United States in metropolitan counties, higher than for the Upper Midwest and United States for micropolitan counties, and a little lower for rural counties. The North Dakota male-physicians-per-10,000-population rate is higher in metropolitan counties than in the Upper Midwest and all U.S. counties (e.g., 39% higher than for the United States). The differences for micropolitan and rural counties were minor, but North Dakota had the lowest male-physician-to-10,000-population rate.

Overall, North Dakota varies little regarding male physicians per 10,000 population with regard to the United States and the Upper Midwest. It has slightly more male physicians per 10,000 population than the Upper Midwest and slightly fewer than the United States.

The geographic pattern of physicians per 10,000 population in North Dakota is more complex than described for physician gender. North Dakota has relatively more physicians per 10,000 population in metropolitan counties (Figure 3.3). For micropolitan (rural) counties, both North Dakota and the Upper Midwest have more physicians than the United States. Rural counties across all three geographic groups have much lower physicians per 10,000 population than is true in metropolitan and micropolitan counties. Rural North Dakota has fewer physicians per 10,000 population than the Upper Midwest and the United States.

For office-based physicians per 10,000 population overall, North Dakota has 9% fewer office-based physicians than the United States and 5% fewer office-based physicians than the Upper Midwest, which are relatively small differences (see Table 3.3). The rates for metropolitan, micropolitan (large rural), and rural are higher, about the same as, and lower than the Upper Midwest and U.S. rates. For instance, North Dakota rural counties are 26% and 14% lower than the Midwest and the United States, respectively. Thus, North Dakota has lower office-based practice in rural counties compared with the other areas and higher office-based practice in metropolitan counties than the Upper Midwest

and the United States; however, North Dakota's micropolitan counties have more office-based physicians than the United States, and fewer office-based physicians than the Midwest.

Regarding hospital-based physicians, North Dakota metropolitan counties have more physicians per 10,000 population than the Upper Midwest and United States by 24% and 37%, respectively. For micropolitan areas, North Dakota similarly has more by 59% and 67%, respectively. In rural counties, North Dakota has fewer physicians per 10,000 population than both the Upper Midwest and the United States by 42% and 36%, respectively. North Dakota physicians in metropolitan and micropolitan counties are more likely to be in a hospital-based practice than the comparison groups. This likely is a reflection of North Dakota's emphasis on family medicine and primary care, which are clinic- and office-based practices. However, North Dakota physicians are more likely to be international medical graduates (IMGs) than in Midwestern states (28% versus 16.4%) and 16% higher than the national average (28% versus 24.1%).

Overall, North Dakota has fewer physicians under the age of 55 per 10,000 population than does the Upper Midwest and U.S. comparison groups, and this is especially true for the 45–54 age group (see Table 3.4). North Dakota has relatively fewer physicians in the 55–64 and 65–74 age groups. However, North Dakota has relatively more physicians per 10,000 population in metropolitan counties across all age categories except for the 75+ group. North Dakota has relatively fewer physicians in rural counties in all age categories than does the Upper Midwest and

Table 3.3

Physicians primarily in office or hospital practices per 10,000 compared with Upper Midwest states and the United States by three metropolitan/nonmetropolitan categories, 2013.^{1, 3, 4}

	ND	Upper Midwest	U.S.
Office	17.1	17.9	18.7
Metropolitan	26.4	22.1	20.4
Micropolitan	11.8	13.5	11.1
Rural	4.9	6.6	5.7
Hospital	5.5	5.5	5.9
Metropolitan	9.2	7.4	6.7
Micropolitan	3.5	2.2	2.1
Rural	0.7	1.2	1.1

United States comparison groups except for the <35 age group. As shown in Figure 3.4, North Dakota physician age structure is similar to that of the Upper Midwest states and U.S. comparison groups, though North Dakota's physicians are a little less likely to be 75 and older.

Another method of comparing North Dakota physicians with the Upper Midwest and United States comparison groups is to do so by their internal distributions by percentages (e.g., percentage of all North Dakota physicians who are female compared with the percentages of the other groups) (see Figure 3.5).

North Dakota has a significantly lower percentage of its physicians who are female than Upper Midwest states and the United States as a whole (North Dakota 28%, Upper Midwest 32.9%, and the United States 34.5%). The national trend over the past decades is for the percentage of physicians who are female to be increasing across the nation.

Origins of North Dakota Physicians

The market for physicians is a national one. Medical school graduates are dispersed widely across the nation and are strongly influenced by such factors as the location of their residency training, specialty choice, opportunities, home origins, and their spouse's origins. The smaller or more specialized the medical residency training, the more nationwide the specialty market for graduates. For instance, the market for primary care physicians is more regional, while the market for neurosurgeons is national and international.

Figure 3.6 shows the states from which North Dakota's practicing physicians graduated from medical school on the left side, and where past graduates of North Dakota's medical school now practice on the right side. This analysis permits a comparison of physician training versus practice location patterns.

In 2013, the balance of migration into and out of North Dakota by physicians based on medical school state location varied widely with respect to where the physicians were practicing. This can be thought of as an "interstate balance of trade" in medical school training and practice destination (excluding IMG graduates).

North Dakota is a net medical school graduate physician exporter (i.e., more North Dakota UND SMHS graduates practice in other states than other states' graduates are practicing in North Dakota). For the UND SMHS, 979 medical school graduates practice outside North Dakota versus 609 graduates of medical schools outside of North Dakota who are practicing in North Dakota. The resulting "interstate balance of trade" between North

Table 3.4

Number of physicians of different age groups per 10,000 people in North Dakota compared with Upper Midwest states and the United States by three metropolitan/nonmetropolitan categories, 2013.^{1, 3, 4}

	ND	Upper Midwest	U.S.
<35	4.3	4.3	4.8
Metropolitan	7.0	6.0	5.5
Micropolitan	2.6	1.4	1.2
Rural	0.8	0.6	0.5
35-44	6.4	6.4	6.8
Metropolitan	10.4	8.4	7.6
Micropolitan	4.3	3.7	2.8
Rural	0.9	1.6	1.3
45-54	5.5	6.5	6.5
Metropolitan	9.0	8.1	7.1
Micropolitan	3.1	4.5	3.7
Rural	1.4	2.2	1.7
55-64	5.9	6.4	6.4
Metropolitan	8.9	7.6	6.8
Micropolitan	4.8	5.3	4.4
Rural	1.5	2.7	2.4
65-74	3.2	3.4	4.0
Metropolitan	4.4	3.8	4.3
Micropolitan	2.7	3.2	2.9
Rural	1.6	1.9	1.8
75+	2.2	2.7	3.3
Metropolitan	2.6	3.1	3.5
Micropolitan	2.2	2.2	2.2
Rural	1.6	1.7	1.6

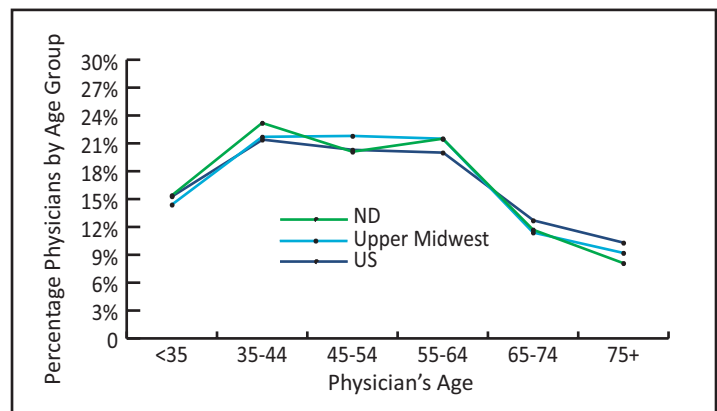


Figure 3.4. Percentage of physicians by age groups for North Dakota, Upper Midwest states, and the United States, 2013.³

Dakota and the rest of the nation is –370 to North Dakota's disadvantage.

There is great variation regarding medical student state of training versus practice state balances. The largest difference in North Dakota net flow that favors another state is Minnesota (i.e., 89 Minnesota graduates practicing in North Dakota and 307 UND SMHS graduates practicing in Minnesota: net –218 to North Dakota's disadvantage); Wisconsin (–67); and Michigan (–14). Some of the explanation for this is that UND graduates who want to specialize in any specialty other than family medicine, internal medicine, psychiatry, general surgery, and

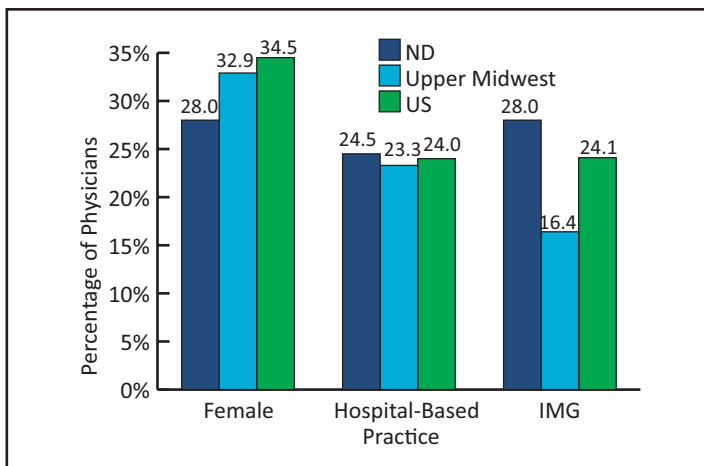


Figure 3.5. Percentages of female physicians, hospital-based physicians, and international medical graduates (IMGs) for North Dakota, Upper Midwest states, and the United States, 2013.³

transitional have to go out of state for their residencies because the residency program type they choose does not exist within North Dakota (e.g., cardiology). Some other comparisons favor North Dakota. For instance, 55 medical school graduates from Missouri practice in North Dakota, while only 12 UND graduates practice in Missouri (+43 in North Dakota's favor). Of the 1,106 U.S. medical school graduates practicing in North Dakota (excluding graduates from Canada and other countries) in 2013, 497 or 44.9% graduated from the UND SMHS.

One important predictor of eventual practice location is where physicians obtain their residency training (others include location of medical school, where they grew up, and geographic origin of spouse when applicable) because many physicians—especially those in primary care—start practicing in the general vicinity of where they completed their post-medical school residency training. Figure 3.7, using 2013 data, shows the states where North Dakota's practicing physicians completed their residency training on the left side, and where past graduates of North Dakota's residency programs now practice.

Note the effect of North Dakota residencies—nearly three-fifths (58.9%) of graduates from these residencies practice in North Dakota or Minnesota. Given how easily patients can cross the North Dakota-Minnesota border for care, some of the Minnesota physicians are treating North Dakota patients. For example, some North Dakota residents are seen by physicians located in Moorhead, Minn. (across the Red River of the North from Fargo).

Of 2013's 1,453 practicing North Dakota patient care physicians, 315 (21.7%) completed a residency within North Dakota while 1,138 (78.3%) did not. Of the 778 UND-residency-trained physicians, 463 (59.5%) practice in other states and 315 practice in North Dakota (40.5%). The overall North Dakota "interstate balance of trade" of currently practicing physicians who completed their residency training in other states is +675 to North Dakota's advantage (1,138 physicians with no North Dakota residency training are practicing in North Dakota while 463 North Dakota residency graduates are currently practicing out of state). North Dakota is a large net importer of other states' residency graduates.

Regarding Minnesota and North Dakota, the residency

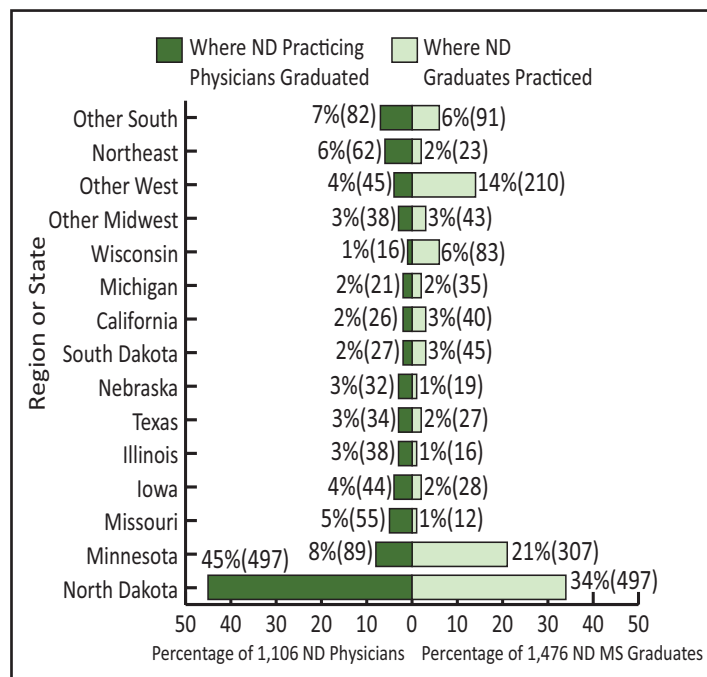


Figure 3.6. Percentage of North Dakota physicians who graduated from different states and where North Dakota physicians who graduated from the UND SMHS currently practice (not including IMGs), 2013.³

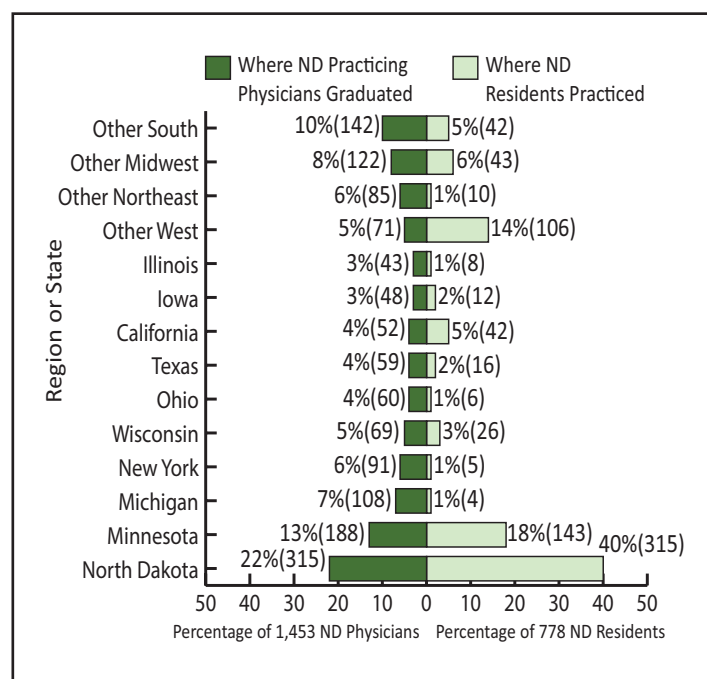


Figure 3.7. Percentage of North Dakota physicians who did residencies in different states and where North Dakota physicians who did residency at UND are currently practicing, 2013.⁵

"interstate balance of trade" bottom line is +45 in North Dakota's favor (i.e., 188 physicians with their residency training in Minnesota are practicing in North Dakota while 143 physicians with North Dakota residency training are practicing in Minnesota).

Of North Dakota's total direct-care physicians in 2015, 26.8% received residency training in North Dakota. Of North Dakota's

Table 3.5
Number of current North Dakota residency slots by type of residency program as of 2016.⁶

Residency	# Number in Residency	Duration Years	# who completed training in 2016
Family Medicine	68	3 Years	19
Internal Medicine	24	3 Years	8
Psychiatry	16	4 Years	5
Preliminary Surgery	3	1 or 2 Years	3
Categorical Surgery	25	5 Years	4
Transitional Year	8	1 Year	8
Total	144		47

total direct-care physicians including IMGs, 33.5% received their medical degree from the UND SMHS (44.9% if IMGs are excluded using 2013 data). Considering North Dakota residency graduates and UND SMHS medical school graduates, 44% either completed a residency in North Dakota or received their medical degree from the UND SMHS or both in 2015.²

One of the more important predictors of physicians establishing a clinical practice in North Dakota is when a doctor both attends the UND SMHS and completes at least one residency in-state. As is evident in Table 3.6 (using 2016 data), such physicians comprise critically important fractions of the various physician specialty types in North Dakota; for what is arguably the single most important specialty—family medicine—they constitute by far the single most common source of such physicians.

Residency Training in North Dakota

Figure 3.8 shows the location and number of trainees in North Dakota's physician residencies. The number of different specialties where a residency can be performed within North Dakota is limited to family medicine, internal medicine, psychiatry, general surgery, and transitional.⁶ Recently added residencies are available in hospitalist medicine, rural surgery, telepsychiatry, hospital medicine, and rural family medicine. Transitional residencies are a yearlong program designed to introduce graduates to a wide range of medical and surgical specialties with the goal of building a broad foundation of clinical skills as a base for future training in a medical specialty. Table 3.5 shows the current numbers of residents in the programs.

As discussed in greater detail in Chapter 10, approval and state funding for 17 additional residency slots per year (total of 51) have been provided in North Dakota. New positions have been awarded since 2012 to UND's Center for Family Medicine in Bismarck (rural family medicine, in conjunction with West River Health System in Hettinger); UND's Center for Family Medicine in Minot (rural family medicine in conjunction with Mercy Medical Center in Williston); UND Department of Surgery (rural general surgery); UND Department of Psychiatry and Behavioral Science (rural psychiatry); and Catholic Health Initiatives-St. Alexius Medical Center (hospitalist and geriatrics). Two additional programs based in Fargo were approved but could not be funded because of state budget shortfalls in 2016—a new family medicine and a new geriatrics residency program.

Through the funding of the Healthcare Workforce Initiative (HWI), the North Dakota Legislature has provided the support to

Table 3.6
Percentages of North Dakota specialty physicians who graduated from the UND SMHS and did at least one residency in North Dakota as of 2016.²

Residency	Percent
Family Medicine	72%
Internal Medicine	49%
Obstetrics and Gynecology	61%
Pediatrics	38%
Psychiatry	45%

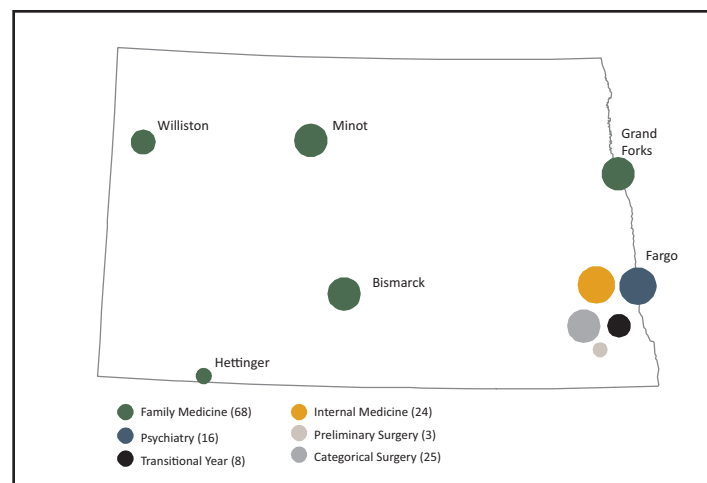


Figure 3.8. Number of residents per year in North Dakota by location and type of residency, 2016.⁶

permit expansion of graduate healthcare provider class sizes, with the addition of 16 medical students per year (total of 64 when fully implemented) and 30 health sciences students per year (total of 90 when fully implemented).

Physician Specialty and Rural Location

North Dakota's patient-care physicians practice in many different specialties. The most prevalent physician specialties practicing in North Dakota in 2015 were family medicine 360 (22.3%); general internal medicine 164 (10.2%); general surgery 109 (6.8%); psychiatry 78 (4.8%); and general pediatrics 85 (5.3%). These specialties account for nearly half of the practicing physicians (50.6%). None of the remaining specialties account for more than 5% of North Dakota's practicing physicians.²

The geographic distribution of physicians is discussed in Chapter 4 in the context of primary care physicians. Naturally, the more specialized areas of practice are centralized in the state's larger cities where the populations are sufficiently numerous enough to support them (i.e., they have the necessary threshold populations whose reimbursements make their practices viable).

Adjacent Border Area SMHS Medical School Graduates and North Dakota Residency Graduates

Another aspect of the production of North Dakota patient-care physicians who are SMHS medical school graduates and residency graduates relates to those graduates who practice in the areas adjacent to North Dakota (i.e., in zip code areas that are adjacent to the North Dakota border or that are within 15 miles of the border in Montana, Minnesota, and South Dakota). This narrow contiguous state band was examined because it can be argued that North Dakota physician-graduates who practice

Table 3.7

Number of international medical graduate (IMGs) and U.S. medical graduate (USMG) physicians per 10,000 population in North Dakota compared with Upper Midwest states and the United States by the three metropolitan/non-metropolitan categories, 2015.^{1, 3, 4}

	ND	Upper Midwest	U.S.
IMG	6.4	4.1	6.4
Metropolitan	9.8	5.3	7.1
Micropolitan	4.9	2.6	2.7
Rural	1.6	1.0	1.3
USMG	16.4	20.9	20.0
Metropolitan	25.9	25.9	21.8
Micropolitan	10.5	14.7	23.1
Rural	4.3	8.0	6.6

within this area should be adjudged successes of the North Dakota training programs because they serve some or many North Dakota residents (e.g., physician clinics in East Grand Forks, Minn.).

The analysis shows that in 2011 there were 65 North Dakota graduates practicing patient care in the previously described adjacent band (34 in Minnesota, 30 in South Dakota, and one in Montana). Nearly three-quarters (71%) of these patient-care physicians were practicing in primary care specialties (i.e., family medicine, general internal medicine, and general pediatrics). During 2011, 61% of North Dakota's practicing physicians were graduates of North Dakota's medical school, residencies, or both. These additional adjacent-practicing graduates increase the number considered to have located their practices "in-state" by 7.4%. The corresponding number of adjacent practicing graduates for 2013 is 67. Current data do not allow us to determine the number of SMHS medical school graduates and residency graduates currently practicing in the border area of Manitoba, Canada (a band about 15 miles along the North Dakota border). It is unlikely that the number of graduates practicing near the Manitoba border (or in Manitoba overall) is significant given that the border is an international one and that the populations of the cities and towns along the border zone are small.

International Medical Graduates

IMGs make up about one-fourth of the North Dakota physician workforce, which is similar to the situation across the country in 2013. IMGs are a critically important component of the professional workforce in North Dakota and throughout the country. They are defined as medical school graduates from any country outside of the United States and Canada.

All three geographic categories of North Dakota counties (e.g., metropolitan) have relatively more IMG physicians per 10,000 population than does the Upper Midwest and United States (Table 3.7). In fact, North Dakota has 85% more physicians per 10,000 population in metropolitan counties than Upper Midwest counties.

There was a higher percentage of IMGs practicing in North Dakota in 2015 from India (7% of North Dakota's practicing physicians) than in any other state (Minnesota having the next highest percentage at 6%) (see Figure 3.9). The largest numbers of IMGs practicing in North Dakota come from India, Pakistan, and the Philippines.

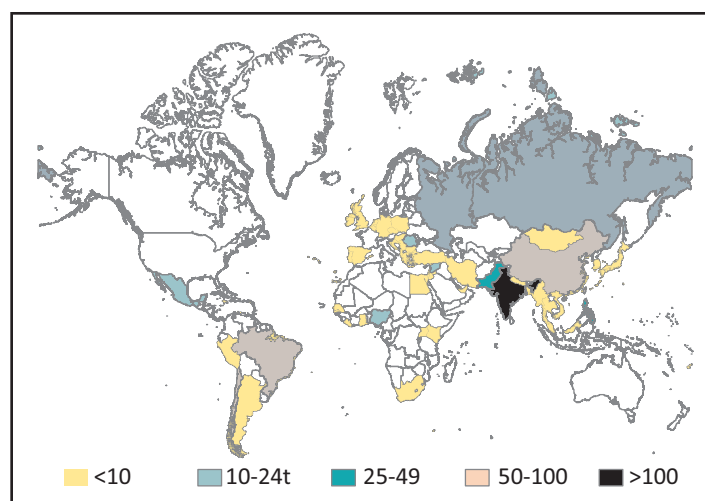


Figure 3.9. Country origins of IMG physicians practicing in North Dakota, 2015.²

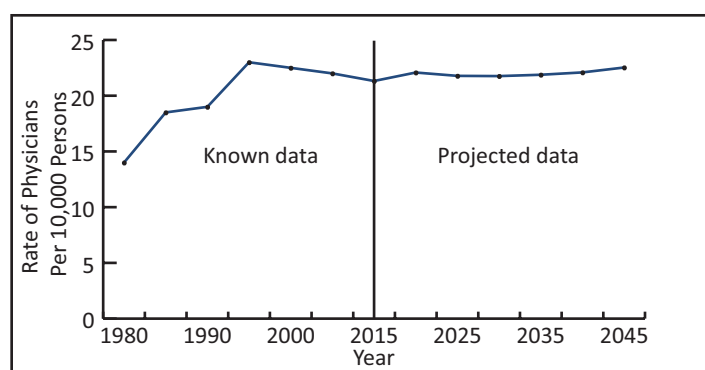


Figure 3.10. Projection of rate of physicians per 10,000 population assuming implementation of Healthcare Workforce Initiative, 2013.^{1, 2, 7, 8, 9, 10}

North Dakota's IMGs are more likely to practice in primary care (though less likely to practice in family medicine), the subspecialties of internal medicine, and psychiatry than other physicians (and less likely to practice in surgery and other specialties). As shown in Table 3.7, IMGs are more likely to practice in rural and micropolitan (large rural) counties of North Dakota than IMGs in the Upper Midwest and United States. Thus, they comparatively help strengthen the provider workforce in North Dakota's neediest regions. However, per 10,000 population, considering just North Dakota, IMGs are most likely to practice in metropolitan counties (9.8 IMGs per 10,000 population versus 4.9 and 1.6). Within North Dakota, the ratios between USMGs per 10,000 population and IMGs are metropolitan (2.64), micropolitan (2.14), and rural (2.69).

Projection of Physicians in North Dakota

If not for the HWI, the combination of the aging of the state's population, increased healthcare coverage, and the increase in the Oil Patch's population would result in the demand for physicians outpacing the supply. All other things being equal, if the population of North Dakota does not expand at an increased rate but at the slower historical rate, the rate of physicians per 10,000 population will increase slightly until 2020 and then remain stable through 2045. As shown in Figure 3.10, the standard projection of

population growth shows a relatively steady supply of physicians relative to the population (as shown in blue), but only if the HWI measures continue to be implemented in full. Full and continuing implementation of the HWI will help ensure that adequate healthcare delivery teams will be available throughout the state. Note that with the current North Dakota state government's financial shortage, two approved residencies are having their implementation delayed.

One important variable in projecting the future supply of physicians in North Dakota is when they decide to retire. Recent projections by IHS Inc. in conjunction with the Association of American Medical Colleges have shown a nearly 10% predicted difference in eventual workforce levels that occur if retirement is accelerated or delayed by as little as two years.¹¹ Because physician burnout and job dissatisfaction appear to be increasing (at least in part because of the burden of dealing with the electronic health record),¹² the frequency of early retirement may increase. The estimated average age of physician retirement at present is 67 years,¹¹ but it is uncertain that this will continue to be the case in the future. For example, over one-third of surveyed physicians have indicated that they plan to accelerate their retirement plans because of frustration with the healthcare system, but there is little evidence so far that they actually are doing so.¹¹ Nevertheless, it is possible that one-third (or even more) of all currently active physicians might retire within the next decade.¹¹ If this were to occur, it clearly would exacerbate the existing physician shortage and distribution problem.

SUMMARY

The supply of North Dakota physicians lags behind the nation, especially in rural counties (5.8 per 10,000 compared with 8 in other Upper Midwest states and 7.1 for the United States). Aging is a problem because more than half of North Dakota's physicians (58%) are 45 to 74 years old. Though a large proportion of North Dakota's physicians were IMGs and Canadian physicians (28%) in 2013, the state lacks large numbers of physicians from other states.

As the physician population in the state continues to age, a large number will be retiring and will need to be replaced. As the North Dakota population also ages, there will be an increased need for physician care. The Oil Patch's recent growth in population has the potential to reduce the number of physicians to serve people by nearly one-half. Continued low oil prices can potentially reduce this problem.

The supply of physicians within North Dakota is not only influenced by the above circumstances but by others external to it. U.S. medical schools are increasing their output of graduates, which should be helpful for filling the growing need for more physicians in North Dakota. However, there are trends that are changing the national and international playing field for North Dakota regarding its ability to attract more physicians. The eventual influence of the Affordable Care Act remains uncertain. With more demand across the country, more physicians produced by medical schools and residency programs will likely remain in their training states, and North Dakota could experience fewer physicians moving from those states and programs into North Dakota to practice. Likewise, the increases in the number of U.S. medical school graduates could reduce the numbers of IMGs from U.S. residency programs, and North Dakota may experience a reduction in the number of IMG physicians coming to North

Dakota to practice.

Thus, this is not time for a business-as-usual approach in the face of all the specifics addressed in this chapter. These influences are likely to lead to fewer physicians within North Dakota to serve its growing population and significant growing number of older adult citizens. North Dakota is vulnerable to various trends and circumstances over which it has little control. In the face of all this, it is critical that North Dakota continues to control its own fate by appropriately continuing to invest in and support the HWI to train healthcare professionals, including physicians, who will practice within North Dakota. Finally, it is important to provide opportunities for young adult North Dakotans to train to be physicians.

For more details on North Dakota's healthcare workforce, see the Center for Rural Health's Workforce Fact Sheet Series at www.ruralhealth.und.edu/publications/health-workforce-factsheets/archive.

References

1. U.S. Census Bureau. (2016). *Current Population Estimates Data*. Retrieved from <http://www.census.gov/popest/data>.
2. Medical Marketing Service. (2015). *AMA Physician Master File, 2015* (Data file). Wood Dale, IL: Medical Marketing Service.
3. U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions. (2015). *Area Health Resource File (AHRF)* (Data File). Retrieved from <http://datawarehouse.hrsa.gov/data/datadownload/ahrfdownload.aspx>.
4. U.S. Census Bureau. (2013). *Metropolitan and Micropolitan Statistical Areas and Definitions* (Data file). Retrieved from <http://www.census.gov/>.
5. Medical Marketing Service. (2013). *AMA Physician Master File, 2013* (Data file). Wood Dale, IL: Medical Marketing Service.
6. Becker, K. (2016). *Personal Communication*, October 11, 2016).
7. U.S. Census Bureau. (2015). *1980 Decennial Census* (Data file). Retrieved from <http://factfinder2.census.gov>.
8. U.S. Census Bureau. (2015). *1990 Decennial Census* (Data file). Retrieved from <http://factfinder2.census.gov>.
9. U.S. Census Bureau. (2015). *2000 Decennial Census* (Data file). Retrieved from <http://factfinder2.census.gov>.
10. U.S. Census Bureau. (2015). *2010 Decennial Census* (Data file). Retrieved from <http://factfinder2.census.gov>.
11. Association of American Medical Colleges. (2016). *The Complexities of Physician Supply and Demand 2016 Update: Projections from 2014 to 2025*. Retrieved from https://www.aamc.org/download/458082/data/2016_complexities_of_supply_and_demand_projections.pdf.
12. Shanafelt, T.D., Dyrbye, L.N., Sinsky, C., Hasan, O., Satele, D., Sloan, J., & West, C.P. (2016). Relationship Between Clerical Burden and Characteristics of the Electronic Environment With Physician Burnout and Professional Satisfaction. *Mayo Clinic Proceedings*. 91 (7), 836–848.

CHAPTER FOUR:

Primary Care and Specialty Physician Workforce in North Dakota

While Chapter 3 addressed aspects of the total North Dakota physician population, this chapter concentrates on primary care and specialist physicians separately. Primary care physicians are the foundation of the North Dakota healthcare delivery system, and access to them by all of North Dakota's population is an overarching goal. Of course, specialist physicians are critically important in their own right. In this *Report*, primary care physicians are defined as physicians in the specialties of family medicine, general internal medicine, and general pediatrics. Note that some use other definitions of primary care, most notably the inclusion of obstetricians/gynecologists (Ob/Gyns) since they are an important provider of healthcare to women. Primary care is sometimes referred to as generalist care (i.e., physicians who provide a broad scope of practice and who are usually the first medical care contact for patients with conditions and health concerns). While specialist physicians often provide some primary care services, they focus on specific medical areas (e.g., cardiology, otolaryngology, and neurosurgery). Some specialists are much more likely to provide components of generalist care (e.g., pulmonology, rheumatology, general surgery, and Ob/Gyn) than others (e.g., dermatology, ophthalmology, and urology). For instance, as important as Ob/Gyn physicians are to women's healthcare, they seldom treat many of women's common generalist care health problems such as broken bones, rashes, sprains, upper respiratory infections, earaches, and high blood pressure.

PRIMARY CARE PHYSICIANS

Demographics

Of the 609 primary care physicians practicing in North Dakota in 2015, 59.1% (360) are family physicians, 26.9% (164) are general internists, and 14% (85) are general pediatricians.¹ The North Dakota population per primary care physician is shown in Figure 4.1. There are no primary care physicians in 14 counties whose combined population is more than 35,941.^{1,2} Counties with greater than 2,500 people per physician may be experiencing the influences of primary-care-physician shortages. Even population-per-primary-care-physician rates below this level are frequently characterized as having primary-care-physician shortages because of travel distances to alternative care and high needs for care (e.g., high numbers of elderly).

Table 4.1 shows the percentage of primary care physicians broken down by sex, hospital-based practice, and international medical graduate (IMG) status. Of the 609 primary-care, direct-patient-care physicians practicing in North Dakota, 66.5% are located in metropolitan counties, 19.1% in micropolitan (large rural) counties, and 14.5% in rural counties. Rural counties have a lower percentage of physicians who are female than metropolitan and micropolitan (large rural) counties (i.e., 30.7% rural versus 34.5% micropolitan, and 37.3% metropolitan), though the differences are not large. The differences in the percentages of hospital-based practice by metropolitan status vary little, from 21.7% in metropolitan counties to 19.3% in rural counties. As shown in Table 4.1, the percentage of North Dakota physicians who are IMGs varies little by metropolitan status (19.8% up to 27.7%). In North Dakota, 25.5% of all primary-care, patient-care physicians are IMGs, with an additional 3.3% receiving their medical degrees in Canada (i.e., approximately 1 in 4 practicing primary care physicians did not graduate from a U.S. medical school).

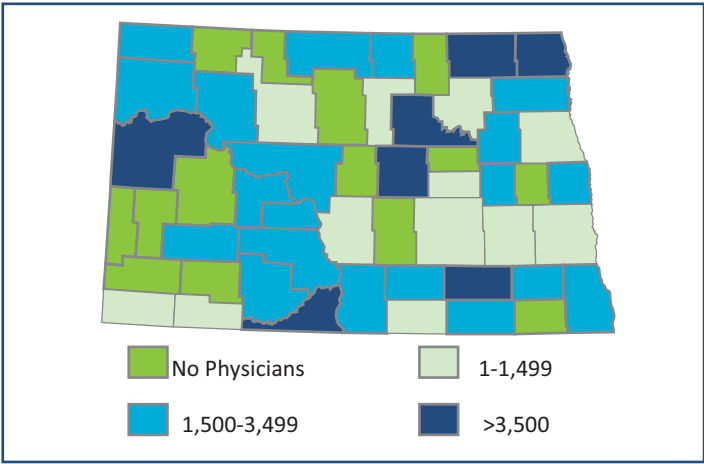


Figure 4.1. Population per primary care physician in North Dakota, 2015¹

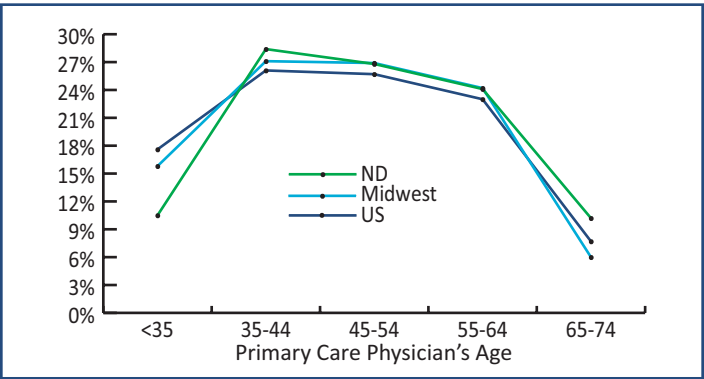


Figure 4.2. Percentage of primary care physicians by different age categories for North Dakota, other Upper Midwest states, and the United States, 2015^{1,3}

Table 4.1
Number and percentage of primary care physicians in North Dakota who are female, have hospital-based practices, or are IMGs, 2015.^{1,3}

	N	Total	Female	Hospital Based Practice	IMG
Total	609		35.8	20.2	25.5
Metro	405	66.5	37.3	21.7	27.7
Micro	116	19.1	34.5	15.5	19.8
Rural	88	14.5	30.7	19.3	22.7

A comparison of the age structure of North Dakota's primary care physicians compared with those of the Upper Midwest states (Iowa, Minnesota, Montana, Nebraska, South Dakota, Wisconsin, and Wyoming) and the United States is depicted in Figure 4.2. North Dakota's primary care physicians are slightly less likely than those in the two comparison groups to be in the youngest age category.

The age distribution of North Dakota primary care physicians is shown by metropolitan status in Table 4.2. The percentage of primary care physicians for rural-designated counties is dramatically higher for the 65–74 age category than for the micropolitan (large rural) and metropolitan county categories (18.2% versus 10.3% and 8.4%, respectively). The micropolitan

Table 4.2

Percentage of primary care physicians in North Dakota by age category and the three metropolitan/nonmetropolitan categories, 2015.^{1,3}

	N	<35	35-44	45-54	55-64	65-74
Total	609	10.5	28.4	26.8	24.1	10.2
Metro	405	10.9	30.9	29.4	20.5	8.4
Micro	116	12.1	24.1	21.6	31.9	10.3
Rural	88	6.8	22.7	21.6	30.7	18.2

- Primary care physicians in North Dakota are younger than primary care physicians in the rest of the country.

(large rural) and metropolitan county categories are similar in their age structures. Rural counties have the lowest percentages of physicians in the less than 35 and 35–44 age categories. The implication of this finding is the susceptibility of the rural counties of North Dakota to the impending retirement of a relatively large portion of their primary-care-provider workforce. Similarly, the small number of younger physicians, especially those under 35 years of age, in the rural counties indicates the difficulty of attracting recent graduates to North Dakota's counties designated *rural* per the Office of Management and Budget geographic county taxonomy.

Primary Care Physician Workforce

The ratio of primary care physicians (with residents included; residents are medical graduates who are undergoing a period of advanced intensive training in their medical specialty before independent practice as a physician) in North Dakota per 10,000 population is a little lower than for the Upper Midwest and a little higher than for the United States (Figure 4.3). The practicing-primary-care-physicians-per-10,000-population ratio are North Dakota (7.9), Upper Midwest (8.1), and United States (7.6).

As can be seen from Figure 4.4, across North Dakota, the Upper Midwest, and the United States, the practicing-primary-care-physician-to-10,000-population ratios are lower for rural counties. For metropolitan counties, North Dakota's rate per 10,000 population is meaningfully higher than for the Upper Midwest and United States (30% and 44.4% higher). North Dakota micropolitan counties have about the same practicing-primary-care-physicians-per-10,000-population ratio as is true for the Upper Midwest (7.5 versus 7.6) and a higher ratio than for the United States (7.5 versus 6.1). Regarding rural counties, North Dakota trails the Upper Midwest (3.9 versus 5.3 physicians per 10,000 population) and slightly trails the United States (3.9 versus 4.1).

North Dakota has only a slightly higher percentage of its direct-patient-care primary care physicians practicing in office-based practice as in the Upper Midwest and in the United States as a whole (7.9 per 10,000 population in North Dakota versus 7.7 in the Upper Midwest and 7.4 in the United States [Table 4.3]). North Dakota has a slightly higher percentage of its primary care physicians practicing in hospital-based practice than in the two geographic comparison groups. By rural or urban status, the ratios for all three groups generally are lower as the counties become more rural.

Table 4.4 shows the practicing-primary-care-physician-per-10,000-population ratio for North Dakota compared with the Upper Midwest and United States by age and geographic

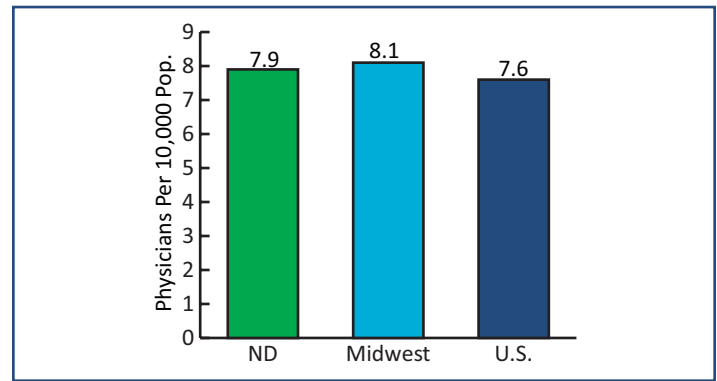


Figure 4.3. Primary care physicians per 10,000 population in North Dakota, the Upper Midwest, and the United States, 2013.^{2,4}

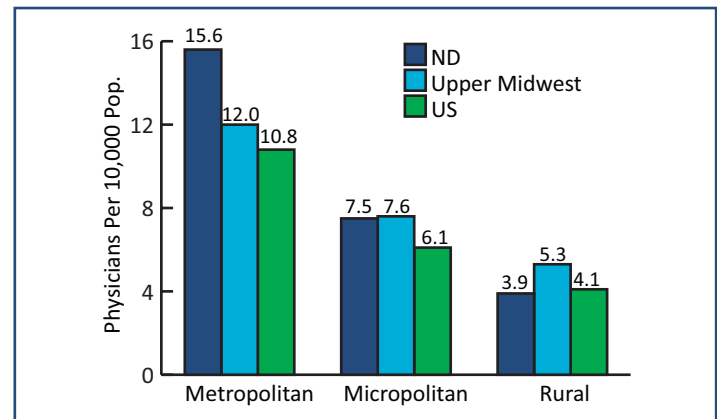


Figure 4.4. Primary care physicians per 10,000 population in North Dakota, the Upper Midwest, and the United States by the three metropolitan/nonmetropolitan categories, 2013.^{2,3,4}

Table 4.3

Primary care physicians primarily in office- or hospital-based practices per 10,000 population in North Dakota compared with Upper Midwest states and the United States by the three metropolitan/nonmetropolitan categories, 2013.^{2,3,4}

	ND	Upper Midwest	U.S.
Office	7.9	7.7	7.4
Metro	11.4	8.8	7.9
Micro	5.6	6.5	5.1
Rural	3.5	4.6	3.6
Hospital	1.1	0.8	0.7
Metro	1.9	0.9	0.8
Micro	0.6	0.7	0.6
Rural	0.3	0.5	0.4

rural and urban status categories. Overall, North Dakota has comparatively more primary care physicians in the less than 35 and the 35–54 age categories, and fewer or the same in the older age categories (e.g., North Dakota 55–64: 2.2 versus 2.4 and 2.3).

The pattern by age categories for North Dakota counties, the Upper Midwest, and United States by metropolitan, micropolitan, and rural has higher primary-care-physician-per-10,000-population rates for metropolitan followed by micropolitan followed by rural for each of the geographic groups (the only exception being that North Dakota's rates for micropolitan [0.3]

Table 4.4

Primary care physicians of different age categories per 10,000 population in North Dakota compared with Upper Midwest states and the United States by the three metropolitan/nonmetropolitan categories, 2013.^{2,3,4}

	ND	Upper Midwest	U.S.
<35	2.4	1.6	1.7
Metro	3.6	2.2	1.9
Micro	2.0	0.8	0.6
Rural	0.5	0.4	0.3
35-44	2.8	2.6	2.5
Metro	4.4	3.1	2.7
Micro	1.6	1.7	1.4
Rural	0.8	1.2	0.9
45-54	2.4	2.6	2.4
Metro	3.5	3.0	2.6
Micro	1.4	2.1	1.6
Rural	1.1	1.5	1.1
55-64	2.2	2.4	2.3
Metro	3.0	2.7	2.4
Micro	2.0	2.2	1.8
Rural	1.0	1.6	1.3
65-74	0.7	0.8	0.9
Metro	1.0	0.8	0.9
Micro	0.3	0.8	0.6
Rural	0.4	0.5	0.5
75+	0.1	0.1	0.2
Metro	0.1	0.1	0.2
Micro	0.1	0.1	0.1
Rural	0.2	0.0	0.1

and rural [0.4] in the 65–74 age group do not follow the pattern, though the exception is trivial [Table 4.4]). The rates of primary care physicians are much higher for metropolitan for North Dakota, the Upper Midwest, and United States than for rural (e.g., the North Dakota rate for 35–44-year-old primary care physicians is 4.4 in metropolitan counties compared with 0.8 for rural counties. Metropolitan is 450% higher than rural.

The federal Bureau of Primary Health Care (BPHC), in collaboration with North Dakota's Primary Care Office at the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) designates primary-care-health-professional-shortage areas (HPSAs). Geographic areas and facilities (including Indian Health Service, community health, and rural health clinics) can be designated under federal criteria if an application is submitted and approved. Being designated as a HPSA provides benefits regarding various federal programs. All or part of 51 of North Dakota's 53 counties are so designated, which is indicative of serious primary-care shortages within North Dakota.⁵

Background of North Dakota Primary Care Physicians

In many ways, the background of North Dakota's patient-care primary care physicians is similar to that of the physician workforce overall in North Dakota, although the contributions of the UND SMHS and residencies are even more prominent. Four out of 10 (41.8%) primary care physicians in North Dakota graduated from its medical school (Figure 4.5). Nearly half (46%) of North Dakota's primary care physicians obtained their residency training from a residency program based in North

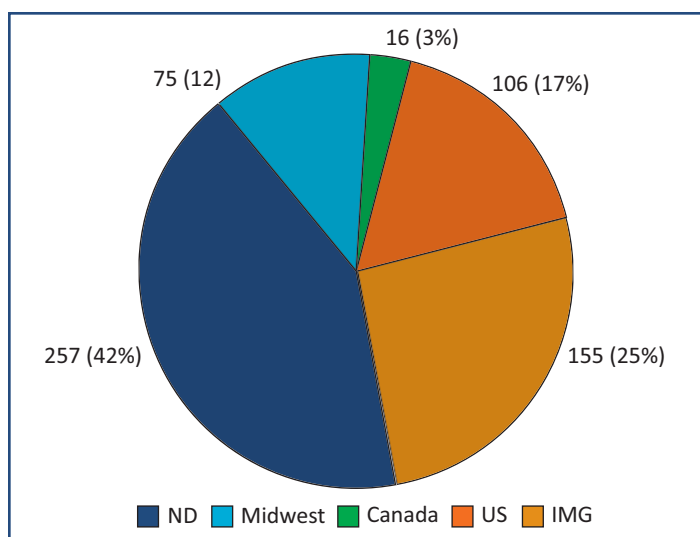


Figure 4.5. Locations where North Dakota primary care physicians graduated from medical school, 2015¹

- North Dakota's primary care physicians graduated from medical schools from all over the United States and the world.
- UND SMHS graduates account for 42% of practicing primary care physicians in North Dakota.
- IMGs account for 25% and Canadian medical school graduates account for 3% (combined 28%) of North Dakota's practicing primary care physicians.
- The rest of the Midwest states account for 12% while the rest of the United States accounts for 17% (combined 29%) of North Dakota's primary care physicians.

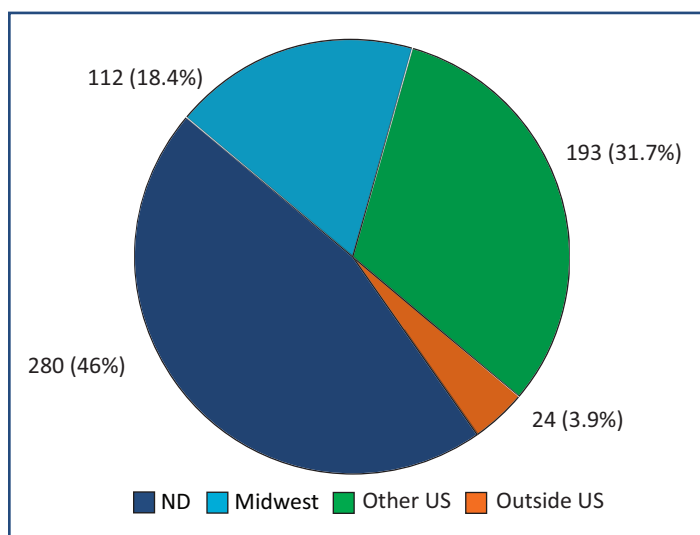


Figure 4.6. Locations where North Dakota primary care physicians did their residency, 2015¹

- Nearly half (46%) of North Dakota's currently practicing primary care physicians did their residency training in North Dakota.
- Primary care physicians who graduated from residency programs outside of North Dakota come from the Midwest (18.4%), other United States (31.7%), and Canada and other foreign (3.9%).

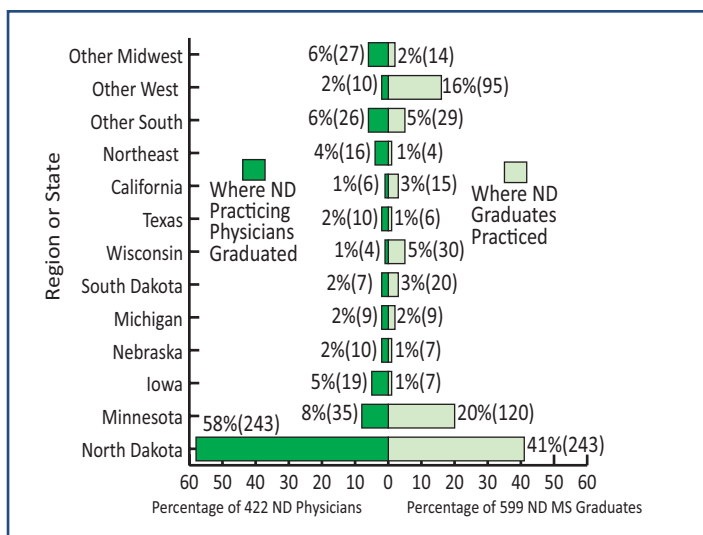


Figure 4.7. Percentage of North Dakota primary care physicians who graduated from different states and where North Dakota physicians who graduated from the UND SMHS currently practice (not including IMGs), 2013⁶

Dakota (see Figure 4.6). Taking the locations of both medical school and residency training into account, more than half (61%) of the primary care physicians currently practicing in North Dakota received one or both types of training within North Dakota (not shown in figures).

Another way that physician supply is often expressed is through population-per-primary-care-physician ratios, which greatly vary across metropolitan, micropolitan, and rural geographic categories. The ratio in 2013 was 2,176 for rural counties, 1,526 for micropolitan (large rural) counties, and 931 for metropolitan counties. North Dakota rural counties have greater than twice the population-per-primary-care-physician ratio than is true in metropolitan counties, which are Burleigh, Cass, Grand Forks, and Ward. When long travel times are considered in the rural areas of North Dakota, these differences are meaningful examples of the disparities in geographic distribution of population-per-primary-care physician, with it being twice as high in rural counties versus metropolitan counties. This is an underestimate of the maldistribution because the rural areas have proportionally more of the elderly who require more primary care. Within the urban areas, the greater number of specialists also provide some generalist/primary-care physician services.

In Chapter 3, all of North Dakota's direct-patient-care physicians were discussed in relation to 1) where UND SMHS medical student graduates practice by state, and 2) where physicians practicing in North Dakota graduated from out-of-state medical schools. Similarly the state's direct-patient-care physicians were discussed in relation to 1) where those who completed residencies in North Dakota are practicing by state, and 2) where physicians practicing in North Dakota completed out-of-state medical residencies. Those analyses and associated figures are modified here to only deal with direct-patient-care primary care physicians.

Figure 4.7 shows the states from which North Dakota's primary care physicians graduated from medical school on the left side, and where past graduates of North Dakota's medical school now practice on the right side. This analysis permits a

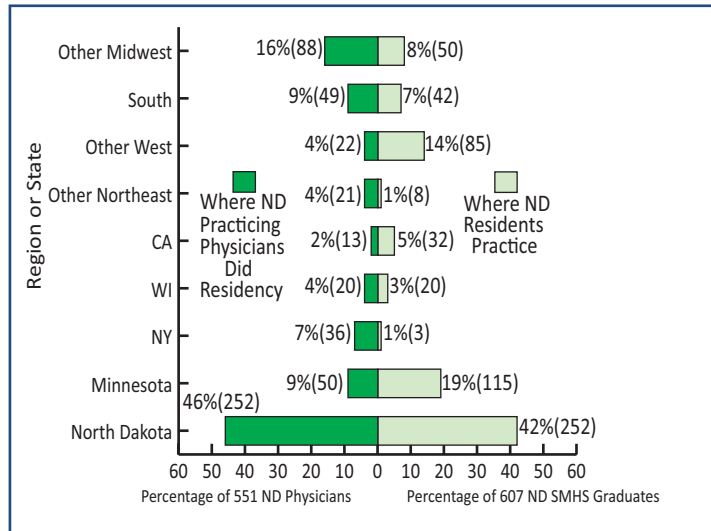


Figure 4.8. Percentage of North Dakota primary care physicians who did residencies in different states and where North Dakota physicians who did residency at UND are currently practicing, 2013⁶

comparison of physician migration patterns.

The balance of migration into and out of North Dakota by primary care physicians based on medical school state location varied widely with respect to where the physicians were practicing. This can be thought of as an "interstate balance of trade" in medical school training and practice destination. North Dakota is a net physician exporter (i.e., more North Dakota SMHS primary care graduates are practicing in other states than other states' primary care graduates are practicing in North Dakota). Specifically, 356 UND SMHS medical school graduates who are practicing as primary care physicians practice outside North Dakota versus 179 graduates of medical schools outside of North Dakota who are practicing primary care within North Dakota (a -177 difference to North Dakota's disadvantage).

There is great variation in the balance of graduates' state of medical school training versus graduates' practice state balances. The largest differences in other-state-to-North-Dakota net flows that favor other states are Minnesota (i.e., 35 Minnesota graduates practicing in North Dakota and 120 UND SMHS graduates practicing in Minnesota: net -85 to North Dakota's disadvantage); Wisconsin (-26); and South Dakota (-13).

Some of the explanation for this relatively large outflow of UND SMHS physician-graduates is that graduates of UND who want to specialize in anything other than family medicine, internal medicine, psychiatry, surgery or transitional have to go out of state for their residencies because the specialty residency program they choose does not exist within North Dakota (e.g., cardiology), and they tend to stay where they complete their residency programs. A few state comparisons favor North Dakota. For instance, 19 medical school graduates from Iowa practice in North Dakota, while only seven UND SMHS graduates practice in Iowa (+12).

Of the 422 U.S. medical graduates (USMGs) practicing primary care in North Dakota (excluding IMGs), 243 (57.6%) graduated from the UND SMHS. If IMGs are included in the calculations (159), the UND SMHS market share of practicing primary care physicians decreases from 57.6% to 41.8% using 2013 data.

An important predictor of eventual practice location is where

physicians obtain their residency training (others include location of medical school, where they grew up, and geographic origin of spouse when applicable), since many physicians start practicing in the general vicinity of where they completed their post-medical-school residency training. Figure 4.8, using 2013 data, shows the states where North Dakota's practicing physicians completed their residency training on the left side, and where graduates of North Dakota's residency programs now practice (right side).

Note the effect of North Dakota residencies—nearly two-thirds (60.5%) of graduates from these residencies practice in North Dakota or Minnesota. Given how easily patients can cross the North Dakota/Minnesota border for care, many of the Minnesota physicians are treating North Dakota patients. For example, the Sanford Health Clinic in East Grand Forks, while located in Minnesota, provides healthcare services to many patients from just across the Red River of the North who live in Grand Forks and the surrounding counties in North Dakota.

Of 2013's 551 practicing North Dakota primary care physicians, 252 (45.7%) completed their residency within North Dakota while 299 (54.3%) did not.

North Dakota is a net importer of other states' residency graduates. Of the 607 total North Dakota-trained residency graduates who are practicing, 355 (58.5%) practice in other states and 252 (41.5%) practice in North Dakota. The overall North Dakota residency graduate "interstate balance of trade" with other states is -56 (299 physicians with no North Dakota residency training are practicing in North Dakota while 355 North Dakota residency graduates are currently practicing out of state). Regarding Minnesota and North Dakota, the residency "interstate balance of trade" bottom line is -65 in Minnesota's favor (i.e., 50 physicians who completed their residency training in Minnesota are practicing in North Dakota while 115 physicians who completed North Dakota residency training are practicing within Minnesota). The largest of the net differentials for other states are New York (+33) and California (-19). Only 31 North Dakota primary care physicians did not complete a residency within the United States (not included in Figure 4.8 as they only represent 5.3% of North Dakota's primary care physicians).

Of North Dakota's total primary care physicians in 2015, 47.8% completed residency training in North Dakota. Of North Dakota's total patient-care primary care physicians (including IMGs), 42.2% received their medical degree from the UND SMHS. Considering both North Dakota residency graduates and UND SMHS medical school graduates who either completed a residency in North Dakota or received their medical degree from the UND SMHS or both, 60.8% of North Dakota primary care physicians (including IMGs) received at least some of their training in North Dakota.

Medical school graduates who complete general internal medicine residency programs generally go on to practice general internal medicine (primary care) or enter internal medicine subspecialty residencies. Nationally, 35% go on to practice general internal medicine (and hospital medicine) and 65% enter an internal medicine subspecialty fellowship (i.e., pulmonology, endocrinology, cardiology, gastroenterology, hepatology, hematology/oncology, nephrology, rheumatology, allergy/immunology, infectious disease, or geriatrics) and practice in those subspecialties.⁷ General internal medicine physicians practice primary care, but it varies somewhat from the scope of practice of family physicians. For instance, generally, family

physicians are much more likely to include care related to pregnancy and delivery, infants and children, and orthopedics than general internists. General internists are more likely than family physicians to provide care related to the list of internal medicine subspecialties listed earlier in this paragraph and see proportionately more elderly patients.

A recent trend is for general internists to become hospitalists. Hospitalists practice in hospitals and assume the responsibility for coordinating and providing hospital inpatient care (and often also work in hospital outpatient departments). About three-quarters of America's hospitalists were trained as internists. It is estimated that nearly 20%–30% of general internists currently practice as hospitalists. Hospitalists are generally not considered primary care physicians. Thus, the best present guess is that less than 10% of physicians who complete a residency in general internal medicine become true primary care physicians. While it is too early to tell what all the consequences of hospitalist growth will be and when growth will level off, it is clear that it is resulting in reductions in the nation's number of primary care physicians.

Of the North Dakota general internal medicine residency graduates, 30.5% (89) are practicing within North Dakota, and 69.5% (203) are practicing elsewhere in the United States. Of the physicians who completed North Dakota general internal medicine residencies, 55.8% (163) are practicing as primary care physicians and 44.2% (129) as subspecialists. The percentage of North Dakota general internal medicine residency graduates (55.8%) in primary care compares very favorably with the national percentage of 35%, if the goal is to produce primary care physicians. It is not known how many of these practicing general internists are hospitalists.

Of the practicing physicians who completed a general internal medicine residency in North Dakota (292), 163 practice in primary care (66 in state and 97 out of state) and 129 practice as subspecialist internists (23 in state and 106 out of state). Thus, out of the 292 practicing North Dakota general internal medicine residency graduates, 66 (22.6%) currently practice in primary care and 23 (7.9%) are internist subspecialists practicing within North Dakota. The most frequent subspecialties practicing in North Dakota are nephrology (5) and infectious disease (4). The most frequent out-of-state subspecialists are practicing in nephrology (13), hematology/oncology (12), cardiovascular disease (11), and endocrinology (9).

Nearly two-thirds (64%) of practicing internists in North Dakota are IMGs (36% are USMGs). Of the 187 physicians who completed a North Dakota general internal medicine residency who were IMGs, only 39 (20.9%) practice in North Dakota, with 148 (79.1%) practicing out of state. Of the 105 USMG North Dakota residency practicing primary care physicians in North Dakota, 50 (47.6%) practice in North Dakota, with 55 (52.4%) practicing out of state. IMGs and USMGs who complete a North Dakota general internal medicine residency are more likely than family physicians to practice in metropolitan counties than in micropolitan and rural counties.

SPECIALTY PHYSICIANS

Demographics

As can be seen in Figure 4.9, most of North Dakota's practicing specialists are located in Fargo, Bismarck, Grand Forks, and Minot, along Interstate 94 and Highway 2. Given the specialist geographic distribution and the generally low numbers

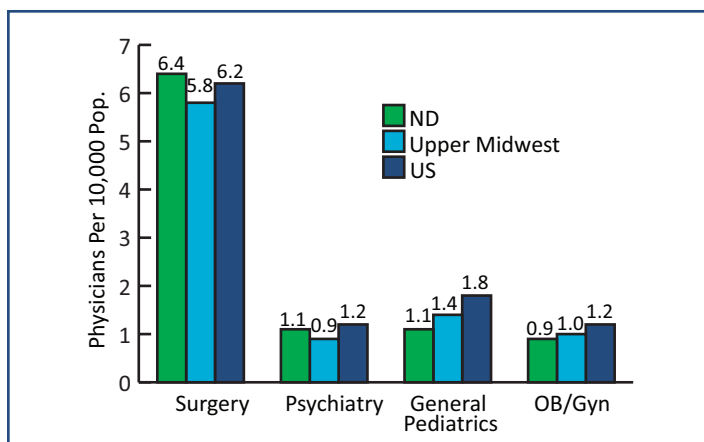


Figure 4.10. Surgeons, psychiatrists, general pediatricians, and Ob/Gyns per 10,000 population in North Dakota compared with other Upper Midwest states and the United States, 2013^{2, 3, 4}

Table 4.7

Specialty physicians per 10,000 population in North Dakota compared with Upper Midwest states and the United States by the three metropolitan/nonmetropolitan counties, 2013.^{2, 3, 4}

	ND	Upper Midwest	U.S.
Surgery	6.3	5.9	6.4
Metro	9.9	7.2	6.9
Micro	4.6	4.7	3.9
Rural	1.1	1.7	1.6
Psychiatry	0.9	0.9	1.2
Metro	1.6	1.1	1.3
Micro	0.5	0.5	0.5
Rural	0.1	0.2	0.2
Gen Peds	1.1	1.4	1.8
Metro	1.8	1.9	2.0
Micro	0.8	0.9	0.9
Rural	0.1	0.2	0.4
Ob-Gyn	0.9	1.0	1.2
Metro	1.3	1.3	1.3
Micro	1.0	0.8	0.7
Rural	0.1	0.2	0.3

versus 1.2 per 10,000 population).

The specialists-per-10,000-population ratios by rural or urban status for 2013 are shown in Table 4.7. Across North Dakota and for each specialty, the rural counties have lower ratios than the micropolitan (large rural) and metropolitan counties. For instance, for general pediatricians, the rural counties have 6% of the amount of metropolitan areas, and micropolitan (large rural) counties have 44% of the amount of metropolitan areas. When North Dakota is compared with the Upper Midwest and the United States, it has about the same supply of physicians for general surgery and Ob-Gyns, except North Dakota rural counties have significantly lower ratios. For psychiatry, North Dakota has a higher ratio for metropolitan and the same ratio for micropolitan (large rural) counties, while it has a slightly lower ratio for the rural counties. For general pediatricians, there are mixed results, though it is clear for North Dakota that the more urbanized a county, the higher the overall ratio.

Regarding specialist residency training, as anticipated, those UND SMHS medical school graduates who completed their specialist residency training within North Dakota (i.e., there was an in-state residency program available and they were accepted into it) were much more likely to currently practice in North Dakota than those who did their residency out-of-state—just as was true for primary care physicians. For example, 71 UND SMHS medical school graduates did their residencies in psychiatry (15 in state and 56 out of state). Eighty percent of the in-state, residency-trained psychiatrists currently practice in North Dakota, while only 14.3% of the out-of-state, residency-trained psychiatrists practice in North Dakota. For those UND SMHS graduates who chose a specialty that did not have a residency in North Dakota, they were significantly less likely to return to practice in North Dakota. For instance, 139 UND SMHS graduates did their residency training in Ob-Gyn out of state, and only 26% (36/139) currently practice in North Dakota. The percentages for the next five most common analogous out-of-state specialty residencies (i.e., no internal North Dakota specialty residency opportunities) are radiology (29% [27/92]), anesthesiology (24% [15/63]), orthopedics (45.2% [19/42]), dermatology (41.7% [10/24]) and ophthalmology (42.9% [9/21]).

SUMMARY

Most of North Dakota's population is located within a federally designated shortage area for primary care. About 1 in 20 people live in a county that does not have primary care physicians. Primary care physicians are more likely to be female in metropolitan counties. In rural counties, practicing primary care physicians are more likely to be older. In 2015, there were 609 direct-patient-care primary care physicians in North Dakota (i.e., 360 family medicine, 164 general internal medicine, and 85 general pediatrics). North Dakota has a slightly lower ratio of primary care physicians to population than other Midwest states but a slightly higher ratio than the United States when resident-physicians are included in the comparison. More than half (61%) of all primary care physicians in North Dakota graduated from the UND SMHS or completed a residency in North Dakota or both.

Of North Dakota's total primary care physicians (including IMGs) in 2015, 47.8% completed residency training in North Dakota. Of North Dakota's total patient-care primary care physicians (including IMGs), 42.2% received their medical degree from the UND SMHS. Considering both North Dakota residency graduates and UND SMHS medical school graduates who either completed a residency in North Dakota or received their medical degree from the UND SMHS or both, 60.8% of North Dakota practicing primary care physicians (including IMGs) received at least some of their training in North Dakota.

Of the practicing physicians who completed a residency in North Dakota (292), 163 practice in primary care (66 in state and 97 out of state) and 129 practice as subspecialist internists (23 in state and 106 out of state). Thus, out of the 292 practicing North Dakota general internal medicine residency graduates, 66 (22.6%) currently practice in primary care and 23 (7.9%) are internist subspecialists practicing within North Dakota (most frequent subspecialties practicing in North Dakota are nephrology [5] and infectious disease [4]). The most frequent out-of-state subspecialists are practicing in nephrology (13), hematology/oncology (12), cardiovascular disease (11), and endocrinology (9).

In 2015, there were 109 general surgeons, 78 psychiatrists, 85 pediatricians, and 64 Ob-Gyns in North Dakota. As with other physicians in North Dakota, these specialists are generally more likely to be older, male, IMGs, and in hospital-based practice when compared with other Midwest states and the United States. North Dakota also has lower ratios of general pediatricians and Ob-Gyns per 10,000 population than the comparison groups. North Dakota has about the same ratio of psychiatrists as the other states.

Nearly two-thirds of the psychiatrists (67.5%) work in the eastern part of the state along Interstate 29; North Dakota is slightly behind in rural counties for the ratio of psychiatrists compared with other states. The availability of general pediatrics in North Dakota is slightly lower in metropolitan counties and the same in micropolitan counties compared with the Upper Midwest and United States. North Dakota's rural counties have slightly fewer general pediatricians than are present in the Upper Midwest and United States. North Dakota has near the national average of primary care IMGs per 10,000 population.

There are many factors that continue to have significant influences on North Dakota's supply of physicians, both in primary care and specialist care. Many of these changes are beyond the direct control of North Dakota. Changes in demand for physician services may disrupt historical workforce supply from one state's medical schools and residency programs to practice sites within other states. Factors such as where graduates grew up and which communities have the desired amenities may play a stronger role in location decisions than they have in the past. The aging of North Dakota's population and physicians, and the population growth of the western Oil Patch, are sure to play important roles. In addition, the availability of generalist physician assistants and nurse practitioners will also play a role in North Dakota's primary-care access, as will be discussed in Chapter 5.

For more details on North Dakota's healthcare workforce, see the Center for Rural Health's Workforce Fact Sheet Series at www.ruralhealth.und.edu/publications/health-workforce-factsheets/archive.

6. Medical Marketing Service. (2013). *AMA Physician Master File, 2013* (Data file). Wood Dale, IL: Medical Marketing Service.
7. Hart L.G. (Personal communication with Dr. Scott Shipman, Association of American Medical Colleges, October 21, 2016).

References

1. Medical Marketing Service. (2015). *AMA Physician Master File, 2015* (Data file). Wood Dale, IL: Medical Marketing Service.
2. U.S. Census Bureau. (2016). *Current Population Estimates Data*. Retrieved from <http://www.census.gov/popest/data>.
3. U.S. Census Bureau. (2013). *Metropolitan and Micropolitan Statistical Areas and Definitions* (Data file). Retrieved from <http://www.census.gov/>.
4. U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions. (2015). *Area Health Resource File (AHRF)* (Data File). Retrieved from <http://datawarehouse.hrsa.gov/data/datadownload/ahrfdownload.aspx>.
5. University of North Dakota School of Medicine and Health Sciences. (2014). *North Dakota Health Professional Shortage Areas*. Retrieved from www.med.und.edu/family-medicine/hpsa.pdf

CHAPTER FIVE:

Nonphysician Healthcare Workforce in North Dakota

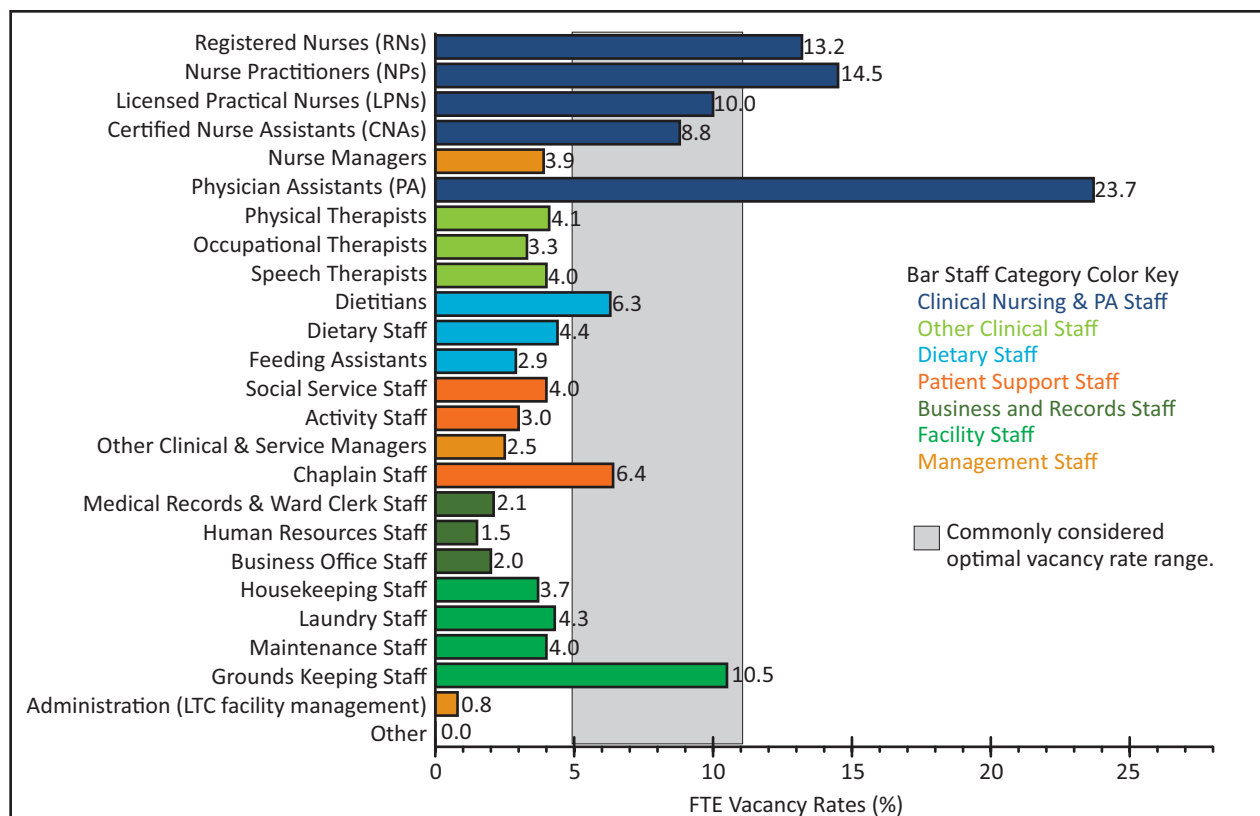


Figure 5.1. Statewide Nursing Facility Workforce FTE Vacancy Rates¹

Note: These vacancy rates are not averages of nursing facility rates (means of means) but are the rates using the overall category number of vacancies and employed providers (essentially weighting these rates by FTE hospital employment counts).

Optimal care of patients depends on a team of healthcare providers. Although previous service delivery models typically had a physician as the center of the healthcare effort, it is clear that better and less expensive care is provided by a robust team of collaborating professionals, with team members providing input and expertise from their disciplines. This chapter briefly addresses many of these provider types.

For this *Fourth Biennial Report*, the *North Dakota Nursing Facility Workforce Survey* was performed. It provides new information on many aspects of the rural and urban nursing facility workforce as of September 2016. For the *Third Biennial Report*, the *North Dakota Hospital Workforce Survey* was performed. It provided new information on many aspects of the rural and urban hospital workforce during September 2014.

In this chapter, the results of the *North Dakota Nursing Facility Workforce Survey* and the *North Dakota Hospital Workforce Survey* are presented, and then select nonphysician healthcare workforce data are addressed separately. Future editions of the *Biennial Report* will expand on these provider types and add additional provider types and new survey information.

NORTH DAKOTA NURSING FACILITY WORKFORCE SURVEY

In September 2016, the Center for Rural Health, in collaboration with the North Dakota Long Term Care Association, performed a workforce survey of all of North Dakota's nursing facilities. Center for Rural Health staff modeled the questionnaire after one previously used in the state of

Washington. The questionnaire was modified based on feedback from North Dakota nursing facility chief executive officers (CEOs), North Dakota Long Term Care Association staff (i.e., CEO Shelly Peterson and Executive Assistant Carol Ternes), and Center for Rural Health staff. The questionnaires were sent to all 81 rural and urban nursing facility CEOs who met the eligibility criteria. All 81 CEOs were asked to participate by filling out a mailed paper workforce questionnaire. The questionnaire included 20 questions, one of which involved asking for staffing information (e.g., number of full-time equivalent internal employees and contract employees, longest vacant position by employee types, and difficulty in recruiting by employee type for 24 nursing facility employee types). Other questions inquired about CEO turnover, employee turnover rates, difficulty recruiting and retaining nurses, external service contracting, and overtime and salary information. The data included in this report are for 95.1% of the nursing facility locations (77 of 81 locations).

Limitations

While the findings from the 2016 *North Dakota Nursing Facility Workforce Survey* tell us much about the nursing facility workforce, they may not be generalizable to all of North Dakota's providers (e.g., those registered nurses [RNs] working in short-term hospitals, physician clinics, and so forth). Caution should be taken in interpreting the data findings because some vacancy rates are based on relatively small numbers of employees (e.g., regional rates for employee types that are not numerous even at the state level). For example, regional (e.g., southwest) and rural/urban vacancy rates for NPs and PAs should be viewed with caution

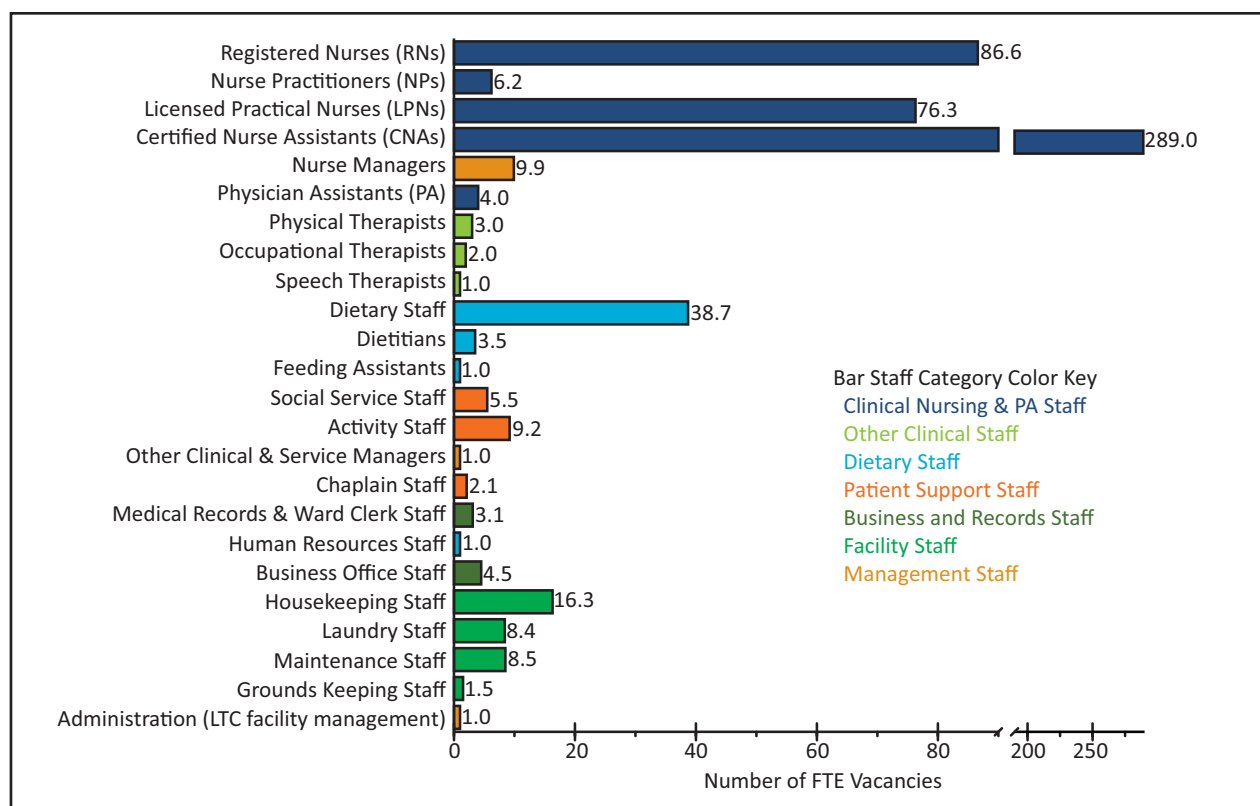


Figure 5.2. Statewide Nursing Facility Workforce FTE Vacancies by Position Type¹

because the North Dakota nursing facilities only employ 36.7 full-time equivalents (FTEs) of nurse practitioners (NPs), 12.9 FTEs of physician assistants (PAs), 24.2 FTEs of speech therapists, 34.1 FTEs of feeding assistants, 28.8 FTEs of other clinical and service managers, 20.5 FTEs of chaplain staff, and 12.8 FTEs of grounds keeping staff. Rates based on these small numbers (and worse yet, on subdivisions of these numbers) may be misleading, but they do represent close to the North Dakota population of such nursing facility staff and vacancies.

Employees' information was requested as FTEs. Generally, this means that an FTE of 1.0 represents an employee working 40 hours a week. The actual number of individuals working for the nursing facility will be higher than the FTE count reported. For example, if two RNs are each working 20 hours a week (0.5 FTE each), it would work out to one FTE, while the number of unadjusted individual employees would be two.

Many internal and external factors influence vacancy rates. For instance, a nursing-facility-employee-type vacancy rate is influenced by the salaries that other nursing facilities pay and the salaries being paid by other types of healthcare entities, which in turn influence the abundance and shortage of specific employee types along with many other factors. If a facility unsuccessfully recruits for a specific type of employee for an extended length of time, the facility may stop recruiting for the position and limit its services. This situation can result in misleadingly low vacancy rates.

Survey Findings

North Dakota's September 2016 statewide vacancy rates for 24 nursing-facility employee types are presented in Figure 5.1. The statewide rates are calculated by dividing the FTEs currently being recruited for by the sum of the FTEs currently

being recruited plus the currently employed FTEs for each provider type. In Figure 5.1, the provider type bars are color-coded by their categories (e.g., dark blue for clinical nurses and physician assistants). The gray area in the graph indicates those vacancy rates that are commonly considered optimal rates (5%–11%). Generally, vacancy rates between 11% and about 20% are considered somewhat high, and those 21% and above are considered high. Rates below 5% can indicate a tight and balanced labor market situation.

As can be seen in Figures 5.1 and 5.2, only a few vacancy rates for clinical staff are 8% or greater: PAs (23.7%), NPs (14.5%), RNs (13.2%), licensed practical nurses (LPNs; 10%), and certified nurse assistants (CNAs; 8.8%). These vacancy rates translate into the following number of FTE vacancies: PAs (4.0), NPs (6.2), RNs (86.6), LPNs (76.3), and CNAs (289.0). Clearly, the large number of CNA, RN, and LPN vacancies are critical to the clinical care of nursing facilities. Furthermore, the nursing facility CEOs were asked about the duration in months of their longest vacant position for which they were recruiting at the time of the survey for each of the 24 employment types (e.g., CNAs). The longest open vacancies of the employee categories were six months for RN followed by LPN at five months and CNA at four months.

Figure 5.3 is a depiction of the number of FTE employees for each of the 24 nursing facility provider types (both internal employees and external contract employees). By far, CNAs are the most numerous type of nursing facility employee with 2,993.1 FTEs. The next four most numerous types of employees are dietary staff (868.8 FTEs), LPNs (688.8 FTEs), RNs (571.8 FTEs), and housekeeping staff (429.4 FTEs).

Figure 5.4 is more complex than the first three figures as it shows FTEs for the 24 provider types across three categories: 1) internal employees, 2) external contract employees, and 3)

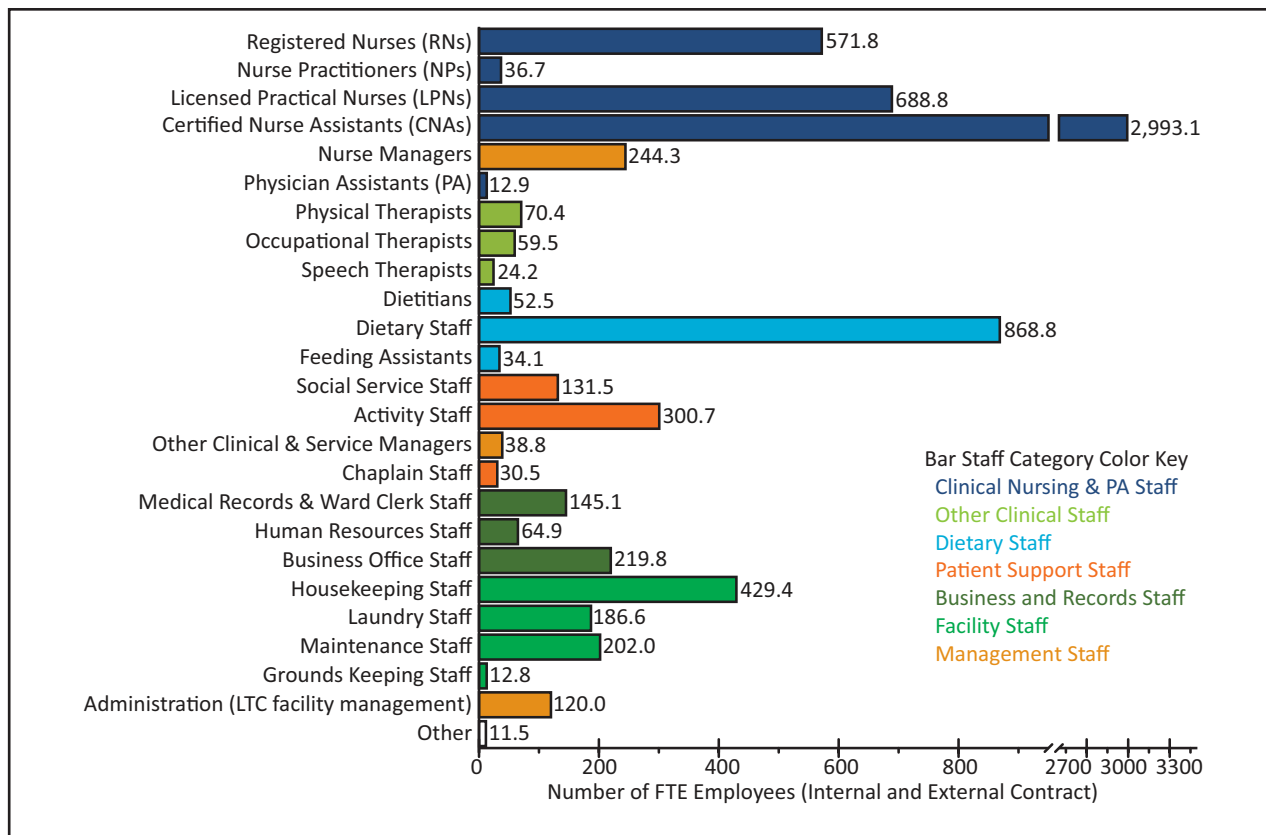


Figure 5.3. Nursing Facility Workforce FTE Internal & Contract Employees by Position Type¹

vacancies for which nursing facilities are recruiting candidates to fill. External contract employees are of special significance for two major reasons: 1) there is a near consensus among nursing facility CEOs that external contract employees are often considerably more expensive than comparable internal staff, and 2) they play an important role, especially for rural nursing facilities, in providing specific clinical services where the volume of need is not great enough to justify internally hiring a full-time provider (e.g., physical therapists, occupational therapists, and speech therapists). To some extent, especially for the nurse employee categories, not counting the external contract employees as vacancies understates the vacancy rates and potential local supply of employees. The FTE numbers of external contract employees by the 24 employee types is shown in Figure 5.5. By far, the 218.5 FTEs of CNAs is the most numerous employee category. The next four most frequent employee category FTEs are LPNs (41.7 FTEs), RNs (40.6 FTEs), physical therapists (39.4 FTEs), and occupational therapists (31.4 FTEs). In total, there are 487.1 FTEs of external contract nursing facility employees, which represents 6.5% of the total nursing facility workforce (7,550.9 FTEs). In addition, there are 582.3 FTEs of vacancies not included in the 7,550.9 FTE count that results in an overall vacancy rate of 7.2%. If all external contract employee FTEs were counted as vacancies, the overall nursing facility vacancy rate would be 12.4%. Even with the contract employees, urban CEOs indicated that 4.9% of their salary expenditures were for overtime, while rural CEOs reported a much higher percentage at 8.3%. Most of the extra cost of overtime is associated with shortages of needed personnel.

Examining the nursing facility workforce at the aggregated state level misses many of the important intrastate variations in factors such as vacancy rates. Scrutiny of Figure 5.6 shows rural

and urban differences in the numbers of employed FTEs for four types of nurses (NPs, RNs, LPNs, and CNAs). Neither rural nor urban nursing facilities employed many NPs, while there were large numbers of CNAs in both. In aggregate, there were 1,123.9 FTE nurses employed in rural nursing facilities and 5,377.3 in urban ones. The vacancies for the nurse types are illustrated in Figure 5.7. There were 456.6 FTE vacancies for the four types of nurses. There were far more FTE vacancies for rural nursing facilities (286.7 FTEs) than for their urban counterparts (169.6 FTEs). For each of the four nurse types, there were more rural vacancies than there were urban vacancies. The largest number of vacancies were for rural CNAs (171.4 FTEs).

The FTE vacancy rates for the nurse categories are displayed in Figure 5.8. The rural/urban rates for the NPs are based on only 28.8/16.9 FTEs and should be viewed with caution. For each of the four nurse types, the rural FTE vacancy rates were higher than for urban. The LPN rural rate of 13.7% was more than twice as high as the associated urban rate. Clearly, rural nursing facilities are having a more difficult time recruiting and retaining the various types of nurses than is true for the urban facilities. In Figure 5.9, nurses are used as an illustration of North Dakota regional variations in vacancy rates. The NP results should be considered with caution because of their low numbers and because of the increased number of divisions. For RNs, LPNs, and CNAs, the employed numbers across the four state regions and three provider types varied between 56 and 1,283 FTEs. The lowest vacancy rate found was for LPNs in the Southwest and the highest vacancy rate was for LPNs in the Northwest (when disregarding vacancy rates for NPs).

Another way of assessing the RN rural and urban FTE employment is illustrated in Figure 5.10. RN FTEs are shown

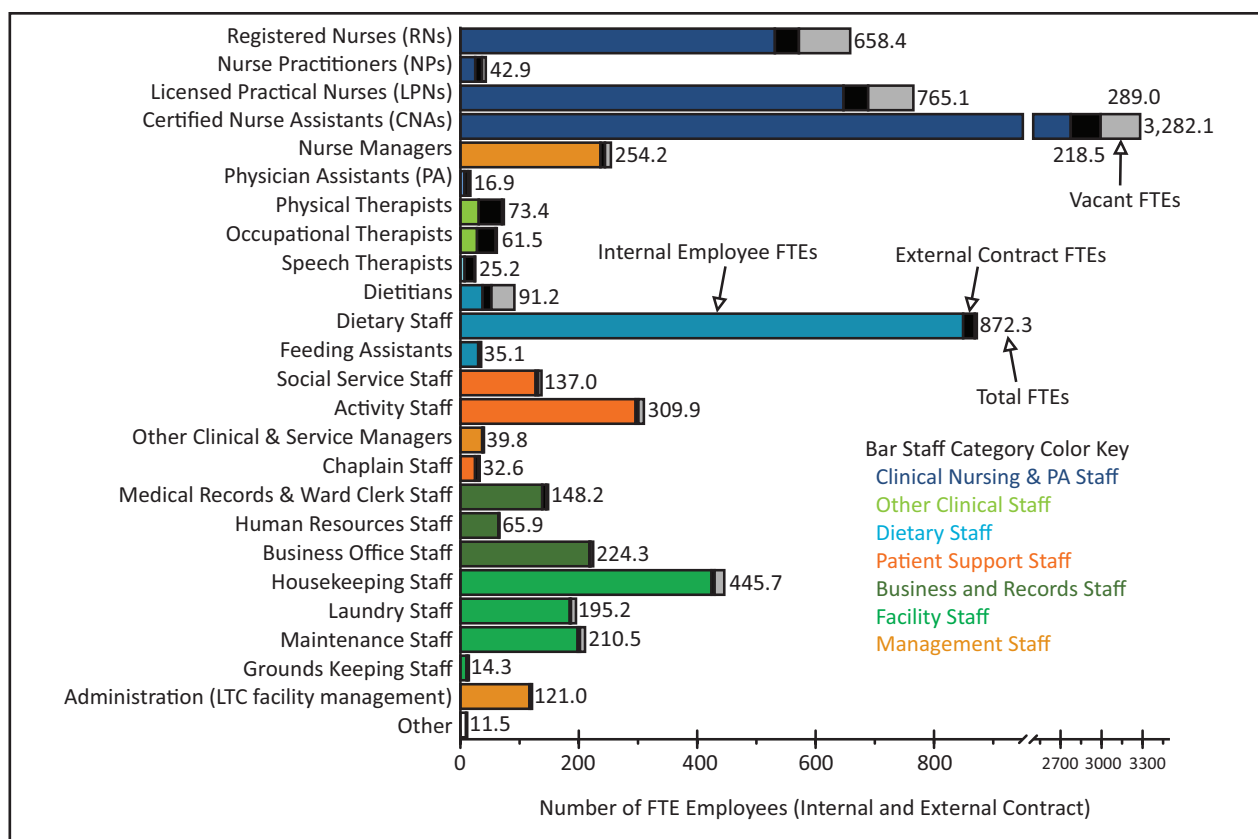


Figure 5.4. Nursing Facility Workforce FTE Internal/Contract Employees/Vacancies by Position Type¹

for each of the nursing facilities and by their rural/urban status. The number of facility RN FTEs varies from 1 through 45. Urban facilities tend to employ more RNs, but there are some that are smaller and have relatively few RNs. The figure is a reminder that the nursing facilities vary greatly.

The number of other clinical provider FTEs employed is shown in Figure 5.11: physician assistants, physical therapists, occupational therapists, and speech therapists by rural/urban status. The numbers of such providers are much fewer than for RNs, LPNs, and CNAs. In particular, there are fewer rural and urban physician assistants and speech therapists than there are physical therapists and occupational therapists. In all cases, there were more rural FTEs for each provider category than is true for their urban colleagues. The corresponding FTE vacancy rates are shown in Figure 5.12 (the PA vacancy rates are based on only 12.9 FTEs and could be misleading). There were no reported urban vacancies for physical therapists, occupational therapists, and speech therapists. Their rural vacancy rates were quite low, ranging from 5.8% to 6.9%.

Other nursing facility staff that are directly involved in patient care are included in Figure 5.13 are dietitians, dietary staff, feeding assistants, and activity staff. The number of FTE employees in each of the four employee types is shown broken out by rural/urban status. The most numerous category is the dietary staff (rural 448.7 FTEs versus urban 420.1 FTEs). There are relatively few dietitians and feeding assistants. There are more FTEs of rural activity staff than urban (166.4 versus 134.3). The vacancy rates of these four provider types are displayed in Figure 5.14. In all cases, the rural vacancy rates are higher than the urban ones, though the difference for dietary staff is not significant. All of these vacancy rates are low, with the highest and largest

difference being for dietitians (rural at 8.6 FTEs versus urban at 3.7 FTEs).

Regarding nursing facilities and physicians, the nursing-facility CEOs were asked about whether they directly employed or contract employed physicians. The results of the question are shown in Figure 5.15 by rural/urban status. About one-third of both rural and urban CEOs indicated that they neither directly hire nor contract employed physicians (generally primary care physicians). Few did both, and only a few directly employed physicians. About 60% of rural and urban CEOs reported that they had external contract-employed physicians. The responses for rural and urban were very similar. Nursing-facility-employed physicians were reported to generally be in family practice. Other listed physician specialties were geriatrics and psychiatry. Much of their responsibilities revolved around fulfilling the duties of a nursing facility medical director. In most of the nursing facilities, the FTE of the physicians was small, with only the much larger nursing facilities reporting significant externally employed physician FTEs.

The CEOs were asked to rate the difficulty of recruiting each of the 24 employee types along a four-point Likert scale (1—very easy, 2—somewhat easy, 3—somewhat difficult, and 4—very difficult). In Figure 5.16, 10 selected employee types (e.g., RNs and physician therapists) are included wherein the mean ratings are shown comparing rural with urban. With only two exceptions, rural CEOs rated it more difficult to recruit the provider types than urban CEOs. The largest differences were for NPs and PAs, where rural was much higher. In another more open question, CEOs were instructed to list the most difficult employee category for which to recruit. Nurses of the various types were listed by urban CEOs as the most difficult to recruit 84.3% of the time, and

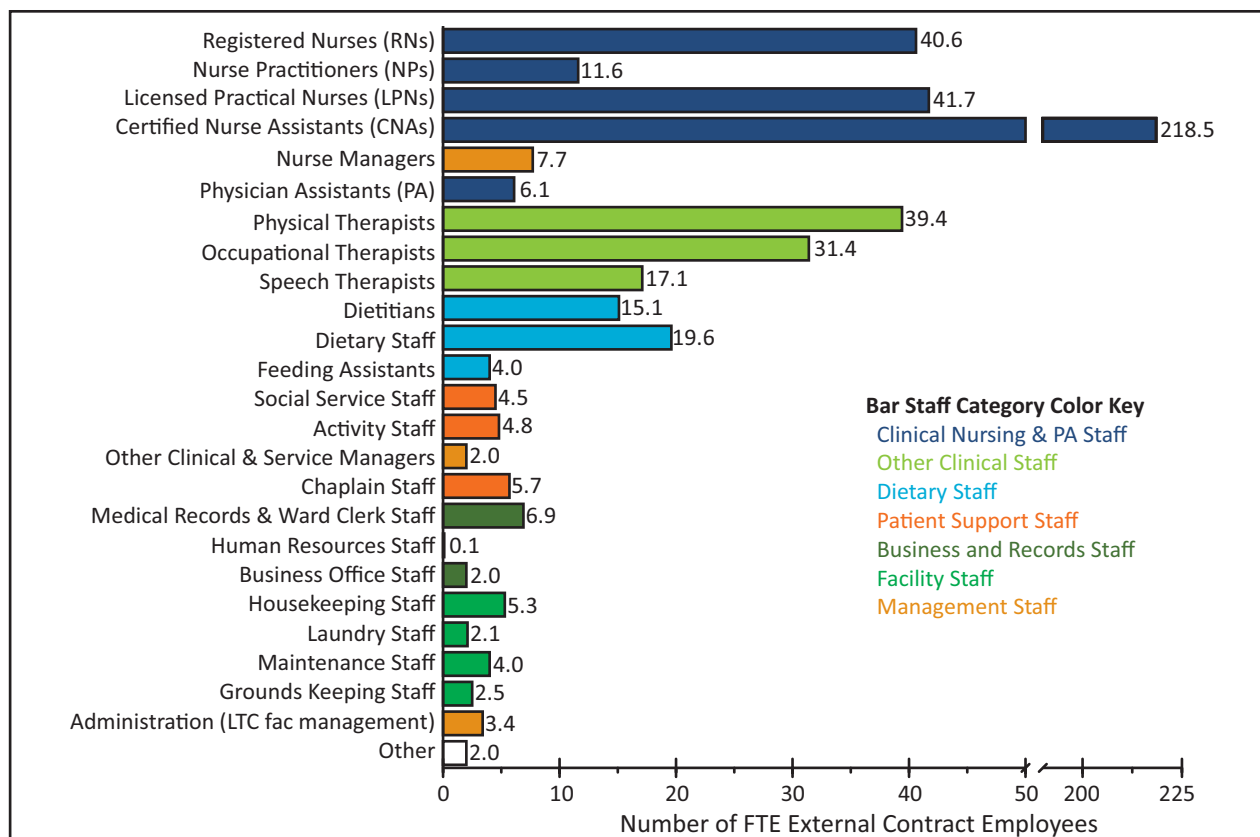


Figure 5.5. Statewide Nursing Facility Workforce FTE Contract Employees by Position Type¹

they were listed among the three most difficult to recruit 90.5% of the time (the comparable percentages for rural are 84.3% and 100%). In another question, 84% of the rural CEOs reported that CNAs had the highest turnover rates of their employee types (urban 71.4%).

When asked about their most significant recruitment problems, rural CEOs indicated, in order, the characteristics of their location, a small pool of local candidates, and low wages. Urban responses were predominantly related to a small pool of local candidates. Rural and urban CEOs agreed that wages were the most important obstacle to retaining personnel. CEOs reported that the mean number of rural CEOs employed at their institutions during the previous five years was 1.7, which was the same as the mean number of urban CEOs employed during the past five years that urban CEOs reported.

Survey Results Summary

The *North Dakota Nursing Facility Workforce Survey* provides a snapshot of nursing facility workforce as of September 2016 that includes data from nearly all of North Dakota's nursing facilities. The findings show that the vacancy rates across the 24 provider types are not excessively high. The highest rates are only moderately high and, considering the numbers of employees in the type categories, are most concerning for CNAs, RNs, and LPNs. NP and PA vacancy rates are high, but the numbers of FTEs are low (36.7 and 12.9).

Clearly, the largest components of the nursing facility workforce are nurses (RNs, LPNs, and CNAs), dietary staff, housekeeping staff, activity staff, nurse managers, and business office staff. Clinical-provider vacancy rates were most often higher

in North Dakota's rural areas than in urban areas.

All in all, the nursing facility CEOs reported that they currently employed 7,550.9 FTE personnel (not counting FTE vacancies). Many times, nursing facilities are one of the largest employers in North Dakota's rural towns. North Dakota's total vacant positions at nursing facilities as of September 2016 was 582.3 FTEs for an overall employee vacancy rate of 7.2%.¹ The vacancy rates for nurses and a few other employee types are higher.

NORTH DAKOTA HOSPITAL WORKFORCE SURVEY

In September 2014, the Center for Rural Health performed a workforce survey of all of North Dakota's short-term general hospitals. Center for Rural Health staff modeled the questionnaire after one previously used in the state of Washington. The questionnaire was modified based on feedback from North Dakota key informants. The questionnaires were sent to all 42 hospitals that met the eligibility criteria. All rural hospital CEOs, as well as the six large urban-tertiary hospitals, were asked to participate. The final response rate was 100% (see Figure 5.17).²

The questionnaire included questions regarding physician workforce and hospital administrators. Five additional questions were asked about workforce-related issues. From the *Survey*, much useful workforce information can be calculated (e.g., current provider-type-specific FTE employees; FTE positions being recruited; and provider-type-specific vacancy rates). Because of the abundance of North Dakota hospital workforce information garnered from the *Survey* responses, only a portion of it can be included in this *Report*. For further information about the *Survey* results and the questionnaire, visit <https://ruralhealth.und.edu/pdf/nd-hospital-assessment-chartbook-2014>.

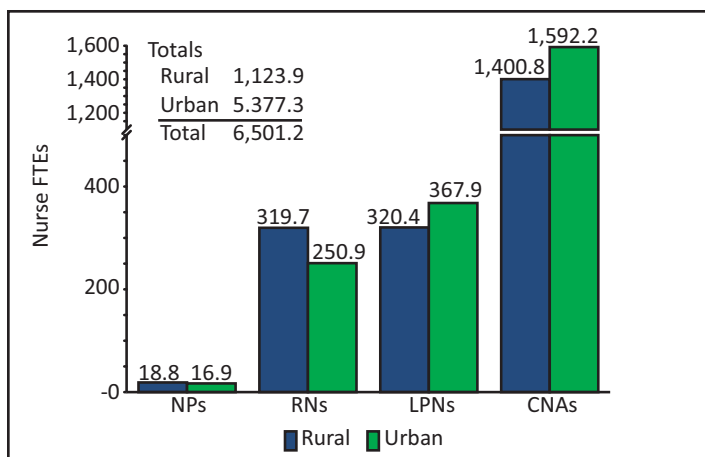


Figure 5.6. Statewide Number of Nurse FTEs Employed by Type¹

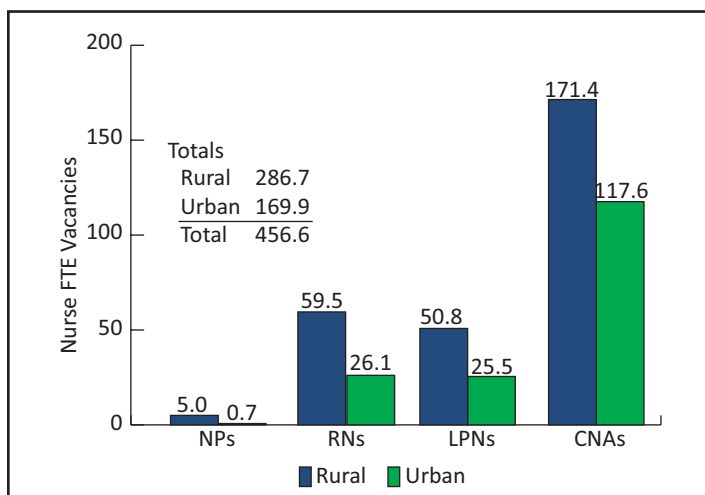


Figure 5.7. Statewide Number of Nurse FTEs Vacancies by Type¹

pdf and <https://ruralhealth.und.edu/pdf/nd-hospital-workforce-survey2014.pdf>.

Limitations

While the findings from the North Dakota Hospital Workforce Survey tell us much about short-term general hospital workforce, they may not be generalizable to all North Dakota providers' nonhospital employment sectors (e.g., nursing homes and physicians' office practices).

However, significant shortages for the hospitals can be ominous for other employment situations because the hospitals are often able to provide higher wages and better job conditions than are other providers. Of course, systemic shortages of provider types across North Dakota's hospitals are significant in and of themselves because of how they influence the provision of timely and quality healthcare. Caution needs to be taken in interpreting the data findings because some vacancy rates are based on small numbers of healthcare employees, and many factors influence vacancy rates. For instance, health-provider-type vacancy rates are influenced by hospital need, salaries hospitals are willing to pay, availability of employed and unemployed providers looking for positions, local community conditions and opportunities, the physical condition of the hospital, working conditions, and so forth. If a facility unsuccessfully recruits for

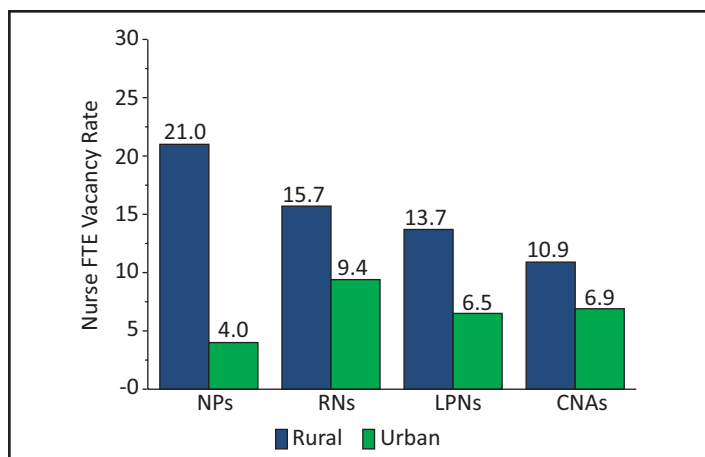


Figure 5.8. Statewide Nurse FTE Vacancy Rates by Type¹

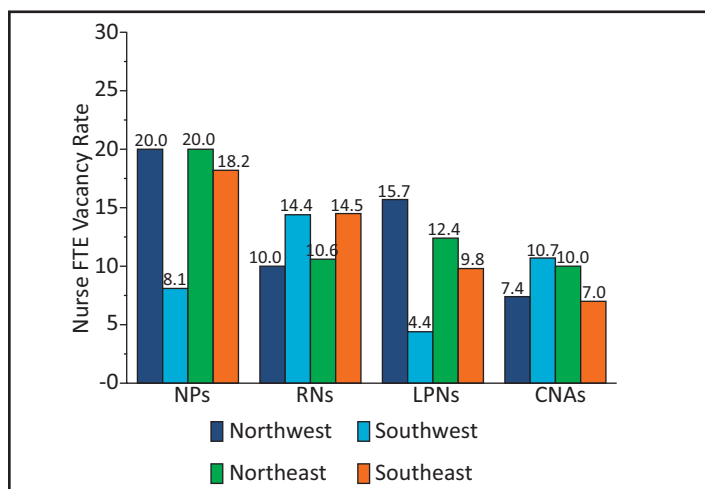


Figure 5.9. Statewide Nurse FTE Vacancy Rates by Type¹

an extended length of time, it may stop recruiting for the position and limit its services, and the vacancy rate may appear lower than it would be if there were an adequate supply of a provider type.

Survey Findings

North Dakota's September 2014 statewide vacancy rates for 25 hospital-staff types are presented in Figure 5.18. The statewide rates are calculated by dividing the FTEs currently being recruited by the sum of FTEs currently being recruited and current FTEs employed, then multiplying the quotient by 100, which results in the percentage of vacant positions.² As can be seen from Figure 5.18, nine of the 25 (36%) staff types have rates that are generally considered in the workforce optimal range (gray-shaded area), three of the 25 (12%) are higher than the optimal rates, and 13 of the 25 (52%) have rates from 0% through 4.9%. Vacancy rates below 5% can be a problem for providers because such rates indicate a slack labor market, wherein there is more of a provider supply than there is demand, which can result in few vacancies that may drive down regional salaries for providers. High provider vacancy rates (e.g., 25% and higher), a tight labor market, can cause salaries and other benefits to increase as the hospitals compete for the limited supply of providers. This can discourage hospitals from staffing configurations that include many of these provider types (thus narrowing the scope of services potentially provided).²

The highest statewide vacancy rates are for nurse assistants

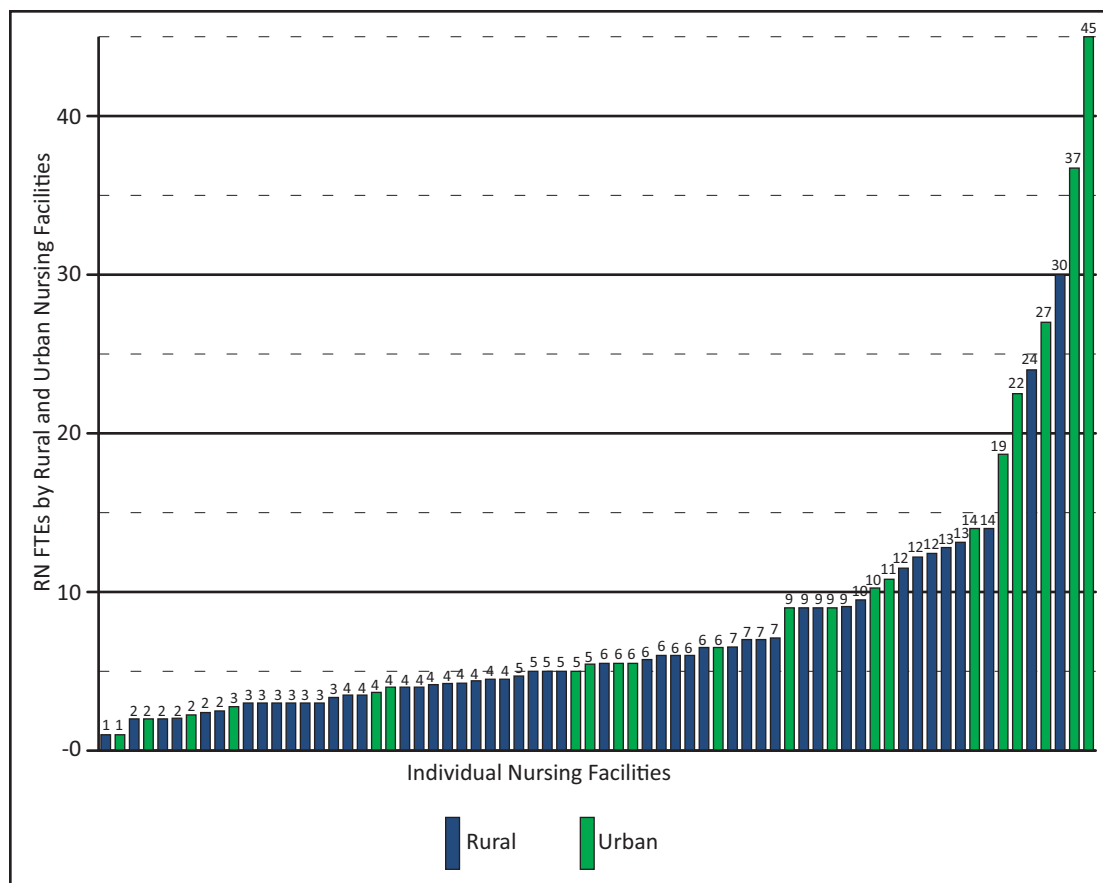


Figure 5.10. FTE Internal Employee and External Contract Employee RNs by Nursing Facilities¹

(15%), PAs (11.6%), and NPs (11.5%). These vacancy rates are not particularly high when compared with other states and facility types. However, it is important to know if the rates are increasing or decreasing, and to examine aspects of the staff types by analyzing such factors as the age distributions of the providers.²

What is most remarkable about Figure 5.18 is how few of the provider types have even moderately high vacancy rates and how many have what can only be described as low vacancy rates. A word of caution in solely depending on vacancy rates is that it is important to consider the magnitude of the numbers of providers represented by the rates. For instance, the vacancy rates for the four nursing provider-type categories are based on large numbers of each nurse type and large numbers of vacancies, while the rate for dietitians is based on few employed and vacant FTEs. The employed FTEs and vacancies for the 25 provider types are depicted in Figure 5.19.²

The statewide vacancy rates for rural counties, urban counties, and for North Dakota as a whole are shown in Figure 5.20 for the four nurse types (i.e., RNs, NPs, LPNs, and nurse assistants). The highest statewide vacancy rate is for nurse assistants (15%) and, likewise, the highest urban-tertiary county rate is for nurse assistants at 17%. The highest rural county vacancy rate is for NPs at 12.2%, which is only a little higher than for urban-tertiary counties' rate of 11.4% for NPs. The highest RN rate was for urban-tertiary counties at 8.8%. Rates in the 5%–10% range are generally thought to be optimal, and rates from 11% to 15% are regarded as only marginally high.²

Most of the remainder of the *North Dakota Hospital Workforce Survey* figures (Figures 5.21, 5.24–5.25, and 5.27–49) are calculated differently than the statewide information (Figures

5.17–5.20). The unit of analyses in Figures 5.21, 5.24–5.25, and 5.27–49 is the hospital. Figures 5.22–5.23 and 5.26 contain data that counts the numbers of vacancies and employed staff by provider and rural or urban status type (not averages across hospitals).²

In Figure 5.21, the highest nurse-type vacancy rate is for urban-tertiary county nurse assistants at 17%. The rural- and urban-county hospital rates are similar for RNs and NPs. Urban rates are significantly higher for LPNs and nurse assistants than for the mean rural hospital rates (i.e., 9% and 17% versus 5.8% and 9.6%).²

Interpreting Figure 5.21 requires some understanding of the number of vacancies and the number of employed nurses by type. As can be seen in Figure 5.22, the number of vacancies upon which the rural and urban-tertiary county vacancy rates are based varies from 7 FTEs to 328. These represent the number of FTEs it would take to bring the vacancy rates down to zero, although as indicated previously, the policy goal should be closer to 5%. While the 328 RN vacancies is a large number, Figure 5.23 shows that the number of employed nurses across types totals 6,501.2 FTEs. In terms of RNs and NPs, there is a great difference in their FTEs by rural and urban county hospital categories (i.e., RNs: rural 605 versus urban 3,741.4; NPs: rural 50.5 versus urban 214.6). Despite an urban-tertiary RN vacancy rate of just 8.8%, this represents 328 FTEs that are vacant, and the importance of having an adequate number of RNs goes without saying. Policy decisions regarding increasing or decreasing North Dakota RN training depend on analyses that include consideration of the age structure of North Dakota's practicing RN population, current and expected trends in RN migration into and out of North Dakota, and the

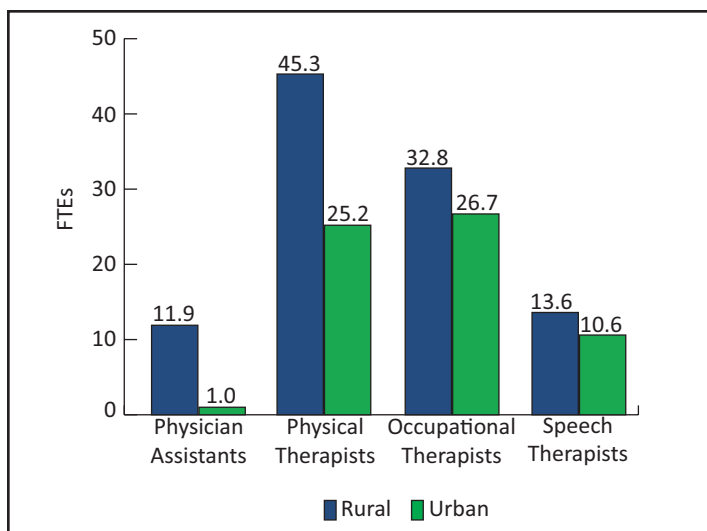


Figure 5.11. Statewide Number of Other Clinical Provider FTEs Employed by Type¹

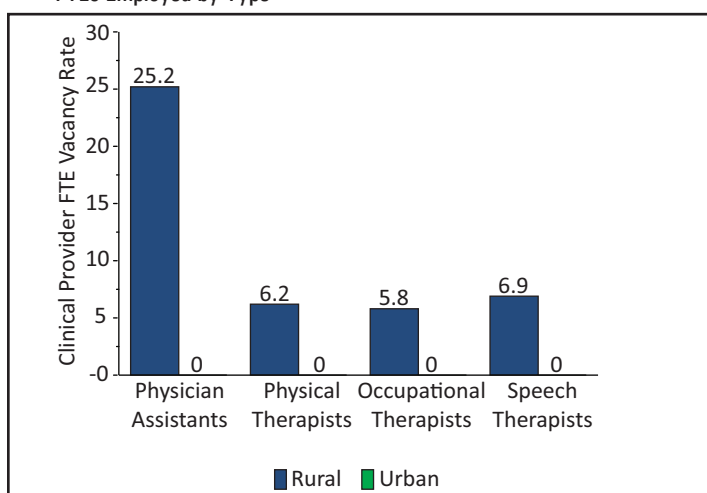


Figure 5.12. Statewide Other Clinical Provider FTE Vacancy Rates by Type¹

volume of changes in numbers of RNs within North Dakota.²

Figure 5.24 shows the median months recruiting for the current longest nurse vacancy by hospitals. The longest was for urban tertiary LPNs at six months. Compared with other states and provider types, the time to fill nursing positions in North Dakota is reasonable. It is shorter for nurse assistants, who have the highest vacancy rates.²

It is possible to depict the nurse vacancy rates by the four rural county quadrants of North Dakota and the urban-tertiary hospital counties separately (Figures 5.25–5.26). This information is provided for nurses because of their higher numbers than for other provider types discussed in this chapter. As can be seen from Figure 5.25, the vacancy rates vary greatly across North Dakota quadrants. Even for the nurse provider types, many of the vacancy rates that look high (e.g., southeast rural NPs at 21.2%) are a function of the small number of NPs and vacancies within that quadrant (i.e., 2 FTE vacancies; Figure 5.26). While the 100% survey response rate makes the figures accurate, if the data were collected every few months, the data at this scale likely would vary widely at the quadrant level. The quadrant and other detailed data graphs and tables are available at <http://ruralhealth.und.edu/pdf/nd-hospital-workforce-survey2014.pdf>.

Figures 5.27 and 5.28 show the rural and urban-tertiary

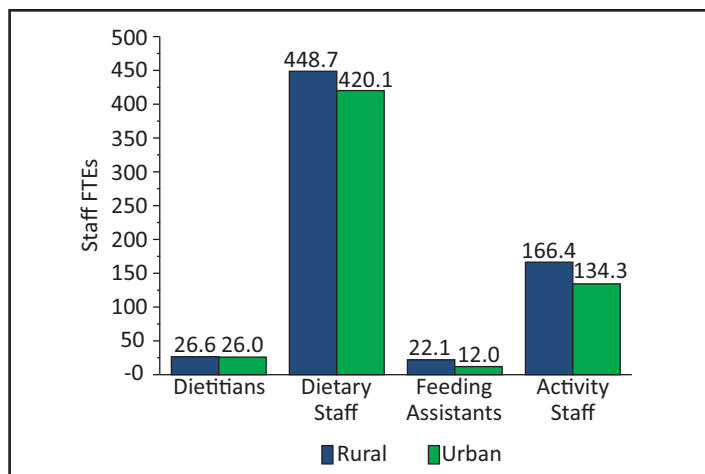


Figure 5.13. Statewide Number of Staff FTEs Employed by Type¹

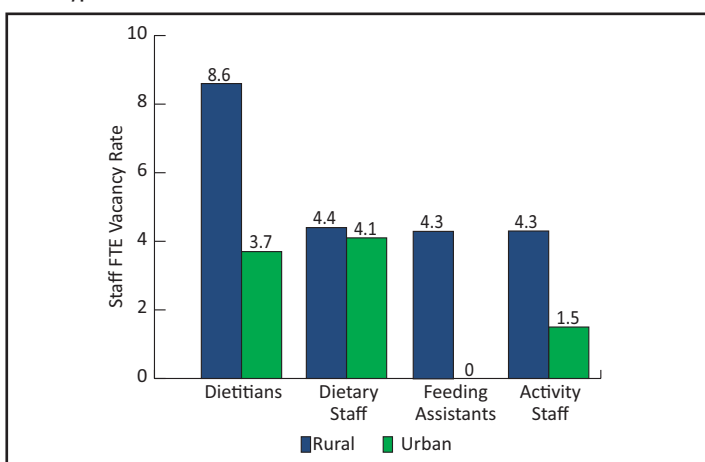


Figure 5.14. Statewide Staff FTE Vacancy Rates by Type¹

county vacancy rates for lab personnel (two categories) and radiology staff (five categories). The two types of lab personnel are medical technologist or medical laboratory scientist (MT/MLS), and medical laboratory technician or clinical laboratory technician (MLT/CLT). The overall vacancy rates for lab personnel range from 4.5% in rural hospitals for MT/MLS to 9.9% for MLT/CLT in rural hospitals. The rural and urban-tertiary vacancy rates for the various radiology staff types (radiographer/radiology techs, specialized radiology techs, ultrasound techs, nuclear medicine techs, and radiation therapy techs) are all low. The highest rate is for rural hospitals (6.9%, 6.4 FTE vacancies for 92.7 FTE positions; Figure 5.19 provides information on the numbers of these provider types).²

Figures 5.30 and 5.31 illustrate information on rural and urban county vacancy rates for other types of medical care personnel (i.e., PAs, dietitians, physical therapists, occupational therapists, respiratory therapists, surgical techs, computer techs, and entry-level jobs). With only a couple of exceptions, the vacancy rates across these provider types and by rural and urban are low. The highest vacancy rate is for rural occupational therapists at 16.8% (3 FTE vacancies for 17.8 FTE positions). The urban-tertiary hospital average PA vacancy rate is 14.1% (21.6 vacancies for 152.8 positions). The most numerous number of vacancies for the eight provider types is for entry-level jobs (rural 45.1 and urban 57.4 FTE vacancies; vacancy rates of rural 9.1% and urban 5.8%).²

The nurse managers/clinical directors and business personnel

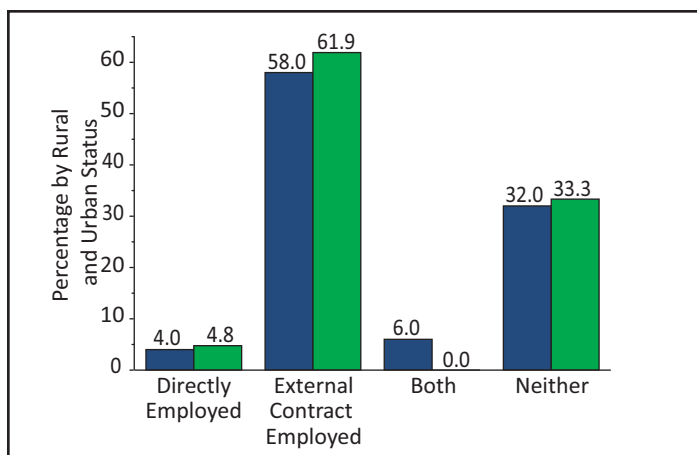


Figure 5.15. Statewide Physicians Directly and External Contract Employed¹

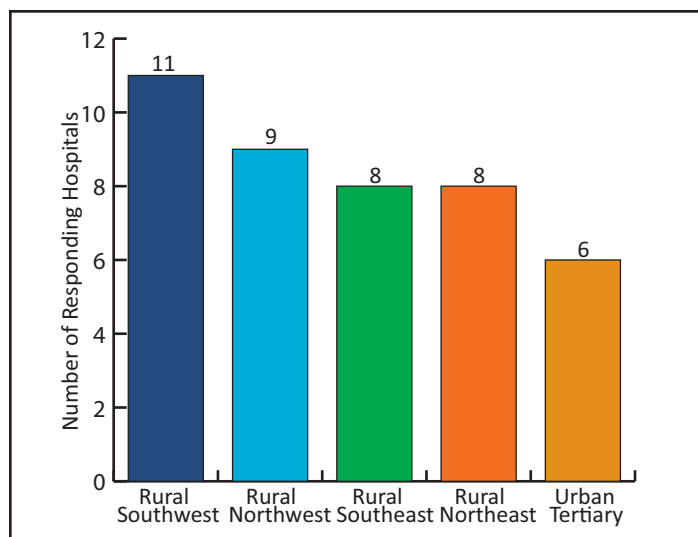


Figure 5.17. Hospital responses by type and location.

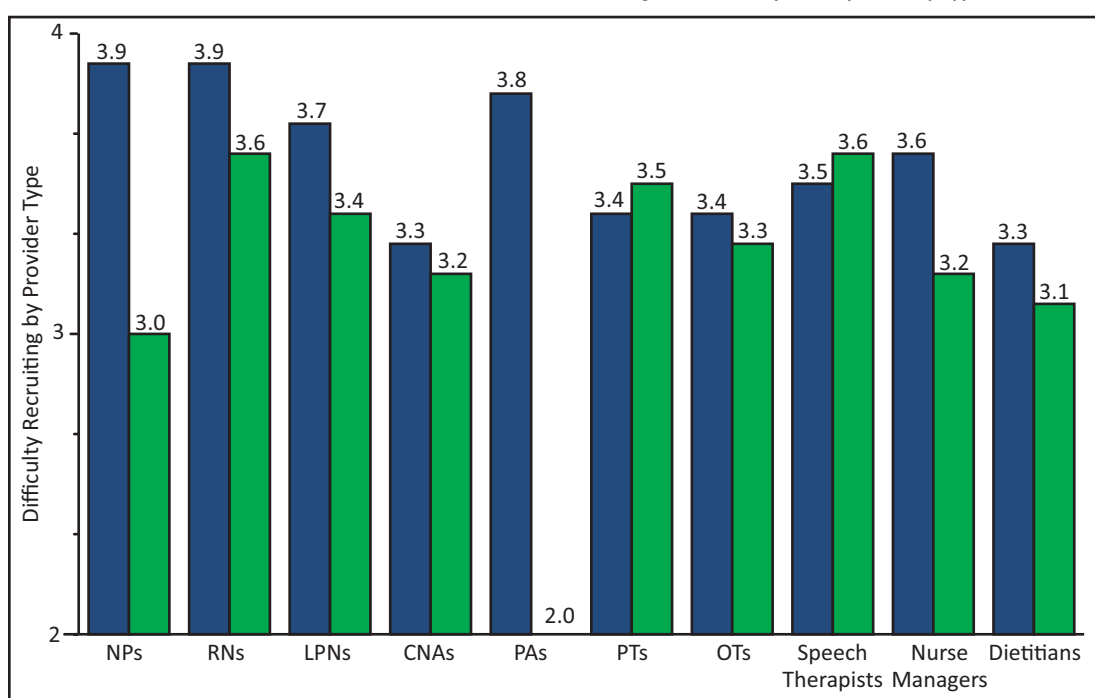


Figure 5.16. Nursing Facility CEO Ratings* of Difficulty Recruiting by Provider Type¹

*Four point scale (1 = very easy, 2 = somewhat easy, 3 = somewhat difficult, and 4 = very difficult)

employee types are presented in Figure 5.32. All vacancy rates are low for both employment categories. The highest vacancy rate is for urban nurse managers/clinical directors (5.7%; 17 FTE vacancies for 297.3 positions). Note that altogether the two personnel types represent 936.4 FTE filled positions and 31.3 FTE vacancies.²

The hospital respondents were asked to rank the difficulty of recruiting each of the 25 provider types. Figures 5.33 and 5.34 show the results for those rated as most difficult, split out by urban (Figure 5.33) and rural (Figure 5.34). The ranking scale ranged from 1 to 4 as follows: 1—very easy, 2—somewhat easy, 3—somewhat difficult, and 4—very difficult. A comparison of the two figures shows that the urban-tertiary hospital respondents rated their ability to fill vacancies as more difficult than did the rural respondents. Whether this difference is actual or related to difference in perceptions is not known. The urban-tertiary hospital most-difficult-to-fill vacancies were

licensed pharmacists, MT/MLS lab techs, entry-level jobs, and surgical techs. It is important to remember that it is not only the availability of personnel that influences the difficulty in filling positions but many other factors, including salaries being offered for the positions. The rural hospital county most-difficult-to-fill vacancies were occupational therapists, both laboratory scientist and technician personnel types, and a group of tied (3.3) provider types (licensed pharmacists, PAs, physical therapists, radiation therapy techs, and ultrasound techs).²

Several of the survey questions inquired about various hospital physician-related workforce topics. The hospital respondents were asked about whether they internally employed physicians (not contracting with an outside entity for a service such as weekend emergency coverage). Urban hospitals reported that 100% had physician employees, while the comparable rural percentage is 71.9%. In total, it is estimated that the urban hospitals employed 860 specialist physicians and 337 primary

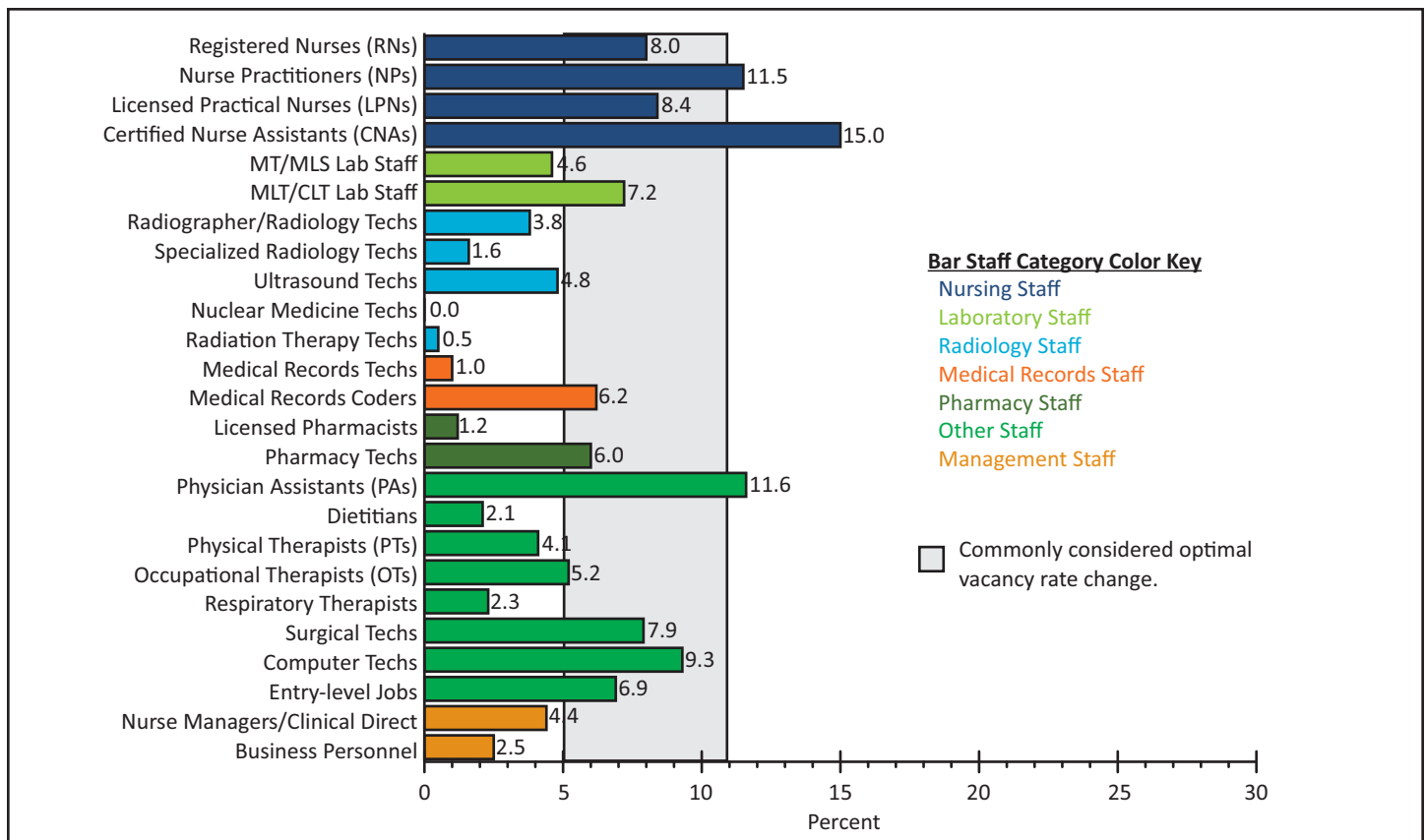


Figure 5.18. Statewide Hospital Workforce Vacancy Rates²

Note: These vacancy rates are not averages of hospital rates (means of means) but are the rates using the overall category number of vacancies and employed providers (essentially weighting these rates by FTE hospital employment counts).

care physicians (total 1,197 physicians), and rural hospitals employed 29 specialists and 54 primary care physicians (total 83; urban and rural grand total 1,280). On the same scale as described for Figures 5.33 and 5.34, urban respondents rated the difficulty in filling primary care physician positions as a 3.5, with the comparable rural hospital rating as 3.7. This would rank the difficulty in filling physician vacancies as tied for second-most difficult for urban hospitals and most difficult for rural hospitals.²

Of the hospitals that employ physicians, respondents were asked to rank on a four-point scale factors that contribute to their recruiting problems (Figure 5.35). The mean across category hospitals has a range of 1 through 4. As is apparent from the figure, rural county hospital respondents consistently reported that all of the eight barriers were more important than did the urban county hospital respondents. The highest-rated factors for rural county hospital respondents were difficulty finding good housing (3.3), lack of cultural activities and opportunities (3.2), excessive work and call schedule (3.2), and lack of spousal employment opportunities (2.8). The three least-reported recruiting problems in rural counties were poor local elementary and high schools (1.2), hospital facility condition (1.6), and lack of continuing education opportunities (1.6). All urban-tertiary response averages were 1.8 or lower. The highest means for urban-tertiary hospitals were difficulty finding good housing (1.8), lack of spousal employment opportunities (1.7), excessive work and call schedule (1.6), lack of cultural activities and opportunities (1.5), and both hospital facility condition (1.3) and noncompetitive compensation package (1.3). The lowest two for urban were lack of continuing education opportunities and poor

local elementary and high schools.²

The hospital CEO respondents were asked to indicate how they staff their emergency departments with physicians on weekends (Figure 5.36). Respondents could mark more than one of the choices, so the percentages for each of the two geographic types can add to more than 100%. All urban hospitals reported that they used their own employees to staff the weekend emergency departments. Among the rural hospitals, 47.2% used their own physicians, 36.1% contracted outside for physicians, and 27.8% used local nonhospital employees to staff the emergency department on weekends. In addition, the hospitals were asked to indicate the number of days per month that visiting physician specialists see patients in the hospitals. The mean for the rural hospitals was 2.9 days per month, and the comparable mean for urban hospitals was 3.8.²

Survey Results Summary

The *North Dakota Short-Term General Hospital Workforce Survey* provides a snapshot of hospital workforce as of September 2014 that included data from all of North Dakota's hospitals. The findings show that the vacancy rates across the 25 provider types are not excessively high. The highest rates are only moderately high and are for nurse assistants, PAs, and NPs. All in all, the hospitals reported that they currently employed 12,140.9 FTE personnel (not counting FTE vacancies). Many times, hospitals are one of the largest employers in North Dakota's rural towns. North Dakota's total vacant positions at short-term general hospitals as of September 2014 was 963.1 FTEs. A little more than one-fifth (20.2%) of the vacancies are in rural county hospitals. In

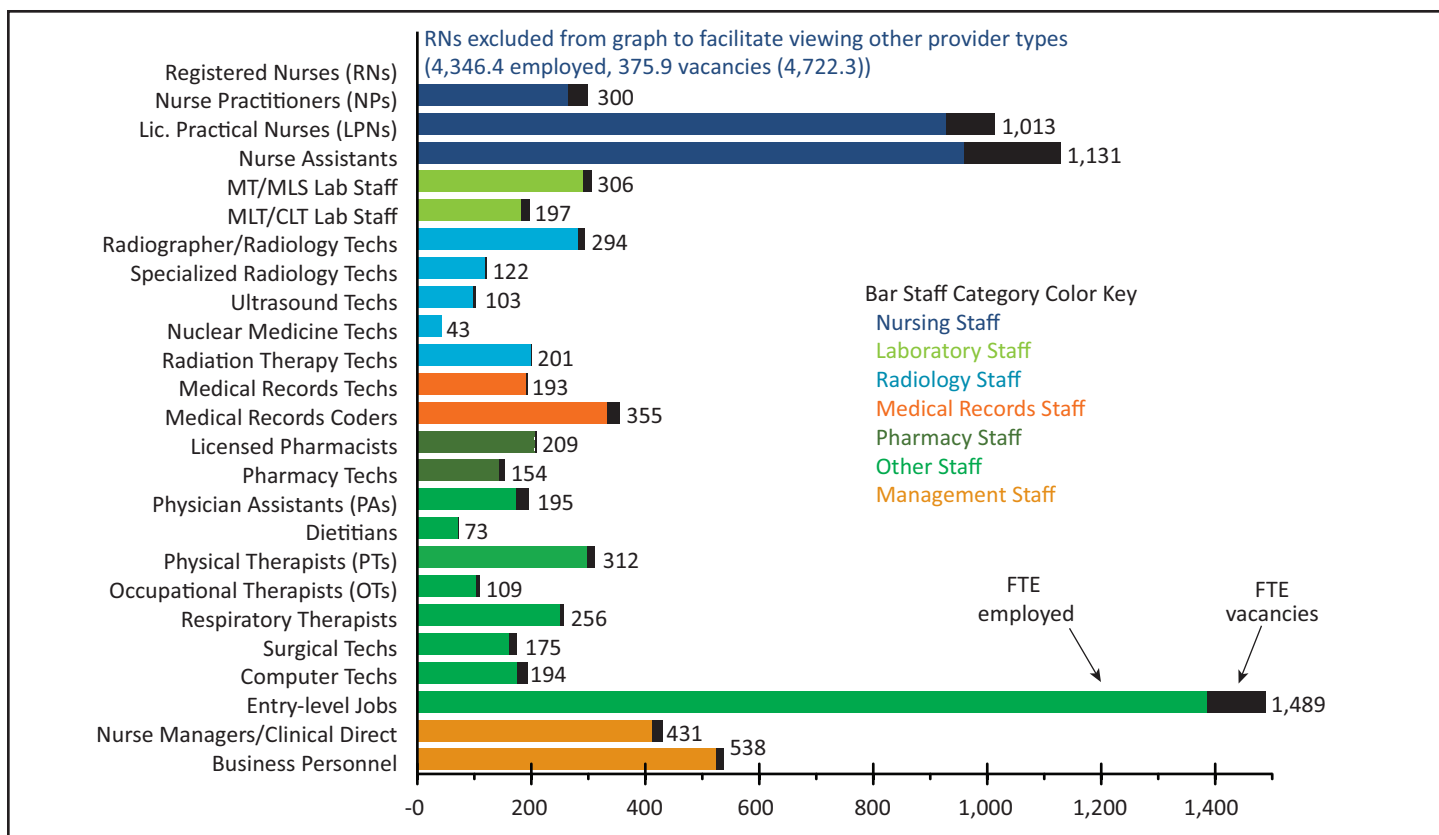


Figure 5.19. Statewide hospital workforce employees and vacancies by position type²

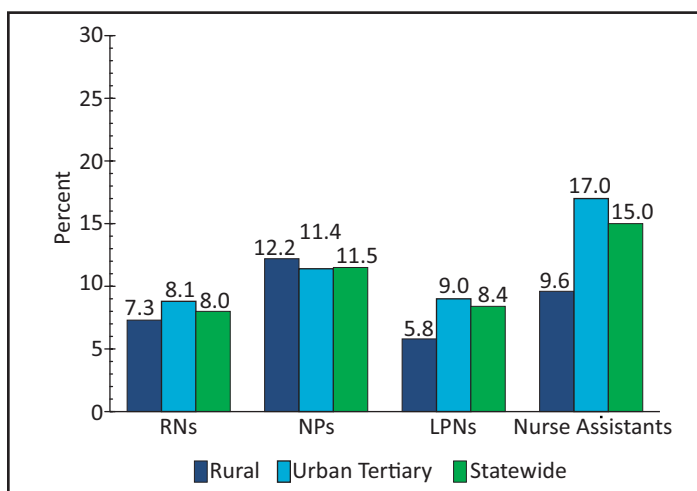


Figure 5.20. Nurse Vacancy Rates by Rural/Urban Status and Statewide²

Note: These vacancy rates are not averages of hospital rates (means of means) but are the rates using the overall category number of vacancies and employed nurses (essentially weighting these rates by hospital FTE employment counts).

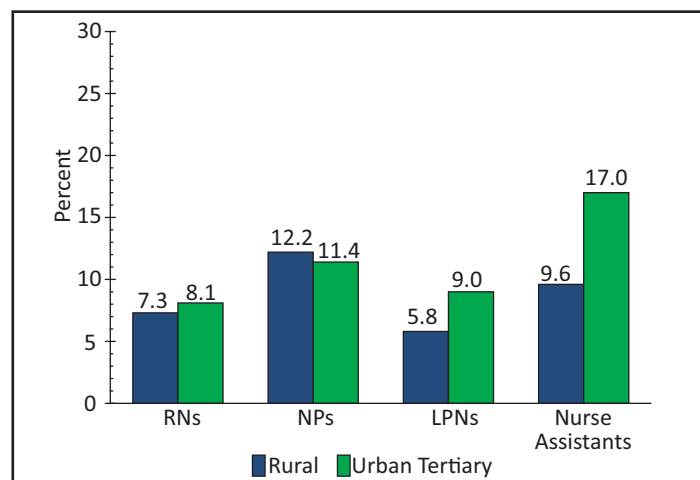


Figure 5.21. Nurse Vacancy Rate²

time difference between the two surveys). More specifically, the two types of facilities employed approximately 10,800 FTE nurses (NPs 300, RNs 4,925, LPNs 1,600, CNAs 3,950, and nurse managers 525).

OTHER HEALTHCARE WORKFORCE PROVIDER TYPES

In addition to both primary care and specialty physicians, there is an extensive array of other healthcare provider types in North Dakota who make indispensable contributions to the health status of the population, especially in rural and underserved subpopulations. Many of these provider types work independently or with minimal collaboration with or supervision from physicians.

For now, only selected provider types are discussed next

addition, the hospitals employed 1,280 physicians (31% of which were primary care physicians).²

Combining the 2016 *North Dakota Nursing Facility Workforce Survey* data with the 2014 *North Dakota Short-Term General Hospital Workforce Survey* results, there are approximately 23,000 FTE employees for the two healthcare facility types (roughly adjusting for nonresponse in the nursing facility survey, for several employee types not specifically inquired about in the short-term hospital survey [e.g., laundry, maintenance, and grounds keeping staff], and the two-year

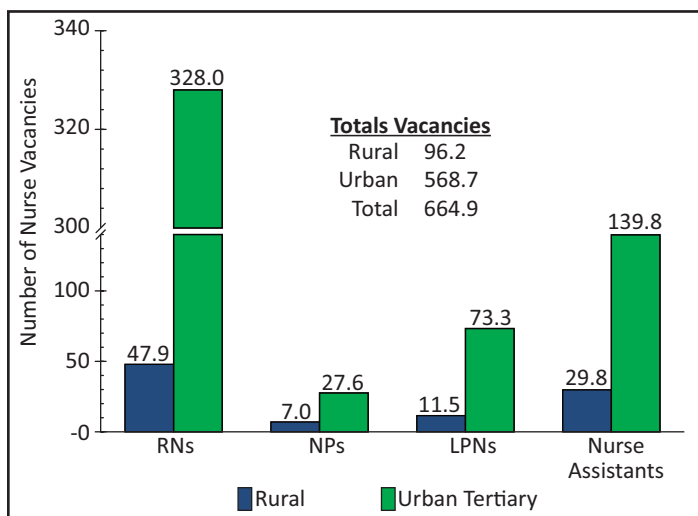


Figure 5.22. Number of Nurse Vacancies²

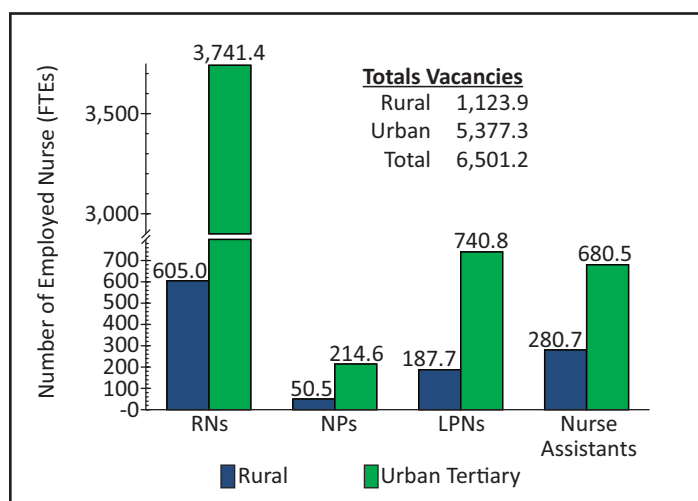


Figure 5.23. Current Number of Employed Nurses²

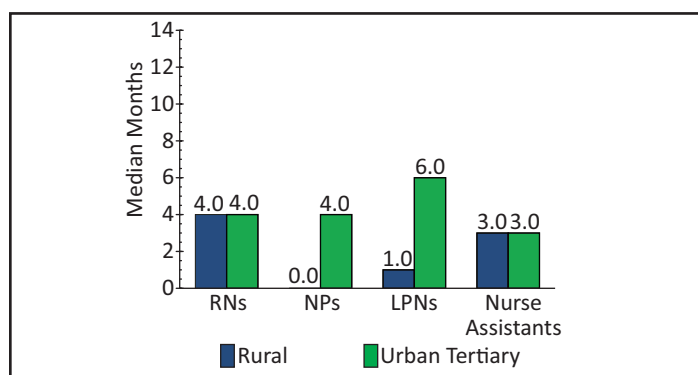


Figure 5.24. Median Months Recruiting Current Longest Nurse Vacancy²

based on several factors, including how numerous they are in the North Dakota healthcare system and their unique care niches. The provider types briefly addressed below are NPs, PAs, RNs, LPNs, CNAs, psychologists, oral health providers, pharmacists and pharmacy technologists, physical therapists, occupational therapists, and medical laboratory professionals. Future plans for the *Biennial Report* are to expand the thoroughness of the sections already present and to add new sections on additional provider types (e.g., anesthesiologist assistants, chiropractors, emergency medical service providers, addiction counselors, and respiratory therapists).

Advanced Practice Providers (NPs and PAs)

There are about 365 licensed NPs and 359 licensed PAs in North Dakota. North Dakota NPs are predominantly female (more than 90%). Across the three metropolitan status categories, there are no large differences in the NP age distribution, though rural counties have higher percentages of those ages 55 to 64 and 65 to 74 (though relatively few of the total NPs are in these two age categories).³

PAs are older in rural and micropolitan counties (i.e., in rural counties, 37.7% of PAs are in the 55-to-64 age group compared with 12.3% in metropolitan counties); 76% of North Dakota PAs are female, and 41% of them are graduates of the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS).

The national ratio of NPs per 10,000 population is 5.8, which is higher than the North Dakota rate of 5.4. The national ratio for PAs per 10,000 population is 2.7 versus North Dakota's 3.2.^{3, 4, 5}

The physician, NP, and PA ratios of providers per 10,000 population are as follows by area: 36.3, 8.4, and 4.0 for metropolitan; 17, 4.1, and 2.1 for micropolitan (large rural); and 5.8, 4.8, and 3.7 for rural. A major limitation of the data currently available is that practice specialization (i.e., primary versus specialty care) information for NPs and PAs is not available. There are currently about 365 NPs, 359 PAs, and more than 1,600 physicians in North Dakota. These are head counts for the practicing providers and do not take into consideration how many of them are working less than full-time (i.e., we do not have full-time-equivalent information). The national literature show that PAs are less likely to be full-time than physicians, and that NPs are less likely to be full-time than either. However, the extent to which this is true in North Dakota is unknown.^{3, 4, 5, 6}

In 2014, the UND SMHS Department of Physician Assistant Studies surveyed 306 licensed PAs in North Dakota with a focus on capturing the demographics and practice characteristics of the workforce. Of the 306, 13 were undeliverable electronically or by postal mail, resulting in 293 possible respondents. Of the 293, 95 fully completed the survey, which is a 32.4% response rate. Caution should be used with survey results because of the low response rate, though these are the only such data presently available. Of the respondents, 82% were female (versus 67% nationally) and 18% were male (versus 33% nationally).⁷ The mean age was 45 years (versus 37 years nationally) and the range was 27 to 81 years. The average length of time in PA practice was 13 years.

With respect to rural background, 62% of the respondents self-reported spending their childhood in a rural area (less than 10,000 population). In addition, 71% of respondents graduated from a North Dakota high school (16% Minnesota and 9% South Dakota), and of those, 63% indicated rural upbringing (50% Minnesota and 75% South Dakota). For college education, 70% of respondents received their undergraduate degrees in North Dakota, (17% Minnesota and 7% South Dakota), of which 63% were from rural upbringing, and 52% of respondents completed their PA degree in North Dakota (14% South Dakota, and 15% Montana, Iowa, Nebraska, and Missouri combined).

Practice characteristics included the following: 55% of respondents were working in outpatient group practice settings and only 10% were working in hospital settings. Additionally,

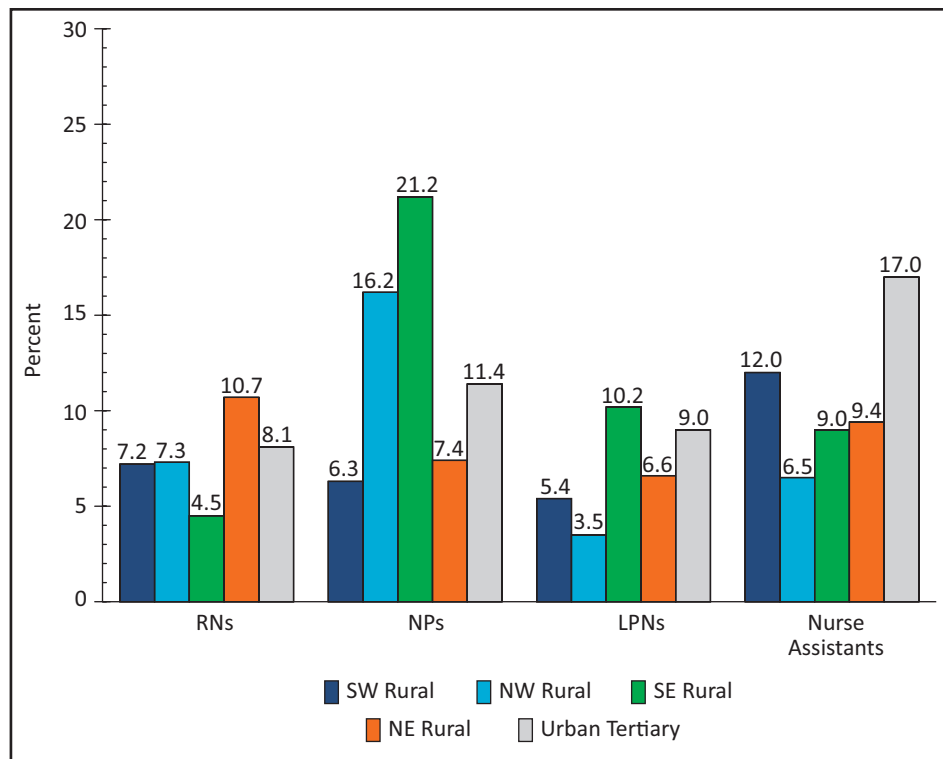


Figure 5.25. Nurse Vacancy Rates²

20% were working in a rural area including adjacencies, 16% in micropolitan and 64% in metropolitan areas. Of respondents, 63% experienced a rural clerkship as part of their PA preparation. Of those, 28% obtained employment in rural areas. Furthermore, 45% of respondents gained employment from their clinical preceptor.

Significant aspects of the role of NPs and PAs are their specialization, clinical scope of practice, and overlap with each other and primary (generalist) care physicians. Although it is often difficult to develop a clear picture of the specializations of NPs and PAs, especially with regard to primary care, it is generally acknowledged that less than half of the practitioners in both fields are involved in traditional primary care.

NPs and PAs practice in primary care and in specialty care. The National Commission on Certification of Physician Assistants indicates that in 2014 39% of PAs in North Dakota practiced in primary care (i.e., family practice, general internal medicine, and general pediatrics). A federal Agency for Healthcare Research and Quality estimate from 2010 indicated that, nationally, 43% of PAs and 52% of NPs practice primary care. Care must be taken in comparing these PA and NP percentages with physician percentages regarding primary care as the methods can vary dramatically.

Those NPs and PAs not involved in primary care often are involved in meeting patient needs in specialty clinics of various types and in surgery. NP and PA scopes of practice in primary care overlap extensively. Likewise, their scopes of practice overlap with primary care physicians, but not to the same extent. Depending on the situation, NPs and PAs can be either complements to primary care physicians or substitutes for some generalist services. NPs, PAs, and primary care physicians often work in the same clinics as a team.

The geographic distribution of NPs and PAs across North Dakota is similar to the findings for physicians, with their highest

per-capita density in the metropolitan areas. The expectation that these advanced practice providers would compensate for the sometimes severe shortage of physicians in rural areas is only partially realized, although PAs are much better distributed across North Dakota than NPs, who like their physician counterparts are almost twice as likely to be found in a metropolitan county compared with rural counties.^{3,4}

There are about 8.4 NPs per 10,000 population for metropolitan counties compared with about 4.1 and 4.8 for micropolitan (large rural) and rural counties (e.g., about 43% fewer in rural than in metropolitan counties). North Dakota's PAs per 10,000 population are about 4 PAs per 10,000 population for metropolitan counties compared with about 2.1 and 3.7 in micropolitan (large rural) and rural counties (about 9.8% fewer in rural than metropolitan counties).

Nurses

While the ratio of LPNs per 10,000 population has remained nearly steady during the recent past, the RNs-per-10,000-population ratio increased by about 27% from 2005 through 2010.^{8,9} Nationally, North Dakota's ratio of RNs per 10,000 population is seventh highest among the 50 states at 115.7 (national mean ratio of 92.1).¹⁰ Another source shows North Dakota with 131 RNs per 10,000 population in 2014 (nationally ranked fourth-highest of the 50 states).¹¹ These data are of licensed RNs and do not take into account FTEs (i.e., includes RNs licensed but not working or working part-time).

North Dakota ranks first for LPNs per 10,000 population among the 50 states at 42.1 per 10,000 population in 2013 based on 421 North Dakota LPNs. The national mean was 22.5 LPNs per 10,000 population.¹⁰

Within North Dakota, the RN-per-10,000-population ratio in 2015 was much higher for metropolitan counties than for micropolitan (large rural) and rural counties (almost twice as

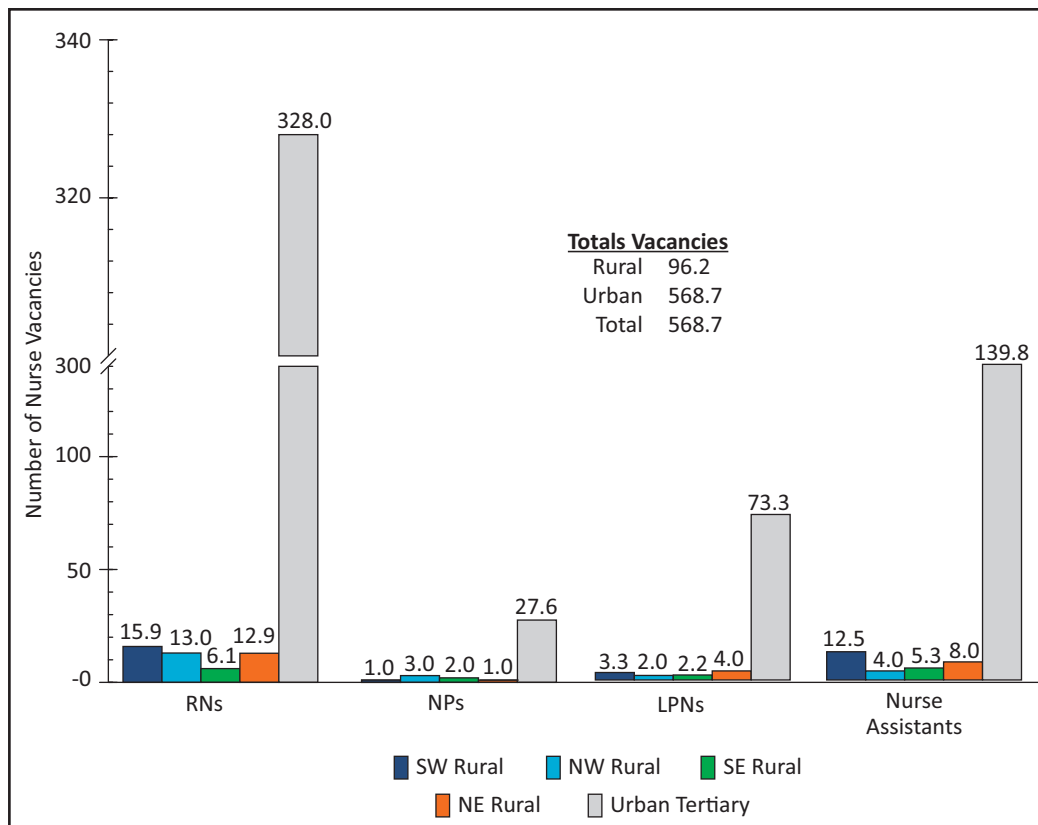


Figure 5.26. Number of Nurse Vacancies²

high): metropolitan 172.6; micropolitan 112.3; and rural 99.3 (Figure 5.37). The LPN-per-10,000-population ratio in 2015 was highest for rural at 48.6, followed by metropolitan, 42.9, and micropolitan, 36.1.^{4, 5, 12}

Figure 5.38 depicts projections of RNs as a function of North Dakota population growth. Assuming a steady population increase, the ratio will increase from 170 in 2010 to 193 in 2032. If a more rapid population growth is assumed, the RNs-per-10,000-population ratio will decrease from 170 in 2010 to 104 in 2032 (a decrease of 39%). In addition, the aging of North Dakota's population will require substantially more RN services in 2032 than were needed in 2010. For both LPNs and RNs, the state's projected additional needs caused by population increases and the aging of the population will be a formidable challenge to meet.

The percentages of RNs and LPNs who are female are extremely high, with the LPNs being slightly higher at 96% (versus 93% for RNs; Figure 5.39). Approximately 73% of RNs work full-time, while 61% of LPNs work full-time. Note that in the several sources cited in this nursing section, the counts of RNs per 10,000 population varies widely (115 to 137), and those that seem most reasonable are utilized here.^{8, 9}

Figure 5.40 illustrates the percentages of RNs and LPNs who work in hospitals, long-term care (LTC), clinics, and other. RNs are most likely to work in hospitals (46%), while only 15% of LPNs practice in hospitals. LPNs are much more likely to work in LTC facilities than RNs (29% versus 8%) and in clinics (29% versus 14%).^{8, 9}

Information from the 2014 *North Dakota Hospital Workforce Survey* shows that North Dakota's short-term general hospitals as of September 2014 employed 4,346.4 FTEs of RNs and 928.5 FTEs of LPNs. The overall North Dakota hospital vacancy rates for RNs and LPNs were 8.0% and 8.4%, respectively. The total number

of vacancies for RNs was 375.9 FTEs and 84.8 FTEs for LPNs. The urban-tertiary vacancy rate for RNs and LPNs was 8.8% and 9.0%, with the comparable rural county vacancy rates of 7.3% and 12.2%. In addition, North Dakota hospitals employed 961.2 FTEs of nurse assistants, and there was a 15% vacancy rate for nurse assistants. The statewide vacancy rate for nurse managers and clinical directors was 4.4%, with the FTE employed figure at 412.1.²

Information from the 2016 *North Dakota Nursing Facility Workforce Survey* shows that North Dakota's nursing facilities as of September 2016 employed 571.8 FTEs of RNs, 688.8 FTEs of LPNs, 36.7 FTEs of NPs, 2,993.1 FTEs of CNAs, and 12.9 FTEs of PAs. The overall North Dakota nursing facility vacancy rates for RNs, LPNs, NPs, CNAs, and PAs were 13.2%, 10.0%, 14.5%, 8.8%, and 23.7% (but for PAs, there was a small number of employed FTEs, 12.9). The total number of vacancies for RNs was 86.6 FTEs, 76.3 FTEs for LPNs, 6.2 for NPs, 289 for CNAs, and 4.0 for PAs. The urban vacancy rate for RNs and LPNs was 9.4% and 6.5%, respectively, with the comparable rural county vacancy rates of 15.7% and 13.7%. CNA rural and urban vacancy rates were 10.9% and 6.9%, respectively. In addition, North Dakota's nursing facility vacancy rate for nurse managers was 3.9%, with an FTE of 244.3.¹ Combined, PAs and NPs only accounted for less than 50 FTEs in North Dakota's nursing facilities. Thus, they only represent 1.1% of nursing employees.

Psychologists

The supply and distribution of licensed psychologists is similar to that seen with physicians and many other providers (Figure 5.41). Nationally there are 2.9 psychologists per 10,000 population, while the comparable ratio for North Dakota is 2.6. There are far more psychologists within North Dakota in

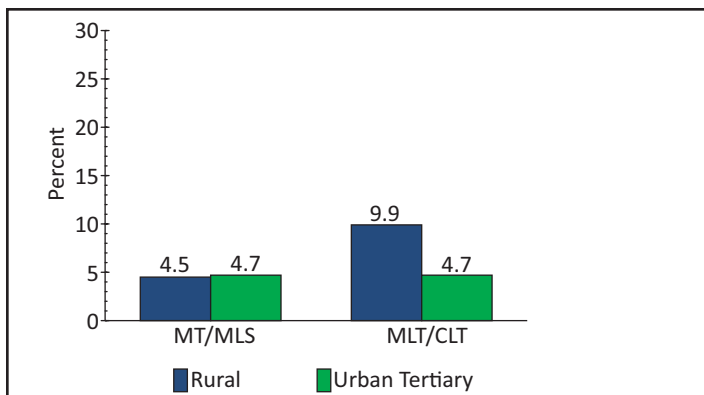


Figure 5.27. Lab Staff Vacancy Rates²

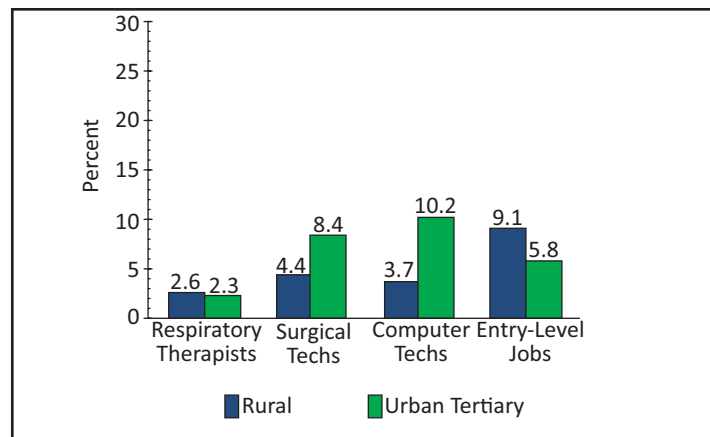


Figure 5.31. Other Workforce Vacancy Rates #2²

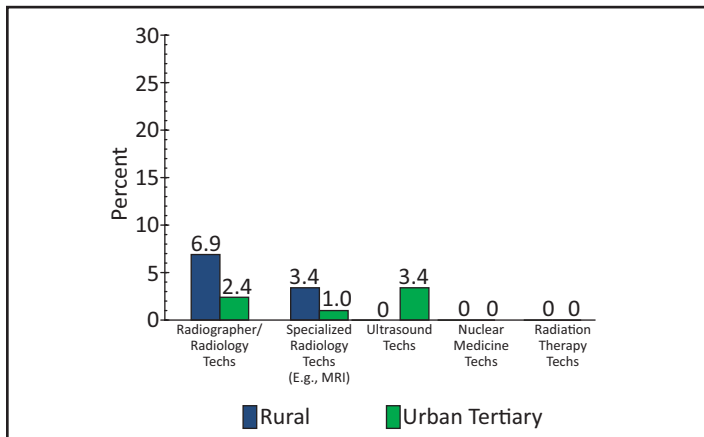


Figure 5.28. Radiology Staff Vacancy Rates²

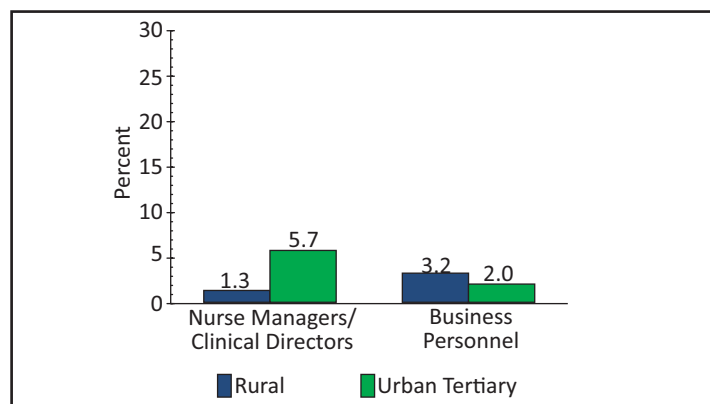


Figure 5.32. Management Vacancy Rates²

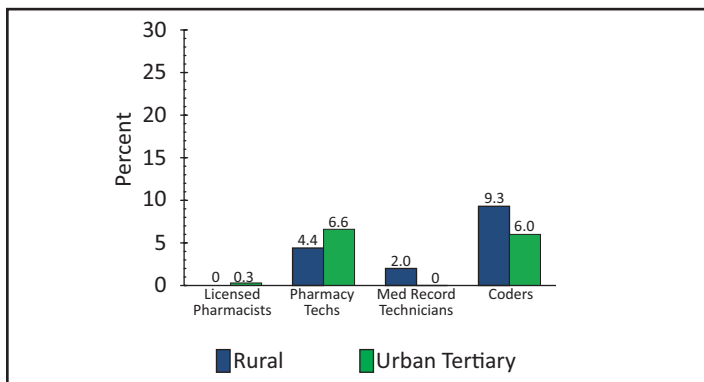


Figure 5.29. Pharmacy & Medical Records Vacancy Rates²

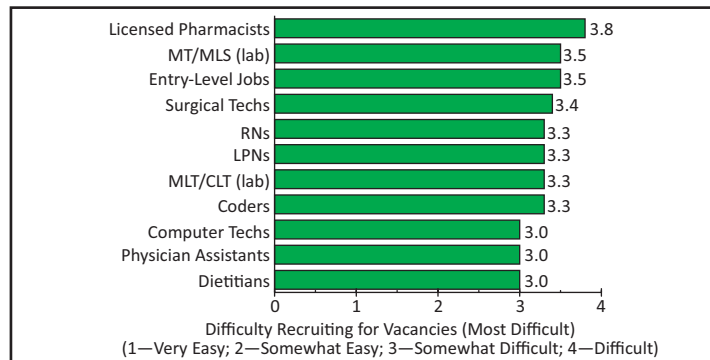


Figure 5.33. Difficulty Recruiting for Urban Vacancies (Most Difficult) By Workforce Type²

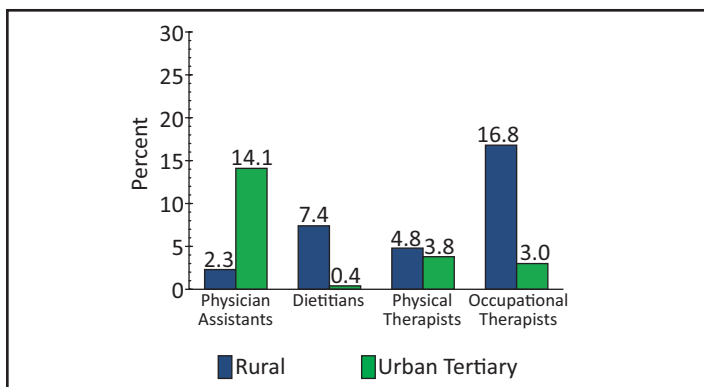


Figure 5.30. Other Workforce Vacancy Rates #1²

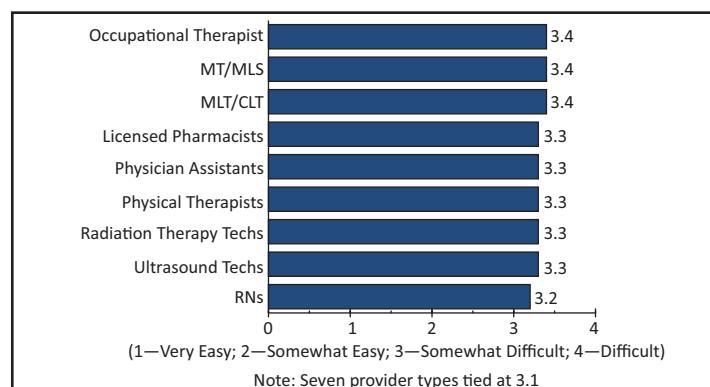


Figure 5.34. Difficulty Recruiting for Rural Vacancies (Most Difficult) By Workforce Type²

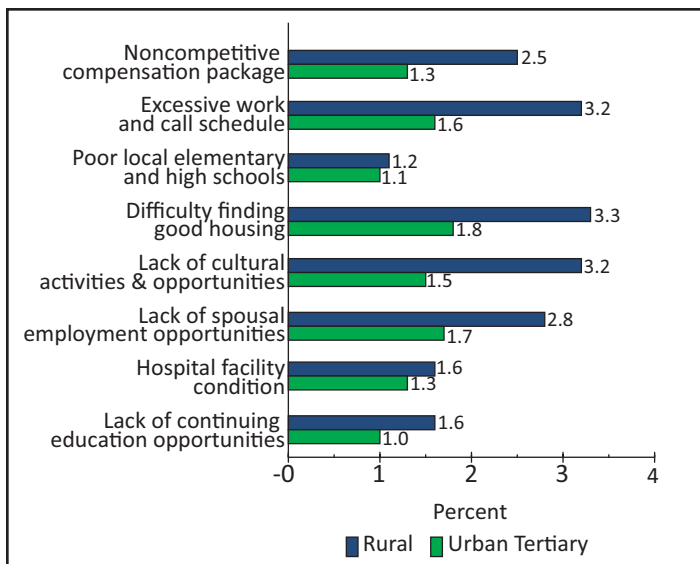


Figure 5.35. Rating of Factors That Contribute To Problems Recruiting Physicians to Hospitals by Rural/Urban Status²
 Note: Respondents were asked to rate the factors on a four-point scale wherein 1—"not a problem at all" 4—"important problem."

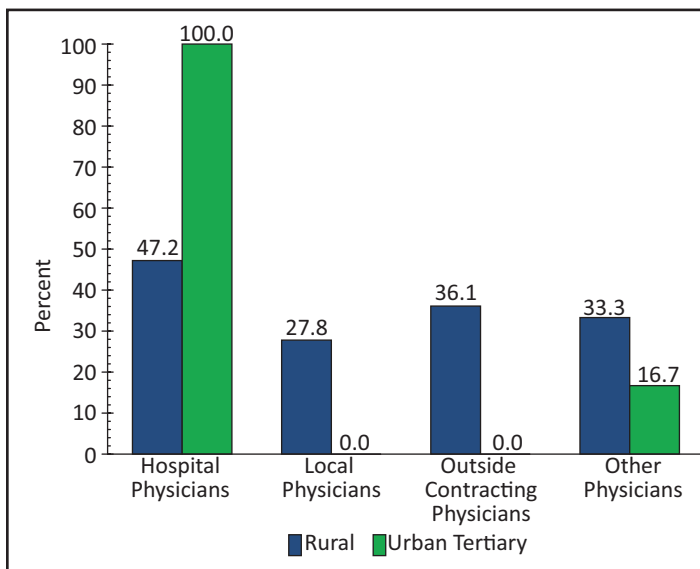


Figure 5.36. Physician Staffing of Emergency Department on Weekends²
 Note: Respondents were instructed to mark all that apply. Thus, the rural and urban tertiary county columns can each sum to greater than 100%.

metropolitan counties than in micropolitan (large rural) or rural counties (3.8 versus 2.3 and 0.5). If one compares the availability of psychologists in metropolitan counties with rural counties, there are 87% fewer psychologists in the rural counties (when corrected for population differences). Clearly, the micropolitan (large rural) and rural counties have far fewer psychologists than do metropolitan counties. These ratios are not adjusted by FTEs, so the actual number of FTE psychologists likely is lower.^{4, 5, 12}

Oral Health Providers

Oral healthcare is vital for good overall health. However, populations that have the poorest oral health conditions typically also have the greatest difficulty obtaining access to care. In North

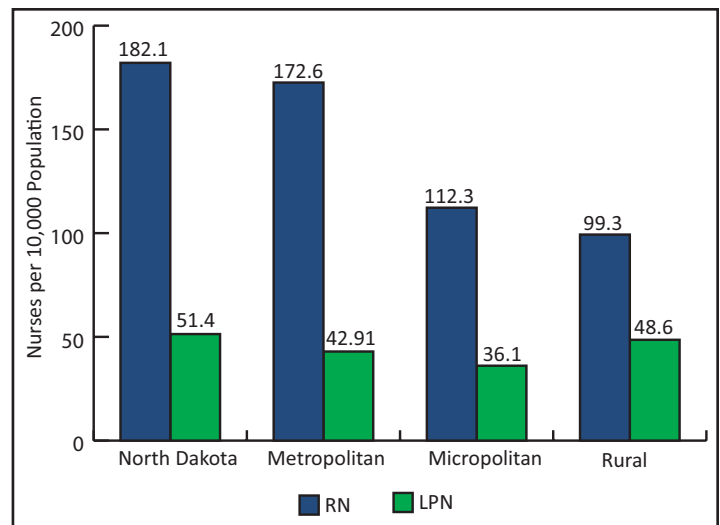


Figure 5.37. RN and LPN per population 2015

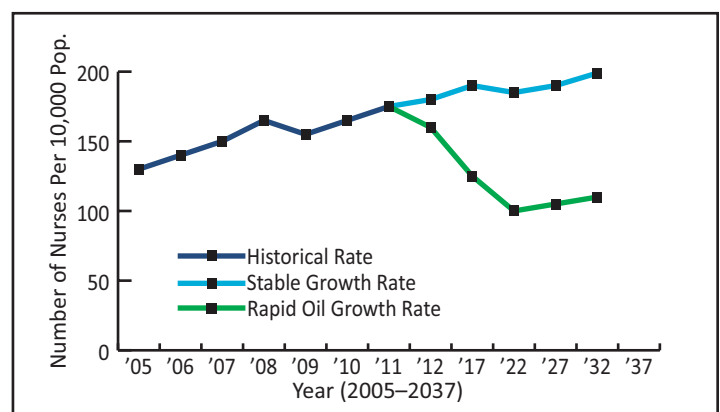


Figure 5.38. RN projection with oil population^{8, 9}

Dakota, there are issues of both access and utilization among the poor, American Indian, rural, elderly, and Medicaid recipient populations. As a result, these populations report poorer oral health status.

In North Dakota, 30% of the state's 53 counties have been designated by the federal government as dental health professional shortage areas.¹³ Those counties have also all been identified as rural communities by the U.S. Census Bureau. As of March 2016, 17 of the 53 North Dakota counties had no practicing dentist, eight had one, and 15 had between two and four (Figure 5.42).

Nearly 62% of all practicing dentists were located in the four largest counties: Burleigh (Bismarck), Cass (Fargo), Grand Forks (Grand Forks), and Ward (Minot). There are 405 dentists in practice, 644 dental hygienists, and 590 dental assistants. However, all three provider types are disproportionately located in urban counties. This includes dentists and their staffs in generalist and specialist care. While about 50% of the state's population resides in urban counties, 68% of dental assistants, 60% of dental hygienists, and 61% of dentists practice in these counties. Roughly 22% of North Dakota residents live in isolated rural communities and struggle to obtain access to oral healthcare. Only 12%, 11%, and 8% of dentists, hygienists, and assistants practice in rural communities, respectively (Figure 5.43).¹⁴

The dental licensure data illustrate the maldistribution of oral health providers across North Dakota, and national data corroborate this finding. The American Dental Association

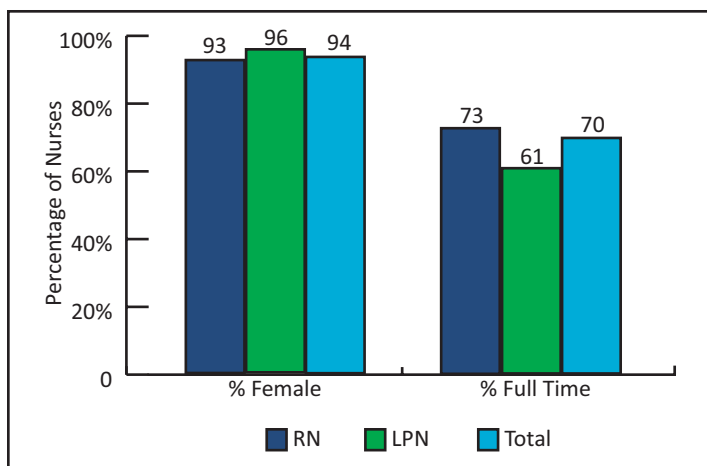


Figure 5.39. RN and LPN per gender, work time (2014–15).^{8,9}

(ADA) identifies 60.9 dentists per 100,000 population nationally. In North Dakota, residents have access to 55.4 dentists for every 100,000 residents, slightly below the national average.¹⁵ The number of dental providers in North Dakota has been on a consistent increase, alongside state population rates; however, there is still greater demand than supply, especially as it relates to geographic maldistribution. Nearly 19% of dentists in North Dakota report anticipated retirement during the next one-to-five years. Collectively, 35% of dentists indicated retiring in the next one to 15 years (Figure 5.44).

The retirement rate mirrors the national trend in which 40% of all practicing dentists are age 55 or older. Because this is a national concern, North Dakota will be in competition with other states looking to grow their dentist workforce as current dentists retire.

The dentist shortage in North Dakota is likely exaggerated by the lack of a dental school within North Dakota and no reciprocity agreement with either nearby state responsible for producing a majority of North Dakota's providers. As of 2016, roughly 46% of all practicing North Dakota dentists had graduated from the University of Minnesota with an additional 23% from one of two schools in Nebraska.¹⁶

Conversely, though there are dental hygiene (DH) programs in Minnesota, the majority of North Dakota's practicing hygienists (61%) graduate from an in-state institution (North Dakota State College of Science [NDSCS]). NDSCS also produces the greatest percentage of North Dakota's registered dental assistants (DA). When there are in-state oral health professional schools, North Dakota retains much of the resulting workforce. NDSCS is the only educational institution in the state providing dental professional degrees and certificates. NDSCS offers a DA certificate, DA Associate of Applied Science degree, and a DH degree. While NDSCS offers an in-state opportunity for North Dakota residents to earn an allied dental degree, both the DH and DA programs have limited availability for student admission. In 2014–2015, NDSCS graduated 14 DAs and 23 DHs. Unfortunately, the number of graduates does not meet the state's demands.

Similarly, as can be seen in Figure 5.45, more dentists in North Dakota report more full-time and part-time vacancies for DAs than DHs. The North Dakota vacancy rate for dentists is unknown and problematic given the small-office entrepreneurial nature of dental practices. However, based on 2014 population

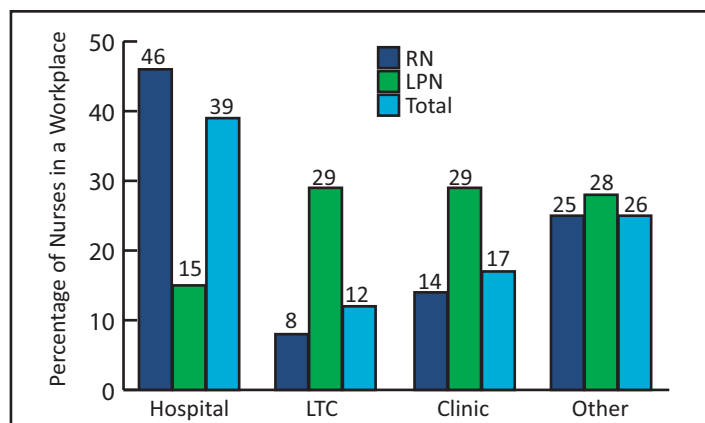


Figure 5.40. RN and LPN by facility (2014–15).^{8,9}

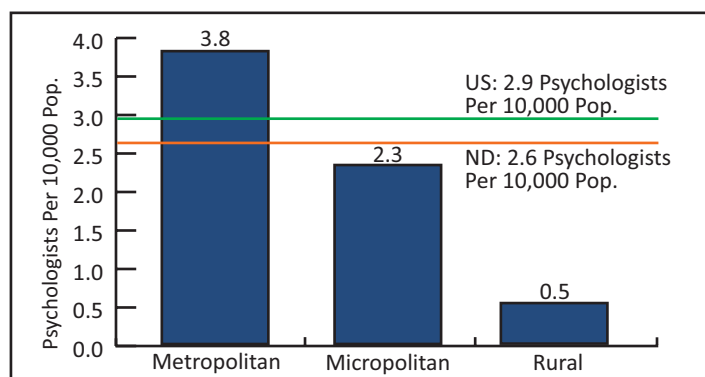


Figure 5.41. North Dakota psychologists per 10,000 population by rural/urban status, 2009.^{4,5,12}

estimates, roughly 50,789 state residents live in counties with no dentist. It is unknown how many of these counties have dental vacancies (practices hiring for a dentist) and how many simply have no infrastructure for a dental clinic.

North Dakota has a need for a larger oral health workforce with its high vacancy rates for DAs and inadequate distribution of oral healthcare services. There is need to both increase the current workforce to ensure existing oral health systems are sufficiently staffed, and to identify innovative models to provide oral healthcare for residents located in counties with no dental services. North Dakota should focus on innovative solutions to provide oral healthcare for residents located in rural and tribal communities not currently served by a dental clinic. This could include utilization of DHs when possible. The state permits DHs to provide care under general supervision, creating a workforce that, if utilized, could provide reimbursable, preventive care without a dentist present in high-need communities outside of the traditional dental office. It is important to also identify opportunities to grow the DA workforce in order to ameliorate the current workforce shortage.

Representatives of the Center for Rural Health have shared research on oral health outcomes, workforce dispersion, and analyses of proposed models with the Health Services Committee during the interim session in 2016. Many fact sheets and policy briefs have been developed and disseminated per request of the committee. These resources may be accessed on the Center for Rural Health's website at <https://ruralhealth.und.edu/what-we-do/oral-health>.

Pharmacists and Pharmacy Technologists

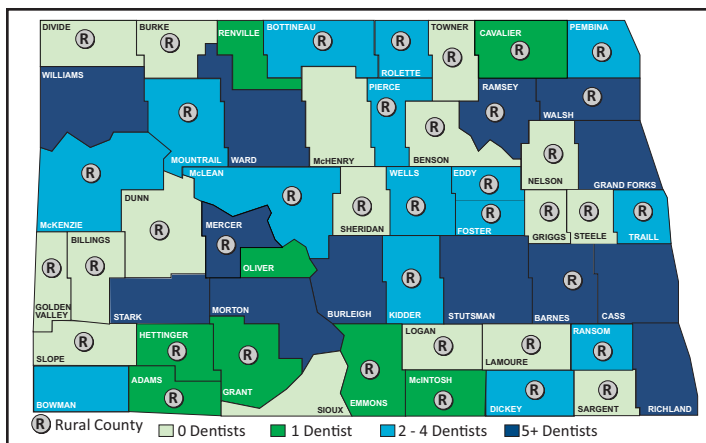


Figure 5.42. Number of Doctors of Dental Surgery in North Dakota counties

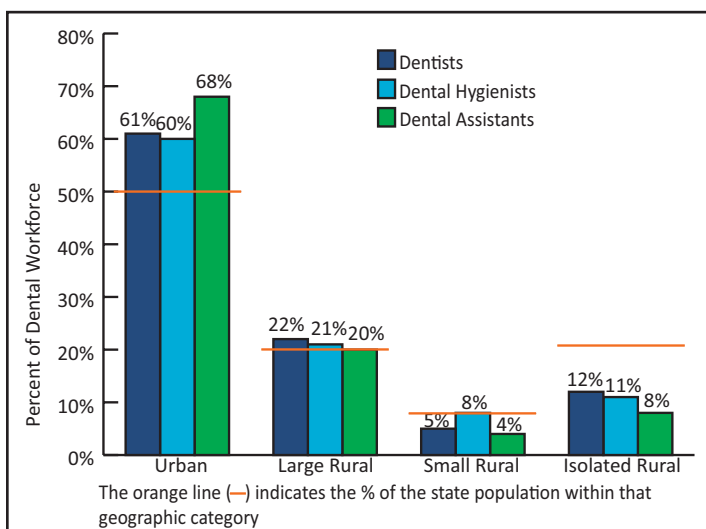


Figure 5.43. Percentages of Dental Workforce Practicing in Rural & Urban Communities

North Dakota has more pharmacists than the country as a whole (Figure 5.46).

The situation differs for pharmacy technicians, where North Dakota lags behind the United States. There is less variation across metropolitan county categories for pharmacy technologists than for pharmacists. The national average ratio of pharmacy technologists per 10,000 population is 10.5, and the overall North Dakota rate is 9.5 (North Dakota 10% lower). Metropolitan North Dakota counties have a pharmacy-techs-to-10,000-population ratio of 10.1 compared with ratios in micropolitan (large rural) and rural counties of 8.8 and 9.1 per 10,000 population, respectively (rural 10% lower than metropolitan; Figure 5.47).

Information from the 2014 *North Dakota Hospital Workforce Survey* shows that North Dakota's short-term general hospitals in September 2014 employed 209 FTEs of pharmacists and 154 FTEs of pharmacy technicians. The overall North Dakota hospital vacancy rates for pharmacists and pharmacy technicians were 1.2% and 6.0%. The total number of vacancies for pharmacists was 2.5 FTEs and 9.2 FTEs for pharmacy technicians.

Physical Therapists

By national norms, North Dakota has an adequate supply of physical therapists compared with the rest of the nation, although they are not evenly distributed geographically across North

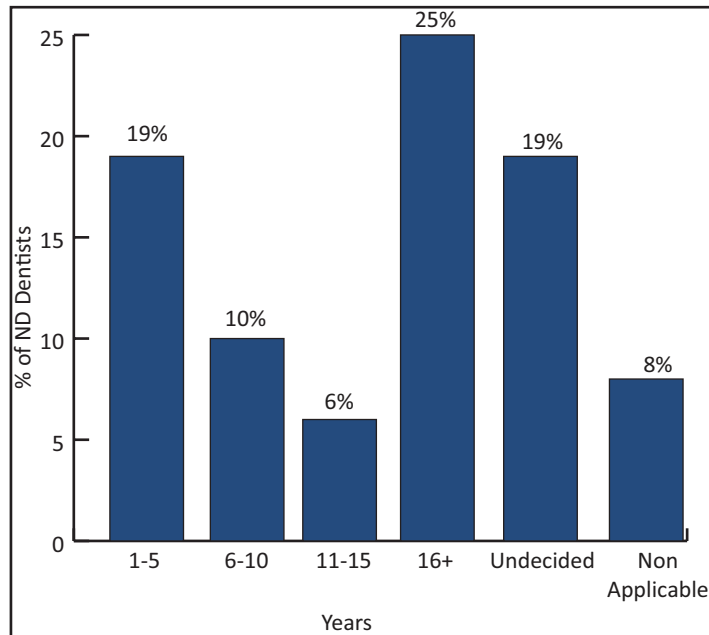


Figure 5.44. Retirement Projections of North Dakota Dentists

Dakota (Figure 5.48). The national ratio of physical therapists is 6.2 per 10,000 population, while the North Dakota ratio is 38.7% higher at 8.6.^{4, 5, 17} In addition, there are 130 licensed physical therapy assistants who have work addresses within North Dakota in 2016.

While this ratio appears to demonstrate an overall adequate supply of physical therapists, the distribution of physical therapists remains primarily in metropolitan counties. Metropolitan counties have demonstrated a much higher ratio than rural counties at 9.9 versus 5.3 per 10,000 population in micropolitan (large rural) and 4.1 per 10,000 population in rural counties (micropolitan counties are 46% and rural counties are 59% lower than metropolitan counties).^{4, 5, 12} As can be seen from Figure 5.48), two-thirds of North Dakota's physical therapists are in metropolitan counties (17% in micropolitan and 17% in rural counties). The corresponding population percentages are 50.1%, 20.5%, and 29.4%, respectively), which clearly shows the geographic disparity regarding the rural population.

In July 2014, an electronic survey was conducted by the SMHS Department of Physical Therapy of North Dakota's licensed physical therapists. There were 272 physical therapists (34%) who responded to the survey. Caution should be used with survey results because of the low response rate, though these are the only such data presently available. The respondents primarily worked in metropolitan counties (73%), followed by micropolitan (14%), and rural (13%) counties. The respondents reported a much higher rate of employment in outpatient facilities (48%) but much lower in hospitals (11%) compared with national trends (35% and 31%, respectively).¹⁸ The numbers of physical therapists working in home healthcare and nursing care facilities was similar to national trends.¹⁸ Notably, the percentage of North Dakota physical therapists under age 35 was substantially higher than national data (49% versus 32%).⁵ It is important to note that nearly 73% of respondents who were licensed and practicing had graduated from a high school in North Dakota. The largest percentage of respondents identified themselves as graduates of UND (64%) followed by the University of Mary (18%).

Information from the 2014 *North Dakota Hospital Workforce Survey* shows that North Dakota's short-term general hospitals as

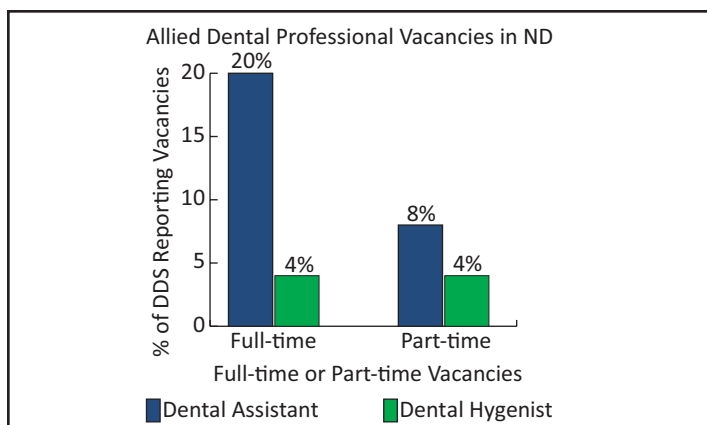


Figure 5.45. Allied Dental Professional Vacancies in North Dakota

of September 2014 employed 312 FTE physical therapists (230.0 urban and 69.2 rural). There were 12.7 FTE vacancies for an overall physical therapist vacancy rate of 4.1% (urban 3.8%, and rural 4.8%).²

Information from the 2016 *North Dakota Nursing Facility Workforce Survey* shows that North Dakota's nursing facilities as of September 2016 employed 70.4 FTE physical therapists (25.2 urban and 45.3 rural). There were 3.0 FTE vacancies for an overall physical therapist vacancy rate of 4.1% (urban, 0.0% and rural, 6.2%).¹

Occupational Therapy Practitioners

In July 2016, there were 735 licensed occupational therapy practitioners in North Dakota; 564 were licensed occupational therapists (OTs), and 171 were occupational therapy assistants (OTAs).¹⁹ In 2015, faculty members from the SMHS Department of Occupational Therapy surveyed 166 occupational therapy providers in North Dakota to gain a better understanding of the issues affecting occupational therapy practice in North Dakota. The Department surveyed 145 OTs and 30 OTAs in North Dakota (response rate 28% and 20%, respectively). Caution should be used with survey results because of the low response rate, though these are the only such data presently available.

The respondent demographics were reported with a range of 23 to 65 years of age and 94% were female. Responses indicated that 58% of practitioners were practicing in zip code areas classified as urban, 23% in large rural, and 16% in small or isolated rural. Using the three-category county definition for 2009, North Dakota data indicate that they are practicing in 63% metropolitan, 23% micropolitan, and 14% rural (Figure 5.49). Of the OT professionals responding to the survey, 52% graduated from the UND SMHS and 22% graduated from the University of Mary. Of the 30 OTAs responding to the survey, 56% graduated from the North Dakota State College of Science. More OTAs reported working in schools than did OTs.

Population trends in North Dakota indicate a reduction in population growth in western North Dakota (at least for now). However, there continue to be families with children, many of whom may need services through the school systems or other community-based agencies. There is also a large aging population in North Dakota, especially in rural areas. These medical needs indicate the need for more skilled OT professionals serving in shortage areas in order to facilitate increased independence and productivity of these populations in progressing through the educational system and being able to remain in their home

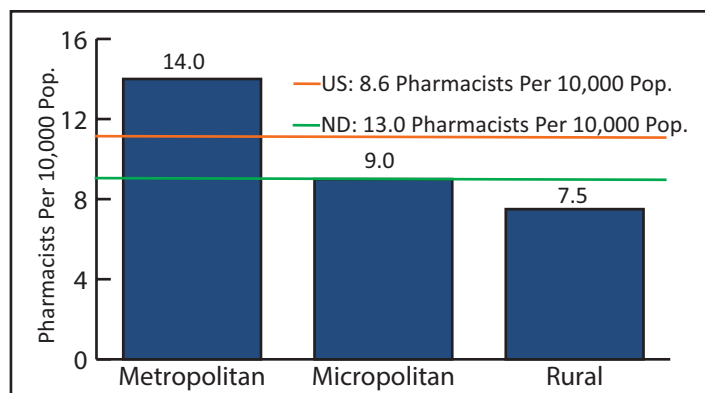


Figure 5.46. North Dakota pharmacists per 10,000 population by rural/urban status, 2009^{4, 5, 12}

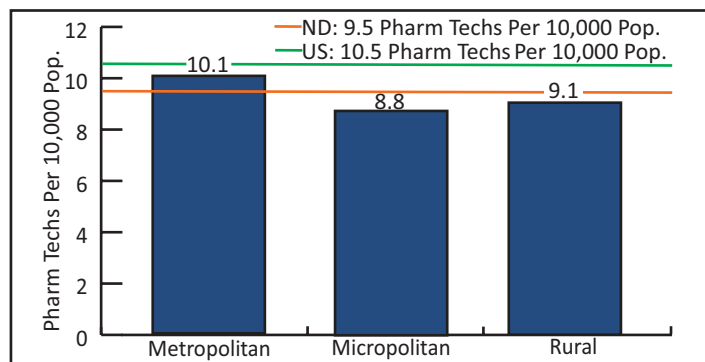


Figure 5.47. North Dakota pharmacy technicians per 10,000 population by rural/urban status, 2010^{4, 5, 12}

communities.

Information from the 2014 *North Dakota Hospital Workforce Survey* shows that North Dakota's short-term general hospitals as of September 2014 employed 103.2 FTEs of occupational therapists (urban 88.4, rural 14.8). Overall in North Dakota, there were 5.7 FTE vacancies (urban 2.7, rural 3.0). The overall vacancy rate was 5.2% (urban 3%, rural 16.8%). The median number of months for the longest vacant position was 2.5. At least for short-term general hospitals in 2014, the supply of OTs was close to meeting North Dakota's needs overall with only 5.7 FTE vacancies, but the rural county vacancy rate of 16.8% was a little high, though based on only 3.0 FTE vacancies.

Information from the 2016 *North Dakota Nursing Facility Workforce Survey* shows that North Dakota's nursing facilities as of September 2016 employed 59.5 FTE occupational therapists (26.7 urban and 32.8 rural). There were 3.0 FTE vacancies for an overall occupational therapist vacancy rate of 3.3% (urban 0%, and rural 5.8%).¹

Medical Laboratory Professions

North Dakota is one of only 12 states that require state licensure for personnel performing medical laboratory testing. Current licensed laboratory professionals include 332 medical/clinical laboratory technicians (MLT/CLT), 697 medical technologists and medical laboratory scientists (MT/MLS), and 10 specialists. In 2014, the UND SMHS Medical Laboratory Science Department electronically surveyed licensed North Dakota laboratory professionals with a focus on capturing the demographics of the laboratory workforce within the state. The survey was completed by 273 respondents for a 28.1% response rate. Caution should be used with survey results because of the

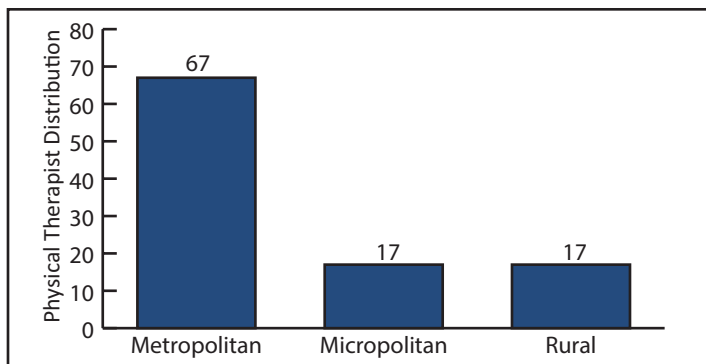


Figure 5.48. Percentage of North Dakota physical therapists by rural/urban status, 2009^{4, 5, 12}

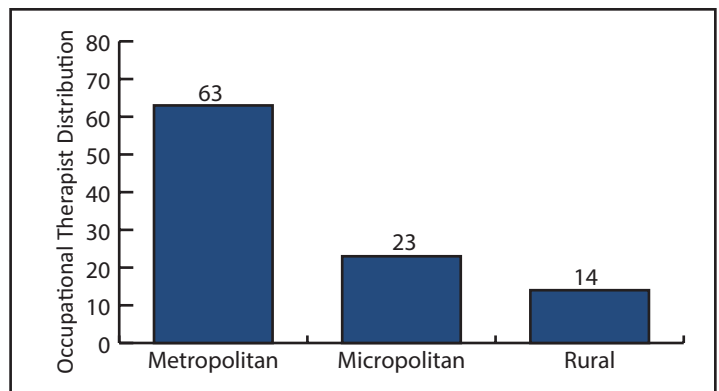


Figure 5.49. North Dakota distribution of occupational therapy personnel by rural/urban status, 2014¹²

low response rate, though these are the only such data presently available.

North Dakota has two baccalaureate-level medical laboratory science programs accredited by the National Accrediting Agency for Clinical Laboratory Sciences (221 programs in the United States) and two associate-level medical laboratory technician programs (230 programs in the United States). Accredited North Dakota medical laboratory science programs produced 80.4% of the practicing medical laboratory scientists, followed by 8% completing programs from neighboring states (Minnesota, South Dakota, and Montana) and the remaining graduates completing programs from non-neighboring states or international programs. Accredited medical laboratory technician programs produced 23.1% of the practicing MLTs/CLTs, while 73.9% come from surrounding states (Minnesota, South Dakota, and Montana) and 2.9% from other U.S.-accredited associate-level programs.

The median age of North Dakota laboratory personnel is 46 years, which is slightly older than the national median age of 42 (ASCP, 2013). More than 70% of the laboratory managers surveyed report it takes three months to a year to fill laboratory vacancies for both medical laboratory scientists (baccalaureate level) and medical laboratory technicians (associate level). North Dakota vacancy findings are inconsistent with a nationally delivered vacancy survey (ASCP, 2013), which reports most laboratory vacancies are filled in less than three months. In addition to an extended period to fill existing vacancies, laboratory managers projected at least a 62% increase in vacancies for MT/MLS and a 78% increase in vacancies for MLT/CLT as a result of current employees leaving positions because of retirement.

Examination of the results from the 2014 *North Dakota Hospital Workforce Survey* show that North Dakota's short-term general hospitals as of September 2014 employed 475.1 FTEs (MT/MLS 292.0 [61.5%], MLT/CLT 183.1 [38.5%]).² The overall statewide short-term hospital vacancy rate for MT/MLS was 4.6% and 7.2% for MLT/CLT. The North Dakota rural vacancy rate for MT/MLS was 4.5%, and the rate for MLT/CLT was 9.9% (urban rates were 4.7% and 4.7%, respectively). The North Dakota short-term general hospital rates of MT/MLS and MLT/CLT per 10,000 population were 4.2 and 2.6, respectively (North Dakota rural rates 2.7, 2.5; urban rates 5.6, 2.8). As reported in the *Third Biennial Report*, of the 25 provider types included in the survey, MT/MLS were ranked the second-most difficult to recruit in urban counties and the

second-most difficult in rural counties. MLT/CLT were ranked the seventh-most difficult to recruit in urban counties and the third-most difficult in rural counties.

SUMMARY

North Dakota has a large number of NPs in metropolitan counties (8.4 per 10,000 population). However, North Dakota's rural counties have 4.8 NPs per 10,000 population, while the national rate is 5.4. North Dakota is ahead of the national PA-per-10,000-population ratio for PAs (3.2 versus 2.7).

Overall, North Dakota is significantly ahead of the nation for registered nurses (116 versus 92 per 10,000 people), especially in metropolitan counties. Rural counties have about 100 fewer RNs per 10,000 population.

North Dakota is very close to the national rate for psychologists (2.6 versus 2.9 per 10,000); however, in rural counties, there are only 0.5 psychologists for every 10,000 people.

There is a shortage of dentists in North Dakota (the rate of 5.4 per 10,000 population is lower than the national rate of 5.9). This is especially true in rural counties where the rate is 3.3 per 10,000.

North Dakota has more pharmacists than the national ratio per 10,000 population and lags slightly in pharmacy techs when compared with the United States. The national ratio per 10,000 population is 8.6 pharmacists per 10,000 population compared with North Dakota's ratio of 13.0.

Physical therapists are primarily found in metropolitan counties, and the overall state rate per 10,000 is 59% higher than the national rate. Rural counties lag behind metropolitan areas and the United States as a whole. These same relationships hold for occupational therapists.

The new information from the 2014 *North Dakota Hospital Workforce Survey* and the 2016 *North Dakota Nursing Facility Survey* generally showed that there were only moderately high vacancy rates for certain provider types with the majority of provider types currently having a good balance of supply and demand. In both surveys, there were shortages as shown by moderately high vacancy rates. NPs and PAs were not employed extensively.

North Dakota has relatively more nonphysician providers (e.g., PAs, RNs, and pharmacists) for some roles and relatively fewer (e.g., dentists, NPs, and psychologists) for others. In addition, there are shortages by metropolitan status and other factors. As with physician specialists and primary care physicians, it is essential for policymakers and educators in North Dakota to

understand the specific issues for all healthcare professionals and to anticipate the consequences of an aging population and the uncertainty of population growth or decline in the Oil Patch.

References

1. Center for Rural Health. (2016). *North Dakota Nursing Facility Workforce Survey* (Data file).
2. Center for Rural Health. (2014). *2014 North Dakota Hospital Workforce Survey* (Data file).
3. Blue Cross Blue Shield of North Dakota. (2012). *Mid-Level Providers 2012* (Data file).
4. U.S. Census Bureau. (2013). *Metropolitan and Micropolitan Statistical Areas and Definitions* (Data file). Retrieved from <http://www.census.gov/>.
5. U.S. Census Bureau. (2016). *Current Population Estimates Data*. Retrieved from <http://www.census.gov/popest/data/>.
6. Medical Marketing Service. (2015). *AMA Physician Master File, 2015 (Data file)*. Wood Dale, IL: Medical Marketing Service.
7. American Academy of Physician Assistants. (2013). *2013 AAPA Annual Survey Report*. Retrieved from <http://www.aapa.org/WorkArea/DownloadAsset.aspx?id=2902>.
8. North Dakota Board of Nursing. (2015). *North Dakota Board of Nursing Annual Report 2014-2015*. Retrieved from <https://www.ndbon.org/>.
9. North Dakota Board of Nursing. (2013). *North Dakota Board of Nursing Annual Report 2011-2012*. Retrieved from <https://www.ndbon.org/>.
10. National Center for Health Workforce Analysis, Bureau of Health Professions, Health Resources and Services Administration. (2013). *The U.S. Nursing Workforce: Trends and Supply*. Government Printing Office: Washington, DC.
11. Which States Have the Most Registered Nurses. Becker's Hospital Review. Retrieved on October 20, 2014, from <http://www.beckershospitalreview.com/hospital-physician-relationships/which-states-have-the-most-registered-nurses.html>.
12. U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions. (2015). *Area Health Resource File (AHRF)* (Data File). Retrieved from <http://datawarehouse.hrsa.gov/data/datadownload/ahrfdownload.aspx>.
13. Health Resources and Services Administration (HRSA). (2016). *Dental HPSAs*. Retrieved from <https://datawarehouse.hrsa.gov/tools/analyzers/HpsaFindResults.aspx>.
14. North Dakota Board of Dental Examiners. (2016). *Licensure File*. <https://www.nddentalboard.org/>.
15. American Dental Association. (2016). *National Licensure File*.
16. North Dakota Department of Health. (2016). *The North Dakota Dental Workforce Survey*.
17. North Dakota Board of Physical Therapy. (2015). *Annual meeting minutes*. Retrieved from <https://www.ndbpt.org/pdf/2015may11minutes.pdf>.
18. American Occupational Therapy Association. (2010). *American Occupational Therapy Compensation and Workforce Study*. Retrieved from <https://www.aota.org/media/corporate/files/educationcareers/prospective/workforcetrend-in-ot-pdf>.
19. North Dakota State Board of Occupational Therapy Practice. (2016). North Dakota Board of Physical Therapy Licensure Data.

CHAPTER SIX:

Healthcare Organization and Infrastructure in North Dakota Hospitals

HOSPITALS AND HEALTH SYSTEMS

A significant health organizational structure is the hospital, along with broader health systems that tend to be an organizational structure composed of a hospital, clinic system, and other healthcare elements (ambulance, nursing home, and others). We tend to use the word *hospital* to mean the actual hospital but sometimes people are referring to the entire interconnected local health system. Regardless, an important—even dominant—player in the national and state system of care is the hospital.

Figures 6.1 and 6.2 depict the distribution of North Dakota hospitals (i.e., Indian Health Service, tertiary, and critical access hospitals), the areas federally designated as health professional shortage areas (HPSAs; pronounced “hip-sah”), and the Oil Patch area. Most of North Dakota is designated as a HPSA.¹ Nearly half of North Dakota’s HPSAs are located within the Oil Patch. The only Oil Patch county not designated is Bowman, located in the extreme southwest corner of the state. As is evident, the tertiary hospitals are located in the four largest cities in the state, and the critical access hospitals (CAHs) supplement the “Big Six” hospitals (Altru Health System in Grand Forks, Trinity Health in Minot, Sanford Health in Bismarck and Fargo, Catholic Health Initiatives [CHI]-St. Alexius Medical Center in Bismarck, and Essentia Health in Fargo) by providing hospital coverage elsewhere. Tertiary hospitals imply the third level of care as primary and secondary hospitals make referrals to these tertiary hospitals that offer a larger complement of specialty care services. Tertiary hospitals are sometimes called referral hospitals. In addition, there are a number of other hospitals that provide a distinct level of care.

According to the North Dakota Department of Health (NDDOH), there are 52 hospitals in the state (36 CAHs, six general acute Prospective Payment System [PPS; tertiary], three psychiatric, two Indian Health Service [IHS], two long-term acute care, two transplant, and one rehabilitative).

The United States Department of Veterans Affairs (VA) and its Veterans Health Administration operates a federally funded hospital for veterans in Fargo, N.D., that is similar to and complements the “Big Six” hospitals in the state. Outpatient care through the Fargo VA Hospital is augmented by eight associated community-based outpatient clinics (CBOC) that are located throughout the state; the CBOCs may be found in Bismarck, Devils Lake, Dickinson, Grafton, Grand Forks, Jamestown, Minot, and Williston, N.D. While the Fargo VA Hospital and its associated CBOCs provide important care to veterans in the state and the region, such federally funded healthcare services will not be analyzed or included further in this chapter or elsewhere in this *Fourth Biennial Report*.

CAHs are rural hospitals that must meet specific federal guidelines such as the following: cap of 25 acute-care beds, an average length of stay of 96 hours or less, location at least 35 miles from another hospital, and reimbursement on an allowable-cost basis as opposed to a PPS, which is used with the Big Six tertiary hospitals. Nationally, about 72% of all rural community hospitals have converted to CAH status (1,332 out of 1,855 as of March 2016).^{2,3} All rural hospitals in North Dakota, with the exception of the two IHS hospitals, are CAHs. In North Dakota, all CAHs are nonprofit; in the country, as a whole, 94% of all CAHs are either nonprofit or government.⁴

All 36 CAHs have important networking relationships with

Table 6.1

Tertiary hospital geographic regions related to critical access hospitals.

Tertiary Hospital	Square Miles	People per Sq. Mi.	Number of CAHs	Average Distance
Bismarck	26,815	7.3	10	110.5
Fargo	12,492	18.2	5	95.8
Grand Forks	10,955	11.1	10	66.6
Minot	20,419	7.5	11	84.5

Minot and Bismarck hospitals service the largest areas, although Grand Forks and Fargo have the highest concentrations of people.

- The Fargo region has the fewest CAHs.
- The distances between the CAHs and the tertiaries are greatest for Bismarck. The CAH closest to a tertiary hospital is only 36 miles away, while the CAH farthest from a tertiary hospital is 182 miles away.

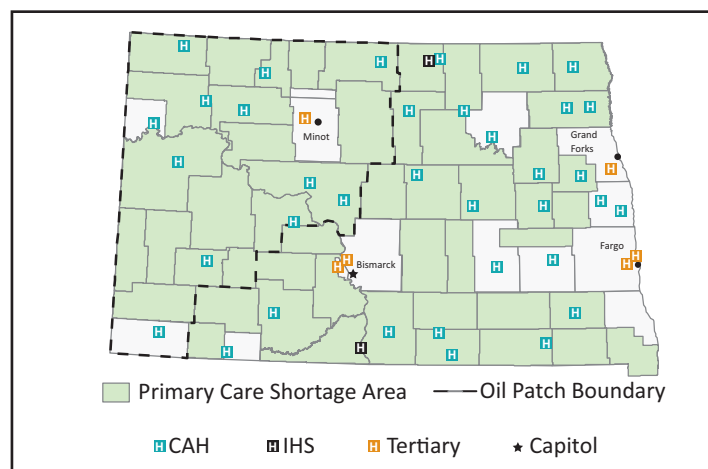


Figure 6.1. Hospitals in North Dakota

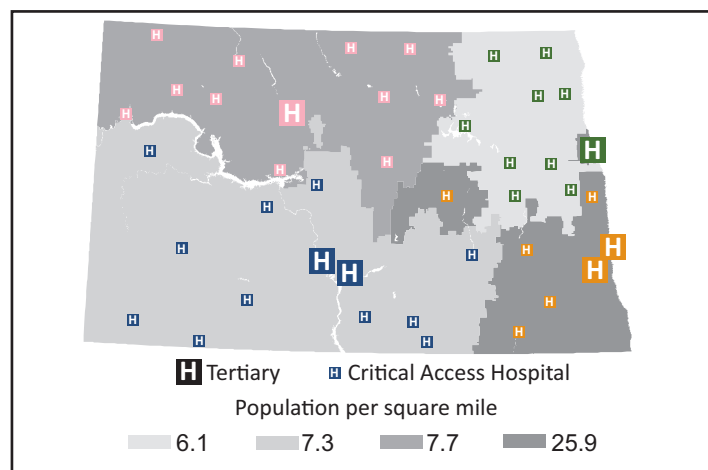


Figure 6.2. Critical access and tertiary network service areas

the Big Six hospitals that are located in the four largest cities of North Dakota. Each city thus forms a tertiary care geographic region (see Figure 6.2, and Tables 6.1 and 6.2). Most of the CAHs are located an hour or more by surface transportation from their tertiary referral center; in inclement weather, the transfer time can be substantially longer or even impossible. CAHs take care of

Table 6.2
Tertiary hospital cities and CAH demographics.

Tertiary Hospital	Tertiary Beds	CAH Beds	Tertiary Average Age	CAH Average Age	Tertiary % Male	CAH % Male
Bismarck	510	230	38.2	42.1	49.4	50.5
Fargo	687	120	35.5	38.5	50.6	50.6
Grand Forks	277	187	34.7	41.9	41.4	50.4
Minot	416	233	36.4	50.5	50.7	51.3

Hospitals in the Fargo region have the most beds (807 total); Bismarck has 740, Minot has 649, and Grand Forks has 464.

- For all regions, the average age of people in the CAH territories is older than those in the four main cities. This would place a greater burden on the CAHs for certain types of care.

an older population than the Big Six because North Dakota's rural population tends to be older (see Table 6.2).

The hospital market continues to consolidate nationally, and this is found in North Dakota too. In comparison to our neighbors in South Dakota, rural North Dakota hospitals tend to have more independence and autonomy in that they are community-controlled, nonprofit hospitals. All CAH as well as the PPS hospitals in North Dakota are nonprofits. North Dakota is unique in that there are no for-profit hospitals. For the rural hospitals, about 56% are independent (neither owned nor formally managed by an external system). There are 15 CAHs that have more formalized relationships with a tertiary hospital. Nevertheless, all CAHs must operate with some form of communication and transfer agreements with a referral hospital. All of the CAHs work with at least one regional tertiary on quality improvement efforts. The tertiary health systems also operate a number of primary care medical clinics either in conjunction with a CAH, or sometimes in a more competitive model. Chapter 7, Quality and Value of Healthcare, will discuss new health system arrangements that are in response to national health reform and alternative payment models. A number of North Dakota CAHs are participating in these new structures including accountable care organizations (ACOs).

Virtually all hospitals including rural hospitals face many challenges that affect their ability to provide quality healthcare services. Healthcare workforce supply; reimbursement from both public and private payers; new models of care with corresponding alternative payment structures; community economic conditions and population changes; and newer pressures to implement health information technology (HIT), and to collect, monitor, and assess quality-of-care indicators all fashion a layer of organizational constraint creating a difficult environment for hospitals. Rural hospitals in particular, because of their small financial margins and a greater reliance on public payers such as Medicare, contend with an especially difficult environment.

Concerns over the financial viability of CAHs are heard from both healthcare administrators and providers as well as community members. Surveys administered by the Center for Rural Health at community events and meetings throughout North Dakota from 2008 to 2016 found that "financial issues facing rural hospitals" was the highest-rated concern out of nine subject areas. Forty-seven percent said this was a high concern. Fully 77% of respondents found it to be a moderate to severe problem. The actual financial condition of North Dakota's CAHs adds credence to this general concern. Operating margin is an accepted financial measure of performance that compares

revenues and expenses associated with patient care. In 2015 (most recent released data year), CAHs in North Dakota had operating margins of +0.1%, which compares with a national CAH operating margin rate of +1.53% (+0.68% in the last *Report*). While barely positive in North Dakota, this is a significant improvement. In the *Third Biennial Report*, operating margins were -1.67%. By 2014, they had dropped even further to -5.1%. North Dakota still has lower operating margins than found in South Dakota and Minnesota. The operating margins for North Dakota CAHs have been negative since at least 2010. Looked at another way, in 2015, 17 CAHs had operating losses (47%) whereas in 2014, 28 CAHs had operating losses (78%). However, in comparison to other states and the nation, the financial operations of North Dakota CAHs associated with patient-care services are problematic. Another common performance measure is total margin, which looks at all revenue and expense sources for a hospital and includes investments, donations, tax revenue, grants, and other revenue sources. Statewide in 2015, North Dakota CAHs had a total margin of +3.1%, which compares with a national total margin rate of +2.97% (+2.33% in the previous *Report*). As is the case with operating margins, the total margins for 2015 also represent a significant turnaround. The *Third Biennial Report* showed a total margin of -0.02% for North Dakota CAHs. The data from 2014 showed a slight negative total margin of -0.03%.⁵ Under both the operating margin and the total margin measures, North Dakota's CAHs have improved but, relative to national data, they still show financial stress associated with operating margins; however, North Dakota CAHs now actually exceed national averages for the first time.⁶

Experts in CAH finances have given much of the credit for the turnaround to the increase in CAHs being engaged in the federal prescription drug discount purchasing program, called the 340B program (a reference to Section 340B of the Public Health Service Act of 1992 that created the discount). This program requires pharmaceutical manufacturers participating in the Medicaid and Medicare Part B programs to provide specific discounts on covered outpatient drugs purchased by some organizations, such as CAHs (added under the Affordable Care Act [ACA]), disproportionate share hospitals, sole community hospitals (a common designation used by rural PPS hospitals or non-CAHs), rural referral centers, family planning programs, homeless programs, federally qualified health centers (or FQHC look-alikes), and other outpatient clinics. However, federally certified rural health clinics (RHCs) are not covered. These organizations are frequently referred to as the "rural safety net" of providers. Nationally, 44% of all hospitals participating in the

program are CAHs. In 2005, there were fewer than 600 hospitals in the country participating (none were CAHs). By 2014, there were 2,140 hospitals involved with 940 being CAHs.⁷ In North Dakota, in 2014, only eight CAHs had positive operating margins, but this had increased to 19 in 2015. Twelve of the 19 utilized the 340B outpatient drug discount program.⁸

The financial situation for North Dakota CAHs appears to be improving; however, there are federal policy efforts being advocated by the pharmaceutical industry to constrain the 340B program that if successful could negate some of the positive financial change being experienced by CAHs and other rural hospitals.

Hospitals have also been affected by two other public policy changes. Under the 2011 Budget Control Act (effective in 2013), Congress in an effort to address federal deficit concerns, mandated sequestration cuts (from Latin meaning “to hold”) in federal spending amounting to \$1.2 trillion over 10 years. This included mandatory programs (e.g., Medicare) and discretionary. Medicare cuts are set at two percent per year deleted in provider payments. In North Dakota, using FY 2014 as an example (most recent year), the payment cut to hospitals amounted to \$14.5 million (\$11.7 million PPS hospitals and \$2.8 million CAHs).⁹ Another important payer is Medicaid (a federal and state program) which is also experiencing provider payment cuts. The overall impact to North Dakota hospitals and physicians is estimated to be \$62 million. This is associated with state cuts to address state financial constraints. Within this \$62 million are a reduction of \$31.5 million in a method change for Medicaid Expansion by moving from a commercial rate to the Medicaid fee schedule (effective January 2017); a reduction of \$24 million in reducing the Medicaid professional fee schedule from 147 percent to 100 percent of Medicare (effective July 2016); and a reduction of \$6.4 million by eliminating the Medical inflator (this latter reduction does not impact CAHs but it does impact federally certified rural health clinics).¹⁰ Federal and state policy, particularly as it relates to reimbursement, has a profound impact on hospitals, including rural hospitals and associated provider groups.

Rural communities have made significant commitments to their hospitals throughout the state, which can have an effect on the total margin rates. In 2005, only four CAHs had some level of local tax support (e.g., mill levy, sales tax), but by 2011, this had increased to 13 CAHs or 36% of all CAHs. The Center for Rural Health's 2014 North Dakota Hospital Workforce Survey found this had increased to 17 CAHs (47%). Ten hospitals receive \$100,000 or more a year from local taxes, with three gaining \$300,000 or more a year. The lowest tax yield was \$3,000 and the highest level of local support was \$550,000. Another four CAHs indicated in the survey that there was a likelihood of local taxes being initiated in the next five years, while seven stated it would not happen. In a similar fashion in 2005, 18 CAHs had the support of a local hospital foundation; this increased to 26 CAHs (72%) in 2011. The 2014 survey found that 29 CAHs (81%) had a hospital foundation.¹¹ While CAHs experience financial stress in many rural communities, local citizens are showing their support through their willingness to tax themselves or to make financial contributions to maintain local access to care.

North Dakota CAHs are complex organizational structures. In almost all rural communities with a hospital, the CAH is a “hub” of health services that goes well beyond acute care by offering primary care, long-term care, basic care, assisted living,

health-promotion and disease-prevention services, and other services that are important to the community. Only one of the 36 CAHs is a stand-alone, sole entity hospital offering exclusively traditional hospital services. This is down from five CAHs in the *Second Biennial Report* and three in the *Third Biennial Report*. In a way, this represents how hospitals operated or presented themselves years ago: the hospital as a hospital as opposed to today's rural health or medical center offering acute, primary care, and other community-based services frequently as part of a multi-organizational system. As rural hospitals start to transition from a volume-based system to a value-based system with alternative payment models (e.g. ACOs, patient-centered medical homes, integrated systems with bundled payments), more and more the focus broadens to a population-health-driven system. There is already a high level of acute-care and primary-care integration in rural North Dakota (e.g., hospitals and clinics in one organizational structure), so networks already exist. Most CAHs own and operate a primary care clinic (usually organized as a provider-based, federally certified RHC), a nursing home, or both, and many offer additional services. CAHs are a central access point to primary care services because 32 CAHs (89% of all CAHs) operate 57 primary care clinics, with 42 of them being RHCs. Thus, these 32 CAHs are providing direct clinic access not only in these 32 communities with hospitals but in an additional 15 other communities. In the *Third Biennial Report*, there were 30 CAHs that had such structures, so there has been some growth in the past two years. In addition, 13 CAHs (36%) operate nursing homes (down one from two years ago), nine operate ambulances, eight own senior apartments (down two), eight offer assisted living, seven operate basic care centers (down one), and two provide home-care services (down one).¹² The changes in ownership over two years shows that the type and level of community or regional integration is fluid. The hospital or health system has to monitor conditions in order to make decisions that simultaneously advance health in the community and protects the financial framework of the institution.¹³

These integrated health-delivery systems are a common and accepted organizational arrangement in North Dakota. From a policy perspective, it is important to understand that CAHs in North Dakota are diversified in their service base and the types of services they provide to rural North Dakota citizens, and it is this diversification that presents a complex set of policy issues. Almost all (97%) of North Dakota CAHs provide services beyond the traditional acute-care and emergency-care base, which means tens of thousands of rural citizens benefit from an organizational arrangement where the rural hospital is a hub provider for essential community health services. However, North Dakota CAHs are still financially vulnerable. The statewide averages show improvement (positive margins), but there is no guarantee that federal policy will continue to be amenable to some policy efforts that work to the benefit of rural providers (e.g., 340B discount program). There are still 17 CAHs or 47% with negative operating margins and 12 CAHs or 33% with negative total net margins. The fragile nature of these critical health providers is a concern for policymakers. In rural North Dakota, if a rural hospital closes, this is a threat to not only accessing hospital care but also primary care, long-term care, and other important community health services. Nationally, since the beginning of 2010 through April 2016, more than 70 rural hospitals have closed in the country in 25 states. About two-thirds were in the South and 75% were in

states that did not adopt Medicaid Expansion. This represents the largest wave of rural hospital closures since the early 1990s. At the national level, this rash of new closings is contributing to a growing concern over access to essential rural health services.^{14, 15}

Federal policymakers recognize that certain impediments may exist in service provisions, regulatory structures, and reimbursement. New national policy is offering alternative structural and organizational arrangements that may over time produce positive results. One of these is the Frontier Community Health Integration Project Demonstration (F-CHIP). This federal three-year initiative seeks to develop and test new models of integrated, coordinated healthcare in the most sparsely populated rural counties. Its goal is to improve rural health outcomes and to reduce Medicare expenditures. F-CHIP is authorized in the ACA, and only CAHs are eligible. Through the demonstration, CAHs in five eligible states would have the opportunity to increase access to services that are often unavailable in frontier communities with the goal of avoiding expensive patient transfers to larger hospitals. The eligible states must have a high level of frontier areas (i.e., 65% of the counties are frontier). Eligible states are Alaska, Montana, Nevada, North Dakota, and Wyoming. Six North Dakota CAHs applied in early 2014 to address at least one of these four areas: (1) telemedicine, (2) nursing home care within the CAH, (3) home healthcare, or (4) ambulance services. Awards were announced in May 2016. Three of North Dakota's six CAH applicants were accepted: Bowman, Elgin, and Watford City. There will be only 10 CAHs from North Dakota, Nevada, and Wyoming involved in the demonstration. Bowman will address ambulance restructuring; Elgin's intervention involves expanded nursing home capacity; and Watford City has telehealth/telemedicine. The Center for Rural Health, through its Medicare Rural Hospital Flexibility (Flex) Program (i.e., a federal program to states to provide assistance to CAHs and to improve the rural health system), provided technical assistance to the North Dakota applicants, hosting statewide meetings to discuss the option for CAHs, and providing grant application assistance. The CRH and the North Dakota Hospital Association will continue to work with the three F-CHIP sites over the next three years.

CAHs work within healthcare networks to provide more and better access to essential health services. They use networks to gain greater efficiency and effectiveness, provide cost savings, share services or personnel, build capacity, and achieve a higher level of organizational performance. The 2014 CAH and PPS Hospital Survey found that the areas that North Dakota CAHs network around included quality improvement, HIT, staff education, staff and board development, medical education, medical coverage and support, health professional recruitment and retention, and supply management. The tertiary hospitals have forged strong networks with the rural hospitals, particularly in the areas of quality and HIT; however, it is important to understand that North Dakota CAHs also work in a number of CAH-exclusive networks. In many respects, the rural hospitals are using networks as a means to also address federal health policy. Quality improvement and HIT development, for example, are significant national health objectives with corresponding federal policy directives and requirements.¹⁶

Finally, it is important to understand some of the issues facing rural North Dakota hospitals. The *2014 North Dakota Hospital Workforce Survey* asked hospital CEOs to review 34 common issues facing rural hospitals. The top issues facing North

Dakota CAHs were the following:

- Access to mental or behavioral health services for inpatients and outpatients
- Access to mental or behavioral health services for substance abuse
- Hospital reimbursement (third-party payer)
- Hospital reimbursement (Medicaid)
- Impact of the uninsured
- Impact of the underinsured
- Primary care workforce supply
- Hospital reimbursement (Medicare)
- Nursing workforce supply
- Ancillary workforce supply

The survey findings, based on the perspective of CAH CEOs, conform to results from other research efforts conducted by the Center for Rural Health. In the Community Health Needs Assessments (CHNAs) mandated under the ACA for all nonprofit hospitals, the Center found the most pressing community health need to be behavioral health/mental health. At the time of the writing of this *Fourth Biennial Report*, the 2016 CHNA process was ongoing; this preliminary finding is based on the completion of 13 CAH-based CHNAs. However, out of 60 ranked community issues, behavioral health/mental health was identified 15 times, with the next-highest-ranked issue being the cost of health insurance, which was noted only seven times.¹⁷ Thus, in the *2014 North Dakota Hospital Workforce Survey*, access to behavioral and mental health service was the highest-rated concern, and in the 2016 rural-based CHNA process, behavioral and mental health was the highest-rated issue.

Another research effort validated the issue of mental health. In a series of interviews of rural physicians and others in 22 rural North Dakota hospitals during 2010–2016, it was found that the lack of mental health services in rural areas was the second-highest-rated impediment (out of 10 items) to the recruitment of rural physicians. This manifested itself in two ways: 1) if the physician believed that the primary care provider was to serve as the principal provider of mental health services, and 2) if the primary care provider was to serve as the gatekeeper or referral source to a mental health provider. Thus, access to mental health has been found to be a rural health issue from the perspective of hospital CEOs, the general public, and rural physicians.^{18, 19}

A final note on rural hospitals is that while they experience significant pressures (e.g., financial, workforce, regulatory, and others), they also make forward strides. For a number of years, iVantage Health Analytics (a national strategic advisory firm that offers healthcare providers an integrated Web-based business intelligence platform for strategic planning, payment optimization, and performance benchmarking), has identified the top-performing CAHs in the country. Every year North Dakota has CAHs in the top 20 and in the top 100 based on a number of performance metrics or hospital strength index. In 2016, CAHs in Carrington, Devils Lake, Jamestown, and Mayville were in the top 100 out of more than 1,300 CAHs in the country. Mayville has been in the top 100 in 2013, 2014, 2015, and 2016; Carrington in 2013, 2014, and 2016; and Jamestown in 2014 and 2016. A number of North Dakota CAHs have been on the list. This shows, in spite of the issues, that North Dakota CAHs can perform at a high level.

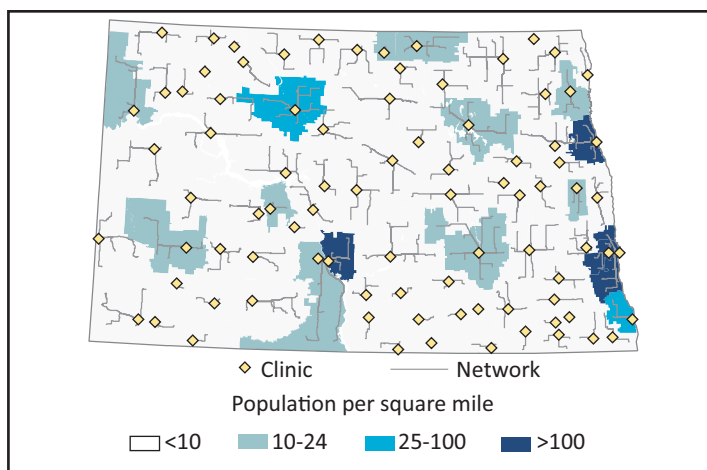


Figure 6.3. Clinics, networks, and population per square mile

AMBULATORY CARE

There are approximately 300 primary care and specialty clinics in the state (see Figure 6.3). Rural and urban hospitals or health systems account for more than 55% of these clinics.^{20, 21}

There are 52 federally certified RHCs in the state (the same as reported in the *Third Biennial Report* and down from 57 reported in the *Second Biennial Report*). These are primary care clinics. CAHs own and operate 42 (down one from the last *Report*) of the RHCs (81%) in the state as provider-based RHCs with the remaining RHCs being either owned by a tertiary provider (six RHCs) or are independent clinics generally owned by a physician or group practice (four RHCs). All of the North Dakota provider-based clinics are owned by hospitals, primarily CAHs, which are nonprofit entities in this state; therefore, the provider-based RHCs are nonprofit. RHCs, both provider-based and independent, can be for-profit or not-for-profit, public or private.²²

There are five FQHCs in North Dakota, with the most common type being the community health center (CHC) model. The five centers (four CHCs and one migrant health center) operate in 14 communities. Eleven of the communities are rural, and three are urban (Fargo and Grand Forks are central sites; Minot is a clinic that is served by a rural-based CHC). Northland Community Health Center, whose main clinic is in Rolla, has expanded into the rural communities of Bowbells and Ray, and has a dental and primary care clinic in Minot. Northland operates clinics in seven communities (Rolla, Rolette, McClusky, Turtle Lake, Minot, Bowbells, and Ray). Valley Community Health Centers moved their central site from Northwood to Grand Forks and operates clinics in Grand Forks and Larimore. The Grand Forks site is also a dental site. Coal Country Community Health Center has a central clinic in Beulah and serves two other west-of-the-river rural communities: Center and Killdeer. Northland CHC and Coal Country CHC are primarily rural-based with Valley CHC and Family HealthCare Center (Fargo) having more of an urban presence. Grafton is served by the Moorhead, Minn.-based Migrant Health Center, another form of FQHC. Three of North Dakota's largest communities are now served by a CHC (Fargo, Grand Forks, and Minot).^{23, 24}

The federal RHC program was created in 1977 by Congress to help address rural healthcare provider shortages; thus the program requires that the RHC employs a nurse practitioner, physician assistant, or a certified nurse midwife for at least 50% of the time the clinic is open. The 50% rule allows a hub clinic to operate

satellites because it can move nonphysician providers (e.g., nurse practitioners, physician assistants, or nurse midwives) from site to site more efficiently. The nonphysician providers are supervised by a physician (in the case of physician assistants) in a manner consistent with state and federal laws and in a collaborative relationship with the nurse practitioners) as established under the Board of Nursing. As the title implies, an RHC can only operate in a federally recognized rural area that is a federally designated healthcare professional shortage area, medically underserved area, or governor-designated area.

The development of RHCs was slow, both nationally and in North Dakota; as recently as 1989, there were no RHCs in existence in North Dakota. In the early part of the 1990s, the program expanded rapidly. At one point, there were about 90 RHCs in North Dakota. This started to decline somewhat, and in 1996, there were 78 in the state. As noted previously, there are now 52. The number of RHCs in the state has declined in part because of changes in reimbursement structure and rates. RHCs receive special Medicare and Medicaid reimbursement. Medicare visits are reimbursed based on allowable costs, and Medicaid visits are reimbursed under the cost-based method or an alternative PPS. RHCs can be for-profit or not-for-profit, public or private. In addition, the regulatory environment has become more complicated with a corresponding adjustment in the clinic market. Between population change, reimbursement issues, and regulatory matters, some clinics have closed or have converted to other models. As previously stated, the CAHs own 57 total clinics (with 42 being federally certified RHCs), and there are 52 federally certified RHCs, which indicates that not all RHCs are owned by CAHs. There are additional clinics in rural areas that are independent or owned by another system.

The FQHC model dates back to the Johnson Administration's War on Poverty, which was created in the mid-1960s as an effort to increase access to care, particularly for lower-income groups (although all income groups can avail themselves of FQHC services). FQHC is a generic category of provider groups that can be organized as community health centers, migrant health centers, or healthcare for the homeless centers. FQHCs receive an annual federal grant to assist them in providing services to low-income groups. RHCs do not have a similar federal appropriation. As such, FQHCs offer services based on a sliding-fee scale, so if a client's income is low enough, there are no out-of-pocket costs. In essence, the federal grant can offset clinic costs in providing care to lower-income clients; this is the FQHC feature that addresses income access to services. In 2014, more than 1 in 4 persons in the United States who were living in poverty were seen for care in an FQHC, in comparison to only 0.6% of people who had incomes that were at 200% or more of poverty. From 2005 to 2014, the proportion of Americans served by an FQHC increased from 5% to 7%. This involved almost 9 million Americans seeking care at an FQHC. While utilization associated with Medicare, Medicaid, private pay, and uninsured increased from 2008 to 2014, the greatest rate increases were noted for Medicaid (expanding from 13.5% to 17.3%) and uninsured (14.7% to 17.2%). This is likely associated with the implementation of the ACA because FQHCs are primary "safety net" providers for low-income/economically disadvantaged individuals and families. Additionally, many FQHCs employ certified application counselors to assist the uninsured in finding and enrolling in a health plan through the Marketplace or into Medicaid Expansion. This growth trend will

likely continue.²⁵

In North Dakota, for 2015, more than 36,000 North Dakotans received care from an FQHC, including almost 13,000 dental patients. In total, there were almost 117,000 total patient visits (including almost 29,000 dental visits). Because of dental access issues for low- or lower-income residents, FQHCs play an important role in oral health. About 31% of the patient base are people 19 years of age and younger. The largest age cohort for service in North Dakota is young adults (20–24) who constitute 44% of the patients. Private pay is the largest payer, narrowly topping Medicaid (32.5% and 30.1%, respectively). While Medicare is a significant payer for rural hospitals and RHCs, it makes up only 9% of the North Dakota FQHC market.²⁶

FQHCs, in contrast to RHCs, have to offer a sliding-fee scale. In addition, FQHCs can be located in urban as well as rural areas, whereas RHCs are only located in accepted rural designations. Like RHCs, FQHCs can be a private or public nonprofit organization. An FQHC is reimbursed from Medicare and Medicaid based on a cost model that uses an all-inclusive reimbursement rate. FQHCs are required to offer a wider scope of services than are RHCs. These more comprehensive services include diagnostic and lab, pharmaceutical, behavioral, oral, hospital and specialty, after-hours care, case management, transportation, and interpretative services. RHCs are only required to address outpatient, emergency, and lab services; however, they are not precluded from offering a wider array of service.^{27, 28}

EMERGENCY MEDICAL SERVICES

Emergency medical services (EMS) are an essential and fundamental service or health delivery function in the overall U.S. health system. EMS commonly refers to out-of-hospital acute medical care or transport to definitive care for patients with illnesses and injuries that the patient or the medical practitioner believes constitute a medical emergency.²⁹ EMS can be viewed as a pre-hospital service, but as EMS continues to develop, it is also seen as a vital element in an overall integrated health-delivery system, where even the role and function of emergency care personnel (generally emergency medical technicians [EMTs] who can be licensed at a basic, intermediate, or paramedic level) are expanding to include more and different skill sets (e.g., community paramedic, where the paramedic is used in a fully integrated model with an expanded scope to address health or medical functions beyond traditional paramedic levels). More and more other critical elements that are meant to address medical and health issues come into play within a framework of EMS. Some of these issues will be addressed in this section such as stroke and cardiac systems of care, the development and potential of community paramedics, the reshaping of the rural EMS system, federal and state policy, and trauma.

At the state level, the division with primary responsibility is the Emergency Preparedness and Response Section of the NDDOH. The section has three divisions: Emergency Medical Systems, Hospital Preparedness, and Public Health Preparedness. The Division of Emergency Medical Systems (DEMS) has a wide jurisdiction of responsibility and service, including licensing ground and air ambulances and quick response units; updating and maintaining training, testing, certification, and licensure programs; providing technical assistance to EMS services; approving continuing education curriculum; administering state

EMS grant programs; maintaining data systems; coordinating and managing the state Critical Incident Stress Management (CISM) Team; coordinating the state stroke system of care; coordinating the state cardiac system of care; maintaining a relationship with the North Dakota EMS Association; and other functions. In addition, the DEMS works closely with the Center for Rural Health on related matters, including a multistate evaluation of an emergency cardiac device, stroke efforts, and the Medicare Rural Hospital Flexibility program. The division also administers the STEMI program, an initiative aimed at improving the system of care for heart attack patients and the community paramedic program (discussed later); and provides oversight to the Simulation in Motion-North Dakota (SIM-ND) program, which provides training and education in trauma events through the use of simulation, including four semi-truck vehicles that travel throughout the state to rural hospitals, clinics, and ambulance systems. SIM-ND is a collaboration between the state and the UND School of Medicine and Health Sciences. Each semi-truck has one section designed to replicate a hospital emergency department and one section replicates an ambulance. Providers are trained through the use of simulators and mock drills.²¹

EMS continues to change and evolve both in terms of new skill sets, requirements and expectations, and even classification of personnel. The paramedic field continues to expand. In 2005, there were 346 paramedics, and in 2015 this had grown by 73% to 597. Based on the state's data, it is difficult to determine how many paramedics are working in rural versus urban areas in North Dakota, as the data only list their place of residence. A relatively large number of paramedics list an out-of-state address; however, there are no data on where they serve (approximately 140 or more than 25% don't list a service location). Emergency medical responder (EMR) is a newer category of provider created in the past four years. Most of the EMS personnel that used to be thought of as first responders have been reclassified as EMRs, who typically render care to the sick or injured while an ambulance is en route. They are usually part of a quick-response unit, fire department, or law enforcement. The emergency medical technician-intermediary/85 (EMT-I/85) is a level of intermediary training formulated by the National Registry of Emergency Medical Technicians in 1985. They provide more invasive procedures than found at the EMT-basic (EMT-B) level, including intravenous therapy, the use of advanced airway devices, and providing for advanced assessment skills. The EMT-I/99 is the closest level to the EMT-paramedic. Also in the intermediate category, they can provide needle decompression of a tension pneumothorax, endotracheal intubation, nasogastric tube placement, use of cardiac event monitors/electrocardiograms, and medication administration to control certain cardiac arrhythmias. The advanced emergency medical technician (AEMT) is considered a mid-level provider of pre-hospital emergency medical services and is a transition from the EMT-I, who has somewhat less training. This, too, is a newer EMS provider having been approved in 2013. It is a category that in some states is being used to replace the EMT-I/85 and I/99. They provide rapid on-scene treatment. Like the paramedic, the AEMT is considered advanced life support.

In North Dakota, there are 4,073 licensed EMS providers (a decline of approximately 9% since the *Third Biennial Report*, or 409 personnel).

- AEMT: 60 (1.5%)

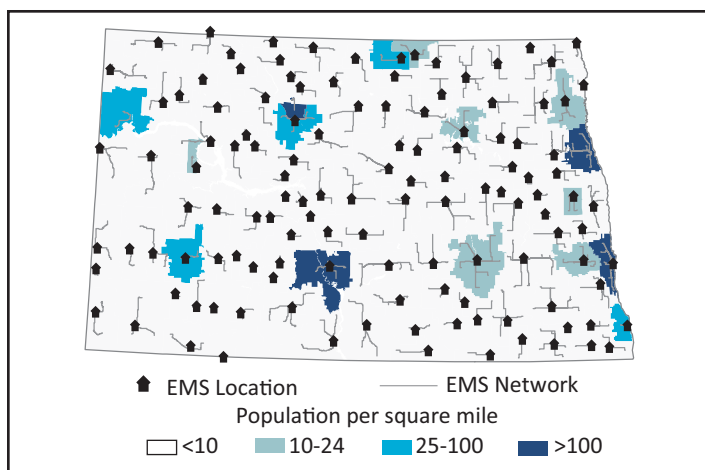


Figure 6.4. EMS networks and population per square mile

- EMT-I/99: 1 (0.02%)
- EMT-I/85: 86 (2.1%)
- EMT/EMT-B: 1,780 (43.7%)
- EMR/First Responder: 2,151 (52.8%)
- EMT-Paramedic: 597 (14.65%)

More than 90% of the EMTs in North Dakota are volunteers. The EMS system in rural areas is heavily dependent on a volunteer model that is seriously strained because of an aging volunteer base, changes in family dynamics and culture, local economics, and how volunteers value personal time versus civic commitment. While the number of paramedics is relatively small (597), they constitute a growing provider base along with the EMT-I/85, I/99, and AEMTs. These are the highest-trained EMS personnel. While the overall number of EMS personnel declined by 9% in North Dakota, there is a slight increase in the number of higher-trained personnel showing that the expectation for improved skill sets is present. Paramedics are concentrated in urban areas, but the number of rural paramedics has increased (advanced life support [ALS] systems must be staffed by paramedics). Sixteen of the state's 22 ALS units are rural-based. While there are more ALS units in rural than urban areas, the vast majority of paramedics are working in an urban setting. A rural unit may employ only one or two, whereas an urban ALS unit will rely on many more. There are 128 ground ambulance units in North Dakota (down from 133 in the last *Report*), with 106 (previously 114) being basic life support (BLS) and 22 (previously 19) being ALS. In addition, there are three air ALS systems, two air critical-care services, and one air BLS system. There are 82 (previously 86) quick-response units. Of the ground ambulances ($n = 128$), 56 (44%) are classified as private/independent, 41 (32%) are government, 16 (13%) are associated with a local fire department, and 15 (12%) are hospital-based. A significant majority (63%) are organized as nonprofits, with 29% being government controlled, and only 8% are for-profit. Similar to CAHs, communities are more willing to tax themselves to take on some of the financial burden of maintaining an ambulance system. In 2015, 63% of ambulance units received local mill levy support.³⁰

Advanced EMS support is most available around the four major cities and in the Oil Patch (see Figure 6.4). Most of the EMS support throughout the state is ground-based and provides basic services (see Table 6.3). The average population served by an EMS unit is 5,623 people, with a median of 1,543 (range 173 to 146,029 people). Eighty-seven percent (108) of the EMS units serve fewer

Table 6.3
Number and type of EMS units in North Dakota.

	Air	Ground	Substation	Total
Advanced Life Support	3	19	-	22
Basic Life Support	1	114	5	120
Critical Care	2	-	-	2

The average EMS area is 560 square miles (range 14 to 2,240 miles).

- The average distance traveled within an area is 12 miles (minimum distance, 0.2; maximum distance, 31.6 miles).
- The average distance from an EMS unit to a CAH is 26 miles (minimum distance, 0.1 miles; maximum distance, 101 miles).
- The average distance from an EMS unit to a tertiary hospital is 73 miles (minimum distance, 0.7 miles; maximum distance, 192 miles).

than 5,000 people but cover an average of 534 square miles. Call volume is not evenly distributed because 12 ambulance services account for 74% of all calls (more than 56,000), and the remaining 116 squads account for 26% (about 20,000 calls).

EMS faces many challenges in the state. These obstacles were documented in a recent report, *A Crisis and Crossroad in Rural North Dakota Emergency Medical Services*, which was completed for the state of North Dakota in 2011. The following were primary challenges identified from the research:

- Recruitment of volunteers was significantly more difficult than a decade before.
- An aging volunteer base is without an adequate supply of generational replacements.
- Almost half (46%) of the volunteers listed on local service rosters were inactive.
- Need was increasing to provide some level of financial incentives for volunteers.
- A small number (35%) of ambulance members frequently take call.
- Some EMS volunteers reported taking more than 120 hours a week for call time.
- Thirty-five percent of ambulance squads had difficulty in filling schedules during specific times of the day or week.
- Some services reported that they expect to close within the next five years.³¹

The report also found that some of the issues have a social, cultural, or political orientation. For example, the authors discuss a finding that “EMS is often not seen as a vital component of community infrastructure worthy of the same funding as law enforcement, public health, road maintenance, water, sewer, and waste removal” (p. 23). In addition, it is common for people, including some public officials, to not understand how EMS is funded. There is some level of resistance to more state involvement because of concerns over loss of local autonomy and control, and local political subdivisions such as cities, townships, and counties are generally not open or ready to assume more responsibility for the direct funding or operations of EMS.

Public policy at the state level has significantly taken on more responsibility for putting forth state monies to assess and plan for rural EMS change and to address through state and federal grants

the need to better educate and train an adequate EMS personnel base. The Legislature infused state dollars into transforming rural EMS starting in the 2007 legislative session. The Legislature put \$1.25 million into a staffing restructuring grant, which was followed in 2009 with an additional \$1 million for a total of \$2.25 million targeted to rural staffing. In 2011, the program language changed to the EMS Assistance Grant, and a total of \$4.25 million was approved. In 2013, the Legislature increased this to \$6.6 million and increased it again in the 2015 session to \$7.5 million. Thus, in an eight-year period, the support to staffing development—training and skill set improvement—went from \$1.25 million to \$7.5 million. All EMS funding (training grants, assistance grants, and Oil Impact Grants for units in the Oil Patch) has increased significantly over the years and amounts to approximately \$15 million, a significant investment in rural North Dakota. Grants have been used not only on staffing and training but also on assessment and planning, and structural realignment to assist in facilitating change in rural EMS. Funding from the state and in some cases augmented by federal funds through the Medicare Rural Hospital Flexibility program (located at the Center for Rural Health) has been used for management and leadership training of rural EMS squads. In addition, through state funding, there were “earmarked” funds for oil-impacted counties that covered additional costs associated with staff, equipment, coverage, and training. In the current biennium, this amounts to \$6 million. The 2015 Legislature also approved what is called a Medicaid rebase in which the payments for ambulance transfers (from one hospital to another) were adjusted. This is pegged at the Workforce Safety Insurance (WSI) rates. This had been at 53% and was increased to 64% for a significant increase of 11 percentage points. For rural ambulances, there are many miles on the road transferring patients. As Table 6.1 shows, the average distance from a CAH to a tertiary hospital is 89 miles, with the longest being 182 miles.³²

While the past five legislative sessions (2007, 2009, 2011, 2013, and 2015) have been supportive of rural EMS, public policy in North Dakota tends to favor a higher degree of restraint and to not take on additional public functions. Although improvements are being made in rural EMS and while there is a growing recognition of the serious problems facing rural EMS, the future of EMS must contend with the cultural and political norms of state public policy—one where the state has significantly increased financial resources and commitments, but does not want to take on full responsibility, and one where political subdivisions have not fully recognized their heightened responsibility or realized their more comprehensive role in the EMS system. There is an understanding that the state government does not wish to be the employer of community-based emergency services personnel. There is an increasing recognition that, in addition to improving actual provider skill levels, there is a corresponding need to improve the ability of rural units in the areas of management, leadership, and planning. The “club-house” stereotype of rural EMS is gradually changing to one that will be more systems-oriented. North Dakotans may find that the time is close at hand to examine who is responsible for “owning” the EMS challenge; where is the locus of control, decision-making, and funding; and what is the level of balance between a traditional volunteer system (that may be antiquated) and one based on a more highly trained and professional model.

Federal grants have also been used to address North Dakota

EMS. Since its inception in 1999, the Medicare Rural Flexibility (Flex) Program has worked to strengthen the rural North Dakota EMS system first by building CAH and EMS partnerships through small program grants intended to strengthen EMS through additional training, equipment purchases, community education, and other efforts, and in more recent years by supporting management and leadership development. Most rural ambulance units are community-based, independently operated, or both with only about 25% of CAHs owning the local ambulance system. The Flex Program has sought to strengthen the relationship between CAHs and local ambulance systems. During the past four years (2012–2016), Flex has provided grant funding to the North Dakota EMS Association to support EMS management training, EMS leadership development, joint EMS and CAH meetings, and for rural EMTs to attend a national rural EMS conference.

Flex funds have been used to develop and operate an EMS Leadership Academy. Recognizing that many rural EMS leaders come into the EMS system with little or no knowledge of leadership skills, this four-level course (developed and facilitated by a national EMS consulting firm) has helped more than 200 rural EMS professionals to develop and enhance leadership skills. The Flex Program assisted the state association through a \$20,000 grant to initiate an EMS Management Academy. This set of courses differs from the leadership curriculum by emphasizing skills associated more with day-to-day operations of a unit such as finance and audits, employment law, IRS reporting, billing reimbursement, quality improvement and quality assurance, and other functions. The 2015–2016 Flex grant supported training on successful billing practices, budget preparation, management case studies, collaboration and system building, and regional transport plan development. About 100 EMTs attended the 2014 and 2015 Management Academy.

Regional EMS and CAH meetings were supported by the Center for Rural Health's Flex Program in each of the years from 2013 to 2016. An average of six regional meetings are held each year. Meetings were held in Bowman, Grand Forks, Harvey, Hettinger, and Minot in 2016. The participants plan the meetings to meet local needs. Meetings have covered such subjects as the following: collaboration, system development, mental health transfers, EMS clinical issues related to quality improvement, workforce needs, service reimbursement, health reform readiness, impact of the uninsured or underinsured, training needs, trauma designation, transport protocol and service, and HIT.

Through the Flex Program, the Center for Rural Health is also working with the North Dakota EMS Association (NDEMSEA) to support statewide efforts on the EMS Voluntary Event Notification Tool (EVENT). EVENT is a Web-based EMS reporting of events such as near-misses, assaults on EMS, patient safety events, and other situations. Flex funds assist the Association in promoting EVENT utilization among state EMS units through meetings, conferences, and website and newsletter marketing.

The Center for Rural Health's CAH Quality Improvement Network (addressed in more detail in the following chapter) secured a federal Rural Health Network Development grant to work with the 36 CAHs on adapting to a new North Dakota law on first-dose medication oversight in the hospital and on hospital-to-hospital emergency transfer communications. With the latter, the Center for Rural Health works with CAHs to develop a process for collecting and reporting on emergency department transfer communication and to improve this important element

in the health system. Patient transfers typically are between the rural ambulance, CAH, and a tertiary emergency department. Technical assistance (TA) comes in the form of meetings and TA calls to identify barriers to transfers or “hand-offs,” and to identify high-performing transfers and share best practices. For the CAH Quality Network, the focus on transfers is part of improving important quality metrics related to continuity of care, lowering and avoiding medical errors, and lowering redundant tests.

Behavioral health and mental health have emerged in the past few years as a significant issue in North Dakota (this is addressed in more detail in the following section on behavioral/mental health), and rural EMS and emergency department staff are affected by the demand. The Center’s Flex Program is supporting the NDEMSA in utilizing the Escaping Violent Encounters (EVE) solutions to better inform and address EMS behavioral health training. This has specific EMS content with a focus on identification, recognition, de-escalation of aggression, and defense. The Flex Program also uses funds to support participation of rural North Dakota EMTs in the national Joint Committee on Rural Emergency Care (JCREC) and conference attendance.³³

Another EMS effort supported through state policy is a community paramedic pilot program. A number of states have initiated this new model. The 2013 North Dakota Legislature supported this effort, and in 2014, a pilot program was released. The Legislature called for a Community Paramedic Subcommittee to operate under the North Dakota EMS Advisory Council with representatives from EMS, nursing, nurse practitioners, and rural health. Stakeholder meetings were convened, and the program solicited licensed North Dakota ambulance services to participate in the pilot. Four pilots were selected in Rugby, Fargo, Bowman, and Dickinson (covering Billings County and the communities of Belfield, Medora, and Beach). During the 2015–2016 biennium, Fargo Sanford and Fargo Essentia, along with the Southwestern District Health Unit in Dickinson, proceeded. Rugby sought and was denied a Center for Medicare and Medicaid Services (CMS) waiver and thus had to curtail its efforts. Dickinson Southwestern District Health Unit proceeded under an additional public health grant from a private funder called Million Hearts. More than 12 paramedics from these communities completed additional training in community paramedicine based on a national curriculum. Efforts being explored by these EMS services include hospice support, prevention of high-risk readmissions, diversion of non-emergent emergency department visits, outreach to clinic patients, behavioral health, and public health support. Community paramedics are experienced field paramedics who undergo additional education to provide a wider scope of primary and non-emergent care. Community paramedicine does not require an additional license and community paramedics operate within the standard scope of practice for a paramedic. During the biennium, discussions with third-party payers were commenced. Medicaid did approve some reimbursement of community paramedics who provide immunizations.^{34, 35}

Community paramedics can be employed to conduct in-home evaluation and patient follow-up to provide care to patients who may seek emergency services for non-emergent conditions; treat patients at high risk for readmission from chronic conditions; treat patients requiring clinic appointments but who lack transportation; staff rural clinics providing basic screening and follow-up; work as part of a public health team

offering primary healthcare outreach, behavioral health and transportation; and provide some level of home care or hospice services. Community paramedics could, in time, be an important provider in frontier and rural areas, and the discipline could serve to build closer collaboration between emergency services and primary care, public health, home care, and long-term care. For North Dakota, the community paramedicine provider could address three critical areas: 1) inconsistent access to care and providers at all levels including the disparity between urban and rural areas, 2) diminished volunteer EMS staffing associated with rural population change and low-volume operations, and 3) the refocus of healthcare to being more preventive and wellness oriented.

Related to these three areas, and addressed in more detail in Chapter 7, is the concentration of human health resources to better coordinate care and manage services not only for the betterment of the patient but also to create organizational and financial efficiencies. The community paramedic model may be a new provider class that can help to redesign elements of the delivery system, particularly in rural areas.³⁵ Barriers at this time for developing the community paramedic model revolve around reimbursement and patient volume. Currently in North Dakota, there is only Medicaid reimbursement to community paramedics performing immunizations. Minnesota allows a much wider scope of services to be reimbursed under Medicaid (health assessments, medication compliance checks, chronic disease monitoring and education, hospital discharge follow-up, and immunizations and vaccinations).³⁶ As more services become reimbursable, the application of the community paramedic model will likely increase. This relates to the issue of patient volume and health-system restructuring. Ambulance services have a high level of fixed costs. A larger health system employing community paramedics that are addressing more population health services offers the opportunity to spread out the costs, which a small or rural system cannot do. In other words, cost savings accrue to the system both in the form of lower cost interventions that replace more expensive services such as repeated visits to the emergency department or rehospitalization, and in the form of maximizing the utilization of a fixed-cost resource (e.g., cost of underutilizing paramedics). Preliminary data from the community paramedicine efforts in Fargo indicate that, in a relatively small sample of 30 patients, emergency room visits were reduced by one-half and the no-show rate to primary care providers was cut by 30%.³⁷ As CAHs and rural or independent ambulance systems become more integrated into alternative payment models such as ACOs, with possibly some form of bundled payments, the ability to align community paramedic services along a continuum of services that improves patient outcomes and maximizes system performance and efficiencies becomes more realistic.

Another important area for North Dakota relates to stroke and cardiac systems of care. The NDDOH, through the Emergency Preparedness and Response Section and the Emergency Medical Services and Trauma Division, works to establish and maintain a statewide stroke system to improve emergency care to those suffering a stroke. Part of this is through a hospital designation process. In 2016, six hospitals are designated as Primary Stroke Centers (the six tertiary hospitals) and 26 rural hospitals (CAHs) are designated as Acute Stroke Ready hospitals. The highest level of designation is the Comprehensive Stroke Center; however, no North Dakota

hospital is so designated. The department has been active in stroke education and has developed modules that are used in EMS. The CAH Quality Network worked with the state stroke program from 2010 to 2016 in an effort to provide stroke care information to CAHs and technical assistance for participation in the statewide stroke system of care.

In a similar way, the state works to establish and maintain a comprehensive cardiac system. The department does this in a variety of ways including having developed a Cardiac Ready designation program and process for communities, which is similar to what was previously stated about stroke designations. These designations are for a community that is prepared to take on cardiac emergency events and to improve survival rates (e.g., recognition of signs and symptoms, access to the EMS system, availability of automatic external defibrillators [AEDs], and offering high-performance cardiopulmonary resuscitation [CPR]). In one preliminary site, Powers Lake, N.D., 50% of the population is to be trained in CPR. In addition, the department has used the Million Hearts program with the American Heart Association in the community paramedic effort in Dickinson and Billings County to address hypertension referrals. A Cardiac Task Force has worked on a continuum of care with statewide cardiac protocols and recommendations for ambulances and hospitals.

At the beginning of this section, it was stated that EMS is a complicated system with much nuance in its delivery structure and the dynamic quality found in a changing workforce. The complexity is a part of the ongoing need to construct viable stroke and cardiac systems of care. As part of this pursuit, there are efforts focusing on EMS regional transport plans. This also represents a level of integration with the trauma system (discussed in more detail in the following section) because that system also has transport plans. Corresponding with the transport plans are also the designation of hospitals at certain levels and standard practices. For cardiac care, in 2012, the Mission: Lifetime program began in North Dakota, which has facilitated discussions and reviews associated with EMS transport of cardiac patients, designating percutaneous-coronary-intervention-capable tertiary hospitals and also the development and implementation of general standards to guide the care of patients having a STEMI or acute cardiac event. STEMI refers to ST-elevation myocardial infarction, which is a form of heart attack. The Flex Program has assisted CAHs and rural EMS on the subject of regional transport plans related to both stroke and cardiac care. However, the focus on stroke and cardiac care is looking at new models that may better reflect the unique quality of these systems as opposed to simply replicating the trauma model.

In 2013, the NDDOH DEMS was awarded a grant from the Leona M. and Harry B. Helmsley Charitable Trust's Rural Healthcare initiative to address gaps in the cardiac system of care. The NDDOH DEMS project, known as the North Dakota Cardiac Care System—Automated CPR Component, received an award amount of \$3.03 million. This project distributed the LUCAS[®]2 Mechanical Chest Compression System to more than 400 hospitals and ambulance services throughout North Dakota. The LUCAS[®]2 is a lightweight, portable mechanical CPR device used to deliver high-quality chest compressions to patients in cardiac arrest.

In 2014, the Center for Rural Health was contracted by the NDDOH to evaluate the success of the project and assist with improving the efficiency and effectiveness of the North Dakota

cardiac system of care. As part of this effort, the CRH, through its Program Evaluation Division, facilitated two multiagency emergency preparedness exercises to assess the interoperability of medical devices and databases used to collect cardiac arrest data across the cardiac system of care in North Dakota. The lessons learned from the exercises assisted in identifying equipment and service gaps, and refining database processes. Extending the notion of cardiac systems of care, collaborations between the NDDOH, American Heart Association, Center for Rural Health, and the Powers Lake community transformed Powers Lake into the first Cardiac Ready Community (CRC). The goal of a CRC is to have a well-prepared community trained in both CPR and AED use, as well as the appropriate response to a cardiac arrest. Continuing the idea of education for cardiac emergency readiness, the Center for Rural Health is in the process of developing an interactive learning module titled, "Continuous Quality Improvement: Time Critical Response Processes," which will be offered to the cardiac system of care stakeholders. Since the *Third Biennial Report*, new strategies have been developed to collect project impact data by phone interviewing providers post-LUCAS[®]2 usage. As of this update, emergency medical services and hospital providers report the LUCAS[®]2 device helped to save the lives of seven North Dakotans who suffered a sudden cardiac arrest.³⁸

TRAUMA SYSTEM AND CENTERS

In the United States, traumatic injuries are estimated to be responsible for more than 192,000 deaths a year, with an estimated death rate of 60.2 per 100,000 persons. Trauma ranks as the third-leading cause of death (fifth in the *Third Biennial Report*) and is the leading cause of death for people 46 years of age or younger, or 47% of all deaths in that age group. Trauma injury accounts for 30% of all life years lost in the United States; that compares with cancer, which accounts for 16% and heart disease at 12%.^{39, 40}

Trauma, according to the North Dakota Century Code, means "tissue damage caused by the transfer of thermal, mechanical, electrical, or chemical energy, or by the absence of heat or oxygen."⁴¹ Falls and motor vehicle crashes account for the majority of trauma in North Dakota. In 2014 (most recent data), the next most prevalent causes of trauma included ATVs, motorcycles, assault, machinery, and animals. Trauma events, as recorded in the state trauma registry, have increased 49% from 2008 to 2014 to a total of 6,008. The numbers in 2014 are slightly below what was reported in the *Third Biennial Report* when there were 6,227 cases of reported trauma events.⁴² In examining the state by region, the area with the largest increase in trauma is the northwest quadrant, recording an 115.4% increase from 2007 to 2014. The southwest quadrant experienced an increase of 64%; northeast, 54%; and southeast, 33%. The area with the highest number of trauma events was found in the southeast, where there were 1,812. This is also the location of the state's largest city, Fargo. The northwest quadrant is home to a significant level of oil extraction activity. Likely because of the rapid expansion in oil and other energy development resources, the incidence of natural-resources-employment-related trauma increased by 49% from 2009 to 2014 (from 32 incidents in 2009 to 166 in 2014). Agriculture has experienced a decline in trauma rates from 104 to 85 occurrences (down 18% from 2009 to 2014).

As was noted previously, trauma is more prevalent in

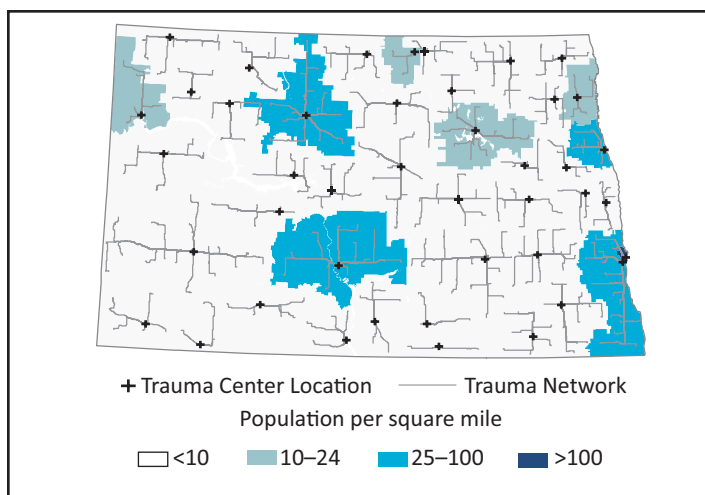


Figure 6.5. Areas served by trauma centers

- The average EMS area is 560 square miles (range 14 to 2,420 miles).
- The average population served by a trauma center is 16,214 people (range 1,464 to 154,499 people).
- Seventy-four percent of trauma centers serve fewer than 10,000 people but cover an average of 1,427 square miles.
- The average trauma center area is 1,643 square miles.
- The average travel distance to a trauma center is 22.6 miles.

younger populations nationwide, and that is the case in North Dakota. In 2014, the age cohort with the highest level of trauma was people ages 20–29, followed by ages 50–59, and then 30–39. People 60 and older are much less likely to experience trauma than someone 20–29. Most trauma cases in the state's registry were categorized as minor, as opposed to moderate, moderate-to-severe, or severe-to-critical.⁴²

Forty-three of North Dakota's 44 acute and critical access hospitals are designated as trauma centers (see Figure 6.5). This includes all 36 CAHs, the six PPS hospitals, and one of the two Indian Health Service (IHS) hospitals. Verification of trauma centers has been based upon nationally recognized standards by the American College of Surgeons Committee on Trauma. The standards address hospital organization, clinical capabilities, facility and equipment availability, quality improvement processes, prevention and public education, trauma research, continuing education, trauma service support personnel, and transfer agreements.

There are five trauma center levels. Level I is a comprehensive regional resource—tertiary care center—providing total care for every area of injury from prevention to rehabilitation. There are no Level I trauma centers in North Dakota. North Dakota does have six Level II trauma centers. A Level II facility is able to initiate definitive care to all injured patients. It offers 24-hour immediate coverage by general surgeons, including orthopedic surgery, neurosurgery, anesthesiology, emergency medicine, radiology, and critical care. The six tertiary hospitals are all Level II trauma centers. North Dakota does not have any Level III trauma centers. This level can provide prompt assessment, resuscitation, surgery, intensive care, and stabilization of injured patients. Level IV trauma centers provide advanced trauma life support before transfer of patients to a higher-level trauma

center. This level provides evaluation, stabilization, and diagnostic capabilities for injured patients. Seven rural hospitals have this designation: six CAHs and one IHS. Level V trauma centers are the most common in North Dakota with 30 CAHs having this designation. A Level V trauma center provides initial evaluation, stabilization, and diagnostic capabilities and prepares patients for transfer to higher levels of care. All CAHs have transfer agreements for patients requiring more comprehensive care at a Level I through Level III trauma center.⁴³ The average travel distance to a trauma center is almost 23 miles.

Studies have found a number of factors that are advantages and assets to the North Dakota trauma system. Common advantages include the following:

- Inclusive system with excellent participation
- Good EMS coverage despite geographic challenges
- Strong, enabling legislation
- Good working relationship between EMS and trauma systems
- Strong cooperation among hospitals
- Rural Hospital Flexibility (Flex) Program collaboration
- State radio communication system
- Budget surplus
- State Legislature is engaged

Challenges and vulnerabilities include the following:⁴⁴

- Large geographic area with a scattered (low-density) population
- Difficulty in recruiting providers
- High reliance on volunteers, particularly in rural areas
- No statewide trauma registry data and little use of existing data collected by trauma centers
- No hospital discharge data
- Lack of specific pediatric protocols and practices
- Relative shortage of air ambulance services
- Poor coordination with existing injury prevention program
- An aging population

ELECTRONIC HEALTH RECORDS AND HEALTH INFORMATION TECHNOLOGY

Health information technology (HIT) is a relatively new entry into the health lexicon. The focus began in the early 2000s, and in some respects, HIT is an outgrowth of slightly older concepts called telemedicine and telehealth. The term “telemedicine” refers specifically to patient and healthcare provider encounters for diagnosis and treatment. The term “telehealth” is a broader term that includes telemedicine but also includes using technology for preventive, educational, and health-related administrative activities. Both telemedicine and telehealth involve interactive medical equipment, computer technology, and telecommunications technology.⁴⁵

It may be helpful to think of telemedicine as the use of technology directed at clinical services and care over distance at different sites; it is a method of delivering healthcare. Within that delivery structure, which employs technology including telecommunications, HIT focuses more on enabling the transfer of patient information and data over distance. HIT is critical in an overall effort to improve patient care quality, safety, and outcomes. It can serve as a vehicle to move critical information quickly and efficiently, thus improving organizational performance. It

may involve electronic health records (EHR); electronic clinical systems such as computed radiography, computerized provider-order entry, picture archiving, and communication systems; clinical decision support systems; and the overall management of health and medical information.

The HIT movement received an important boost in January 2004 when President George W. Bush called for the widespread adoption of EHR within 10 years.⁴⁶ Since then, there has been significant growth throughout the country, although it has been harder in rural areas because of cost, staffing issues, technology access, and other concerns. Both federal and state policies have been engaged. Overall, North Dakota health organizations have done well in acquiring and adapting technology, including HIT.

At the federal level, the Office of the National Coordinator (ONC) for Health Information Technology was established in the U.S. Department of Health and Human Services. The American Recovery and Reinvestment Act (ARRA) provided more than \$30 billion in investments to hospitals, clinics, and physicians to develop HIT systems through the Health Information Technology for Economic and Clinical Health (HITECH) Act. HITECH also provided incentive payments and funding to assist health organizations and professionals to meet “meaningful use” objectives for electronic health records; created the HIT Extension Program that supports state-based HIT Extension Centers that provide technical assistance, including HIT staff development to providers and health organizations; and provided federal funding in the form of grants and loans.^{47, 48, 49}

North Dakota has also developed state policy to support HIT development. In 2006, the first statewide HIT summit was held, which provided an opportunity for health providers, policymakers, state associations, educators and researchers, and others to gather to better understand key concepts and statewide needs. Following this, the North Dakota HIT Steering Committee (22 private and public entities) was created by the Legislature in 2007 to establish a more formalized process for the state to assess needs and to develop operational plans. This has been renamed the HIT Advisory Committee (HITAC). One of the steps supported was a provider-needs survey in 2008 administered by the Center for Rural Health.

Since the last *Biennial Report*, North Dakota providers’ investment in and implementation of electronic health records has accelerated, spurred for the most part by the Medicare and Medicaid incentive programs and ultimate penalties included in the HITECH Act. Also contributing to the advancement of EHR implementation is the work of the state HIT director, staff, and the HITAC through the state HIT loan program established in 2009, administered through the Information Technology Department, to assist healthcare providers with the purchase and implementation of an EHR system. All recipients of state HIT loan funds are required to complete a satisfaction survey as a term of their loan agreement. Survey results indicated that 70% would not have been able to purchase an electronic health record system without the loan funding. To date, 27 loans have been made for a total of \$13.7 million.

In addition to the previously mentioned resources available for providers, the Center for Rural Health and Quality Health Associates of North Dakota (formerly the North Dakota Healthcare Review, a quality improvement organization that is the state subcontractor to the multi-state regional quality improvement organization) partnered with Key Health Alliance,

an association of Stratis Health; National Rural Health Resource Center; and The College of St. Scholastica to form the Regional Extension Assistance Center for HIT (REACH), which was funded by the ONC of HIT. Since June 2010, REACH served both North Dakota and Minnesota in providing technical assistance for the implementation of EHRs and in assisting them in attaining the various requirements to meet meaningful use Stages 1 and 2. The regional extension center (REC) program and REACH concluded on April 7, 2016. During the six years of service to improve care by implementing and using EHR systems, the REACH program worked with nearly 5,100 clinicians at 662 clinic locations, and assisted 121 CAHs and rural hospitals (Minnesota and North Dakota) to achieve Stage 1 meaningful use through the federal incentive payment program for healthcare providers. Stage 1 meaningful use focused on using the EHR to capture and share data. REACH worked across North Dakota and Minnesota, primarily with small healthcare organizations and those providing care to the underserved, such as community health centers and rural care providers. These providers generally lagged behind in EHR adoption because of their size and resource limitations. REACH achieved its goal of bringing 3,600 clinicians to Stage 1 meaningful use. The program supported an additional 1,489 clinicians in adopting and optimizing their EHRs and nearly all (98%) of the 5,089 clinicians implemented certified EHRs, e-prescribing, and quality reporting—critical stepping stones to using EHRs to improve care delivery through meaningful use. As of December 2015, North Dakota ranked 4th at 68% for office-based physicians having demonstrated meaningful use through the Medicare EHR Incentive Program. Nationally in 2014, 32.5% of office-based physicians with a certified EHR system were electronically sharing patient health information with external clinicians. North Dakota ranked highest at 58.8% of these physicians sharing information with external clinicians.

REACH was key to bringing EHR meaningful-use incentive dollars to clinicians and CAHs throughout the two states. From January 2011 to January 2016, combined Medicare and Medicaid payments to all clinicians (not just REACH clients) through the EHR Incentive Programs totaled \$78 million in North Dakota. At the conclusion of REACH technical assistance, of the 632 priority primary care providers (PPCPs) as defined by the ONC, REACH clients in North Dakota had experienced the following effects:

- 65 (10%) were working to adopt a certified EHR
- 567 (90%) had adopted a certified EHR, and were using it for e-prescribing and quality reporting
- 360 (57%) had attested to achieving Stage 1 meaningful use (many PPCPs were ineligible to attest)

REACH worked with all 36 CAHs in North Dakota. When the REACH program concluded

- 1 (3%) was still working to adopt a certified EHR;
- 35 (97%) had adopted a certified EHR, and were using it for computerized provider-order entry and quality reporting (95%); and
- 32 (89%) had attested to achieving Stage 1 meaningful use.

Of the 62 regional extension centers across the country funded by the ONC for HIT, REACH ranked 7th in the nation for the number of priority primary care providers it assisted to achieve Stage 1 meaningful use. REACH clients obtained the technological capabilities and companion change management skills needed to advance clinical processes and improve outcomes. They are more prepared to participate in quality

Table 6.4

Barriers to EHR implementation identified as having the greatest impact among health entities in 2012–2013.

	Ambulance	Chiropractic	Nonaffiliated Clinics	Hospitals	LTC	Optometry	Pharmacy	Public Health
Obsolescence issues	X							
Difficulty achieving acceptance among staff	X							
Difficulty in justifying expense or return on investment		X	X	X	X	X		X
Concern over completeness and accuracy of records		X	X				X	
Difficulty changing work flow patterns				X		X		
Current reimbursement system				X				
Not enough time for training					X	X		
Inability of technology to meet needs								X
Prescription transaction fees							X	

incentive payment programs as a result of the changes made to achieve meaningful use and most importantly to deliver high-quality, safe, and cost-effective care to their patients. For clinics, the meaningful use objectives of the Medicare EHR Incentive Program will roll into the Merit-Based Incentive Payment System in 2019, along with the Physician Quality Reporting System and the Value Modifier Program.⁵⁰

North Dakota in Comparison with the Nation

A 2014 data brief reported by the National Center for Health Statistics identified the use and characteristics of EHRs among office-based physicians between 2001 and 2013. Adoption of basic and any EHR systems has been steadily increasing across the United States; North Dakota has experienced some of the highest rates of implementation. In fact, the report states that “in 2013, the percentage of physicians who had a system meeting the criteria for a basic system ranged from 21% in New Jersey to 83% in North Dakota ... the percentage of physicians who had a system meeting the criteria for a basic system was ... higher than the national average in nine states (Iowa, Massachusetts, Minnesota, North Dakota, Oregon, South Dakota, Utah, Washington, and Wisconsin).”⁵¹

Since 2005, every licensed ambulance service is required to submit data to the NDDOH. However, the DEMS explains the electronic reporting among ambulance units “is not an aggregate health record but rather a record of every patient-care encounter.” All patient-care encounters are collected into a Statewide Online Ambulance Reporting (SOAR) system. Hospitals have the capability to log onto SOAR and download patient-care reports in instances where that facility is listed as the destination.” The majority (65%) of the ambulance units responding to the state survey indicated no plans to electronically send or receive patient-care summaries to other healthcare entities. In contrast, there was significant interest in exploring the North Dakota Health Information Network (NDHIN), which can be used to

electronically exchange health information. Therefore, more education is needed among EMS personnel about the potential use of the NDHIN.

Barriers to EHR Adoption

In addition to the financial burden of implementing and upgrading electronic health record systems, other barriers and challenges that organizations face are listed in Table 6.4.

The remaining North Dakota healthcare entities recently surveyed (e.g., dentists, optometrists, chiropractors, and home health workers) had limited response rates; therefore, no overarching conclusions can be drawn as to the progress of EHR implementation among these types of providers. However, the state HITAC and HIT staff within the North Dakota Information Technology Department will increase efforts to work with these as well as other providers to continue growth of the electronic exchange of health information in the future.

Health IT Workforce

While all healthcare entities are at varying levels of EHR implementation and use, there remains a great need in the area of workforce with health IT expertise and skills. The two top skill sets needed for a majority of the health entities are 1) assistance inputting data and 2) assistance to design, maintain, and customize the EHR, which has been identified as a significant need every year among those who have been surveyed.⁵¹

While most healthcare entities have implemented an EHR, workforce needs have changed with regard to supporting the existing EHR. In 2016, the Marketplace needs to have resources and experts, which can assist with facilitating ongoing security requirements, change management skills, workflow design, data analytics, and optimization of EHR to better serve the patient and allow providers to more easily and effectively utilize the EHR.

e-Prescribing

Pharmacists have the capacity to participate in electronic health information exchange through e-prescribing, which is the electronic transmission of prescription or prescription-related information between a prescriber, dispenser, pharmacy benefit manager, or health plan, either directly or through an intermediary, including an e-prescribing network. In a 2011 Surescripts report, North Dakota ranked 49th in e-prescribing activity; currently, North Dakota is ranked 15th. In 2012, pharmacies listed phone and fax as the top two ways they received new prescriptions and renewals. By 2013, e-prescribing was the primary mode for these transactions. The 2015 national Surescripts report showed e-prescribing has increased by 300%.^{52, 53}

There is a significant challenge facing the nation today related to the drug abuse epidemic, specifically opioid abuse, which is the No. 1 cause of preventable death in the United States and responsible for killing 28,000 people in 2014. In December 2015, opioids made up 32% of all controlled substance e-prescriptions. While the use of e-prescribing has increased, overall adoption and enablement of electronic prescribing for controlled substances (EPCS) grew. However, there is a real disparity between pharmacy and prescriber enablement of EPCS. All 50 U.S. states and Washington, D.C., are ranked based on the number of pharmacies and prescribers enabled for EPCS; North Dakota ranks 47th for EPCS.⁵³

North Dakota Health Information Network

The state health information exchange program, branded the North Dakota Health Information Network (NDHIN), promotes innovative approaches to the secure exchange of health information within and across state lines. NDHIN allows providers to obtain accurate and complete patient health information, which can yield benefits such as better coordination of care, quicker diagnoses of health problems, reduced medical errors, and safer care at lower costs. NDHIN is overseen by the HITAC. The HITAC consists of representatives from the governor's office, Legislature, Information Technology Department, NDDOH, and Department of Human Services, as well as stakeholders appointed by the governor, who represent providers, consumers, payers, and trade associations. The HITAC's vision is "quality healthcare for all North Dakotans anywhere, anytime."

The HITAC has implemented the NDHIN in two phases: direct secure messaging (DSM) known as Communicate and query-based services. Communicate is a simple, secure method for participants to send encrypted health information directly to known, trusted recipients. Approximately 573 individuals have accounts set up to use DSM. Some examples of information that providers and payers exchange include documents, images, Health Level 7 message strings, claims attachments, and continuity-of-care documents.

There are 104 healthcare organizations with signed participation agreements with NDHIN. The Clinical Portal is the query-based component, which allows authorized individuals to use a robust bidirectional health information exchange to obtain medical information from numerous facilities with one query by securely connecting providers' EHR systems. The portal provides authorized users with a complete summary of care, including information such as allergies, medical history, diagnostic results (i.e., labs, radiology), immunizations, and other medical

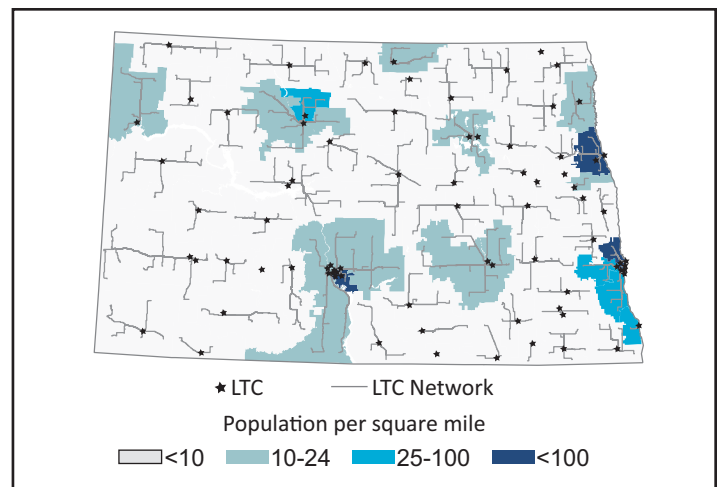


Figure 6.6. Long-term care (LTC) in North Dakota

- Fifty-nine cities have at least one LTC facility (35 of these cities also have an assisted living facility).
- Thirty-two LTC facilities are located in areas with fewer than five people per square mile. Only four locations have 40 or more people per square mile, from Bismarck (41.5) to Fargo (232).
- The average distance to travel to an LTC is 20.3 miles.

information. All of this information can be used by healthcare providers to make the right decisions for patients. Additionally, the infrastructure allows providers to automatically report immunizations, reportable conditions, and syndrome surveillance to the NDDOH.

At the end of June 2016, more than 500 users were accessing query-based services, and more than 900 messages were sent through the NDHIN weekly. Additionally, as the NDHIN and EHR systems mature, the amount of information being shared continues to increase. To minimize the number of places providers need to go to obtain information, clinical portal users can also query the North Dakota Immunization Information System and the Prescription Drug Monitoring Program.

Another feature includes subscription and notification services, which allows a provider that has a medical treatment relationship with another provider to "subscribe" to a patient and receive notifications when an event is triggered. Event triggers may include an inpatient admission or discharge, abnormal lab result, panic results, new final radiology result, and emergency room admittance. Future enhancements include adding medication information to the clinical portal, as well as partnering with other healthcare providers, such as long-term care and behavioral health providers. NDHIN has also expanded the image exchange in the state, improving access to patient information from other states and federal agencies. Lastly, an advance directive repository is currently in a trial phase. The repository will allow citizens to upload an advance directive and give permission for authorized users, such as their provider, to access it. The NDHIN team continues connecting, training, and testing with providers on the query-based clinical portal infrastructure.⁵⁴

In the past three years, NDHIN has made significant progress. The planning, development, and implementation of NDHIN has been supported, to date, with state and federal funds.

The future of NDHIN is now at a crossroads, where participants will be expected to contribute financially. In order to inform the future direction of NDHIN, the North Dakota Information Technology Department contracted with CedarBridge, a consulting firm, on behalf of the of HITAC to conduct an environmental scan of the operations and service offerings of NDHIN as part of a larger endeavor to develop a business plan for future health information exchange services, accompanied by an analysis of the expected return on investment. The environmental scan was completed June 2016, and a business plan was completed October 2016.

Telehealth

According to the Great Plains Telehealth Resource and Assistance Center (GPTRAC), funded by the U.S. Health Resources and Services Administration (HRSA), telehealth and telemedicine may appear to be very similar, but there are some important differences. As discussed previously, telehealth is the more general term and means the electronic transfer of medical information for the purpose of patient care. This includes clinical, educational, and administrative uses and applications. Telemedicine is specifically the use of these technologies to deliver patient-care services. Through technologies such as videoconferencing and other online applications, telehealth allows care providers to reach more people.

With the mandate of EHR implementation through the HITECH Act, telehealth has taken a bit of a backseat in the HIT arena. However, providers have continued to grow their utilization of videoconferencing beyond meetings and educational purposes.

An example of one of the most-used telemedicine applications in North Dakota is for tele-emergency, currently in place in 29 of the 36 CAHs. This innovative service is provided by Avera Health's eEmergency program in South Dakota, supported by funding from the Helmsley Charitable Trust. Through a two-way video technology, board-certified emergency physicians and emergency-trained nurses are made available to assist local providers in treating trauma, heart attack, stroke, and other critical conditions. The around-the-clock eEmergency team supports the local provider to ensure immediate emergency care, allowing rural hospitals to do the following:

- Access specialty support during difficult and multiple emergency cases
- Initiate diagnostic testing sooner
- Streamline emergency transfers when needed
- Keep the patient near home, as appropriate

The development of telepharmacies throughout the country started in North Dakota, because the state was the first in the country to pass administrative rules in 2001 that allowed retail pharmacies to operate in certain remote areas without requiring a pharmacist to be present. This is discussed in more detail in the section on pharmacies.

Lastly, efforts are gaining ground to utilize telehealth to meet mental and behavioral care needs (discussed in more detail in the Mental Health section). One successful model in North Dakota is a project through the Catholic Health Initiatives (CHI), funded by a HRSA Rural Healthcare Outreach Grant, to provide telepsychiatry services in the emergency rooms in 11 North Dakota CAHs and three outpatient clinics.

In a number of applications, telehealth has the potential to increase access to care for patients, minimize their need to

travel to receive specialty care, and alleviate healthcare workforce shortages and bring specialty care to consumers through real-time, two-way electronic communications. In response to the growing need to better coordinate telehealth efforts within the state, the chair of the North Dakota HITAC established a Telehealth Workgroup in September 2014, which serves to identify telehealth services being provided in the state; reviews state and federal regulations and makes recommendations for potential policy changes to achieve harmonization of state and federal laws; and informs and educates HITAC and interested stakeholders about telehealth. This Workgroup provided comments about telehealth to the North Dakota Board of Medicine, as well as testimony during the 2014 legislative session relating to individual and group health insurance coverage of telehealth services. A bill for the North Dakota Public Employees Retirement System (NDPERS) uniform group insurance coverage passed and is currently being implemented. Sanford Health Plan administers the benefit plan and will provide a progress report to the Legislature on the effect of this law on NDPERS beneficiaries. The report will be used to determine how to proceed with a law related to reimbursement for telehealth services for the general public.

LONG-TERM CARE AND AGING SERVICES

As was discussed in Chapter 1, North Dakota must contend with an aging population that has a corresponding effect on policy decisions (federal and state) as it relates to health infrastructure, health status, education, housing, transportation, economic development, and other sectors. Long-term care (LTC) or aging services are a function of healthcare that is directly affected by population factors, particularly the aging of the population. In North Dakota, from an organizational framework, long-term care facilities include assisted living, basic care, and nursing care. Each is a different type or level of care with corresponding services. In a previous chapter, the significant workforce issues found in long-term care were discussed.

According to the North Dakota Long Term Care Association, 2 out of every 5 North Dakotans will require some type of long-term care (LTC) service during their lives. The need for personal assistance with everyday activities increases with age. The top three factors affecting the need for nursing home care are 1) being female, 2) being 80 or older, and 3) living alone. By age 75, 55% of individuals are living alone. The association also found that the most common reasons provided for nursing home placement include 1) the need for assistance with daily care throughout the day, 2) complex medical needs, and 3) the need for continuous supervision.⁵⁵

Currently there are 80 skilled nursing facilities (with 62 or 78% located in rural areas). Ninety-six percent are nonprofit. There are 68 basic-care facilities in North Dakota (with 47 or 69% located in rural areas). Seventy percent are nonprofit. North Dakota has 72 assisted living facilities (with 44 or 61% located in rural areas). Sixty-seven percent are nonprofit.^{56, 57}

North Dakota long-term care facilities provide care to more than 19,000 citizens. More than 31,000 North Dakotans (65 years of age and older) live alone or 30% of that age cohort. The growth in the elderly population will have a significant impact on aging services and LTC. North Dakota is projected to see an increase in the 65-years-of-age-or-older population by 44% from 2013 to 2025, to almost 150,000 people (148,060). Currently, North

Dakota is tied for 4th in the nation in the highest proportion of individuals 85 years of age and older.⁵⁸

An *assisted-living facility* is a congregate residential setting, where the residents have private apartments and contract for services. There is an à la carte service plan for residents to select the services that best fit their needs. A basic plan typically covers meals, housekeeping, activities, transportation, and laundry. The assisted-living facility typically provides health services from bathing to medication management to hospice. In North Dakota, the age range of current residents is from 51 to 104, with the average age being 85. Females are a large majority comprising 74% of assisted-living tenants. The most common reasons people have for choosing assisted living include the following: 1) assistance with daily care, 2) social isolation, 3) confusion, and 4) need for supervision. More than half (55%) who move out of an assisted-living facility are admitted to a skilled nursing facility. The cost of assisted living has an average rental charge of \$2,084 a month (range from \$800 to \$3,873 per month). The average service package is \$955 per month. Most costs are absorbed by the tenant, with LTC insurance assisting in 25% of the cases.

A *basic-care facility* is a congregate residential setting with private rooms and semiprivate rooms, providing 24-hour supervision with a comprehensive care plan; thus, it contrasts with assisted living in that basic care is “a step up” in terms of supervision and the type and level of care. Basic care provides an all-inclusive rate providing room, meals, personal care services, supervision, activities, transportation, medication administration, nursing assessment, and care planning. The average age of a basic care resident in North Dakota is 82 (range 47 years to 102 years old). Females are a large majority comprising 75% of basic-care residents. The most common reasons people chose basic care include the following: 1) assistance with daily care, 2) needing supervision, and 3) confusion. More than half (55%) who move out of a basic-care facility are admitted to a skilled nursing facility. The cost of basic care is on average \$3,523 a month (range from \$2,300 to \$5,100 per month). Almost 6 out of 10 (59%) of basic care residents need assistance to pay for the care.

A *nursing facility* provides 24-hour nursing care and supervision. It is the highest of the three types of LTC in North Dakota. The most significant issue that drives an admission to a nursing facility is that the resident requires care throughout the day. Residents are unable to meet their own needs of dressing, toileting, eating, and remaining safe. Most residents are admitted after a hospitalization or come directly from their home. The average age of a nursing-home resident is 84 years of age (range 16 years to 108 years old). The average length of stay is less than a year. According to the Centers for Medicare and Medicaid Services (CMS), nursing facilities in North Dakota had the highest percentage of residents who were 95 years of age or older in the country at 9.11%, compared with a U.S. average of 5.11%. North Dakota also ranked first in having the highest percentage of nursing home residents who were 85–94 years of age (47.2% versus 35%). A slightly lower percentage of residents in North Dakota are female than found in assisted-living and basic care but still account for two-thirds of nursing home residents (67%). The most common reasons people have for entering a nursing facility include the following: 1) assistance with daily care, 2) complex medical needs, 3) needing continuous supervision, 4) dementia, and 5) incontinence. The average cost for one day of care in a North Dakota nursing facility, in 2015, was \$249.70.

Nursing facilities can charge extra for a private room and more than 90% do so. In 2014 (most recent year data), Medicaid was the primary payer for nursing facility care accounting for 54% of the payments. This was followed by private pay at 38%, Medicare at 8%, and other at less than 1%.⁵⁹

LTC faces many challenges. Similar to hospitals, clinics, EMS, and public health, one of the primary obstacles is workforce. As of July 2012, 63 of the more than 80 nursing facilities reported more than 750 vacant positions. The annual turnover rate for certified nurse assistants (CNA), who are in many ways the backbone of the LTC system, is 58%. The CNA turnover rate has fluctuated over the past few years, but it has been more than 50% since 2006 (43%, 2002; 35%, 2003; 53%, 2006; 53%, 2008; and 62%, 2010).⁵⁹ The nursing turnover rate has been more than 30% since 2010, with the licensed practical nurse (LPN) turnover being 36% and the rate for RNs standing at 32% in 2012.

More than one-third of the nursing facility workforce is 50 years of age or older. The workforce situation is so challenging that in 2012, 14% of nursing facilities stopped admissions because of insufficient staffing. In 2012, 2 out of 3 (66%) nursing facilities contracted with private agencies to deliver daily resident care. This represented a significant increase from 2010 data when 2 out of 5 facilities contracted for staffing. Many nursing facilities' residents are served by a workforce of their peers.⁵⁹

Like hospitals, nursing facilities are having to contend with an environment that is driven more and more by public policy focused on quality improvement. In 2016, the CMS added six new quality measures to the consumer-based Nursing Home Compare, nearly double the previous number of measures. The new measures address 1) successful discharges to the community, 2) outpatient emergency department visits, 3) re-hospitalizations, 4) improvement in the functions of a patient, 5) whether the patient's ability to move independently worsens, and 6) antianxiety or hypnotic medications. All of the measures are used to establish a “star rating” intended to assist consumers in their evaluation of nursing home care (one star is low, five stars is best).

At the state level, the Aging Services Division with the North Dakota Department of Human Services administers programs and services that enhance the quality of life and help elders and people with physical disabilities live independently in their homes and communities. Aging Services provides a number of services including the following: dementia care services program, adult family foster care licensing, Older Americans Act supportive services, Older Americans Act nutrition services, payment for the establishment of guardianship services, LTC ombudsman program, senior community service employment program, telecommunications equipment distribution program, and vulnerable adult protective services.⁶⁰

PHARMACIES

North Dakota has more than 233 pharmacies with 150 (64%) being located in rural areas (see Figure 6.7). Five counties, all rural, have no pharmacies.⁶¹ Rural pharmacies, like other rural health providers, have felt the pressure of reimbursement and workforce issues. Rural pharmacies typically pay more to drug manufacturers per prescription and sell a relatively low volume of medications, so the resulting profit can be very low. There is increasing competition from mail-order and Internet suppliers, who are able to sell at large volume and negotiate lower prices from drug manufacturers, and may pass part of these savings on

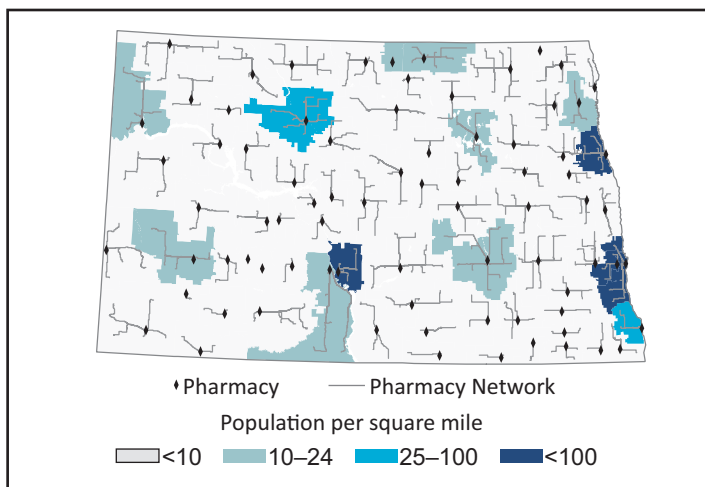


Figure 6.7. Pharmacies in North Dakota

- North Dakota currently has 233 pharmacies.
- 150 (64%) are rural or located outside of metropolitan areas.
- There are 79 towns with at least one pharmacy.
- Five rural counties have no pharmacies.

to customers.

Some third-party payers have low payment rates for prescription drugs, so pharmacies may actually lose money supplying medications paid for by these programs. Independent pharmacies tend to be more dependent on revenue from prescription medication sales, making them more vulnerable to decreases in prescription volume. Rural pharmacists tend to work longer hours than their urban counterparts. Relief coverage for vacation and illness is often difficult for rural pharmacists to find, which can result in overwork or temporary pharmacy closings. This combination of lower wages and longer hours can make it more difficult for rural areas to recruit and retain pharmacists. In addition, rural pharmacies face the same issues as do other rural providers from declining population bases to volatile economic conditions to changes in technology. A 2014 research article from the Rural Policy Research Institute found that nationally from March 2003 to December 2013, there was a net closure of 924 (12.1%) independent rural community pharmacies. Thus, in 2013 there were 6,700 independently owned rural pharmacies in the country. The sharpest decline was from 2007 to 2009 when the number of independent rural pharmacies declined by 7.2% (from 7,383 to 6,853). Many rural communities have only one pharmacy, so maintaining access to these services is also an issue. The number of rural community retail pharmacies where there was only one in the community declined by 15% from 2003 to 2009 (from 2,063 to 1,767). Since then, the number has remained relatively unchanged. In 2013, there were 1,773 rural retail pharmacies operating as solo retail pharmacies. However, almost 500 (490) rural communities that had one or more retail pharmacies (e.g., independent private, chain, or franchise) in March 2003 had no retail pharmacy in December 2013.⁶²

During a part of this period, two federal health policies were enacted that related to the payment of prescription medications. One, Medicare-approved private companies (e.g., large pharmacy chains and insurance groups) started to offer Medicare prescription drug discount cards. These were offered to Medicare Part A and Part B participants, and they provided discounts on

outpatient prescription drugs. This started in January 2004. Then in 2006, the Bush Administration and Congress created a new Medicare benefit in the form of Medicare Part D (the prescription drug benefit). There is some evidence of an association between the sharp decline in the number of independently owned retail pharmacies in rural communities and the implementation of Part D (e.g., the effect of regulatory constriction and lowered reimbursement).^{63, 64} One national study, funded by a grant from the Community Pharmacy Foundation, found that the gross margin for community pharmacies declined by 22% following the implementation of Medicare Part D and that this led to a decline in total owner compensation by about 21%. The study indicates that some community pharmacies may deal with this loss by limiting the number of Part D plans they accept, signing with plans that provide an adequate margin, which could lead to even more limited access for rural citizens. From an access perspective, this is a conundrum: Everyone wants to pay less for prescription drugs; however, the benefit to the individual can sometimes be a detriment to the provider. If it is severe enough, the provider can cease to operate, which then exacerbates access even more for the consumer.⁶⁵ In North Dakota, the large majority of rural pharmacies are accepting all Part D plans even if there is a cost structure that is unfavorable to the practice; however, there are signs that this is cracking as some rural pharmacists have had to decline plans that over a number of years have been shown to be too negative and threaten the viability of the pharmacy. Nevertheless, virtually all rural North Dakota pharmacies work with Medicare beneficiaries to assist them in navigating the maze of competing plans by providing free Medicare Part D plan counseling. This extra assistance allows the pharmacist to help beneficiaries choose a plan that is best for the elder.⁶⁶

A positive feature of the ACA is that over time it addresses one of the problems associated with Medicare Part D. The prescription drug benefit has a coverage gap. Specifically, once a Medicare recipient reached a certain level (in 2016, this was \$3,310 in drug costs), Medicare prescription drug coverage ceased until it reached a higher level (\$4,850) and coverage kicked in again. The uncovered cost is referred to as the “doughnut hole.” What the ACA does for seniors receiving Medicare is that over a period the ACA gradually “fills in” the doughnut hole by 2020 when there will be a more traditional co-payment of 25%. For example, before the ACA, the beneficiary paid 100% of the “doughnut hole” gap in coverage out of pocket; however, under the ACA, the “filling in” means that in 2016, the beneficiary would pay 45% of the cost for brand names and 58% for generics that fell into the gap; in 2017, the beneficiary pays 40% of the brand name cost and 51% of the generic. This drops again in 2018 and 2019, and then settles at a more traditional out-of-pocket rate of 25% for both brand name and generic medications in 2020. Policy analysts see a continuing expansion in the role of the pharmacist in care consultation with patients because of the ACA, and as the doughnut hole shrinks, it is anticipated that this will help the individual Medicare recipient through lower out-of-pocket costs and in turn help the retail pharmacy.

Since 2000, there has been a net change of +2 in rural pharmacies in North Dakota (15 closed and 17 new ones opened), but a number of others are at risk of closing. Each year, more pharmacists retire and, in some cases, are not replaced by new pharmacist-owners. This can contribute to access-to-care issues, particularly in rural areas because one pharmacy may serve an

expanding geographic area. In response to increasing challenges with maintaining access to pharmacy services, a telepharmacy pilot project was initiated in 2001. Now a national model, this has helped to maintain services at retail businesses, nursing homes, and rural hospitals across the state. This is discussed in detail in the following section.

A final area of policy interest is the federal discount drug program, the 340B Program (previously discussed in the Hospitals and Health Systems section). The purpose of the discount was to expand access to affordable medications by low-income populations and support the operations of healthcare safety net organizations such as FQHCs, CAHs, sole community hospitals, and other organizations that meet federal goals in maintaining access for vulnerable populations such as Medicaid and Medicare recipients, populations in underserved areas, or people who have economic or health disparities. Pharmaceutical manufacturers whose drugs are covered by Medicaid are required to sell drugs to covered entities at 340B discounts. As of 2014, there were more than \$7 billion in medications distributed to about 2,140 hospitals, and numerous clinics and other health organizations. There are 940 CAHs (44% of all hospitals) involved. The \$7 billion figure is more than three times what was covered by 340B in 2005.⁶⁷

Covered sales are expected to exceed \$16 billion by 2019, fueled by the ACA's Medicaid expansion. It is also estimated that the 340B discounts represent only 2% of the \$340 billion pharmaceutical market. There has been some recent push-back from the pharmaceutical industry over lost revenue because of the discounts. Advocates for rural health and low-income patients argue, however, that the discount is necessary to provide access to needed medications and to alleviate some of the cost differential faced by rural health providers. The number of 340B participants had increased significantly as the ACA expanded the number of approved safety-net providers to include CAHs, sole community hospitals, rural referral centers, freestanding children's hospitals, and some cancer hospitals.⁶⁸ By lowering the cost to the healthcare provider, costs can be lowered for the patient or client, and health facilities can use the cost savings to make other important adjustments. From a rural perspective, the 340B drug program has been generally viewed as a positive federal effort, especially with the inclusion of CAHs. As was discussed in the Hospitals and Health Systems section, it appears that the 340B drug discount program has contributed to a better bottom line for a number of North Dakota CAHs, as witnessed by the association of improved margins and participation in the discount program. There have been policy discussions to consider the inclusion of federally certified RHCs; however, as of 2016, federal policy has not changed.

From a rural perspective, the rural Medicare beneficiary advances by both a cost reduction in medications and by stabilizing the local hospital or clinic so that access to a safety net provider can be maintained.

A final policy note relates to state policy. Since 2015, all administration of the first dose of medication to a hospitalized patient must be first reviewed by a pharmacist. This has been initiated to ensure greater patient safety. The review does not have to be on-site; it can be done through telepharmacy applications. As was previously discussed in the EMS section, the Center for Rural Health secured a federal Rural Health Network Development grant that addresses CAH quality improvement

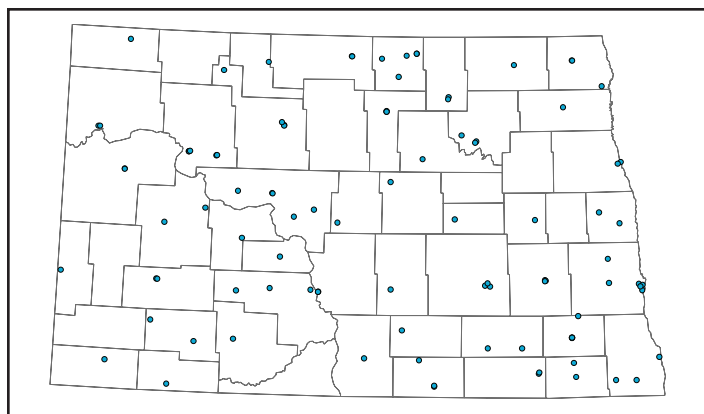


Figure 6.8. Telepharmacies in North Dakota⁷⁰

- North Dakota currently has 98 telepharmacies.
- Eight counties have no telepharmacies.

both as it relates to an emergency function and as it relates to medications. In both cases, the thrust of the grant is to assist CAHs in improving quality and patient safety. Under this grant, the CAH Quality Network has secured a vendor to assist the CAHs that did not have 24-hour pharmacy coverage (10 CAHs) so as to both gain coverage but also to lower costs through group purchasing rates; provide training and education to all 36 CAHs on remote pharmacy reporting, increasing efficiencies, and best practices; and provide technical assistance for developing policies and procedures to ensure compliance of pharmacist first-dose review and to share information between CAHs on evidence-based practices.

Telepharmacies

The development of telepharmacies throughout the country began in North Dakota in 2001 (see previous section on Pharmacies). North Dakota was the first state to pass administrative rules allowing retail pharmacies to operate in certain remote areas. In 2012 (most recent data year), there were 10 states with laws governing telepharmacies.⁶⁹

Telepharmacies have become a practical means to keep access to medications available in a growing number of rural locations (see Figure 6.8). A telepharmacy benefits the patient and the pharmacist, creates employment opportunities for health workers, supports local business and economic development, and supports local health providers and organizations such as CAHs, clinics, long-term care facilities, and public health.

How does telepharmacy work? A licensed pharmacist at a central pharmacy site supervises a registered pharmacy technician at a remote telepharmacy site through the use of videoconferencing technology. The technician prepares the prescription drug for dispensing by the pharmacist. The pharmacist communicates face-to-face in real time with the technician and the patient through audio and video computer links.⁶⁹

Rural North Dakota has felt the positive effect of telepharmacy. Forty-five (85%) of North Dakota's 53 counties are involved with the North Dakota Telepharmacy Project. As of 2016, there were 98 pharmacies involved in the Telepharmacy Project, an increase from the previous *Biennial Report*. Many of these remote sites are in communities where the central pharmacy closed (in many cases because of retirement), and there are remote sites in communities that either have not had

a pharmacy or have not had their own site for many years. The Telepharmacy Project has both protected access to an essential service and has in some cases expanded access. Of the 98 sites, 69 are retail pharmacies and 27 are hospital pharmacies. There are also two Minnesota sites involved. Approximately 80,000 rural citizens have had pharmacy services restored, retained, or established through the Telepharmacy Project (a collaboration of the North Dakota State University College of Health Professions, the North Dakota Board of Pharmacy, and the North Dakota Pharmacists Association). The effort has restored valuable access to healthcare in rural and frontier areas of the state, and has added approximately \$26.5 million in economic development to local rural economies.⁶⁹

PUBLIC HEALTH

Public health is both an important and fundamental set of health and environmental services that has made significant contributions to improving the health status of most Americans, rural and urban, and an evolving concept that goes beyond the provision of services as the U.S. health system transforms under the ACA. At the same time, public health remains unheralded and misunderstood. A rural North Dakota public health director once remarked, “If I am doing my job well, you don’t even know I’m here.” While acute care, long-term care, clinical care, and EMS attract much of the spotlight, garnering more public awareness and attention, public health throughout the 20th century and now into the 21st century has significantly changed the lives of millions of Americans. Some of the accomplishments associated with public health include, but are not limited to, development and widespread access to vaccinations, control of infectious disease (e.g., through emphasis on clean water and improved sanitation), fluoridation of drinking water, provision of safer and more healthful foods, access to family planning, increased motor vehicle safety, and tobacco control. Disease prevention and health promotion are highly associated with public health.

Public health covers a wide scope of activities. It can be defined as “the field of health science that is concerned with safeguarding and improving the physical, mental, and social well-being of the community as a whole.”⁷¹ Schneider distinguishes public health from medicine in this manner: “While medicine is concerned with individual patients, public health regards the community as its patient, trying to improve the health of that population. Medicine focuses on healing patients who are ill. Public health focuses on preventing illness.”⁷² Thus public health is concerned with the concept of population health including the determinants of health (e.g., medical care and the delivery system; individual behavior; genetics; physical environment; and social conditions and determinants such as income, education, public safety, housing, transportation, and culture). Population health and public health are not synonymous but they do interrelate. According to Kindig and Stoddard (2003), population health refers to “an approach [that] focuses on interrelated conditions and factors that influence the health of populations over the life course, identifies systematic variations in their patterns of occurrence, and applies the resulting knowledge to develop and implement policies and actions to improve the health and well-being of those populations.” Thus, population health is a comprehensive concept requiring a systematic understanding of the health status of the population through a focus on the determinants of health, public health policy, processes to address

health, and the involvement of both a healthcare and public health system—all to improve the population’s health. Population health is concerned with both the measurement of health outcomes and the pattern of determinants.⁷³ To augment the availability of highly trained public health workers and strengthen the population health workforce, North Dakota State University and the University of North Dakota recently initiated collaborative Master of Public Health degree programs. The programs share similar core coursework but distinctive specialization tracks. At the University of North Dakota, the Master of Public Health Program is contained within the newly created Department of Population Health. Organizationally, for the UND School of Medicine and Health Sciences, this indicates that the comprehensive goal of improving population health is interrelated and inclusive of focal areas such as public health, which emphasizes understanding health within a context of the health system (including access to and availability of health services and providers), the nature of disease and disease prevention, community dynamics, organizational structures, and public policy.

Much of what has been presented in this chapter relates to the healthcare delivery system and its role and issues (e.g., hospitals, ambulatory care, EMS, trauma, and LTC). The healthcare system and the public health system are two sides of the same coin. In some respects, the national experiment in health reform—particularly when thought of within the context of the Institute for Healthcare Improvement’s (IHI) Triple Aims of better care, better health, and lowered cost—represents a unique opportunity in the American health system to better maximize both healthcare and public health practices to meet the needs of the overall population. The nexus may be the gradual breaking down of institutional, organizational, and even philosophical walls between healthcare and public health. The healthcare system, under the ACA, is evolving as it takes up a movement to value health outcomes linked with improved organizational efficiency, for example, in an effort to address the Triple Aims. To do so, the healthcare system is more inclined to be engaged with traditional public health concerns such as population health. Recently a healthcare leader in North Dakota said, “As hospitals, we never used to be too concerned with things like poverty and housing, but now [under health reform] we have to be, and that is a good thing.”⁷⁴ In order to improve the status of health in the United States, there must be an improvement in healthcare (the structure, management, and planning within the system), and the corresponding controlling of health costs can create an economic model that may be better suited to improve both the healthcare system and the health of the population.

An example of this is the ACA requirement that all nonprofit hospitals conduct a Community Health Needs Assessment and implementation plan every three years. The rationale is to produce a community health benefit, an activity or effort that improves population health. The community-benefit concept, while expansive in both design and implementation, lends itself nicely to a focus on population health and the determinants of health. The fact that hospitals are required to include public health in this facilitates the interconnections for a comprehensive vision of community health and population health overall—possibly even transformative. Another example, which will be discussed in more detail in the next chapter covering quality and value, relies on the fundamental nature of the Triple Aims. Hospitals, ambulatory care, public health, EMS, LTC, mental

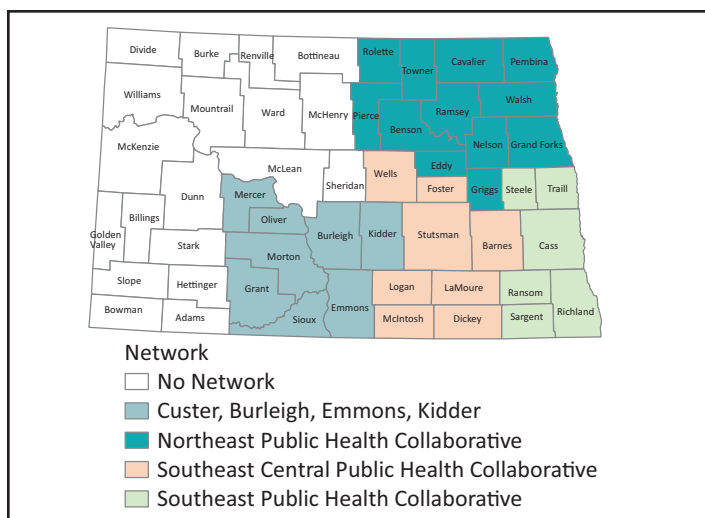


Figure 6.9. Public Health Units by Regional Network

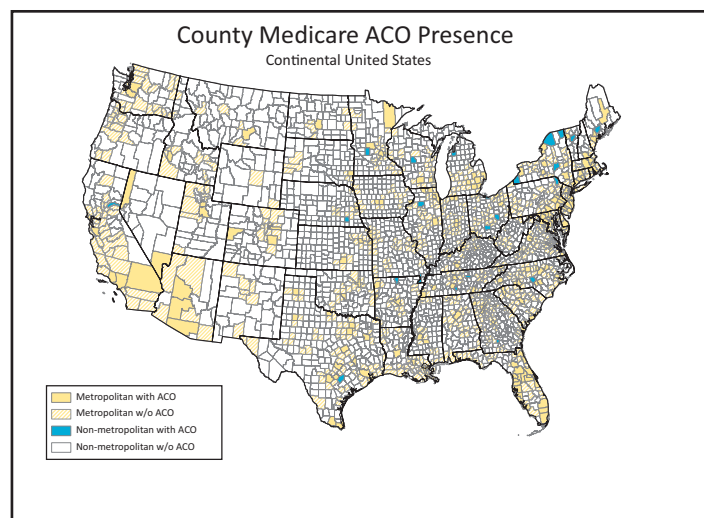


Figure 6.10. Accountable Care Organizations (ACOs)

health, and other provider arrangements can all establish some level of integration to better improve health outcomes. Part of this is linking payment and outcome through alternative payment models in the form of ACOs, patient-centered medical homes, clinically integrated networks, the use of bundled payments, and other new organizational platforms that seek system redesign based on an emphasis on outcome and value over volume. In other words, by focusing not only on patient outcomes and health status (including prevention and maintenance) but also on a provider-incentive system where outcome and efficiency are rewarded, the American health system seeks to transform itself into one that better integrates population health, curative care, and palliative care.

The remainder of this discussion will focus on three core elements of public health in North Dakota: Healthy North Dakota, public health accreditation, and public health units.

Healthy North Dakota is a statewide partnership of more than 400 committee members and organizations working to determine solutions for more healthful living. Healthy North Dakota was created in 2002 to be a platform for better health. It ties together partners and stakeholders (state agencies, higher education, businesses, nonprofits, and health providers) in an effort to identify strategies and innovative solutions to public health issues. Healthy North Dakota has filled gaps in prevention efforts, fostered common dialogue and messages on prevention, created collaborative efforts, and secured external funding. Over the past few years, this umbrella group, administered by the NDDOH, has addressed the following: health inequities; worksite wellness; food insecurity and hunger; prevention of chronic disease (including heart disease, diabetes, and cancer); and health at all stages of life from childhood to elders; and made links between physical and mental/behavioral health, socio-ecological determinants of health, women's and maternal, and children's health. Healthy North Dakota hosts six yearly stakeholder calls to share information and strategies. The alliance facilitated implementation of the Creating a Hunger Free North Dakota strategic plan and secured external funding for an effort to reduce high blood pressure and health disease in the Million Hearts national learning collaborative. In addition to the workgroups, Healthy North Dakota is composed of the Statewide and Vision Strategy for a Healthier North Dakota (SVS). This

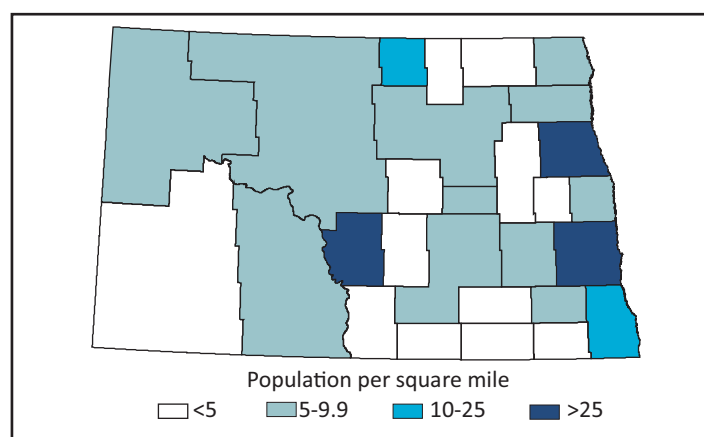


Figure 6.11. Local public health unit areas and population per square mile⁷⁸

There are 28 public health units in North Dakota, with 22 in the eastern half of the state.

- Twenty-one units cover a single county, and seven cover multiple counties.
- The average area covered by a unit is 5,525 square miles.
- Only three (Bismarck, Grand Forks, and Fargo) have a population density of more than 40 people per square mile.
- The average age of population for 18 public health units is more than 40.

group—composed of key stakeholder groups including the governor's office, state business chamber, statewide health associations, public employee representatives, the UND School of Medicine and Health Sciences, Blue Cross Blue Shield of North Dakota, large health organizations, and others—developed a statewide health improvement plan for North Dakota. This comprehensive plan includes the following goals: 1) implement selected prevention and wellness initiatives, 2) increase ownership and personal health responsibility, 3) build future services infrastructure, 4) secure the required human resources, 5) implement appropriate medical technology, and 6) align financial resources with health outcomes. The formal mission of Healthy

North Dakota speaks directly to the matter of population health: healthy people and healthy communities.^{60, 75}

Another core element is the opportunity afforded public health to achieve accreditation. The Public Health Accreditation Board (PHAB) is the national nonprofit organization that administers the accreditation program for tribal, state, local, and territorial health departments in the United States. The effort is funded by the Centers for Disease Control and Prevention (CDC), and the Robert Wood Johnson Foundation. The goal of this voluntary national effort (public health is not required to be accredited) is to improve and protect the health of the public by advancing the quality and performance of public health departments. Health department performance is measured against a set of nationally recognized, practice-focused, and evidence-based standards. Once achieved, accreditation is for five years.⁷⁶

Currently, the NDDOH is being reviewed for accreditation. Central Valley Health District in Jamestown is the first accredited local health department in the state. Southwestern District Health Unit in Dickinson has had a site visit, and Fargo-Cass Health Unit in Fargo has submitted a letter of intent.

Part of the accreditation process involves input from the public on community health issues and the development of an action plan. For public health, the assessment is called a community health assessment (CHA) and the action plan is called a community health improvement plan (CHIP). It should be noted that the public health process for a CHA and CHIP is different than what is required under the ACA for nonprofit hospitals. For public health, a CHA and CHIP are to be conducted every five years as part of a reaccreditation. For nonprofit hospitals, their CHNA and strategy plan follows a three-year time frame and hospitals are required to include public health in the process. North Dakota has worked to lessen duplication and redundancy and to build upon the opportunity for collaboration. For example, the Center for Rural Health has assisted many hospitals and public health units in their respective processes, working to develop common approaches and methods. A common survey was developed that is used by both hospitals and public health; the survey was developed with input and critique from both public health and hospitals.

Additionally, to assist the local public health units with their CHA and CHIP process, an external grant was secured by the NDDOH. The Gaining Ground Initiative was awarded by the National Network of Public Health Institutes with funds from the Robert Wood Johnson Foundation to seven states, including North Dakota. The purpose was to assist public health in preparation for accreditation. A subcontract was awarded to the North Dakota State University Master of Public Health Program to conduct tribal-focused CHA in North Dakota. A subcontract was awarded to the Center for Rural Health to assist with CHA and CHIP in rural areas. Individual public health districts also secured additional funding from the North Dakota Consensus Council for the effort. The CRH worked with Lake Region District Health Unit in Devils Lake; Walsh County Health District in Grafton; Rolette County Public Health District in Rolla; City County Health District in Valley City; and the Southeast Regional Public Health Network, representing public health units in the counties of Cass, Ransom, Richland, Sargent, Steele, and Traill. The regional process is discussed in more detail later. The CRH assisted Custer Health in Mandan with its CHIP (some of the

Table 6.5
Public health units by type and number of counties

Type	Counties
City/County Health Department	3
City/County Health District	1
Multicounty Health District	32
Single County Health Department	6
Single County Health District	11

CHA had already been completed in collaboration with an area CAH, which the CRH had facilitated, and this additional effort extended the CHA for Custer’s remaining service area and the work on corresponding CHIP). The Walsh County process was inclusive of the CAHs in Grafton and Park River. The effort in Walsh County showcased a strong public health and, in this case, multihospital collaboration that worked together for the benefit of the entire county.⁷⁷

The third core area covers local public health. While each public health unit can organizationally determine its own mission and primary focus, there are some common services provided. All North Dakota public health districts provide the following: immunizations (for all ages), blood pressure screening (adults and school-age children), scoliosis screening (school-age children), vision screening (school-age children), high-risk infant follow-up, and vitamin B12 injections. In addition, most but not all units provide the following services: maternal and child health (e.g., home visits, sudden infant death syndrome prevention follow-up visits, and child health services); health promotion (e.g., diabetes, foot care, and community wellness programs); communicable disease (e.g., tuberculosis, and skin and scalp conditions); school health (e.g., hearing screenings and AIDS education); environmental health (e.g., public water system inspection, environmental sanitation services, and water pollution control); occupational health nurse activities; mental health; skilled nursing activities; and maternal and child health initiative grants.

North Dakota’s public health system is decentralized with 28 independent local public health units working in partnership with the NDDOH (see Figure 6.11). The 28 local public health units are organized into single or multicounty health districts, city-county health departments, or city-county health districts. Seventy-five percent of the local health units serve single county, city, or combined city-county jurisdictions, while the other 25% serve multicounty jurisdictions (see Table 6.5). The majority of the multicounty jurisdictions are located in the western part of the state. In this decentralized approach, the units are required to meet state standards and follow state laws and regulations, but they can exercise their own powers and have administrative authority to make decisions to meet their local needs.

Some rural public health units, like rural hospitals, have used special federal rural health grants to address broader community needs. The Southwestern District Health Unit in Dickinson, which serves a large eight-county region, has used multiple federal Rural Health Outreach grants and Rural Health Network Development grants to create a health screening (e.g., various cancers and cardiovascular conditions) and education model. The public health effort, called Pathways to Healthy Lives, is a strong community-engagement model in which the public health unit, the local Dickinson hospital, and the community action agency worked as a network along with many other area groups

to plan and develop services. The impetus for the effort was a community needs assessment and planning process conducted a number of years ago. This community engagement effort became the nucleus for community awareness and involvement, which is at the heart of rural health. The Tri-County Chronic Disease Management Program was also a Rural Health Outreach grant product. Developed and administered by the City-County Health Department in Valley City, Tri-County was a network-focused effort involving City-County, Central Valley Health Unit in Jamestown (serving Stutsman and Logan counties), and South Central Adult Services in Logan County. The program placed a strong focus on self-management and teaching clients how to learn more about their chronic disease, and to self-monitor and manage it, while working closely with their primary care providers. Clients gained awareness and more self-confidence.⁷⁹ Both rural efforts, Dickinson and Valley City, are examples of essential health services (e.g., health screenings and chronic disease management) that are recognized and valued under health reform, possibly at a level that is higher than was previously found (at least they are services that can be adequately rewarded within new payment models). While these are services that public health has championed, in the current transformative climate, they are now also services that produce “value” in terms of stronger health system performance. In other words, in an age of alternative payment models, these are services that can contribute to better care, better health, and lowered cost. Thus, some public health functions that public health units perform at a high level, with accepted quality indicators, and at a reasonable cost can now be services that could be attractive to an ACO or other model. Public health units have been involved in other federal rural health grants addressing community wellness, chronic disease, home care, mental health, and other critical community health needs.

As was previously noted, part of the ACA requirement that nonprofit hospitals address community benefit through a Community Health Needs Assessment (CHNA) and implementation process stipulated that the process must involve input from public health. Public health units have been involved, to one degree or another, with nonprofit hospitals in a CHNA process. It was also previously mentioned that the PHAB requires public health entities to also conduct a CHA process as part of an accreditation effort. Thus, public health has been actively engaged in the community assessment process—either one that was meant to meet accreditation needs or one to meet the ACA requirement for hospitals. At the time of this *Report*, the process was ongoing; however, evidence to date has found support in rural North Dakota for a number of issues that lend themselves to public health solutions: obesity/overweight, poverty, teen pregnancy, bullying, elder services, and adolescent or adult alcohol or drug abuse, to name a few. An observation from the CHNA experience was that if the community health partners developed open, collaborative relationships, then there was an opportunity for progress on these health issues. The value of the process is that it can encourage health organization collaboration in striving to build a vision for community health. Through a variety of channels, health reform is either encouraging or sometimes requiring more collaboration between provider groups in an effort to improve health status.

Through the Community Transformation Grant (funded by the CDC and administered by the NDDOH in partnership with the Center for Rural Health and the NDSU Master of Public

Health Program), the CRH conducted both an electronic survey of public health directors and phone interviews. In addition to exploring the organizational functions of public health, the CRH looked at the level of public health involvement with the hospitals and the broader issue of community collaboration. Twenty-two of the 28 public health units responded to the electronic survey. More than half planned to work with the local hospital on community assessments. Public health directors were also asked what the barriers were in completing a needs assessment, and the most common response was “limited financial resources,” followed by “lack of engagement with partners,” which tied with “not enough staff.” In the electronic survey, public health directors were also asked to assess the extent of public health’s collaboration with other community organizations. The two top-rated partners (based on the assessment of full collaboration) were the school district and the worksite wellness programs (tied), followed by local health coalitions and city or local government (tied). Hospitals were rated fifth. The lowest-rated partner for collaboration was economic development. During phone interviews, respondents were asked to discuss the level of ease in local or area collaboration. About two-thirds indicated that collaboration was easy, positive, or productive in their communities. There were opinions expressed indicating that groups could meet to discuss common community issues, less turf protection, and an interest in getting things done.⁸⁰

The attitudes expressed by public health are similar to what the Center for Rural Health has learned from hospitals. With external forces (e.g., health reform and the public health accreditation process previously discussed) encouraging and even mandating more collaboration, it is important that the entities involved have the ability, desire, resources, and mind-set to seek out collaboration. There is some indication that both hospitals and public health recognize that working together for the good of the community is a process that takes time (being more cognizant of other agencies’ environmental issues and values), but is necessary. This may bode well for greater community engagement and better population health.

A final note on local public health relates to the development of regional public health networks. The 2009 Legislature authorized the creation of such networks and appropriated \$700,000 to plan and establish the networks. The state dollars and some additional funding from the Bush Foundation has contributed to the development of four regional networks. There is Custer Health’s regional network covering eight counties in the central-west, including Burleigh and Morton; Southeast Central Collaborative, also covering eight counties including Stutsman; Southeast Public Health Collaborative, covering six counties including Cass and Richland; and Northeast Public Health Collaborative covering 12 counties including Grand Forks and Ramsey. Part of the impetus for the networks is to foster greater collaboration that can also contribute to public health accreditation. While the individual units maintain their autonomy, the regional process is an initial step in both a rethinking and a restructuring for public health. It comes at an appropriate time as most health provider organizations need to contemplate how they fit and function in a quickly changing health delivery system.

MENTAL HEALTH

The prevalence of mental illness in rural areas is equal to or

greater than in urban populations, with rural residents reporting greater rates of depression than those in metropolitan areas. Suicide rates are higher among men in rural areas than among men in urban areas. Untreated depression is a chronic issue. Rural access difficulties result in many rural residents forgoing treatment altogether or obtaining care from nonspecialists for mental health problems. The issues in rural mental health include disparities in access, availability of culturally appropriate treatment, quality, mental health disparities in rural areas, and special populations.^{81, 82}

North Dakotans tend to experience slightly higher rates of mental health problems than the national average.⁸³ Mental illness can trigger an array of challenges, ranging from decreased work productivity to strained family relationships. Mental illness, while not uncommon, is often highly stigmatized, and consequently individuals are frequently reluctant to seek care, particularly when there is a perception that others will learn of their illness.

The mental health system in North Dakota relies heavily upon the state Department of Human Services Division of Mental Health and Substance Abuse (DMHSA), which has public responsibility for mental health services. The DMHSA functions as the state mental health authority, overseeing services delivered through eight regional human service centers and the North Dakota State Hospital in Jamestown. The human service centers provide crisis stabilization and resolution, inpatient services, psychiatric and medical management, social services, residential services and support, vocational and educational services, and supportive employment. The State Hospital provides physical, medical, psychological, and other services, and is accredited and Medicare-certified.⁸⁴

Throughout the state, there are 25 facilities or programs providing mental health services, including the eight regional human service centers. This includes both public and private organizations such as Prairie St. John's in Fargo and the Red River Behavioral Health System, formerly the Stadter Center, in Grand Forks. Most provide multiple forms of care services. Seven provide outpatient and partial hospitalization; seven provide residential care; six provide inpatient, outpatient, and partial hospitalization; three offer outpatient, partial hospitalization, and residential care; and one provides inpatient, outpatient, and residential care. All of these resources, with the exception of one, are located in urban (Bismarck, Fargo, and Grand Forks) or large rural areas (Devils Lake, Dickinson, Jamestown, and Minot). The one rural exception is a residential care facility in Sentinel Butte. While centers are in all regions and corners of the state, rural access is still limited.⁸⁵

One way of addressing some of the access issues is through tele-mental health, which is continuing to develop in North Dakota. The eight regional human service centers have tele-mental health capacity. For example, if someone goes to the Williston center to see a psychologist and one is not available, that patient can access one who is available in Devils Lake, Jamestown or any of the seven centers. The Department of Human Services is also able to use tele-mental health to provide services in another setting such as a mental health provider in one of the regional centers seeing patients that may be in a hospital or nursing home. Additionally, the regional centers can connect with providers in the State Hospital in Jamestown. Electronic medical record data are also available to the providers as is a telepharmacy system. The tele-mental health services are available for children,

adolescents, and adults. Tele-mental health is provided through the larger urban-based tertiary systems too. The No. 1 tele-health service from Altru Health System in Grand Forks is psychiatry, and it provides tele-mental health links to nursing homes as well. CHI-St. Alexius Health System in Bismarck offers tele-mental health and employee assistance counseling around the state. The UND School of Medicine and Health Sciences is using telemedicine technology as a way to increase both educational preparation and rural access. Beginning in 2015, the School added one additional psychiatry resident a year with much of the training being done remotely, relying in part on telemedicine. The telemedicine experience now has been added to the curriculum of all psychiatry residents. In their first year, residents will receive training in Fargo, including the human service center there. Training in years two and three are split between Fargo and a rural location (one-third of the training at a rural site), where they would be working with a primary care physician. The fourth year of the residency is one-half rural and one-half in Fargo.⁸⁶

Rural health providers have been active in developing community-focused solutions to address mental health. The 2014 *North Dakota Hospital Workforce Survey* found that "access to mental/behavioral health services—inpatient and outpatient" was the highest-rated concern out of 34 items, with "access to mental/behavioral health services—substance abuse" being the second-highest problem facing rural hospitals. The 2011 hospital administrator survey had found mental health access to be the third-highest concern at that time. In spite of the fact that roughly two-thirds of North Dakota CAHs (at that time) had negative financial margins and were facing serious health workforce supply issues, access to mental health emerged as more of a pressing issue than either of those subjects. As was discussed in more detail earlier, the hospital survey finding is also supported by other Center for Rural Health research that found significant concerns associated with rural access to mental health and behavioral health services (e.g., 2016 CHNA aggregate data and the Community Apgar Project study related to facilitators and barriers to rural physician recruitment and retention).¹⁴ This is evidence that the issue and its effect are recognized as a serious rural problem not only for patients and families but also for the overall delivery system. Since the mid-1990s, there have been three Rural Health Outreach grants or Network Development grants in North Dakota that addressed some facet of mental or behavioral health. The Rural Mental Health Consortium in central North Dakota has involved four CAHs working together since 1994. The network is still active in 2016 and employs advanced practice nurses trained specifically in mental health to serve the population. As an outreach grant, the four CAHs had only three years of federal funds to develop and operate the program. After the federal funding ended around 1997, the program has been successfully maintained by the network and is still in operation. The Wellness in the Valley Suicide Prevention program, operated in the Valley City area, created a county-wide suicide prevention effort involving 18 agencies. The network was led by the CAH, public health agency, and a primary care clinic. It is no longer in operation. In 2011, Mental Health America of North Dakota received a federal Rural Health Network Development award to develop a regional network of behavioral health (mental health and substance use) entities to improve access to behavioral healthcare and reduce behavioral health disparities. This network also involves the Elbowoods Memorial Health Center, Sakakawea

Health Center (a CAH), the North Dakota Federation of Families for Children's Mental Health, the Area Health Education Center, and the Coal Country Community Health Center. The North Dakota Rural Behavioral Health Network operates through Coal Country Community Health Center. It employs a licensed social worker and three addiction counselors. It is licensed to provide drug and alcohol evaluations as well as outpatient substance abuse treatment and aftercare. Additional services address anger, anxiety, grief, mood disorders, personality disorders, relationships, and suicidal thoughts.

The 2013 Legislative Assembly supported a study resolution that was referred to the Legislative Council interim study process. With the guidance of the Interim Health Services Committee, an independent study was conducted in early 2014. The result was the *Behavioral Health Planning Final Report*, which was issued and presented to the interim committee in July 2014. Schulte Consulting LLC from Iowa conducted the study, which relied on face-to-face meetings with individuals and groups, five public hearings, and biweekly public conference calls. More than 414 people participated for a total of almost 20,000 minutes contributed by interested North Dakota parties. More than 230 documents, not including e-mail communication, were reviewed for the report. The guiding purpose put forth by the Legislature was "to create a plan based on specific goals and objectives to improve behavioral health services in North Dakota."

The Schulte study (as it is often referred to) discussed 51 strategies to improve behavioral health. Most would require some form of direct public policy action, while a small number would be the responsibility of other organizations (e.g., law enforcement, schools, universities, and providers). The strategies or recommendations essentially fell into six broad themes: 1) address service shortages, 2) expand workforce, 3) change insurance coverage, 4) change the structure and responsibility of the North Dakota Department of Human Services, 5) improve communication, and 6) improve data collection and research.

The Schulte study became the impetus for a statewide effort and coalition called the Behavioral Health Stakeholders that met in 2014, before the 2015 legislative session and in the fall of 2015 following the legislative session. The Center for Rural Health hosts the North Dakota Behavioral Health Stakeholders group website at www.ruralhealth.und.edu/projects/nd-behavioral-health. The Stakeholders group has served as a springboard for discussions and policy formulation. It is composed of providers, policymakers, educators, researchers, advocacy groups, and others who share perspectives and ideas for improving the behavioral health and mental health system of North Dakota. Before the 2015 Legislature, a number of policy-focused workgroups were created (e.g., workforce development) and were structured to identify and develop legislation. Each workgroup had a state legislator assigned to it to assist in policy construction. While not all of the bill language was incorporated into proposed legislation, the Stakeholders group made a significant contribution to policy. The 2015 Legislature had 19 bills (not all were from the Stakeholders' process) that directly affected behavioral and mental health. The proposed legislation covered the gamut of focal areas: children, adults, substance abuse, and workforce. Sixteen of the 19 bills had a workforce component. A few key laws that emerged from the session are discussed here. HB 1396 provides a \$700,000 appropriation to be used for student loans for certain health professions including those engaged in the area of behavioral

and mental health. The loans are available for physicians, clinical psychologists, advanced practice nurses and physician assistants, people licensed as addiction counselors, professional counselors, registered nurses, and licensed social workers. HB 1049 also was a loan bill. The new law will develop a revolving loan fund for addiction counseling internships with \$200,000 of appropriated funding. The internship sites are to be coordinated by the Area Health Education Center. SB 2048 as enacted creates a \$750,000 voucher system to assist people seeking care for substance abuse treatment from private providers as opposed to the state's regional human service centers (because of budget constraints, the amount has been cut to \$375,000 in 2016). This law also calls for a continuing study of behavioral health needs, which has been a focus in the 2015–2016 interim legislative process. Additionally, the 2015 Legislature increased services for seriously mentally ill by 35 slots; supported a 10-bed crisis residential unit/transitional living unit in the north-central region serving Minot and Williston; supported a 15-bed expansion to the Tompkins Rehabilitation and Corrections Center, an addiction treatment facility; and supported the ND Cares Coalition for veterans services. Behavioral and mental health will be on the policy agenda for the 2017 Legislature.

ORAL HEALTH

Access to oral healthcare is problematic for millions of Americans because of a variety of factors, including financial barriers, transportation difficulties, problems with navigating government assistance programs, workforce supply, and the funding of those programs. Rural residents, for example, report poorer oral health (i.e., higher rates of permanent tooth loss) than people in urban areas. Dental concerns are also issues for rural populations.^{87, 88}

Inadequate access to a dental professional may be heightened by typical hours of operation. Dentists in the state generally work four-day weeks, Monday through Thursday. While only 13% of dentists in the state reported working 40 hours or more, it did not seem to have an effect on wait-time. Roughly 48% of dentists reported that a new patient could make an appointment for an exam within a week of calling their office. Collectively, 71% reported a patient would be seen within two weeks of calling, and only 13% said a patient would wait more than four weeks.⁸⁹

The specified wait time may be for those patients who are insured. Growing concern is found for access to oral healthcare for the uninsured and Medicaid recipients. In 2013, 249 dental practices billed for at least one Medicaid patient in the calendar year; only 65 (26%) of these practices saw more than 100 Medicaid patients. The number of dental practices that see no Medicaid patients and do not bill Medicaid is unknown. It is also important to note that in the North Dakota Medicaid file, there is no distinction between a dental practice that employs one dentist and a dental practice that may employ 10 or more. The following data speak to those dental practices that accepted at least one Medicaid patient in 2013 without regard to the number of employed dentists at any given practice.⁹⁰

A majority of North Dakota dental practices that had billed Medicaid in the past calendar year (58%) saw 50 or fewer Medicaid patients. These dental practices (58% of those billing Medicaid) accounted for only 11% of Medicaid patients that visited a dentist in 2013. More than 50% of Medicaid patients who saw a dentist in 2013 received care from one of only 21 North

Dakota dental practices; this means that 8% of the dental practices billing Medicaid in 2013 provided care to 52% of the Medicaid enrollees accessing dental services.⁹⁰

Inadequate access to oral healthcare services for North Dakota rural, tribal, and low-income residents has significant impact on individual oral health status. Not only do these groups have less access to oral healthcare services but typically report lower oral health literacy as well; when combined, these two conditions lead to rampant decay and early edentulism.

Tooth decay (cavities) is one of the most common chronic childhood conditions in the United States. Untreated tooth decay can cause pain and infections that may lead to problems with eating, speaking, playing, and learning. There are several contributing factors that lead a child to develop tooth decay, some of which include infrequent brushing, not flossing, consuming sugary drinks or soda, not visiting a dentist annually, and not having access to oral hygiene products like a toothbrush or toothpaste. In North Dakota, American Indian adolescents are significantly more likely to have these poor oral health predictors than their non-Hispanic white peers. Rural adolescents are at a greater disadvantage than urban adolescents, but not significantly. Finally, students who attend schools with a larger percentage of the population participating in the National School Lunch Program (NSLP) are less likely to have a toothbrush and less likely to have brushed on the day of assessment.⁸⁵

While 96% of all North Dakota non-Hispanic white third-grade students have a toothbrush, the same is true for only 49% of their American Indian peers. As a result, only 32% of American Indian youth brushed their teeth on the day of assessment compared to 66% of non-Hispanic white adolescents. Likewise, children attending lower-income schools (>50% of children eligible for NSLP) are less likely to have access to a toothbrush and subsequently less likely to have brushed (48%) on the day of assessment than students attending schools with <50% of children eligible for NSLP. Rural adolescents are slightly less likely than their urban peers to brush their teeth, to have been to the dentist, or to own a toothbrush. Several years of data are available through the NDDOH. However, comparisons cannot be made because of changes in the survey methods. Though trends are not presented, it is important to note that over time, American Indian, other racial minorities, and lower-income students have always reported poorer oral health predictors than non-Hispanic white and higher-income adolescents.⁹¹

Poor oral health literacy, and inadequate access to a dental team or dental supplies result in poor oral health. In 2015, roughly 73% of all third-grade students in North Dakota had experienced decay, though only 28% had untreated decay. The rate of untreated decay was significantly higher for American Indian (51%), and other minority children (41%) than their white peers (24%). Compared with non-Hispanic white children, American Indian and other minority third-graders have the following:

- Significantly lower rates of dental sealants.
- Significantly higher prevalence of rampant decay.
- Significantly higher need for early or urgent care.

Among North Dakota's middle-school students, American Indians are less likely than their non-Hispanic white peers to have visited a dentist in the past 12 months and more likely to have never been to a dentist. American Indian and other minority middle-school students also report more cavities than their non-Hispanic white peers. This has been a consistent trend between

2007 and 2015.⁹²

American Indian high school students are also below the state average for the percentage of students who have visited a dentist in the past 12 months. However, the rate has been slowly increasing from 2007 (55%) to 2013 (62%). North Dakota adolescents have also seen an increase in the percentage of youth with no cavities. However, this trend is not evident among American Indian high school students. This population has yet to have more than 23% of individuals cavity-free. In North Dakota, American Indian, other minority, and low-income youth are at the greatest risk of decay and untreated decay. They are also the populations least likely to have visited a dentist in the past 12 months, and less likely to have received fluoride varnish or dental sealants.⁹²

The 2013 Legislative Assembly supported a study resolution on oral health. The Interim Health Services Committee had jurisdiction over this matter during the 2013–2014 interim, and again in the 2015–2016 interim. With financial support from the Pew Charitable Trusts, the Center for Rural Health was commissioned to conduct an extensive study on oral health needs and policy recommendations; funding has continued through 2016. The 2015 Legislature approved additional policy to extend the oral health study with more analysis of the feasibility of dental therapy and the effect of the North Dakota Dental Association's case-management proposal (Senate Concurrent Resolution No. 4004). The Interim Health Services Committee is again reviewing the possibility of approving and licensing oral health mid-level providers.

As of July 2016, 19 states had either passed or were exploring new oral health workforce models. Three states have given authority for dentists to hire a dental mid-level; an additional three states authorized tribes to hire (see Figure 6.12). Though there are varying models of dental therapy in the United States, all of the new provider types serve as a member of the existing dental team. In partnership with a providing dentist, a dental therapist may provide preventive and basic restorative care for patients, providing this care with or without the dentist physically being present. Utilizing a dental therapist to provide basic and common restorative care allows a dentist to then provide more complex care, and accept more underserved and Medicaid patients. A mid-level oral health provider is one that has graduated from an accredited program, and provides primary oral healthcare directly to patients to promote and restore oral health through assessment, diagnosis, treatment, evaluation, and referral services. In comparison with dentists, these mid-level providers require less education, perform fewer procedures, and command lower salaries. Under this model, a dental team consists of a dentist (providing restorative care and leading the dental team); a dental therapist (primarily providing preventive and basic restorative care, and serving the underserved/Medicaid patients); a dental hygienist (primarily providing preventive care); and a dental assistant (assisting members of the dental team as the team member provides direct patient care). For more information, review Expanding the Dental Team in North Dakota at www.ruralhealth.und.edu/projects/nd-oral-health-assessment.

Representatives of the Center for Rural Health have shared research on oral health outcomes, workforce dispersion, and analyses of proposed models with the Interim Health Services Committee during the interim session in 2016. Many fact sheets and policy briefs have been developed and disseminated on

References

1. Health Resources and Services Administration. (2015). *HRSA Geospatial Data Warehouse*. Retrieved from <http://datawarehouse.hrsa.gov/>.
2. Rural Health Information Hub. (2016). *Critical Access Hospitals*. Retrieved on March 18, 2016, from <https://www.ruralhealthinfo.org/topics/critical-access-hospitals>.
3. American Hospital Association. (2016). *Fast Facts on U.S. Hospitals*. Retrieved on March 18, 2016, from <http://www.aha.org/research/rc/stat-studies/fast-facts.shtml>.
4. Report to the Congress Overview of the 340B Drug Pricing Program, Medicare Payment Advisory Commission, May 2015. <http://www.medpac.gov/docs/default-source/reports/may-2015-report-to-the-congress-overview-of-the-340b-drug-pricing-program.pdf?sfvrsn=0>.
5. Flex Monitoring Team. (2014). *CAH Financial Indicators Reports: Summary of Indicator Medians by State*. Retrieved from <http://www.flexmonitoring.org/publications/annual-financial-indicator-reports/>.
6. Flex Monitoring Team – University of Minnesota, University of North Carolina at Chapel Hill, and University of Southern Maine <http://www.flexmonitoring.org/>.
7. <http://www.medpac.gov/docs/default-source/reports/may-2015-report-to-the-congress-overview-of-the-340b-drug-pricing-program.pdf?sfvrsn=0>.
8. North Dakota Rural Health Association, *2015 Hospital Survey*, unpublished data.
9. Gibbens, B. (Personal communication, September 13, 2016).
10. Gibbens, B. (Personal communication July 8, 2016).
11. Center for Rural Health. (2012). *CAH Financial Conditions and Concerns* (Fact Sheet). Retrieved from http://ruralhealth.und.edu/pdf/cah_financial_2012.pdf.
12. North Dakota Rural Health Survey Association. (2014).
13. North Dakota Rural Health Association. *2015 Hospital Survey*, unpublished data.
14. National Rural Health Association. (2014). *Rural Health Voices*. Retrieved on October 1, 2014, from <http://blog.ruralhealthweb.org/2014/05/rural-hospitals-closing-at-alarming-rate/>.
15. Respaut, R. (2014). Rural Hospitals Pressured to Close as Healthcare System Changes. Retrieved on October 1, 2014, from <http://www.reuters.com/article/2014/09/03/us-healthcare-rural-insight-idUSKBN0GY14620140903>.
16. Center for Rural Health. (2014). 2014 CAH and PPS *Hospital Survey* (Data file).
17. Center for Rural Health. (2016). Medicare Rural Hospital Flexibility Program, CHNA process, unpublished internal data.
18. Center for Rural Health. (2013). North Dakota's Significant Health Needs as Identified by Community Health Needs Assessments, Aggregate Results for All North Dakota Hospitals.
19. Baker, E., Schmitz, D., Wasden, S., MacKenzie, L., & Morris, B. (2011). Accessing Critical Access Hospital (CAH) Assets and Capabilities for Recruiting and Retaining Physicians: The North Dakota CAH Community Apgar Program.
20. Center for Rural Health. (2012). Environmental Scan of Health Information Technology Adoption Amongst North Dakota Health Care Entities. Accessed at <https://ruralhealth.und.edu/what-we-do/hospitals-and-facilities/publications> North Dakota Department of Health. (2014). Facility Directory, Rural Health Clinics.
21. North Dakota Department of Health. (2014). Facility Directory, Rural Health Clinics.
22. Rural Assistance Center. (n.d.). What is a Rural Health Clinic? Accessed at <https://www.ruralhealthinfo.org/topics/rural-health-clinics>.
23. Health Resources Services Administration. (2006). Comparison of the Rural Health Clinic and Federally Qualified Health Center Programs. Retrieved from www.hrsa.gov/ruralhealth/policy/confcall/comparisononguide.pdf.
24. Gibbens, B. (Personal communication, August 10, 2016).
25. <http://archinte.jamanetwork.com/article.aspx?articleid=2513445>.
26. Community Healthcare Association of the Dakotas. (n.d.) *2015 Snapshot*.
27. Health Resources Services Administration. (2013). *2013 Data Snapshot*. Retrieved from <http://bphc.hrsa.gov/uds/view.aspx?q=s&year=2013>.
28. Healthcare Economist. (n.d.). *Providers for Underserved Populations: RHC and FQHC*. Retrieved from <http://healthcare-economist.com/2012/04/16/providers-for-underserved-populations-rhc-and-fqhc/>.
29. North Dakota Department of Health. (2014). Biennial Report 2011 to 2013.
30. North Dakota Department of Health Emergency Medical Systems Division. (n.d.) Numbers in North Dakota EMS, 2015.
31. Center for Rural Health. (2014). Medicare Rural Hospital Flexibility Program. Internal Program Data.
32. North Dakota EMS Association. (n.d.) 2015 Legislative Session Final Report.
33. Reed, Ken. (2014). Community Paramedic and Mobile Integrated Healthcare: A Changing Paradigm for EMS. Testimony to the Interim Health Services Committee.
34. Reed, Ken. (2014). North Dakota Pilot Community Paramedic Program: An Overview for the North Dakota Legislative Health Services Committee. Testimony to the Interim Health Services Committee.
35. Massmann, N. (2014). *Collaborating to Improve Cardiac Care*. North Dakota Medicine. 39(3), 20–21.
36. <http://www.health.state.mn.us/divs/orhpc/workforce/emerging/cp/index.html>.
37. North Dakota Department of Health. (2015). *EMS Advisory Council Minutes*. Retrieved from https://www.health.nd.gov/media/1182/minutes_07232015_final.pdf.
38. Center for Rural Health, Evaluation Division, LUCAS 2 Evaluation (Data set).
39. CDC, National Trauma Institute. (2014). *Trauma Statistics*. Retrieved from http://nationaltraumainstitute.org/home/trauma_statistics.html.
40. CDC National Center for Health Statistics at <http://www.cdc.gov/nchs/fastats/injury.htm>.

41. North Dakota Department of Health. (2012). *2012 North Dakota Trauma Data Report*. Retrieved from <http://ndhealth.gov/trauma/uploads/resources/503/2012-trauma-data-report.pdf>.
42. North Dakota Department of Health. (2014). North Dakota Trauma Data Report 2014.
43. American Trauma Society. (n.d.). *Training Center Levels Explained*. <http://www.amtrauma.org/?page=traumalevels>.
44. State of Alaska Health and Social Services. (n.d.). Health Planning and Systems Development. Retrieved from <http://dhss.alaska.gov/dph/HealthPlanning/Pages/default.aspx>.
45. American Telemedicine Association. (2006). Telemedicine, Telehealth, and Health Information Technology. Retrieved from http://www.americantelemed.org/files/public/policy/hit_paper.pdf.
46. U.S. Department of Health and Human Services. (2011). Office of the National Coordinator for Health Information Technology: Health Information Technology: A. Funding Table. Retrieved from http://www.hhs.gov/recovery/reports/plans/onc_hit.pdf.
47. Cisco. (n.d.). FAQ for Healthcare ARRA: HIT Stimulus. Retrieved from http://www.cisco.com/web/strategy/docs/healthcare/09CS2146_FAQ_ARRA_HIT_S tim_r1_052709.pdf.
48. U.S. Department of Health and Human Services. (n.d.). Health Information Technology Extension Program. Retrieved from http://healthit.hhs.gov/portal/server.pt/community/hit_extension_programregional_centers_cooperative_agreement_program/1335/home/16374.
49. Center for Rural Health. (2014). Evaluation of the North Dakota Health Information Network and Health Care Entities Adoption and Use of Health Information Technology.
50. REACH Program Report. Retrieved from <http://www.stratishealth.org/documents/REACH-final-report-2016.pdf>.
51. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention National Center for Health Statistics. (2014). *Use and characteristics of electronic health record systems among office-based physician practices: United States, 2001–2013* (NCHS Data Brief, no. 43). <http://www.cdc.gov/nchs/data/databriefs/db143.pdf>.
52. Hufstader, M., PhD, Swain, M., BBA, & Furukawa, M. F., PhD. (2012). *State Variation in E- Prescribing Trends in the United States*. Retrieved on October 26, 2016, from <http://surescripts.com/docs/default-source/PressRelease-Library/statevariationine-prescribingtrendsintheunitedstates.pdf?sfvrsn=2>.
53. Surescripts. (2015). *2015 National Progress Report*. Retrieved on October 26, 2016, from <http://surescripts.com/news-center/national-progress-report-2015/>.
54. ND ITD Report 2015-2016. Retrieved from <https://www.nd.gov/itd/sites/itd/files/legacy/publications/2015-2016-annual-report.pdf>.
55. North Dakota Long Term Care Association. (2013). *Long Term Care in North Dakota*. Retrieved from <http://www.ndltca.org/documents/report.pdf>.
56. North Dakota Department of Health. (2014). List of Nursing Home Facilities in North Dakota. Retrieved from http://www.ndhealth.gov/HF/PDF_files/Nursing%20Home/nursing_home_july_2014_with_total_beds.pdf.
57. North Dakota Department of Human Services. (2016). List of Assisted Living Facilities in North Dakota. Retrieved from <https://www.nd.gov/dhs/services/medicalserv/medicaid/docs/assisted-living/al-facility-list.pdf>.
58. U.S. Census Bureau (2015). *Percent of the total population who are 85 years and over, 2015, Total population, American Community Survey 1-year estimates*. Retrieved from http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_GCT0104.US01PR&prodType=table.
59. North Dakota Long Term Care Association. (n.d.). 2015 North Dakota Long Term Care Facts & Figures.
60. North Dakota Department of Human Services, 2013–2015 Biennial Report, no date, <https://www.nd.gov/dhs/info/pubs/docs/13-15-biennial-report.pdf>.
61. North Dakota Board of Pharmacy. (2016). *North Dakota Board of Pharmacy Annual Report*. Retrieved from <https://www.nodakpharmacy.com/pdfs/allPharmacies.pdf>.
62. Ullrich, F. and Mueller, K. (2014). Update: Independently Owned Pharmacy Closures in Rural America. *RUPRI Center for Rural Health Policy Analysis, Rural Policy Brief*.
63. RUPRI Center for Rural Health Policy Analysis. (2013). Rural Pharmacy Closures: Implications for Rural Communities. *Rural Policy Brief, Brief No. 2012-5*.
64. RUPRI Center for Rural Health Policy Analysis. (2011). Independently Owned Pharmacy Closures in Rural America, 2003–2010 *Rural Policy Brief, Brief No. 2011-5*.
65. Reissetter, B., Dunson, D., Kolassa, E., Schwab, P. (n.d.). *CPMM Policy Report Effect of Medicare Part D Reimbursement on Community Pharmacy Profitability*. Retrieved from <http://www.drake.edu/deltarx/articles/other/effectofmedicarepartdreimbursementoncommunitypharmacyprofitability/>.
66. Gibbens, B. (Personal communication, September 2, 2016).
67. Medicare Payment Advisory Commission. (2015). *Report to the Congress Overview of the 340B Drug Pricing Program*. Retrieved from <http://www.medpac.gov/docs/default-source/reports/may-2015-report-to-the-congress-overview-of-the-340b-drug-pricing-program.pdf?sfvrsn=0>.
68. Oehsen, W., Doggett, G., & Davis, J. (2012). *The 340B Drug Discount Program: A New Era of Enforcement and Oversight*. *Journal of Health & Life Sciences Law*, 5, 72–123. Retrieved from https://www.healthlawyers.org/Publications/Public%20Documents/June2012Journal_Article2_abstract.pdf.
69. North Dakota Telepharmacy Project. (n.d.). NDSU Telepharmacy Program. Retrieved from <http://www.ndsu.edu/telepharmacy/>.

70. North Dakota Board of Pharmacy. (2016). Licensed Telepharmacy Locations in North Dakota. Dataset.
71. Public Health. (n.d.) *Miller-Keane Encyclopedia and Dictionary of Medicine, Nursing, and Allied Health*, Seventh Edition. (2003). Retrieved on December 20, 2016, from <http://medical-dictionary.thefreedictionary.com/public+health>.
72. Mary Jane Schneider. (2014). *Introduction to Public Health 4th Edition*. School of Public Health, University of Albany, State University of New York, Rensselaer.
73. What is Population Health and How Does it Compare to Public Health, HealthCatalyst, no date. Retrieved from <https://www.healthcatalyst.com/what-is-population-health/>.
74. Gibbens, B. (Personal communication July 7, 2016).
75. North Dakota Department of Health, North Dakota State Health Improvement Plan 2014-2016, no date.
76. Public Health Accreditation Board, National Public Health Department Accreditation, December 2014.
77. Center for Rural Health, program information.
78. North Dakota Department of Health. (2012). Public Health Units. Retrieved from <http://web.apps.state.nd.us/hubdataportal/srv/en/main.home>.
79. Center for Rural Health, internal program and evaluation data.
80. Center for Rural Health. Community Transformation Grant. Unpublished program data, 2014.
81. Schulte Consulting. (2014). Behavioral Health Planning Final Report.
82. Gray, J. (2011). Rural Mental Health Research White Paper. Retrieved from http://ruralhealth.und.edu/pdf/j_gray_nimh_white_paper.pdf.
83. Substance Abuse and Mental Health Services Administration, Behavioral Health Barometer, North Dakota 2014.
84. North Dakota Department of Human Services. (n.d.). North Dakota Department of Human Services Programs, News, and Public Notices. Retrieved from <http://www.nd.gov/dhs/>.
85. Compare North Dakota Mental Health Facilities at <http://mental-health-facilities.healthgrove.com/d/I/North-Dakota>.
86. "The Role of Telehealth in Health System Change" Brad Gibbens, National Conference of State Legislatures and North Dakota State Legislature, June 30, 2015).
87. Center for Rural Health. (2014). North Dakota Oral Health Report: Needs and Proposed Models, 2014. Submitted to the Interim Health Services Committee.
88. Health Resources and Services Administration (HRSA). Dental HPSAs. Retrieved July 2016 from <https://datawarehouse.hrsa.gov/tools/analyzers/HpsaFindResults.aspx>.
89. North Dakota Department of Health. (2016). The North Dakota Dental Workforce Survey.
90. United States Department of Health and Human Services. State Medicaid File, 2013.
91. Schroeder, S. (2016). Social Factors Affecting Pediatric Oral Health in North Dakota.
92. Schroeder, S. (2016). Pediatric Oral Health Disparities in North Dakota.

CHAPTER SEVEN:

Quality and Value of Healthcare

NATIONAL OVERVIEW

As was discussed in Chapter 2, “The Health of North Dakota,” which focused on the issues of health status and population health, the quality and safety of care that is delivered in a healthcare system is directly associated with improving and maintaining overall health status. In a complex healthcare system, there are a number of concerns, such as the availability of providers, access to care and health services, technology and treatment advancement, and the financial dimensions of affordability and payment. Each of these is a contributing factor in the overall strategy to reform or redesign the health system. In addition, the quality of care that is provided to the population and the patient outcomes produced are equally important facets of reform. This chapter will focus on two areas: care quality and health reform, particularly the status of both in North Dakota.

The Institute of Medicine’s (IOM) six principal aims to improving health (i.e., safety, effectiveness, patient centeredness, timeliness, efficiency, and equity) are the cornerstones for improving health status and system performance in a period of transformative change.¹ The IOM has been central in identifying the elements in the U.S. healthcare system that have contributed to the systemic dysfunction associated with cost, performance, access, quality, and other facets, and has offered insights and articulated critical reform elements. Be it formalized healthcare reform as envisioned through public policy instruments, or restructuring and providing incentives through market conditions compelled by an adaptive private health system, the configuration of healthcare must contend with systemic, societal, and policy change. The IOM, along with others, calls for a modernized or modified healthcare system predicated on openness, responsiveness, and shared responsibility. The federal Agency for Healthcare Research and Quality (AHRQ) applies the six aims in its nationwide analysis and assessment of health quality.

The IOM work influenced the development of the Medicare Modernization Act (MMA) of 2004 and the Patient Protection and Affordable Care Act (PPACA), or Affordable Care Act (ACA) for short, of 2010. The MMA initiated quality data reporting for hospitals, pay for reporting, transparency through posting hospital-based data for public review, and the development of pay-for-performance strategies. The ACA continued the focus on improving quality and safety, transparency, and pay-for-performance or value-based purchasing for hospitals, nursing homes, physicians, home health, hospice, acute long-term care hospitals, rehabilitation hospitals, and others. In addition, the ACA calls for a national strategy on quality to “improve the delivery of healthcare services, patient-health outcomes, and population health.” The National Priorities Partnership (NPP), composed of 52 major national organizations, created a shared vision to achieve better health, and a safe, equitable, and value-driven healthcare system. After engaging both public and private stakeholders (approximately 300) and collecting input, the NPP, with the ACA as a policy umbrella, developed the National Quality Strategy (NQS). Within the federal government, the NQS is led by the Agency for Healthcare Research and Quality (AHRQ). The NQS was created “to improve the delivery of healthcare services, patient health outcomes, and population health.” The Strategy was released in March 2011 to align quality measures and quality improvement activities. The NQS established what has become the focus or goal of health reform: *better care, better health, and lower costs*. The three have become

the accepted principles of national health reform. The NQS created its “Three Aims” of better care, healthy people/healthy communities, and affordable care out of the ACA in 2011. A few years before this (2007), the Institute for Healthcare Improvement (IHI) developed its “Triple Aim” framework, which is essentially the same concept with different wording: improving the patient experience of care, improving the health of populations, and reducing the per-capita cost of healthcare. Regardless of language, better care refers to improving the overall quality of healthcare with an emphasis on more patient-centered, reliable, accessible, and safe care. Better health addresses the U.S. Department of Health and Human Services’ Healthy People vision and mission of improving population health by supporting evidence-backed interventions on behavioral, social, and environmental determinants of health. Lower costs refers to identifying strategies to reduce the cost of quality healthcare for individuals, families, government, and employers.^{2, 3, 4}

The NQS evolved from previous NPP efforts, including a significant report (2010) to the secretary of Health and Human Services covering priorities on a national quality standard, and a 2008 report, *Aligning Our Efforts to Transform America’s Health*, which discussed goals associated with patient and family engagement, population health, safety, care coordination, palliative and end-of-life care, and the implications of healthcare overuse versus appropriate care.³ The 2008 report also discussed a series of drivers for a transformative system, including performance measurement, public reporting, payment systems, research and knowledge dissemination, system capacity, and professional development.⁵ The continuing work of the NPP builds on the efforts of the IOM and others. This represents a developmental process involving private and public entities, with health policy implications such as influencing the focus and even the structural elements found in healthcare reform. While the private sector can put in play many transformative elements, the public sector—through financing mechanisms, workforce considerations, and legal conditions—sets many of the parameters for healthcare system transformation.

Better care is achieved by employing the IOM’s thrust to be more patient-centered, employing evidence-based science, addressing safety, and targeting effectiveness and efficiency to improve access and achieve greater equity. Better health of the population is attained by promoting effective communication; improving care coordination; engaging communities, employers, payers, and providers as partners; and promoting the most effective prevention and treatment approaches. Affordable care focuses on the need to simultaneously produce better care and better health, and to do so in a manner that reduces the rising cost of healthcare for individuals, families, employers, and the public sector.

The emphasis in healthcare reform on new healthcare delivery models, reforming payment structures by rewarding improved outcomes, focusing on patient-centeredness and evidence-based treatments, and accentuating disease prevention are all efforts to improve health status and to lower the growth in healthcare costs.

To help achieve these aims, the NQS also established six priorities to help focus the efforts of public and private partners. Those priorities are as follows:

- Making care safer by reducing harm caused in the delivery of care

- Ensuring that each person and family is engaged as partners in their care
- Promoting effective communication and coordination of care
- Promoting the most effective prevention and treatment practices for the leading causes of mortality, starting with cardiovascular disease
- Working with communities to promote wide use of best practices to enable healthful living
- Making quality healthcare more affordable for individuals, families, employers, and governments by developing and spreading new healthcare delivery models.⁵

The six NQS priorities show the continuing development of thought relative to a transformative approach to the healthcare delivery system. The six IOM principles (safety, patient-centeredness, effectiveness, efficiency, timeliness, and equity) are similar to those expressed through healthcare reform and have served as guiding pillars for reform. There is a continuing movement to foster greater transparency, inclusion, patient-centeredness, and communication; to call for enhanced accountability from providers and the overall healthcare system to individuals, families, payers, employers, and communities; to focus on prevention, health promotion, care coordination, and greater patient knowledge and involvement; to emphasize that better health and better care can arise from a responsive healthcare system that recognizes that efficiency in organizational performance can produce better health and medical outcomes; and to initiate new healthcare delivery approaches to associate patient outcomes with provider payment structures in order to ensure a more equitable distribution of healthcare services. This represents a national pursuit for a more equitable and responsive system and one, admittedly, that has eluded our country's collective ability; however, it is a goal that draws on shared talents, skills, and aspirations. New work put forth in 2012 by the IOM addresses both the need for change and the cost associated with the resistance to change.

In a 2012 IOM report, *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*, the argument is made that the pace of change is still too slow in implementing appropriate steps to improve the performance, quality, cost, and equity dimensions of the U.S. healthcare system, and the adoption of evidence-based practice is inconsistent.⁶ The IOM finds that the healthcare delivery structure is still too complex; costs are too high and efficiency is sacrificed; unacceptable outcomes are present in the form of shortfalls in patient safety, care coordination, access to care, limited clinical evidence guiding patient care, and health disparities; and that an intrinsic need to grow, adapt, and learn is hindered. If the commitment to, pace of, and instruments for change are not secured and applied, then the healthcare system will continue to decline as stated in the IOM report:

If unaddressed, the current shortfalls in the performance of the nation's healthcare system will deepen on both quality and cost dimensions, challenging the well-being with respect to its ability to meet patients' specific needs, to offer choice, to adapt, to become more affordable, to improve—in short, to learn. Americans should be served by a healthcare system that consistently delivers reliable performance and constantly

improves, systematically and seamlessly, with each care experience and transition.⁶

To achieve greater value through a more optimally performing healthcare system, the IOM supports strategies to 1) capture the opportunities present in technology, industry, and policy; 2) develop pathways to a continuously learning healthcare system; 3) engage patients, families, and communities; 4) achieve and reward high-value care; and 5) create a new culture for care.

The healthcare community—providers, payers, policymakers, academics, and advocacy groups—recognizes the need to better align or, at the very least, build viable linkages between those who practice healthcare and those who generate knowledge of the healthcare system and the resident components of that system. In a 2014 summary report from two meetings, called *Integrating Research and Practice: Health System Leaders Working Toward High Value Care*, the IOM's Roundtable on Value & Science-Driven Health Care, along with the Patient-Centered Outcomes Research Institute's Research Network, discussed the need to integrate research into the delivery of care so as to "leverage its experiences, rather than creating a set of parallel infrastructures and process." The first workshop involved clinical and administrative healthcare system leaders and researchers to focus on strategic priorities to integrate "knowledge-generation efforts" into practice. The second workshop addressed leadership design involving both top organizational leaders and "field leaders."

An important element discussed in the proceedings was the idea that to transform the healthcare delivery system, research could not reach a natural progression without understanding the implementation of research into the "real world," and delivery systems that relied on the knowledge and present organizational structure could not be expected to transform to the level of significant change. In August 2016, the National Academies of Sciences, Engineering, and Medicine's Roundtable on the Promotion of Health Equity and the Elimination of Health Disparities issued findings from *The Private Sector as a Catalyst for Health Equity and a Vibrant Economy: Proceedings of a Workshop*. This work incorporates another element of a transformative system: the role of the private sector or of the contributions of private-public partnerships and the implications for healthcare, health equity, and health status. The movement to value incorporates a focus on quality improvement (as argued by the IOM, NPP, AHRQ, and many other sources); a focus on changing the structure, orientation, financing, and performance of the health system; and a focus on the actors who serve as agents for change. The latter point, from the National Academies, is that the range of participants goes beyond the public sector and how the health system adapts or does not adapt to public instruments and new policy directives, as it also involves the needs of the private business sector. Employers still pay for the majority of private health costs and have a vested interest in a transformative health system and the implications for economic opportunity (including workforce productivity and availability), better employee health (and the possibility of lower worker health costs coupled with better health behaviors), and improved community health (better population health represents an investment in the largest cost structure facing any employer-employee costs along with the opportunity to address equity issues that impacts the community and employers). Private and public collaboration lends itself to the concept of "community benefit" embedded in

health reform as a responsibility of the health system to facilitate improved population health, and collaborative models are a vehicle for health, business, transportation, housing, and other sectors to fashion comprehensive changes to population health.⁷

Healthcare in the second decade of the current century—and going forward—is struggling with and contemplating many of the same issues from its past: controlling cost, improving quality of care and health status, and instituting higher organizational and system performance. Much of what drives healthcare system change involves public policy instruments being used by private and public sector players in an effort to “improve” not only the system of care (global level) but also to create real concrete change in health and medical outcomes (individual and community levels). Better care, better health, and more affordable care have become focal points in the redesigned American healthcare system. The remainder of this chapter will look at where North Dakota stands in this pursuit.

ASSESSMENT OF HEALTH QUALITY IN NORTH DAKOTA

There are different public and private organizations that analyze state-specific quality data. Such analysis can be instructive for state and local officials, providers, employers, payers, and individuals who are interested in understanding effective interventions and healthcare status. Such data can serve to guide both public policy and local programs’ responses. The amount of quality-relevant data, the number and type of measures, and the number of health organizations and providers collecting and using quality-related measures grow each year. Both the scientific knowledge and the policy directives that guide and shape the incorporation of data metrics and evidence-based principles become more refined and pronounced over time. The recognition on the part of policymakers and health advocates of the importance in understanding how healthcare systems and providers intervene to promote optimal health and the actual collection and analysis of health outcome data are fundamental factors in a transformative U.S. healthcare system. To assist in our understanding of performance and quality in North Dakota, three sources will be used: the federal Agency for Healthcare Research and Quality (AHRQ), which is housed in the U.S. Department of Health and Human Services and serves as a major research arm for the federal government; the Commonwealth Fund, a national private foundation; and Quality Health Associates of North Dakota (QHAND), (formerly North Dakota Health Care Review Inc.), the state subcontractor to the Great Plains Quality Innovation Network, which is the Centers for Medicare and Medicaid Services (CMS) Medicare Quality Innovation Network-Quality Improvement Organization (QIN-QIO) for the region covering North and South Dakota, Nebraska, and Kansas.

In the *2015 North Dakota State Snapshot* report (most recent), the AHRQ rated North Dakota as “average” in comparison with other states in regard to overall healthcare quality as documented in the *2015 National Health Care Quality Report* (see Figure 7.1).⁸ “Average” is the same rating reported two and four years ago in the *Third Biennial Report* and in the *Second Biennial Report*. In the baseline year (2007), North Dakota also had an “average” rating. States are graded as very weak, weak, average, strong, and very strong. There are more than 150 measures that cover seven areas. This, too, changes over time as two years ago there were 109 measures in five areas. The focus in

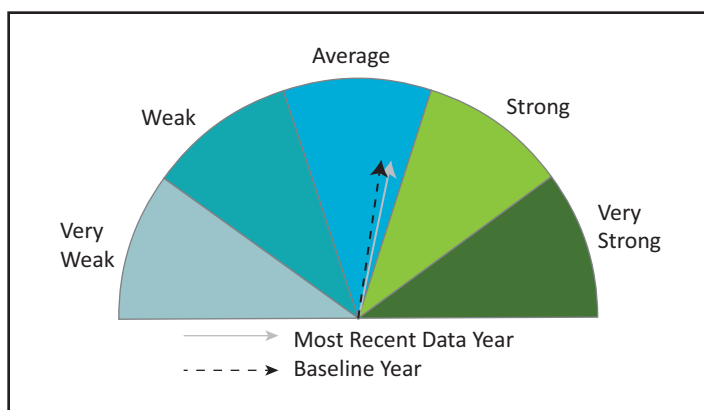


Figure 7.1. NHQR quality measures⁸

2016 is as follows:

- NQS priorities (care affordability and coordination, effective treatment, healthy living, person-centered care, and patient safety)
- Access to care (structural access and utilization, and patient centeredness)
- Disease and conditions (cancer, cardiovascular disease, chronic kidney disease, diabetes, HIV and AIDS, mental health and substance abuse, musculoskeletal disease, and respiratory diseases)
- Health insurance (private, public, or uninsured)
- Priority populations (Asian or Pacific Islander, black, children, high income, Hispanic, individuals with specific needs, native Hawaiians or other Pacific Islanders, low income, older adults, residents of rural areas, white, and women)
- Settings of care (ambulatory care, home health-hospice, and hospitals)
- Types of care (acute, chronic, preventive, and safety)

Of the 154 separate measures, North Dakota reached or surpassed the benchmark for 71 measures (46% of the measures). It was close to the benchmark on 63 measures (41%) and was “far away from the benchmark” on 20 measures (13%). The AHRQ looks at the strongest and weakest measures for a state. “Strongest” means the state performed above the all-state average, and the measures are strongest among that state’s measures relative to all reporting states. North Dakota’s strongest measures (top two) were “adolescents ages 16–17 who received one or more doses of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) since the age of 10,” which was 100% better than the benchmark, and “persons aged 13–15 years who received one or more doses of meningococcal conjugate vaccine,” 54% better than the benchmark. “Weakest” are those in which the state performed below the all-state average and are the weakest among the measures relative to all reporting states. For North Dakota, the two weakest were 1) “Hospital admissions for immunization-preventable influenza per 100,000,” where North Dakota was 304% from the benchmark; and 2) “Hospital admission for short-term complications of diabetes per 100,000 population age 6–17,” which had the state at 251% from the benchmark.

In comparison with other states measured on this scale, North Dakota ranked 9th with a composite score of 57.1 (in the *Third Biennial Report*, the state ranked 16th). This compares with top-rated Maine with a composite of 65.47 and the lowest-rated

state New Mexico with 30.75. South Dakota ranked below North Dakota, 14th overall, with a composite of 52.62. North Dakota's composite for 2015 (57.1) was higher than the composite score in 2014 (53.45) but below its 2012 composite (57.89).

In the most recent year, North Dakota's best scores (i.e., being rated "very strong") were found in diseases and conditions (chronic kidney disease and HIV/AIDS), access to care (utilization), and NQS priority (care affordability). North Dakota recorded its only "very weak" ranking on mental health and substance abuse, and it had two "weak" rankings for public, under the health insurance category, and Hispanic, under the priority populations. In looking at North Dakota by comparing its base year (2007) with the most recent year (2015), there are both positive findings and areas where the state has gone backwards. For example, in 2015 North Dakota had four measures rated "very strong;" in 2007, none were rated "very strong." In 2015, North Dakota had four measures rated "strong;" in 2007, there were nine measures rated "strong." In 2015, there were 13 measures rated "average;" in 2007, there were five. In 2015, there were two measures rated "weak;" in 2007, there were none. And in 2015, there was one measure rated "very weak"; in 2007, there were none.⁸

In the *Commonwealth Fund Scorecard on State Health System Performance—2015*, North Dakota was ranked 26th overall, which is down from its position in 2014, which was 14th. North Dakota ranked 9th overall in 2009, so there has been consistent slippage for the state.⁹ The Commonwealth Fund also used subcategories to analyze quality and performance: access, prevention and treatment, avoidable hospital use and costs, equity, and healthy lives. The rankings associated with each measure are presented in Table 7.1 for both 2014 and 2015.

Based on the Commonwealth Fund assessment, North Dakota has experienced declines on its main measures. The state's overall ranking went down, as did the scores for access, prevention and treatment, avoidable hospital use and costs, and equity. Only the healthy lives measure improved by two positions from the previous time. Nevertheless, North Dakota did see improvements in 11 indicators while having five worsen. Other factors for North Dakota's declining scores may need to be considered.

The *Commonwealth Fund Scorecard* assesses states on 42 indicators of healthcare access, quality, costs, and outcomes over the 2013–2014 period.⁹ The report finds "extensive variation among states in people's ability to access care when they need it, the quality of care they receive, and their likelihood of living a long and healthy life. However, this *Scorecard*—the first to measure the effects of the ACA's 2014 coverage expansions—also finds broad-based improvements. On most of the 42 indicators, more states improved than worsened."^{9,10}

North Dakota's best category (highest state rating) was prevention and treatment, where the state stood at 19th (a decline from 17th before). Within the prevention and treatment band, the measure of "children with emotional, behavioral, or developmental problems who received needed mental healthcare in the past year" showed North Dakota ranked 1st. The state also ranked 3rd on a measure related to Medicare recipients with dementia, hip/pelvic fracture, or chronic renal failure who received a prescription drug that is contraindicated for that condition. North Dakota, within the prevention and treatment band, ranked 3rd on high-risk nursing home residents with

Table 7.1

North Dakota rankings associated with Commonwealth Fund State Scorecard—2015⁹

Category	2014	2015
Access	9th	25th
Prevention and treatment	17th	19th
Avoidable hospital use and costs	1st	22nd
Equity	18th	36th
Healthy lives	29th	27th

pressure sores. Conversely, the state ranked 49th for hospitalized patients given information about what to do during their recovery at home; 47th on Medicare fee-for-service patients whose health provider always listens, explains, shows respect, and spends enough time with them; 42nd for children with a medical and dental preventive care visit in the past year; and 42nd for adults with a usual source of care.

In the *access* band, North Dakota dropped from 9th to 25th. While it ranked 1st under the band for adults who went without care because of cost in the past year, it also ranked 34th overall on access for children ages 0–18 who were uninsured; 34th in individuals under 65 with high out-of-pocket medical costs relative to their annual household income; and 39th for at-risk adults without a routine doctor visit in the past two years. It was 8th for access for adults ages 19–64 who were uninsured. Numerous research studies have found that people who have routine visits to a primary care physician or provider have better health outcomes and achieve a better health status.

North Dakota's best ranking, under avoidable hospital use and cost, was 6th for short-stay nursing home residents readmitted within 30 days of hospital discharge to nursing homes. The lowest ranking was 37th for home health patients also enrolled in Medicare with a hospital admission.

North Dakota dropped from 18th to 36th for health equity, where its best score was 1st for adults who went without care because of cost in the past year and its lowest ratings were a ranking of 48th for at-risk adults without a doctor visit (other race), 49th for adults without a usual source of care (Hispanic ethnicity), 50th for adults without a dental visit in past year (Hispanic ethnicity), and 51st for adults who smoke (Hispanic ethnicity). Under the health equity metric, North Dakota ranked 50th for adults who are obese.

Only under healthy lives did North Dakota's overall ranking improve (from 29th to 27th). The state ranked 2nd for both percentage of adults ages 18–64 who have lost six or more teeth because of tooth decay, infection, or gum disease; and adults age 18–64 who report fair/poor health or activity limitations because of physical, mental, or emotional problems. It ranked 3rd for breast cancer deaths per 100,000 population. The state ranked 41st for adults ages 18–64 who are obese and 45th on children ages 10–17 who are overweight or obese.

The *Commonwealth Fund Scorecard* data showed that for all the indicators, North Dakota ranked in the top five states or territories for nine indicators. Conversely, the state ranked in the bottom five states on three indicators. In terms of quartile rankings, North Dakota ranked as follows: top quartile, 13 indicators; 2nd quartile, seven indicators; 3rd quartile, 12 indicators; and bottom quartile, eight indicators.

In analyzing the Hospital Consumer Assessment of

Healthcare Providers and Systems (HCAHPS) data for North Dakota (2013), North Dakota's critical access hospitals (CAHs) had higher overall scores on nine key survey measures than did the larger, tertiary hospitals, according to Quality Health Associates of North Dakota (QHAND), the state's subcontractor to the regional quality network. HCAHPS data are now being collected, as directed under the ACA, from all nonprofit hospitals. These are consumer-driven assessments of the hospital inpatient experience. The HCAHPS data also indicated that Prospective Payment System (PPS) hospitals had slightly lower scores in North Dakota when compared with national averages on all measures; however, North Dakota CAHs surpassed national CAH scores on six of the nine measures. The highest HCAHPS score for both CAHs and PPS hospitals in North Dakota was for the same question—patients saying that their doctor always communicated well, which had agreement from 85.7% of CAH patients and 77.5% of PPS hospital patients. About 75% of CAH patients (74.3%) said they would definitely recommend the hospital to another person, which exceeds the national CAH rate (73%), the North Dakota PPS rate (69.5%), and the national PPS rate (70.5%).¹¹

North Dakota CAHs and PPS hospitals both exceeded the national average rate for heart failure (2013 data, most recent). The state's PPS hospitals ranked 6th out of 50 states (97.8% versus 96% for national), and the CAHs ranked 10th out of 50 (91.9% versus 88.1% national). For acute myocardial infarction (AMI), the North Dakota PPS rate was 99.3% versus a national rate of 98.1% (the state ranked 10th for PPS); however, there were insufficient data to calculate the state's CAH rate for AMI. The national CAH rate was 90.5%. A third key hospital measure, pneumonia, found North Dakota CAHs exceeded the national average (outperforming them) on pneumonia measures. Although North Dakota's PPS hospitals performed better than North Dakota CAHs, they did not exceed the national rate. North Dakota PPS hospitals ranked 45th out of 50 with a rate of 94.5% in comparison with the national PPS rate of 96.3%.

North Dakota CAHs ranked 18th with a rate of 92.4%, which was better than the national CAH rate of 91.3%. A fourth hospital measure was outpatient, where once again both types of hospitals in the state exceeded national rates. North Dakota PPS hospitals (ranked 22nd) had a rate of 97.1% on outpatient measures, slightly ahead of the national rate of 96.9%; North Dakota's CAHs (ranked 9th) had a rate of 96.6%, compared with the national rate of 94.7%. The final key hospital metric—surgical care improvement program (SCIP)—also showed PPS hospitals and CAHs surpassing national statistics. PPS hospitals in North Dakota (ranked 23rd) had a 98.1% rate versus the national rate of 97.9%; North Dakota's CAHs performed slightly better than both North Dakota PPS hospitals and national CAH rates (North Dakota 98.5%, national 96.8%). North Dakota CAHs ranked 7th.¹²

Another important subject is that of readmission rates (i.e., patients discharged from a hospital setting but then readmitted later). Readmission rates are viewed as a measure of the local health system's ability to coordinate the care of patients over the full continuum of care offered. A lower percentage is better. Overall, the total hospital 30-day-readmission-rate data showed that North Dakota outperformed the nation with a 16.5% rate; this compares with a 17.7% rate for the national average in 2012 (most recent data). North Dakota ranked 18th out of 50 states. For the total hospital comparison, there are no PPS and CAH

breakdowns for the year. There is evidence that North Dakota has a lower readmission rate for heart attack readmissions, at least for PPS hospitals. North Dakota ranked 12th out of 50 states for PPS hospitals and 13th out of 50 for CAHs for data in 2012. The North Dakota PPS rate was 17.77%; it was 19.4% for CAHs. This compares with national PPS numbers showing a rate of 18.15% and a CAH rate of 18.28%. For heart failure readmissions, both North Dakota PPS hospitals and CAHs performed better than the national average. North Dakota CAHs ranked 6th out of 50 with 22.37% in comparison with the national CAH rate of 22.9%; North Dakota PPS hospitals ranked 8th out of 50 with a 21.97% rate in comparison with a national PPS rate of 22.87%. A third readmission category is pneumonia, and again both North Dakota PPS hospitals and CAHs performed slightly better than the national average. North Dakota CAHs performed better than North Dakota PPS hospitals on this measure. North Dakota PPS hospitals ranked 22nd out of 50 states with a rate of 17.41% in comparison with the national rate of 17.54%. North Dakota CAHs ranked 13th out of 50 and had a rate of 17.13%, while nationally the CAH rates were 17.36%. According to the quality improvement organization, this may mean that North Dakota does better at coordinating patient care; however, there are other variables (e.g., type and degree of illness) that need to be analyzed in more detail.¹²

With regard to Hospital Compare (i.e., a CMS website that provides consumers with information about how well hospitals deliver recommended patient care), just 21% of the nation's CAHs report data on at least one outpatient quality measure.¹⁰ However, in North Dakota, all 36 CAHs report inpatient, outpatient, and HCAHPS measures. North Dakota was one of the first 10 states to have 100% reporting. PPS hospitals are required to post measures; CAHs are not required to do so, which is testimony to the efforts of North Dakota's CAHs and statewide support structures such as the CAH Quality Network (a program within the Center for Rural Health's Rural Hospital Flexibility Program), QHAND, and the hospital association.

QHAND provides assistance to hospitals on key measures for heart failure, pneumonia, acute myocardial infarction, and other conditions. Overall, in comparing North Dakota PPS hospitals with CAHs, the PPS hospitals since 2005 have had better measures. Overall, the PPS hospitals in the state outperform the CAHs, but when North Dakota CAHs are compared nationally with other CAHs, there is no significant difference or North Dakota CAHs outperform the national rates.¹³

QHAND is also working with North Dakota nursing homes to reduce healthcare-acquired conditions in nursing homes such as pressure ulcers and falls. Through a multistate collaborative, the Great Plains Quality Improvement Network, QHAND is providing training and tools based on the best clinical, management, and leadership practices of high-performing nursing homes. About 60% of North Dakota nursing homes are participating in the Nursing Home Quality of Care Collaborative.¹¹

NORTH DAKOTA QUALITY IMPROVEMENT AND VALUE-FOCUSED ORGANIZATIONS, NETWORKS, AND PROGRAMS

The following efforts indicate that North Dakota has invested a significant level of resources into building a culture of support and organizational design to improve healthcare quality, health outcomes, organizational performance, and efficacy for patients,

providers and systems, and payers. The organizations, networks, and programs discussed in this section represent efforts for better care, better health, and more affordable care.

Medicare Quality Improvement Organization (QIO) Program

The national QIO network, whose mission is to monitor and analyze the quality of care provided to Medicare and Medicaid recipients, comprises organizations operating in each state, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. In North Dakota, the QIO is QHAND, a private, nonprofit organization located in Minot. QHAND has expertise in quality improvement, data analysis, quality and utilization review, and health information technology (HIT). The goal of QHAND is “to improve the quality of care for the people of North Dakota by successfully balancing the needs of providers, consumers, stakeholders, and payers.”¹³ It operates, as do other QIOs, under a contract with the CMS. QIOs are essential instruments within the ACA as healthcare reform is implemented. QHAND has worked collaboratively with a number of health entities in North Dakota, including the Center for Rural Health, North Dakota Department of Health (NDDOH), and the North Dakota Hospital Association (NDHA), along with others. It serves as a partner organization on the North Dakota Medicare Rural Hospital Flexibility (Flex) Program as a steering committee member and as a member on the CAH Quality Network Advisory Committee.

In a substantially rural state like North Dakota, QHAND has placed significant emphasis on working to advance quality of care for rural citizens. QHAND has actively participated with the North Dakota CAH Quality Network by providing data analysis and consultations. At times when a focus on CAHs has not been a high priority under the CMS's scope of work, QHAND has continued to provide support to North Dakota rural providers and is an active partner with the Center for Rural Health in addressing rural hospital quality improvement issues. In collaboration with the Center for Rural Health and the Flex Program, QHAND formed the North Dakota Patient-Centered Medical Home Coalition.

In addition to acquiring, analyzing, and reporting data, QHAND provides technical assistance to all CAHs for collecting and reporting inpatient and outpatient CMS quality measures in the areas of congestive heart failure, pneumonia, acute myocardial infarction, outpatient measures, and the SCIP. This work with CAHs includes helping them install the CMS Abstraction and Reporting Tool and all updates; encouraging participation in Hospital Compare (a national quality measurement database); providing training on the quality measures and abstraction specifics; providing hospital-specific quarterly reports on their performance; disseminating updates; providing phone support for any issues; and completing on-site visits as needed. The QIO offers training and assistance for CAH quality-improvement efforts relative to hospital-acquired infection prevention, improved care transitions, and reduced avoidable readmissions.

As a subcontractor to the Regional Extension Center (REC) for Minnesota and North Dakota, QHAND's experts help providers adopt, implement, and meaningfully use HIT, enabling them to improve quality of care and to benefit from federal funding in support of information technology adoption. QHAND REC staff members have provided this assistance to 559 primary care practices and all 36 CAHs since February 2010. As a result, North Dakota's rate of adoption of electronic health record (EHR)

systems among physician-based office practices is more than 90%, well above the national average.¹⁴

QHAND serves as the North Dakota subcontractor to the Great Plains Quality Innovation Network, the CMS QIN-QIO for the region encompassing North Dakota, South Dakota, Nebraska, and Kansas. In this role, the North Dakota QIO leads QIN-QIO efforts in North Dakota, including facilitating learning and action networks, convening communities, and teaching and providing technical assistance to healthcare providers and consumers to improve healthcare, encourage healthy communities, and lower costs. Currently, QHAND facilitates the North Dakota Health Research & Educational Trust Hospital Engagement Network (called the NDHEN, which is discussed in more detail later) on behalf of the NDHA. This includes providing technical assistance to 34 North Dakota hospitals with a goal of reducing preventable hospital admissions by 20% and reducing harm by 40%. QHAND also holds a contract with the North Dakota Department of Human Services (NDDHS) to provide inpatient and outpatient hospitalization utilization review as required by federal regulations to ensure that Medicaid patients are only receiving hospital care necessary to meet their medical needs.¹³

North Dakota CAH Quality Network¹⁴

The mission of the North Dakota CAH Quality Network (composed of all 36 CAHs) is to support ongoing performance improvement of North Dakota's CAHs. Started in 2007 by the Center for Rural Health, the network serves as a common place for North Dakota's CAHs to share best practices, tools, and resources related to providing quality care. The network's staff supports quality improvement activities of network members and assists them with the CMS Conditions of Participation (CoP), benchmarking data, analysis of data, administration of an active e-mail listserv, connecting statewide and national quality-of-care-oriented committees and taskforces to facilitate communication and less duplication, and general technical assistance to the CAHs.

The CAH Quality Network has emphasized assistance to the CAHs by offering a number of services, including the following:

- The network has developed an easy-to-follow checklist that assists CAHs in tracking their efforts to meet the CMS CAH regulations. These standards are the foundation for improving quality and protecting the health and safety of patients. CoPs apply to all areas of a healthcare organization. Network staff update the document for the CAHs when the CMS releases changes to the CoPs.
- The network works closely and collaboratively with the NDDOH, serving as a liaison to facilitate communication between CAHs and the NDDOH.
- North Dakota CAHs share their survey deficiencies on a network-hosted, quarterly, technical assistance webinar. The meetings serve as a platform for CAHs to share their survey deficiencies and plan for correction. The CAHs learn from each other by reviewing the deficiencies and determining how to make corrections.
- The network developed a state-shared uniform credentialing form. The collaboration was statewide with stakeholders such as Blue Cross Blue Shield of North Dakota (BCBSND); Medicaid; Medica; Tri-West (an insurance company); the NDHA; the NDDOH; all North

Dakota tertiary hospitals; and one CAH representative from each of the four state regions.

- The network developed a Virtual Library of Shared Tools, an online repository of CAH-specific resources that serves as a one-stop-shop for resources, policies, protocols and best practices related to CAH quality and state-survey resources.
- The network developed a Healthcare Safety Zone Portal, a Web-based data management and reporting tool that improves communication within the healthcare setting and facilitates long-term care and CAH-specific benchmarking efforts.
- The network works with CAH staff to provide consultation (on- or off-site) with hospital clinical data abstraction, research, and networking.
- The network developed a CAH listserv, used to share information and post questions among CAHs. It serves as a one-stop approach and provides timely responses from CAH colleagues.
- The network hosts educational speakers, presenters, webinars, and other training opportunities to members on pertinent topics.

A goal of the network is to improve information sharing at the regional and state level among tertiary facilities and stakeholders to prevent duplication of efforts. The network contributes to not only the development of rural-based solutions and systems but also the development of healthcare professional staff skills and resources. Only North Dakota CAHs belong to this network, although it coordinates closely with the six tertiary hospitals in the state. These tertiary hospitals have quality improvement agreements, and services are provided to the CAHs. The network is staffed by the UND Center for Rural Health personnel and supported by the Federal Office of Rural Health Policy (FORHP), the U.S. Health Resources and Services Administration (HRSA), and Flex Program funding. Oversight and direction are provided by an eight-member executive advisory board composed of representatives from CAHs in each region of North Dakota (hospital CEOs, directors of nursing, and quality coordinators or directors). From 2015 to 2016, the executive advisory board, network, and Flex staff met 12 times.

The Network, through the Center for Rural Health, has added more than 70 new resources to the CAH Quality Virtual Library of Shared Resource Tools. Over the 2015–2016 period, more than 1,003 documents were viewed and accessed 420 times. To facilitate communication and information exchange, the network operates a listserv, which in a typical year averages 50 or more messages. A formal program evaluation of the network found the listserv to be an effective way for CAHs to ask questions of each other in an anonymous way because the questions are read first by the coordinator who then sends out the questions to network members. Each year, more than 50 people participate in the annual Flex CAH pre-conference /Quality Network meeting that is part of the Dakota Conference on Rural and Public Health. In addition, the network supports CAH-tertiary hospital meetings three times a year by webinar and one time a year face-to-face in central North Dakota. At the April 2016 all-region meeting, there was representation from all 36 CAHs. Participation from North Dakota CAHs continues to be strong.

The CAHs and the six tertiary hospitals plan the meetings to discuss hospital quality on a regional basis. The agendas include

other stakeholders (NDHA, NDDOH, ND Health Information Network, Quality Health Associates, and others) who leverage the platform of the network for communicating with CAHs and to reduce duplication of meetings. This has proved to be one of the most supported efforts of the network, by CAHs and networking tertiaries alike.

Currently there are six quality-improvement efforts or programs in which North Dakota CAHs participate. The six are administered through the network and have the organizational support of the Center for Rural Health Flex Program, including staff support. Each of the following quality improvement efforts or programs will be addressed in turn.

1. Medicare Beneficiary Quality Improvement Program
2. Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)
3. State Stroke System of Care Program
4. Health Care SafetyZone Portal
5. Benchmark for Excellence in Patient Safety (BFEPS)
6. Rural Health Network Development (RHND) Grant Program for pharmacy first-dose review within 24 hours and Emergency Department Transfer Communication (EDTC)

Medicare Beneficiary Quality Improvement Program (MBQIP). MBQIP is funded by the FORHP and HRSA. It is a Flex Program initiative charged with increasing CMS Hospital Compare participation rates for CAHs and dedication to quality-improvement initiatives (see www.medicare.gov/hospitalcompare/search.html).¹⁵

Hospital Compare is a CMS initiative that collects quality-related data on more than 4,000 CMS-certified hospitals. An active website allows hospital users to review quality-related data to help inform their decision-making. Participation in MBQIP initially was voluntary; however, the FORHP has implemented a phased approach that now requires all CAHs nationwide to participate in MBQIP in order to be eligible to receive any Flex funds. This means education, webinars, meetings, and funds for quality improvement, finance and operations, Community Health Needs Assessments, and emergency medical services work are dependent upon CAH participation. The MBQIP seeks to increase attention on quality healthcare for all CAH Medicare beneficiaries, both inpatient and outpatient. The network staff works with CAHs to increase data submission on all measures and assists CAHs and regional CAH groups with data and identifying quality-improvement projects. The North Dakota Flex Program in partnership with the North Dakota CAH Quality Network and QHAND provide the following technical assistance: 1) improve healthcare outcomes on Hospital Compare and other national benchmarks; 2) access needed technical assistance around data collection and reporting; 3) analyze their own and comparative data via Hospital Compare, and 4) collaborate with CAHs to improve quality.

Since the program's inception in 2011, all 36 of North Dakota CAHs have participated in MBQIP. Forty-four of 45 Flex states are participating today. North Dakota was one of the first 10 program states to have 100% of its CAHs participating in this nationwide effort to improve hospital quality of care. At the beginning of the program, only 21% of CAHs participated nationally. In 2016, about 92% of all U.S. CAHs participated. Phase 2 of the MBQIP program, which began Sept. 1, 2012, works with all participating CAHs to collect HCAHPS data (see next section). MBQIP

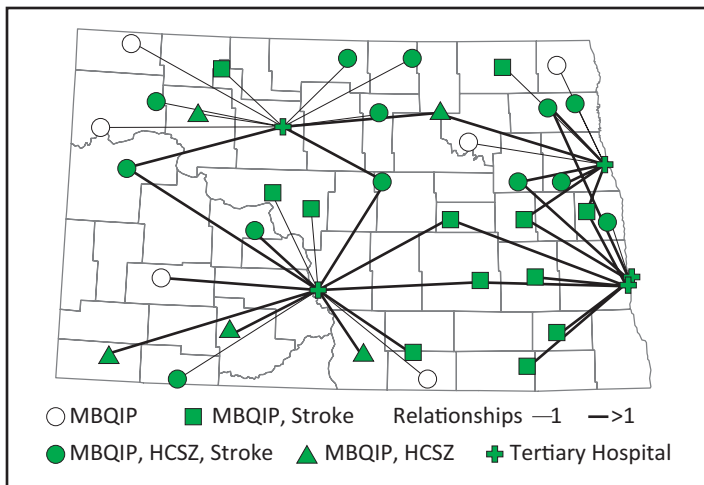


Figure 7.2. Quality initiatives and network referrals

2016 has a focus on four quality domains: patient safety, patient engagement, care transitions, and outpatient quality improvement activity. Under each domain, there are activities to focus on quality measurement to increase patient safety and quality of care. In North Dakota, 30 of 36 CAHs reported influenza vaccines for all employees (2015 flu season), and 20 of 36 CAHs reported data on influenza vaccines for acute care inpatients (Quarter 4, 2014). In addition to all 36 CAHs reporting on HCAHPS (Quarter 1, 2016), all CAHs are reporting on EDTC (Quarter 1, 2016), and 19 of 36 CAHs reported on Emergency Department throughput measures, and chest pain and heart attack patient safety measures (Quarter 4, 2014). North Dakota ranks 6th in the nation as of Quarter 2, 2014, through Quarter 1, 2015, in terms of participation.

CAHs and PPS hospitals are in different places along the continuum of adopting quality improvement metrics and how those metrics are used, especially for reimbursement. Under the ACA, CAHs are being brought along more slowly; they are in a “process” stage, where the emphasis is placed on learning how to gather quality-related data and report on it, and in some cases conduct some level of analysis and benchmarking. Again, this is a critical function played by the North Dakota CAH Quality Network, assisting and facilitating in this adaptation. However, CAHs that are part of an alternative payment model (APM) such as an accountable care organization (ACO) or patient-centered medical home (PCMH) model are being paid based on value (i.e., payment tied to performance based on quality metrics). PPS hospitals are in more of an “outcome” stage where value-based payments apply. For example, most PPS hospitals are involved in the CMS Hospital Value-Based Purchasing program (VBP), where participating hospitals are paid for inpatient acute-care services based in part on the quality of care, not just the volume of care. MBQIP plays a significant role in assisting small, rural, and in many cases isolated CAHs to adapt to health system change and reform.

Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). HCAHPS is a CMS standardized survey instrument and data collection method for measuring patients’ perspectives on hospital care. It is a requirement for PPS hospitals and voluntary for CAHs under the ACA with the purpose of formally incorporating patient assessments of their inpatient hospital experience into the overall measure

of hospital performance. It is part of the overall change in healthcare to be more inclusive and responsive to the consumer, and to incorporate patient perspective on the quality of care into determinants of organizational performance. While many hospitals had collected information on patients’ satisfaction with their care, there had previously been no national standard for collecting this information that would yield valid comparisons across all hospitals. The intent of the HCAHPS initiative is to provide a standardized survey instrument and data-collection method for measuring patients’ perspectives on hospital care.

The HCAHPS survey contains 18 patient perspectives on care and patient-rating items that encompass eight key topics: communication with doctors, communication with nurses, responsiveness of hospital staff, pain management, communication about medicines, discharge information, cleanliness of the hospital environment, and quietness of the hospital environment. The North Dakota CAH Quality Network coordinator helps CAHs to understand the HCAHPS process, complete contracts, submit data, review reports, and review data regionally, statewide, and nationally to identify areas for quality improvement as well as best practices.

The Flex Program supports partial funding to 23 North Dakota CAHs and as of Oct. 1, 2016, all 36 CAHs have identified a vendor.

State Stroke System of Care Program. The CAH Quality Network works collaboratively with the NDDOH, emergency medical systems (EMS), and other stakeholders to reduce the death and disability associated with heart disease. The network has been a key entity in the development of a statewide system of care in the treatment of stroke patients. The guidelines developed assist healthcare providers in the care of stroke patients. The network secured a subcontract under the NDDOH’s Heart Disease and Stroke Program over the past six years with the current contract concluding in June 2016. Continued participation through the Flex Program will be ongoing. The State Stroke Program facilitates the on-boarding of North Dakota CAHs to participate in the project by agreeing to utilize the *Get With the Guidelines* Stroke patient-management tool, self-attest to stroke readiness CAH designation, and implement the state stroke algorithm in treatment of stroke care. The network has provided ongoing assistance and support to registry participants. The Center for Rural Health and the network collaboratively work with the American Heart Association and the North Dakota Department of Health to establish contracts for the *Get With the Guidelines* Stroke Patient Management Tool. Under the program, the network does the following: 1) assists CAHs to establish use of the patient-management tool, 2) facilitates sharing between state stroke program participants, 3) establishes ongoing communication with state stroke program participants (e.g., monthly meetings with the participating hospital advisory council [PHAC]), and 4) facilitates regional discussions on stroke system opportunities, tools, and trainings. The NDDOH Stroke Task Force held six meetings in 2015–2016. The network has assisted in developing state stroke educational training modules for CAH providers and staff, stroke protocols, CAH stroke readiness assessment, acute-stroke treatment guidelines, and other functions. The PHAC involves a stroke coordinator from each of the six tertiaries and a CAH representative from each of the four regions. Twenty-five CAHs participate.

Health Care SafetyZone Portal–Clarity Group. The Health

Care SafetyZone Portal is a browser-based data collection and communication tool to address adverse-events management. It is used among North Dakota CAHs to track and analyze infection reports, medication events, equipment, employee incidents, facility and security events, falls, procedural and clinical events, patient and family concerns, Health Insurance Portability and Accountability Act (HIPAA) violations, and other measures. The North Dakota CAH Quality Network, through financial support from the Flex Program, hosts monthly user-group meetings, helps identify areas for improvement in the data, and assists in information sharing and identification of best practices.

Participating hospitals now cover the expense of the event reporting tool; however, when the effort began in 2008, Flex funds supported the access cost to the Clarity Group platform. Clarity Group is a national organization that provides management assistance, including technology, to healthcare organizations. Clarity Group worked with the North Dakota Flex Program to initiate a demonstration project to address CAH needs to collect and analyze quality and patient-event data. Since then, other states have joined, and the CAHs can benchmark their data with that of other CAHs (see BFEPS description in the next section). Currently, 18 of the 36 CAHs use the Health Care SafetyZone Portal, and through Sanford Health System, some CAHs use a similar event-reporting tool (Midas); Catholic Health Initiatives (CHI) facilities all use Intelligent Resources Informed Strategies (IRIS). The network coordinator works to identify shared event measures across different systems and tools or data platforms to develop a more comprehensive understanding of quality measures across North Dakota. The network assists with bimonthly meetings of Health Care SafetyZone Portal users via webinars, where data and best practices are shared along with feedback on the tool. Four national user-group meetings were hosted to review functionality of the tool. In addition, the quality event reporting through the portal has helped to inform other initiatives in North Dakota, such as the Health Engagement Network's (HEN 2.0) work being done through a Health Research & Educational Trust (HRET) of the American Hospital Association. North Dakota has 28 CAHs (78%) submitting data on falls, infection, medication events, and other measures either through the Portal or through Sanford Health or CHI-St. Alexius. Efforts have been streamlined by the network and QHAND (leading the HEN 2.0 initiative). Collaborative efforts have focused on education and quality improvement to reduce duplication of work.

Benchmark for Excellence in Patient Safety (BFEPS). This is a program within the Health Care SafetyZone Portal through the Clarity Group; North Dakota CAHs can elect to participate in benchmarking and data sharing with all CAHs in the nation that use the event-reporting system. In North Dakota, 16 of the 19 CAHs using the Portal are participating in this program. Over the past year, quarterly data meetings (using webinars) were hosted by Clarity Group, the vendor.

RHND Grant Program for pharmacist first-dose review of medication within 24 hours and EDTC. The CAH Quality Network was awarded an FORHP Network Development grant in September 2014, covering the years 2014–2017. This three-year initiative focuses on two important quality steps. The first is telepharmacy to better facilitate pharmacist review of medication orders within 24 hours. The second is improved care coordination related to outpatient EDTC and enhanced data collection tools and methods (e.g., pharmacy reviews and outpatient EDTC). This

grant facilitates North Dakota's ability to address a CAH statewide regulation that requires CAHs to review first-dose medication by a pharmacist within the first 24 hours. North Dakota CAHs were surveyed and 10 North Dakota CAHs did not have 24/7 access to pharmacy coverage. The RHND grant assisted CAHs in supporting telepharmacy within their facility. In addition to the Center for Rural Health, the CHI's ePharmacist program is providing expertise and education on telepharmacy. QHAND, the state resource on quality improvement, is assisting with EDTC data abstraction and analysis of data. The network shares benchmarking EDTC data at quarterly CAH region meetings.

North Dakota Hospital Engagement Network

The North Dakota Hospital Engagement Network (NDHEN) is a collaboration of the NDHA, QHAND, and HRET. NDHEN currently has 28 facilities enrolled. HRET was awarded a CMS contract to support the Partnership for Patients initiative (2015–2016 HEN 2.0). Partnership for Patients is a federal initiative and is discussed in more detail in the following section on health reform.

The Partnership for Patients effort focuses on 10 areas for quality improvement. Participating hospitals are instructed on how to implement best practices and lessons learned through the use of webinars and educational sessions. Within the NDHEN, QHAND supports local education and training. Some of the targeted areas include the following: adverse drug events, central-line-associated bloodstream infections, surgical site infections, pressure ulcers, and preventable readmissions.

Nationally, more than 1,600 hospitals are involved. The CMS estimates that the nationwide initiative will help to save 60,000 lives by stopping preventable injuries and complications. As was previously noted, the IOM has estimated that approximately 50,000 to 100,000 needless deaths happen every year in hospital settings because of mistakes. Nationally, the goal is to reduce unnecessary readmissions by 20% and avoidable harm by 40%.¹⁶

STATEWIDE PROGRAMS TARGETING BETTER CARE, BETTER HEALTH, AND LOWER COSTS

The following programs all operate in North Dakota. Some are from the public sector, some are from the private sector, and some are a public-private partnership. Each in their own way has a focus and mission that works to improve health, improve care, and control costs. Some are focused on a subset of the population or a set of conditions, while others are broader in scope.

Meaningful Use of Electronic Medical Records' Clinical Quality Measures

This national effort, through the federal Office of the National Coordinator for Health Information Technology, is administered in the North Dakota HIT office. The concept of *meaningful use* was discussed in detail under the HIT section in Chapter 6 on health infrastructure. By defining a set of measures for meaningful use, federal policy is attempting to determine the overall set of metrics that will be used. Providers who reach meaningful-use objectives receive incentive payments and the clinical quality measures (CQMs) are the outcome measures. As was reported in Chapter 6, as of 2016, 32 of 36 CAHs had met meaningful use under Stage 1 requirements.

The linkage of HIT with clinical quality measures is another significant step in the transformative process, whereby technology is a tool not only to facilitate quality measurement

and improvement but also to apply the elements of pay-for-performance or value-based purchasing (along with other APMs) as the country moves into a value frame of payment. Later in this chapter, the focus shifts more to payment structures within health reform. At that point, it is easier to comprehend how the integration of quality metrics, technology, system redesign (including elements such as patient-care coordination, reductions in inpatient admissions and readmissions, and reductions in the utilization of the emergency department), along with payment reform all coalesce into a transformed system.

North Dakota STEMI Program

The Midwest Affiliate of the American Heart Association secured \$7.1 million in funding to implement Mission: Lifeline, a community-based initiative aimed at improving the system of care for heart attack patients throughout North Dakota. The three-year initiative was launched in September 2011 with the Leona M. and Harry B. Helmsley Charitable Trust as the lead funder. The state legislature provided \$600,000 of matching funding for the project. A Mission: Lifeline funding grant was available to every North Dakota hospital.

Mission: Lifeline is a strategic initiative to save lives and reduce disability by improving emergency readiness and response to all heart attack patients while focusing on ST-elevation myocardial infarctions (STEMIs). A STEMI is caused by the sudden, total blockage of a coronary artery—the deadliest type of myocardial infarction. North Dakota ranks among the top 10 states with the highest STEMI death rate. Unless the blockage is eliminated quickly to restore blood flow, the patient risks death or long-term disability. Approximately 30% of STEMI patients do not receive treatment to restore blood flow, whether clot-busting drugs (fibrinolytics) or the preferred therapy of percutaneous coronary intervention, also referred to as angioplasty.

In 2014, as the original Helmsley Charitable Trust initiative ended, the Mission: Lifeline effort became part of a larger umbrella called the North Dakota Cardiac System of Care, with oversight from the NDDOH's Division of EMS. The Cardiac System of Care includes STEMI, chest pain, and cardiac arrest¹⁷ (this was discussed in Chapter 6).

North Dakota hospitals have developed a cardiac system of care for acute coronary syndrome guidelines. This means no matter where you are in North Dakota, you will receive the same diagnostic care for a heart attack. Guidelines direct hospitals to timing of an electrocardiograph, calling ahead to arrange transfer to a hospital that can perform a percutaneous coronary intervention, dispatching EMS, and following the American College of Cardiology/American Heart Association clinical guidelines to definitive care.

MediQHome

MediQHome was a process or platform based on the joint principles of the PCMH. In 2016, BCBSND transitioned MediQHome into its new payment method Blue Alliance, which is discussed later. However, a discussion on MediQHome is warranted as it served an important role in initiating data and analytic activity surrounding population health. The PCMH model seeks to extend primary care access; organize care to ensure accessible, patient-centered, coordinated care; align financial incentives to enhance value and achieve savings; and meet and raise benchmarks for high-quality, efficient care. The

PCMH rests on years of research showing that the U.S. healthcare system needs a strong primary care base.¹⁸ The overriding goal of MediQHome was to provide the right care at the right time for the right reason, resulting in a healthier North Dakota. Specifically, it worked to accomplish the following:

- Improve the quality of patient care.
- Promote collaborative decision-making between patients and doctors.
- Create better doctor-patient relationships.
- Provide clear treatment plans for patients to follow.
- Enable a better quality of life.
- Create more cost-effective care.

The PCMH is a model of a physician practice that emphasizes readily accessible, comprehensive, coordinated care and active involvement of the member and family in healthcare access and outcomes. Each member has an ongoing relationship with a personal physician trained to provide first contact and continuous, comprehensive care. This personal physician leads a team at the practice level to take responsibility for the ongoing care of patients. This physician is responsible for providing all the member's healthcare needs or arranging care with other qualified professionals. This includes care for all stages of life: acute care, chronic care, preventive services, and end-of-life care. Payment appropriately recognizes the added value provided to patients who have a patient-centered medical home.

MediQHome began as a pilot program by BCBSND in 2005 and expanded in 2007; the statewide launch was in 2009. MediQHome allowed providers to focus on their patients' health outcomes through the use of MDinsight, an interactive decision-support tool. MDinsight helped the provider identify care opportunities by organizing all available patient clinical data to create patient-specific clinical summaries and quality reports. Having this information allowed the provider to identify current and missed care opportunities in individual patients or groups of patients with specific chronic conditions.

Physicians, clinics, and networks used the quality program's reporting capability to design and implement care processes that led to improved care for all patients. BCBSND analyzed the data within the database and, when appropriate, provided comparative clinical, outcome, and economic reporting of the MediQHome quality program. Overall, 80% of BCBSND members residing in North Dakota were in the MediQHome program. More than 75% of the primary care physicians in North Dakota participated in MediQHome.

MediQHome served as a bridge transitioning both healthcare providers and the patients they care for from the traditional system to one focused on value, improved outcomes, and performance. MediQHome provided necessary tools (e.g., MDinsight) to collect and assess patient data for better decision-making for the benefit of the health of the patient. It provided benchmarks, analytics, initiated better understanding of care options, and likely instilled greater confidence and knowledge on the part of providers (better care) that can translate into both better health outcomes (better health) with improved performance (lowered costs). BCBSND believes that the PCMH model and MediQHome have brought forward the beginnings of successful implementation of alternative models of reimbursement to providers, created a focus on clinical quality outcomes, and set the stage for an important feature of the ACA: APMs, including ACOs.¹⁸

Healthy Steps

Healthy Steps is a children's health insurance plan that BCBSND administers for North Dakota. It is the Children's Health Insurance Program (CHIP) for North Dakota. The NDDHS has the responsibility to monitor, evaluate, and improve the quality of care delivered to the members. Programs such as Healthy Steps seek to not only provide healthcare coverage to eligible enrollees—in this case people ages 18 and younger—but also to do so in a manner that produces better health outcomes in a financially efficient way. Accepted concepts such as case management and care coordination have been brought into the process to ensure patient-quality outcomes and higher-performing structures producing greater value.

BCBSND identifies Healthy Steps enrollees with special healthcare needs by using a health-risk assessment, provider referral, and claims data. The program provides case management services to enrollees with special healthcare needs to facilitate care coordination and to secure medical services. Nurse case managers assess, facilitate, and advocate for options and services to meet CHIP participant needs to promote quality and cost-effective outcomes. The case management process used by CHIP has been reviewed and approved by the External Quality Review Audit. Since the *Third Biennial Report*, BCBSND initiated a new Well Care Visits program for enrollees 12–18 years of age. The NDDHS also contracts with Delta Dental on a preventive dental services program for Healthy Steps children.^{19, 20, 21} At the end of June 2016, there were more than 42,000 North Dakota children enrolled in Healthy Steps and Medicaid out of just under 90,000 North Dakotans enrolled in Medicaid, or about 47% of North Dakotans enrolled are children under 18 years of age.^{15, 22} More than 83% of eligible children in North Dakota participate in either Medicaid or Healthy Steps in comparison with more than 87% nationwide, based on 2011 statistics, which are the most recent federal statistics.²³

While the CHIP program had its start as part of the Balanced Budget Act of 1997, the program was also addressed as part of health reform in 2010. The ACA extended federal funding of CHIP through September 2015. The ACA has also increased the federal matching rate by 23%, which was extended by the new Sustainable Growth Rate-CHIP law in 2015 until fiscal year 2017.²⁴ This added more than \$3 billion in additional CHIP funding for states; the average federal matching rate is 88% (meaning for every dollar used by CHIP to cover children's services, 88 cents is paid by the federal government with 12 cents being paid by the state). The eligible rate for North Dakota and Minnesota is 88% in comparison with South Dakota with a 91% rate. The ACA also provided an additional \$40 million in federal funding to continue efforts to promote enrollment in Medicaid and CHIP.¹⁹

Medicaid Primary Care Case Management Program (PCCM)

The purpose of the PCCM is to provide adequate access to primary care for certain Medicaid populations that are required to participate. This is another Medicaid effort to address access, quality, and cost-effectiveness. The PCCM also provides coordination of care and continuity of healthcare services, works to avoid duplication of service, emphasizes high-quality care, and ensures efficacious healthcare services. The program requires that all non-emergent healthcare services be provided through the client's primary care provider.²⁰

Medicaid Health Management Program (HMP)

In 2007, the NDDHS initiated a Medicaid disease management program. The program focused on asthma, diabetes, chronic obstructive pulmonary disease (COPD), and congestive heart failure. This program was transitioned in 2011 into the Health Management Program (HMP). The new program allows providers to provide additional care coordination services in the form of a health management program for the previously listed health conditions. Providers may qualify for an additional per-member, per-month payment. The HMP offers an integrated service package (e.g., high-risk screening and assessment, care coordinator, triage, referral system that includes tracking referrals and results, recall system for appointments, pharmacy review, inpatient and discharge transitions, education, and emergency department diversion). Patients receive an individualized care plan, a personal primary care provider, and education and training to help the Medicaid patient better understand their condition and self-management.²⁰

North Dakota State Plan to Prevent and Manage Chronic Disease

The NDDOH developed and issued this plan in 2012 with partner organizations. The plan focuses on collaborative activities that are meant to accomplish specific goals, objectives, and strategies to improve the health of the population. The plan addresses the following areas:

- Surveillance and evaluation
- Environmental approaches that promote health, and support and reinforce healthful behaviors
- Healthcare systems and quality improvement
- Personal health and self-management
- Health inequities capacity

In 2013, the NDDOH formed a coordinated chronic disease evaluation team to guide chronic disease surveillance and evaluation. In 2014, the team issued a set of prioritized chronic disease indicators to guide data analysis and to report on statewide outcomes. To better meet the needs of the state's American Indian population, a new epidemiologist specializing in American Indian data was hired and will work with North Dakota tribes.²⁵ In 2016, the department offered a number of programs: coordinated chronic disease prevention, heart disease and stroke prevention, tobacco prevention and control, tobacco cessation services, tobacco surveillance, behavioral risk-factor surveillance system, and youth risk-behavior system.²⁶

Worksite Wellness Programs

Worksite wellness has become a strong focus to foster better health, and better and more affordable care. Healthy North Dakota (through the NDDOH), BCBSND, and the Dakota Medical Foundation in Fargo initiated a statewide effort in 2009 and have created an online toolkit to help the business community initiate worksite wellness activities. According to the NDDOH, more than 80% of North Dakota employers believe in the benefits of worksite wellness but seek more support and guidance. The toolkit covers the following: management support, creation of a team, collection of data, creation of an operating plan, choice of appropriate interventions, creation of a supportive environment, and evaluation. Each of the subjects has a resource section that can help businesses find tools, models, and samples.²⁷ The Seventh Annual Worksite Wellness Summit, hosted by BCBSND, was

held in Fargo, in October 2016, with sessions on motivational interviewing, creating a culture of healthful eating, starting a worksite wellness program, tools for changing people's attitudes about health and fitness, and organizational health.²⁸

Blue Distinction Centers

Blue Distinction is a designation that is awarded by the Blue Cross Blue Shield Association (BCBSA) to medical facilities that have demonstrated expertise in delivering quality healthcare. The Blue Distinction program historically focused on quality only. In 2012, the program was enhanced to not only focus on quality but also meeting cost measures to address the market demand for affordable healthcare for a total value program. Blue Distinction includes the national program Total Care, which recognizes physicians who spend more time on prevention, holistic "total" care, and personalized care planning for their patients. The focus is on healthcare, not sick care, and is designed to strengthen the relationship between the provider and the patient. Blue Distinction Specialty Care recognizes Blue Distinction Centers and Blue Distinction Center+. The former is awarded to health centers based on their expertise, while the latter blends expertise and efficiency. There are seven specialty areas covered: bariatric surgery, cardiac care, complex and rare cancers, knee and hip replacement, maternity care, spine care, and transplants. Factors such as quality care, treatment expertise, and patient results are used as metrics.

Facilities meeting the eligibility requirements and completing the designation process will be listed as a Blue Distinction Center on the BCBSA National Doctor and Hospital Finder website.²⁹

HEALTH REFORM

Health reform, the ACA, Obamacare—whatever terminology is used—represents a significant change in the healthcare landscape for America. Topical and controversial, healthcare reform as currently implemented in the United States is for some a misguided takeover of the healthcare system by government, especially at the federal level; for others, it is a necessary step and important opportunity to create more equitable access to care, improve quality of care, and control costs. For some, it simply does not go far enough (possibly favoring a single-payer system as opposed to more incremental policy change). Regardless, the formal Patient Protection and Affordable Care Act was enacted in March 2010 with parts of the new law being immediately implemented that year (e.g., providing payments to Medicare recipients to begin the process of closing the "doughnut hole" in the prescription drug benefit, making it illegal for insurance companies to deny health insurance for children if they have a preexisting condition, and forbidding insurance companies from rescinding insurance coverage or the practice of denying coverage to someone insured based on a technical mistake). Other parts have been rolled out systematically, allowing for some elements of incrementalism. There have been questions, some that only the Supreme Court of the United States could address (*King v. Burwell* covering state or federal health insurance exchanges).

The rationale that promulgated health reform is in some ways simple: too much cost and too much consumption of the economic pie, as well as too few resources and too few (or limited) positive health outcomes relative to the cost. Using 2008 as a base year (as that was when health reform emerged as a salient political issue in the presidential campaign), it can be shown that

there were forces at play that contributed to a climate for change. Healthcare expenditures accounted for about 16.6% of the gross domestic product (GDP) compared with 9% in 1980. At that time, most other industrial countries had health expenditure/GDP rates of 8% to 10% with a median of 8.7%. Health spending was estimated to be \$2.4 trillion in 2008 and on a per-capita basis the United States spent \$7,538 in comparison with \$3,923 spent in 15 similar countries. The growth rate in spending for the United States outpaced most other countries by significant levels. About 2 out of 5 people spent 10% or more of their disposable income on out-of-pocket medical costs, and healthcare costs were the No. 1 reason for personal bankruptcy.^{29, 30} GDP is one way to measure economics. Another economic factor was healthcare employment. Before 1960, healthcare consumed about 3% of private sector employment, but by 2008, it was at about 11%. As deep as the 2007–2009 recession was, healthcare actually added 559,000 jobs.³¹ There were almost 15% of the population without health insurance (compared with about 11% in 2016). The uninsured rate peaked at 17.1% just before the rollout of the individual mandate for insurance in late 2013.³² Other common health statistics showed that the U.S. medical provider base was lower than other countries. The United States in 2008 had the lowest physician-to-population ratio in comparison with 10 other industrialized countries, with the U.S. ratio being 2.42/1,000 population compared with 3/1,000 for the other countries. Out of 12 industrialized countries, the U.S. per-capita spending for pharmaceuticals was about 2 times the median (\$897 versus \$461). Pharmaceutical use in the United States was much higher too, with 61% of U.S. adults taking at least one prescription in comparison with the median for comparison countries of 54%.³³ In comparison with other countries, U.S. health outcomes were worse: In the United States, life expectancy was lower and infant mortality was higher.³⁴ Thus, health reform was a paramount issue during the 2008 election, and upon the election of the new president, it became a key focus of the Obama Administration that resulted in the enactment of the ACA in March 2010.

For some, healthcare reform is simply an access-to-care issue best represented by increasing insurance coverage through Medicaid expansion or the Marketplace (originally referred to as the Exchange) for purchasing private insurance. The goal of increasing coverage is an important, fundamental aspect of healthcare reform; however, healthcare reform is much broader—and some would say pervasive—than insurance access. To some degree, the media has focused most of its attention on the insurance aspect to the detriment of other important elements of reform. This may be because of the complexity of other features or a sense that many of the other reform functions seem esoteric and too focused on addressing the perceived murkiness of the healthcare system.

Throughout this publication, the authors have made reference to healthcare reform, particularly in terms of how it relates to, influences, or even changes fundamental healthcare system functions. This includes healthcare workforce, improved quality of care, healthcare system efficiency (sometimes interpreted exclusively as cost control), and ultimately improved health status and population health. These are all significant issues; however, for the public and mass media, it may be easier to understand having or not having health insurance than it is to understand vague concepts like "value over volume." Regardless of media attention or a lack thereof, by the end of 2016, a significant level

of implementation will have occurred. Medicaid enrollment in North Dakota, for example, will have grown by more than 20% as a consequence of the ACA.³⁵ Implementation of the ACA has had effects nationally, and North Dakota has experienced the effect of healthcare reform as much as any other state.

The following discussion breaks health reform into two sections. The first is insurance and financial coverage. This will be discussed first with national overtones, and then as it relates to North Dakota. The second is health system reform. This, too, will be analyzed at the national and state levels.

INSURANCE AND FINANCIAL COVERAGE

Health Reform at the National Level

Let's start with some of the numbers, at least as they relate to Medicaid expansion and Marketplace enrollment. While the initial rollout of the Marketplace in 2014 did not happen without some serious snafus, by 2015 and 2016 most of the blips in the system seem to have been resolved. Nationally, the rate of uninsured has declined by 7 percentage points, from a high of 18% (Quarter 1, 2014) to a low of 11% (Quarter 1, 2016). There are some sources that have it lower at 8.6%; it depends on the survey used. At the 8.6% rate, that would be the first time since uninsured data have been collected that the rate would be below 9%.³⁶ The higher level of 18% was recorded right after the individual mandate went into effect in early 2014 requiring all Americans to have health insurance; thus, it represents the benchmark to compare coverage. As of February 2016 (most recent data), approximately 12.7 million Americans were enrolled in the Marketplace (an increase of 1 million over the previous open enrollment). When the Marketplace enrollment is combined with Medicaid Expansion and young adults being able to stay on their parent's health plan until they are 26, there are more than 21 million Americans covered who had not had insurance prior to the ACA. During the initial rollout in 2014, there were 8 million people enrolled through the Marketplace. Before the ACA, about 48.6 million people were uninsured, and in 2016, about 27.3 million are uninsured. Some of the subgroups experiencing the largest reductions in uninsured rates include people earning \$36,000 a year or less (30.7% uninsured in 2013, 20% uninsured in 2016 for a reduction of 10.7 points); people ages 26–34 (28.2% uninsured in 2013, 18.5% uninsured in 2016 for a reduction of 9.7 points); Blacks (20.9% uninsured in 2013, 11.4% uninsured in 2016 for a reduction of 9.5 points); and Hispanics (38.7% in 2013, 28.3% in 2016 for a reduction of 10.4 points). Health reform is changing how Americans access insurance. With the advent of the Marketplace, the percentage of Americans who purchase insurance on their own or through a family member has increased, from 17.6% in 2013 to 21.8% in 2016 (4.2 point increase). The percentage who have insurance through their employer has dipped, from 44.2% in 2013 to 43.4% in 2016 (0.8 point decrease). Medicaid has increased by 2.5 points (from 6.9% in 2013 to 9.4% in 2016).^{32, 37}

While the movement in the number of Americans who are insured relative to those who are uninsured has been significant and is positive, there are still millions (roughly 27 million to 28 million) without insurance. Many live in the 19 states that did not expand Medicaid. For these people, there is a “coverage gap” because they earn too much to qualify for traditional Medicaid (eligibility is set at up to 100% of the federal poverty level, whereas Medicaid Expansion “extends” coverage up to 138% of poverty)

but do not earn enough to qualify for the subsidies available to people in the Marketplace. The ACA was designed so that Medicaid Expansion would be universal or available throughout the country; however, when the Supreme Court ruled that it was up to the states, that then meant people in states that did not extend coverage were in a coverage gap as the federal subsidies were designed to kick in at 138% of poverty level. According to the Kaiser Foundation, there may be about 3 million to 4 million Americans in the gap. Texas and Florida alone account for about 46% of these people. A plurality (45%) are white, non-Hispanic, ages 35–54 (35%); and have excellent or very good health (50%). A majority are female (52%) and do not have children (76%). They hold down jobs with 41% working full-time and 21% working part-time. A plurality (48%) work for a small employer with 50 or fewer employees.³⁸ Others who are not covered include a relatively large number of younger and healthy adults who are 19–34 in age (about 8 million); noncitizen immigrants who are prevented under the ACA from being insured by the government (about 7 million); and 14 million who do not necessarily fit into a category but tend to be of working age, 35–64 (about 10 million); minors, 0–18 years of age (4 million); non-Hispanic white (more than 8 million); have incomes from \$25,000 to \$50,000 (4 million); and work full-time (almost 5 million). With about 4 million children uninsured in this group, that shows that even with Medicaid, Medicaid Expansion, and CHIP there are still children falling between the gaps of public programs.³⁹

Nationally, hospitals' uncompensated-care burden has declined, and research is associating much of that decline to ACA-mandated changes such as Medicaid Expansion. A study published in *Health Affairs* (2016) estimated that uncompensated-care costs decreased from 4.1% to 3.1% of operating costs in Medicaid Expansion states; furthermore, the estimate for non-expansion states was a decrease from 5.7% down to 4% of operating costs if they had participated in the expansion. Some of the difference is associated with the nature of the patient base. There have been greater savings associated with hospitals that had a higher uncompensated-care base before the enactment of the law. Many of the states that have not expanded Medicaid are states that have a higher uncompensated-care level; thus, if they had participated in the program the benefit to those hospitals and states would likely be even higher than noted in the states that did implement Medicaid Expansion.⁴⁰ The Healthcare Financial Management Association observed that in the first year of Medicaid Expansion, hospital uncompensated-care costs declined for the first time since 2001. The decline was by about \$4 billion (from \$47 billion to \$43 billion). The Office of the Assistant Secretary for Planning and Evaluation for the U.S. Department of Health and Human Services estimated that the ACA reduced hospital uncompensated-care spending by 21% and the Kaiser Family Foundation released an analysis showing a decline of 17% or almost \$6 billion for 2014.⁴¹ A recent study of rural hospitals by the University of North Carolina's Cecil G. Sheps Center for Health Services Research (2016) found that the percentage of revenue associated with uncompensated care for rural hospitals was lower in Medicaid expansion states (8% versus 10%–11% in non-expansion states); thus, there is a higher financial burden borne by rural hospitals in non-expansion states.⁴² While these studies may have slightly different financial savings and sometimes cover different time frames, the general conclusion is that the ACA, particularly the Medicaid Expansion, is associated

with a decrease in uncompensated-care costs. The requirement for at least nonprofit hospitals (and most hospitals are nonprofit) is that they invest in what is called a community benefit for better health in their communities (the previously discussed Community Health Needs Assessment and implementation plan are process steps required under the ACA that identify the community need that can be addressed to produce a community benefit). As hospitals experience financial savings (from ACA implementation) by having lower levels of both charity care and bad debt, public policy requires that they offset those savings through a financial commitment for a stronger community by improving population health. This advances the goal of better health, better care, and lower costs.

Health Reform in North Dakota

In North Dakota, as of March 2016 (most recent data), there were 20,536 North Dakotans who had gained access through the Marketplace for private insurance coverage. This was an increase of 19% (18,171 people enrolled) from 2015.^{43,44} Correspondingly, the other enrollment option, Medicaid Expansion, saw 19,389 individuals enrolled as of March 31, 2016 (most recent data).⁴⁵ Thus, as of 2016, about 40,000 more North Dakotans had health coverage either through the Marketplace or Medicaid Expansion. An exact number of uninsured in North Dakota has been difficult to determine; however, many have pegged it at about 60,000–80,000 before the ACA. Using the middle number 70,000 as a base, with 40,000 newly insured, the percentage of uninsured has declined by about 57% since 2013. The uninsured rate ranges from 6.9% as of 2015 in one source to 7.9% also in 2015 from another source.^{45,46} The Robert Wood Johnson Foundation found that the North Dakota uninsured rate in 2013 (before the Marketplace enrollment and while North Dakota's Medicaid Expansion program was being rolled out) was 12.3% as a point of comparison. North Dakota's uninsured rate at roughly 7% to 8%, compares with South Dakota's rate of 9.8% (South Dakota did not expand Medicaid). Nationally, state's that expanded Medicaid had an average uninsured rate of 9.6% in comparison with the non-expansion states of 12.7%.^{46,47}

The NDHA has estimated the positive effect on the state's hospitals since Medicaid expansion to be approximately \$68 million, close to the amount of reimbursement that the six urban-based PPS hospitals receive from another specialized ACA benefit, the Frontier Amendment (benefiting hospitals in North Dakota and three other states), which brings in roughly \$65 million a year for 10 years to North Dakota.⁴⁸ As was stated in the previous section covering health reform implications at the national level, hospitals are experiencing some level of financial benefit from the ACA, including the expansion of Medicaid. There is the lessening of bad debt and charity care, and increased Medicaid reimbursement both in terms of increased volume and increased payment rates. Under the ACA, the costs of expansion for the first three years is covered by the federal government and then is reduced to 95%. Over the next few years, the ratio moves in increments to a 90:10 level, where the states cover only 10% of the added costs. This compares with general Medicaid where the state may contribute up to 50% of the Medicaid costs. Thus, in North Dakota, hospitals receiving millions of dollars more in Medicaid reimbursement is positive. The reimbursement is at a level that can be used to treat a new patient base that because of limited access to healthcare services has, in many cases, years of untreated

conditions. It does cost money to treat these patients to not only address chronic conditions or delayed primary care but to also hopefully improve their individual health status and to focus on prevention. Over time, these new patients—through prevention, care coordination, health coaching, and other methods—become examples of the concept of better care, better health, and lowered cost. Additionally, by reducing uncompensated-care costs, hospitals have the resources to address community needs as part of their community benefit effort.

Many people enrolling through the Marketplace are eligible for a federal subsidy to help buy down the cost of their premiums. In North Dakota, about 86% of the Marketplace enrollees received the federal tax credit for 2016. The average subsidy per month was \$262 (2016) with the average out-of-pocket cost after the subsidy being \$142 per month. The ACA has an individual mandate to carry insurance. If it is determined that someone does not have insurance, they are subject to a penalty. For the 2016 tax year (taxes due in April 2017), it is 2.5% of the yearly household income or \$695, whichever is greater.⁴⁹ Since one of the principal obstacles to carrying health insurance has been cost, the ACA addresses insurance affordability through Medicaid Expansion or through the Marketplace. To increase the number of people having access to private insurance so as to meet the federal mandate, the ACA provided tax credits (a subsidy) to make insurance affordable. In June 2015, the Supreme Court, in *King v. Burwell*, upheld the constitutionality or legality of the use of subsidies in every state, including those that use the federal as opposed to state marketplace (the state-versus-federal marketplace had been at the heart of the constitutional question). If the Court had ruled against this, making the tax credit not available in states that used the federal marketplace (like North Dakota), the average increase in premiums in North Dakota would have been 169% in one year because of the absence of a tax credit. With 86% of North Dakota Marketplace subscribers availing themselves of a tax credit, this would have effectively eliminated access to insurance for thousands of North Dakotans. There would have been negative consequences to the general private market of health insurance as well (in other words, insurance coverage not gained through the ACA Marketplace) because the American Academy of Actuaries estimated that those premiums would have increased from 35% to 55% nationwide. This shows that even though the ACA Marketplace is a public-access platform, the health insurance market can be influenced by both private and public economic forces. It is a complex structure. It is important to understand that the subsidy is only available by enrolling through the Marketplace. The subsidy can go as high as 400% of the federal poverty level (for a family of four in 2014, this would mean up to an income of \$94,200).^{43,50}

There are resources to assist North Dakotans with enrolling in the Marketplace and Medicaid expansion. The ACA supports private contracts to organizations to serve as “navigators” to assist people in maneuvering the complex health insurance market, including eligibility for Medicaid and Medicaid Expansion. North Dakota is served by two organizations. One is the North Dakota Center for Persons with Disabilities (NDCPD) located at Minot State University in Minot. The CMS contract supports the NDCPD in having 15 navigators working throughout the state. There is at least one navigator in each of the eight planning or human service regions of the state (Williston, Minot, Devils Lake, Grand Forks, Fargo, Jamestown, Bismarck, and Dickinson). The

navigators are trained in the enrollment process and can provide direct one-on-one assistance to people seeking help. According to Program Director Neil Scharpe, the NDCPD found public libraries and county extension offices to be good dissemination sites.⁵¹ Human Service Centers, tax preparers, local health insurance companies, and county social service offices were also reliable places to partner.⁵² The second navigator organization serving North Dakota is the Great Plains Tribal Chairmen's Health Board in Rapid City, S.D. The Great Plains Tribal navigator program serves American Indians in both North and South Dakota. In North Dakota, there are four navigators associated with the Great Plains effort. In addition to navigators, another resource is called a certified application counselor (CAC). While the navigator program is a formal contract between the CMS and an entity, other organizations can have workers trained to be CACs. Working in a manner similar to that of a navigator, CACs also work to enroll North Dakotans. CACs could be located in a number of locations, including PPS hospitals like Altru Health System, rural hospitals such as First Care Health Center in Park River and Pembina County Memorial Hospital in Cavalier, public health units such as City-County Health District in Valley City, and other locations. In addition, other central sources for CACs were the four community health centers (Fargo, Rolla, Beulah, and Grand Forks) and their clinic locations, serving a total of 14 communities.⁵³

There are other key features to healthcare reform that affect North Dakotans. One of these is "filling the doughnut hole" found in the expansion of Medicare to include prescription coverage (Medicare Part D.) Created as part of the Medicare Modernization Act (2004), prescription coverage was available up to a set amount (with a deductible and coinsurance), and then there was a coverage amount that reverted back to the responsibility of the beneficiary (this gap is the doughnut hole). Insurance would cover the remainder. Because of annual adjustments, this doughnut hole was set for 2016 so that the customer is responsible for prescription costs above \$3,310 until it reaches the cap of \$4,850. The gap between the \$3,310 and the \$4,850 was referred to as a "doughnut hole." This is the amount that is 100% the responsibility of the beneficiary. A requirement of the ACA is to "fill in" the doughnut hole. This will be gradual with more of the gap filled each year. In 2014, more than 11,309 North Dakota Medicare recipients received \$9.6 million from the federal government as part of the ACA policy to close the doughnut hole (about \$850 each).

Nationally, about \$15 billion was paid back to America's seniors, representing 9.4 million Medicare recipients.⁵⁴

Another ACA Medicare benefit is access to free prevention services. Nationally, in 2014 alone (most recent year), 39 million people benefited from this service. In North Dakota, this affected more than 72,000 beneficiaries in 2014. The benefit covers cancer screenings, bone-mass measurements, annual physicals, and smoking cessation. For the non-Medicare public, there are also free preventive services covering immunizations, certain cancer screenings, contraception, reproductive counseling, obesity screening, and behavioral assessments for children. This will likely affect around 360,000 North Dakotans. The elimination of out-of-pocket costs for many services is part of a focus that the ACA places on increasing prevention to not only improve health status but also as a means to control overall costs. Later in this section, we will discuss APMs, which will include elaboration on

how prevention or the "wellness visit" is an important element for health organizations to increase quality and outcomes, and to control or lower healthcare costs. More than 60% of seniors have at least one chronic condition (e.g. congestive heart failure, diabetes); thus, the potential to better manage not only the health condition but also the cost function is evident.^{54, 55, 56}

A commonly discussed benefit from the ACA relates to preexisting conditions. Somewhere between 50 million and 129 million non-elderly Americans (19%–50%) have some form of preexisting health condition that could have placed them in a position to be denied insurance coverage. Before the ACA, millions of Americans either were denied coverage or feared they could be dropped by their company (this latter concern, called rescission, was outlawed in the ACA). One study found that 36% of those who tried to purchase insurance directly were turned down, charged more, or had a specific health problem excluded from their coverage plan. In North Dakota, 276,000 residents had a preexisting condition that is now protected under federal law. About 17% of North Dakotans 18–24 years of age had a preexisting condition, as well as 36% ages 45–54, and 47% ages 55–64.⁵⁷

In addition, many North Dakota families now benefit from the ACA provision that adds coverage for people up to the age of 26 on their parent's health plan. This covers 2,630 young North Dakotans. Nationally, more than 2.3 million young adults can now be covered under their parent's plan. A final benefit to note is that health reform requires health insurers to provide consumers with rebates if the amount they spend on health benefits and quality of care is low—as opposed to advertising and marketing. In 2014, 947 North Dakota consumers received almost \$69,000 in insurance rebates.

While thousands of North Dakotans and millions of Americans have experienced new opportunities for insurance coverage from the Marketplace or Medicaid Expansion, there are many people who have insurance either through their employer or have to purchase it on their own. They do not qualify for Marketplace subsidies or Medicaid Expansion, and have experienced some "sticker shock" on premium increases in the open market. Nationwide, premiums are expected to increase by 5% to 6% in 2017 for employer-supported plans (i.e., plans where the employer covers all or part of the health insurance for employees) and likely higher for the smaller number of people who are in the individual market (i.e., buying insurance on their own because they do not have employer-paid insurance.) Most people are accessing insurance as an employment benefit, or they are part of the Marketplace or participate in public insurance such as Medicare, Medicaid, or CHIP. Individual rates may increase at double digit levels. Additionally, the rates that insurance companies charge for plans sold through the Marketplace are tipping into double-digit increases. Some employer plans are kept in check by having higher deductibles and co-pays making a trade-off between premiums (costs to the employer and possibly the employee) and out-of-pocket costs for the employee. Some deductibles are as high as \$6,500 for an individual plan and \$13,000 for a family plan.

The rationale for the premium increases has been ascribed to "sticker shock" for the insurance industry. The ACA precludes insurance companies from denying insurance to people with preexisting conditions or practicing rescission (i.e., people have insurance but the company determines that they had a preexisting

condition before purchasing insurance and the company severs the coverage). On one hand, the ACA has opened up new markets for private insurance by increasing the pool of subscribers, but on the other hand, the industry is finding more sick people who can't be denied coverage unless they cannot afford the premium. Before the ACA, insurance companies could control some of the cost by limiting the access of some people (e.g., people with costly preexisting conditions) from purchasing health insurance (however, they could attempt to purchase into a high-risk plan). Post-ACA companies have to find a way to balance the increased costs of many more subscribers who are sick, and higher premium increases for all subscribers seems to be a method. Not everyone who has chronic diseases or other health issues is able to qualify for subsidies. There is a sizable group of Americans who are economically middle class who have health conditions, and they may be bearing the brunt of the changes, including the cost of care, in the system.⁵⁸

HEALTH SYSTEM REFORM

Health Reform at the National Level

As was previously stated, there may be a media bias to focus more on insurance and financial coverage rather than health system reform since the ACA was enacted in 2010. What is being missed and not adequately explained to the average citizen is how health reform is significantly changing the American healthcare delivery system and how we as a nation—and even as individuals—approach and contemplate health. In a nutshell, under health reform, we are 1) attempting to increase access to healthcare by establishing financial security (e.g., insurance) so as to improve health status; 2) restructuring the delivery system to focus more on population health such as disease prevention, health promotion, care coordination, and disease management so as to improve health outcomes; and 3) realigning payment structures that incorporate quality of care and health outcomes or health improvements as opposed to simply rewarding volume. Higher-cost services such as inpatient care, readmissions to the hospital, and excess use of the emergency department as a substitute for primary care are scrutinized so as to target appropriate care (better care). In a way, the dual concepts guiding health reform are insurance access and the allocation and management of financial risk (increasing insurance coverage and spreading more financial risk to the provider class). Thus, the Three Aims of better health, better care, and lower or controlled costs are addressed through this focus. This is a simplification of health reform; however, the essence of reform is embodied in that framework.

The structural change to the health delivery system is well underway. There are a number of new or alternate payment methods generally referred to as APMs (designed to reduce health costs via a value and risk sharing mechanism): ACOs, bundled payment models, patient-centered medical homes, pay for performance (such as value-based purchasing), and in the physician area, there is the Medicare Access and CHIP Reauthorization Act (MACRA), which is also an effort to integrate quality and better patient management into the physician reimbursement system (MACRA was not formally part of the ACA, but Congress ended the old payment model and enacted MACRA in 2015). The ACA authorized the development of new APMs based on the recognition that transforming the delivery of care meant a significant redesign of payment structures so as to

couple medical or health outcomes (for the patient) and efficiency and performance (for the organization) with payment.

The structural redesign of the American health delivery system brings into the framework of discussions essential elements that have been covered throughout this *Biennial Report*: financial conditions and constraints, health professional workforce demand and supply, organizational arrangements and systems, health quality metrics and analytics, quality of care and patient safety improvement, and health information technology, such as electronic medical records. Health reform is pervasive, systemic, and complex, encapsulating needs and wants that have meaning for the private and public sectors, and individual and collective levels, and involve the tangible and conceptual. The issue for rural citizens and providers is, do they fit in this new value-based system? If they do, how? How can health facilities with limited utilization, workforce shortages, and financial constraints navigate this new delivery system? Do they still have or offer value? One national rural health and health reform expert commented that “the greatest threat to the sustainability of rural healthcare systems are market forces that will force doctors and patients to choose high-value providers and partners—and rural will be left behind.” It was further elaborated that in the new world of APMs and the orientation to finding “value” from all providers that rural providers may be excluded if they do not have the data and the ability to show that they, too, are a high-value provider. They will be skipped.⁵⁹

The current nomenclature favors the phrase “volume to value” as a convenient way to illustrate a very complex subject. Essentially, what we are attempting to do is gradually adjust our payment structure from one that relies on and reinforces paying for more services on a fee-for-service basis (e.g., each encounter, test, or procedure has a set price and the more that is done for or to the patient, the more the provider is reimbursed, regardless of the actual medical or health outcome) to a payment structure that rewards positive, measureable outcomes. In other words, it isn't how much is done or how frequent, it is the effect of the medical or health effort.

So, what are some of the significant changes in pursuit of better care, better health, and lowered costs? U.S. Department of Health and Human Services Secretary Sylvia M. Burwell announced in January 2015 some ambitious goals to shift Medicare payments into a value-based framework. The first goal was to have 30% of Medicare payments paid through an APM by the end of 2016 and 50% by the end of 2018. The second goal was to have fee-for-service (FFS) payments linked to quality and value with 85% by 2016 and 90% in 2018. The secretary announced in March 2016 that the goals for that year were already met, well ahead of the end of the year. Thus, 30% of Medicare payments involve an APM, and 85% of FFS is connected to quality and value. As of January 2016, CMS estimated that approximately \$117 billion in Medicare FFS payments were linked to APMs. This is out of \$380 billion or 31%, right above the goal of 30%.^{60, 61}

For hospitals—or at least PPS hospitals, with a lesser effect on CAHs—there are a number of federal policy efforts supported by the ACA that can be characterized as “paying for value” and are part of the redesign from a volume-based system to a value-based system. One is the Hospital Readmissions Reduction Program, where hospitals that have excess readmissions are penalized. This initiative started in October 2012. Readmissions have been identified as a significant and unnecessary cost to the

system. CMS has found that this initiative has resulted in an 8% reduction in readmissions, or 150,000 fewer admissions. As of 2016, more than 1,600 PPS hospitals have been penalized for having too many readmissions in each of the program's five years. That is a function of the provider-sponsored risk concept. PPS hospitals are affected by the readmissions efforts; however, while CAHs are exempt under the ACA, some CAHs are engaged in other efforts to reduce readmissions. A second PPS effort is the Hospital Value-Based Purchasing (VBP) Program, where part of a hospital's inpatient Medicare payments are directly linked to quality or outcome metrics (the 85% goal). Hospitals are given an incentive on a pay-for-performance method wherein a portion of reimbursement is influenced by how well the hospital performs on a set of measures compared with other hospitals or how much they improve their performance on each measure compared with their baseline performance period. There are more than 3,000 hospitals (including North Dakota PPS hospitals) involved with value-based purchasing. The VBP program is designed to promote better clinical outcomes for inpatients and to improve their care experience. A third ACA value effort is the Hospital-Acquired Condition Reduction Program. This ACA effort reduces Medicare payments for hospitals that rank in the lowest or worst performing quartile for hospital-acquired conditions. All three of these initiatives are indicative of the drive to correlate quality with payment and to emphasize value or outcomes.^{62, 63}

The fourth financial option to control or lower cost based on a value and provider-risk model is called bundled payments. This was first implemented by the Center for Medicare and Medicaid Innovation, which was created by the ACA to develop and test new models through the Bundled Payments for Care Improvement Initiative (BPCI), which is based on aligning financial and performance accountability for a single episode of care. In other words, payment follows the patient as one payment allocation is made to be shared by all the providers for an episode of care. This contrasts to the traditional approach, where each provider receives a separate payment directly from the payer. The single-source payment is "bundled" and then allocated to the providers. The theory is that a bundled payment may be more efficient and is awarded based on value or outcome as opposed to each provider receiving a payment for specific services. CMS has found that 20%–40% of Medicare costs are associated with waste, overtreatment, and lack of care coordination, and the bundled payment method is one of many new tools to be employed to create a system based more on value than volume. There have been more than 1,700 providers and 300 health organizations involved with the BPCI effort. Under the BPCI, there have been four inpatient models used covering a range of options: hospital services only, hospital and physician services, and inpatient and post-acute care. BPCI is another form of provider risk, where the provider assumes some of the financial risk in treating the patient. Some healthcare experts have cautioned that one of the unintended implications is that the bundled payment structure may change relationships with post-acute-care providers. For example, if a bundled payment is operating through an urban-based ACO or other APM, it is to the financial benefit of the APM to contract with a post-acute provider that has high quality and low cost. If they determine that a rural CAH swing-bed program or nursing home meets the threshold, they will likely contract with the rural facility; however, if they find another facility in a different community that is a better quality and cost partner, they

will likely contract with that entity. Unless the patient specifically says they want to go back to their home provider, the post-acute care does not have to take place in the originating community. The decision rests with the primary facility. Experts feel this will lead to changes in some facility-to-facility relationships.^{64, 65}

A fifth example, patient centered medical homes (PCMH), is in some ways the oldest APM. The American Academy of Pediatrics pioneered the idea in 1967 to create a new medical approach that strove to include patients and families in the treatment process by emphasizing primary healthcare that was accessible, family-centered, coordinated, comprehensive, continuous, compassionate, and culturally effective. It emphasizes the role of primary care, and sometimes is called the primary care medical home model. The IOM first focused on the concept in the 1990s and described it as "patient centeredness," which was defined as a partnership between providers, their patients, and their patients' families to acknowledge and respect the wants and needs of the patient and to provide the patient and family with the information to make an informed decision. In the early 2000s, family medicine also adopted the language of patient centeredness in a report titled, *The Future of Family Medicine: A Collaborative Project of the Family Medicine Community*, which called for everyone to have a personal medical home.⁶⁶ In the PCMH model, the primary care provider is the focal point for care delivery central to a team of providers that can include nurses, mid-level or nonphysician providers, medical assistants, nutritionists, social workers, pharmacists, and care coordinators. Mental or behavioral health and other specialty services can be woven into the application of the model. It is meant to be holistic, yet driven by the personal physician. From a payment perspective, the PCMH also moves beyond the traditional fee-for-service arrangement. With the patient at the center of the model—and all efforts being focused on patient improvement—the PCMH payment scheme seeks to acknowledge that FFS does not compensate the provider for the additional work done to coordinate a patient's care (e.g., patient education, provider communication, support services, and interactions with the patient outside of the clinical setting). PCMH enhances FFS with evaluation, management, and additional codes for medical home activities. It can also incorporate per-member, per-month medical home payments and allows for risk adjustment. Like the ACO, there are both public and private PCMH models operating. The Geisinger Health Plan program (associated with the Geisinger Medical Center, a large rural-based system in Pennsylvania) was found to have reduced hospital admissions by 18% and readmissions by 36% per year. The Group Health Cooperative of Puget Sound was found to have reduced emergency department visits by 29%. The ACA encourages the PCMH through Center for Medicare and Medicaid Services Innovation (CMSI) demonstration projects that emphasize prevention, care coordination, HIT, and shared patient-provider decision-making. The Milbank Memorial Fund and the Patient-Centered Primary Care Collaborative issued a report on the model in 2014. The study showed that there have been some improvements in cost, utilization, population health, prevention, and patient satisfaction, but there is still a gap in evidence with regard to physician satisfaction. The model can strengthen larger health systems, specifically ACOs. A study published in the *Journal of the American Medical Association* was less promising.⁶⁷ The study based on three years of data found that the PCMH did not reduce hospitalizations, emergency

department use, ambulatory care services, or costs. The experiments with APMs are still relatively new, and it will take time to isolate what works best and under what conditions.⁶⁸

The origins of the ACO model (the sixth value and risk model) are found in the ACA. ACOs are the most prevalent APM. An ACO is a network of providers. It can be physicians only, hospitals only, physicians and hospitals, or other health providers. The ACO is “accountable” for the cost and quality associated with coordinating care for a defined patient population. ACOs are strongly associated with the Medicare program; however, there are also private-based ACOs. As of January 2016, there were 894 public and private ACOs in the United States, which was an increase of 12% over the previous year. Medicare accounts for a majority (53%) with 477. ACOs, while a type of APM, are themselves broken down into subcategories of models. Out of the 477 Medicare ACOs, there are 434 Shared Savings, 21 Next Generation ACO, nine Pioneer, and 13 Comprehensive End-Stage Renal Disease Care models. The number of Pioneer ACOs declined by eight as they transitioned into the new Next Generation ACO. There are more than 28 million people served by an ACO, up from 22 million in 2015. More than 9% of all Americans are now receiving healthcare within this model.

Out of the almost 900 ACOs, about 475 are Medicare-sponsored with the most common model being the Shared Savings ACO (91% of all Medicare ACOs). There is also the Pioneer ACO model, for which there are nine in operation, and the new Next Generation (21 initiated in 2015). The Shared Savings and the Pioneer models were announced in 2011, and while they each concentrate on improving care and quality for Medicare beneficiaries along with reducing healthcare costs, they do differ in their construction. The Shared Savings Model accepts risk for at least 5,000 beneficiaries. Depending on their tolerance for risk, these ACOs can be one-sided, where the ACO shares in savings if they accrue but does not bear any loss, or two-sided, where they share both savings and loss with Medicare. The Pioneer Model accepts risk for at least 15,000 beneficiaries (with 5,000 in rural areas). The Pioneer ACO has four alternative payment options that involve varying levels of risk for savings and loss, but in the third year, they transition to a population-based payment plan. The Pioneer ACO has involved mostly hospitals with much of the ACO capabilities already in place, as some evolved from Shared Savings. There is more accepted risk on the part of the ACO in this model relative to Shared Savings. The Next Generation model requires even more risk allocation to the providers, above what is found in the Pioneer Model (up to 100% of the risk). This also means that the Next Generation model provides for more opportunity to share in cost savings (bonuses for better care coordination and care management). The networks entering this model tend to be experienced, having been either part of a Pioneer or a Shared Savings model. The participants have also had positive financial experiences with the ACO model and have the insights gained through care coordination and other efforts to better manage care and to increase efficiency. Next Generation also employs prospective rather than retrospective benchmarks and will test beneficiary incentives. The Next Generation version of the ACO represents the slow evolution of this value-based model, one where more experience may lead to higher tolerance for financial risk.^{69, 70, 71}

Medicare unveiled a rural option in 2016 called the ACO Improvement Model (AIM). Rural ACO activity has been

slower to develop for a variety of reasons, including concerns over meeting a threshold of 5,000 beneficiaries, experience with networks (forming and operating), workforce (not just the number of providers but administrative and managerial experience), and overall capacity (including familiarity with care coordination, patient coaching, and data acquisition and analytics). In 2015, only 31 CAHs were formally part of an ACO (only 8% of all ACOs had a CAH). Federally certified rural health clinics (RHCs) and federally qualified health centers (FQHCs) are also eligible to be part of an ACO; however, data were not available on the number of RHCs or rural-based FQHCs that are participating. The AIM initiative places a significant effort on first building capacity in rural ACOs (technical assistance grants, training on care coordination, collection of patient data, and data analytics) to ensure greater success. These arrangements last for three years before the rural ACO becomes fully operational. This, too, is a CMSI initiative.

The fundamental difference between the Shared Savings, Pioneer, and Next Generation models rests with risk. The Pioneer Model has a higher level of financial risk assigned to the providers than the Shared Savings Model, and the Next Generation Model can assume even more risk than the Pioneer Model. It is a combination of experience (including positive financial incident and operating within a network of providers working in the same direction) and risk tolerance that facilitates where a provider or network of providers may be on this risk continuum. There are one-sided risk models and two-sided risk models that are applied. As is implied, the one-sided model operates in a manner where the providers are eligible for payment bonuses for meeting quality measures and reducing spending; however, they do not experience penalties if those benchmarks are not achieved. In a two-sided model, providers experience greater risk and can not only benefit from bonuses but can also be subject to penalties. The penalties are the difference. The Shared Savings Model is the least risk-oriented as 96% of Shared Savings ACOs are one-sided (2015 data). Participation in an ACO is entirely voluntary. Providers decide if they should seek to develop an ACO and their comfort level with financial risk; it is not decided by Medicare or Medicaid (there are Medicaid ACOs too). The one-sided model is the most common for both public and private ACO arrangements. This is likely because of a natural tendency for organizations to be cautious and conservative when approaching a new effort, especially one where a decision can have significant implications for the financial viability of the organization. Thus, contemplating financial risk and how much to assume is a compelling idea. All APMs—including ACOs—are complex, and providers are investing time and effort to understand these new models.

Under Medicare, ACOs must accept responsibility for at least 5,000 beneficiaries. Private-based ACOs are not required to follow the 5,000 threshold, but data indicate that most do. Private and public ACOs differ. Private ACOs have been found to be more experimental by incorporating other APMs into their structures (e.g., ACO with bundled payment features and payer subsidies); private ACOs have contracts that may offer greater flexibility and customization features for providers and payers' patient populations; and private ACOs have had a tendency to take on more financial risk.

To date, the financial implications associated with ACOs overall are encouraging. The 900 or so ACOs are all individual networks with some experiments being successful and others

not. From 2012 to 2014 (most recent data), the Shared Savings and Pioneer ACO models generated more than \$417 million in savings to Medicare.⁶²

One of the possible weaknesses of the model is that the responsibility or accountability rests with the providers, not patients. Generally, there are no incentives or penalties given to patients for following or not following healthful behaviors. The Next Generation model has started to incorporate some beneficiary incentives at least in the sense that it will offer \$50 reward payments to beneficiaries who receive a set percentage of their care from the ACO. This is a small start; it is an inducement to participate in a network focusing on quality and improved outcomes. Additionally, except for some private ACOs, patients can stay or leave the ACO; they are not in a closed network. This is likely positive for the patient, but it lessens the ability of the health system to maintain a core base.^{62, 68, 72, 73}

There are also federal efforts to promote better care and safety. One ACA-sponsored activity is Partnership for Patients (in North Dakota, this is addressed through the Hospital Engagement Network [HEN], involving the hospital association and Quality Health Associates). Nationwide, there are 27 separate HENs in operation. Partnership for Patients is a quality-of-care and patient-safety initiative that has had the goal of saving 60,000 lives by averting millions of hospital-acquired conditions over three years through the reduction of complications and readmissions, and by improving care transition from one care setting to another. The most recent data indicated that 50,000 fewer patients died in hospitals and approximately \$12 billion in healthcare costs were saved as a result of a reduction in hospital-acquired conditions. This means there was a 17% decline in hospital-acquired conditions. A second effort is the Comprehensive Primary Care Initiative, which is a multi-payer partnership between Medicare, Medicaid, and primary care physicians in four states (Arkansas, Colorado, New Jersey, and Oregon). Under the project, primary care providers receive non-visit-based care management fees from the payers by focusing on care management for patients in most need. It focuses on care coordination, improved access, patient experience tracking, better coordination with hospitals and specialists, and the use of HIT. Preliminary studies from the first year of implementation showed that the project generated more Medicare savings than costs associated with the provider management fees. It also reduced hospital admissions by 2% and emergency department visits by 3%. A third ACA program to address better care and safety is the Multi-Payer Advanced Primary Care Initiative. While similar to the Comprehensive Primary Care Initiative (multi-payers), this model is managed by the eight states involved, not Medicare. There are 3,800 providers and 400,000 Medicare recipients participating. A fourth effort is the Transforming Clinical Practice Initiative (TCPI), which will support 150,000 clinicians over a four-year period by creating peer-based learning networks to develop quality-improvement strategies. These learning networks are called Practice Transformation Networks (PTN). PTNs are operating in North Dakota and will be addressed later. There are other initiatives addressing healthy infants, better coordination of chronic disease management, and state innovation models.⁶²

The previous discussion on national and state efforts on quality directly relates to this discussion on payment. Even for CAHs, nationally 1 in 5 are posting inpatient and outpatient measures, and in North Dakota, all 36 CAHs are posting such

data basically to prepare themselves for the day when they can participate more directly in this national movement to leverage better care, better health, and lowered costs. CAHs are starting to provide measures even though they are not required to post quality-related indicators in Hospital Compare, are not eligible for quality- or outcome-related reimbursement, and are not required to be part of an ACO.

It should also be pointed out that this transformation built on quality and outcomes linked to payment is not easy. Not only will there be winners and losers along the path to reform but also there will be approaches or models that will be modified or even rejected. ACOs, for example, are sanctioned under the ACA to be a delivery-and-payment model (different than the heavily structured and constrained managed-care models from the 1990s) but still emphasizing quality, care coordination, and payment associated with better outcomes. Still, many health experts express the view that the APMs being demonstrated today may not be here in 10 years. This is a flexible and transformative period with much experimentation. It will take time and dedication, mixed with a high tolerance for failure, to find approaches and methods that work. “The ACO may not survive, but a focus on population health will,” was a comment from a health expert.⁶⁵

Finally, for providers in North Dakota and in other states with a significant rural population, how open will the APM experiment—including ACOs, bundled payments, and value-based purchasing—be to including not only rural patients but also rural providers such as a CAH with swing beds or a nursing home, along with a medical base of one primary care physician and two nurse practitioners or physician assistants? Can some of these high-value models be inclusive of rural health? As a North Dakota health expert stated, “Our missions are changing in rural hospitals to be leaders for better population health and prevention, no longer just a hospital for acute care but now a real health center for the entire community. But our [hospital] boards need to be willing to change.”⁶⁵

Health Reform in North Dakota

System change has found its way to North Dakota. Since the *Third Biennial Report*, there has been a significant level of activity that involves not only how we deliver and pay for healthcare but also how we think about health, including a greater recognition of social determinants of health, population health, and our individual and societal role and responsibility. The Three Aims are taking root in North Dakota too. One statewide health expert recently said, “We are used to there being new rules for the game. In healthcare, we learn those new rules—could be a regulatory change, could be a new program, could be a new reimbursement stream—and we learn how to apply those new rules, to play by them. But now we are seeing in health reform that it isn’t that the rules have changed again, rather it is that the game has changed permanently.”⁶⁵ That is a rather profound observation and examination of a dynamic and possibly transformative change in the U.S. health and health delivery system. Others have remarked that what is being implemented today will evolve over time and be very different in five or 10 years. The previous statement that the ACO model may not prevail, but a continued focus on population health will continue, illustrates that point.

Regardless of the model invoked, there is profound change in North Dakota. North Dakota’s six tertiary hospitals, which are paid under the PPS, are participating in value-based

purchasing (pay-for-performance) and reduced readmission efforts. In addition, the ACO model is being applied not only in urban systems but in rural as well. BCBSND has offered a new alternative payment plan, and clinical settings are being prepared to adapt to the new physician-quality-based model MACRA. There is a great deal of adjustment, and while it is not necessarily pervasive in North Dakota, there is enough on the surface that a general sense of a directional change can be noted. We will look at the fledgling ACO experience first.

Five CAHs located in Bowman, Hazen, Park River, Rugby, and Watford City along with a community health center in Beulah and the UND Center for Family Medicine in Bismarck are participating in an ACO venture that is part of the National Rural Accountable Care Consortium, which has changed its name to Caravan Health. There are also some rural facilities in California that are part of this same ACO since geographical location, including being contiguous, is not a factor in forming an ACO. Called the High Sierra Rural ACO, it is meeting the covered lives threshold of 5,000. Caravan Health was developed in 2013 by a group of rural hospital administrators and rural physicians to develop and implement a redesigned rural model for better care and health, and one that could be economically viable within the context of a reduced-cost structure. It has grown rapidly from a network of six ACOs to one composed of 24 separate ACOs representing 159 rural systems (including 92 CAHs, 55 rural PPS hospitals, 168 RHCs, and 39 FQHCs). There are more than 6,000 providers serving more than 500,000 rural Medicare beneficiaries. Caravan Health accessed \$46 million in AIM funds (the rural-based ACO initiative, ACO Investment Model from CMSI) in 2015. The funds are used to assist the rural facilities in developing and adapting ACO operations, including care coordination training, data analytics, provider and facility collaboration, utilization management, and other core features. It is a Medicare Shared Savings one-sided model (no risk but if savings are gained, the rural facilities can share in those savings with Medicare). In addition, the ACO is developing a PTN via another ACA-supported effort (Transforming Clinical Practice Initiative). These were mentioned in the previous national overview. For the High Sierra Rural ACO, the PTN component (which is clinical) involves training and preparing the medical providers on quality and outcome measurement and techniques. This integrates providers in the community health center and the UND Center for Family Medicine into the ACO operation. A shared process that interconnects the ACO and the PTN within the same network shows the comprehensive nature—and the complexity—of this transformation. As a rural effort, some of the earlier expressed concern about the applicability of the ACO model is being tested. Can the model work in rural areas? When interviewed on his experience with the model, one North Dakota hospital CEO stated that “the attraction [to the ACO model] is the shift to quality and health outcomes, and linking the reimbursement to quality and outcome, the value over the volume. Attractive, too, are the resources provided [in getting started], data, and education from the AIM dollars with the National Rural [Accountable Care] Consortium. I believe we will see the ACO model to have the positive impact on better quality and lowered costs, reducing emergency department visits, reducing admissions to the hospital, and with better health to the patient.” Another North Dakota CAH CEO addressed the idea that structural change contributes to a culture change when he

commented, “I feel invigorated. We [hospitals] are the pariah of society because when things go bad [for people], the hospital does well [makes money], so this feels good. We are doing the right thing, which is my prime motivation.”

The AIM grant essentially is a trial run in developing an ACO, as it builds capacity and operates as a learning environment. There are four essential services provided by Caravan Health through the AIM grant to the CAHs. One is a data warehouse/analytic center. CAH CEOs have stated that data elements are essential to understanding their patients so as to better develop an appropriate care plan that improves their health and lowers costs. As one CEO said, “Robust data [on the patient] are available, like cost per member per month, who is high risk and high cost, who has had wellness checks, what services were provided. It gives me a comprehensive set of data that I never had before.”

Care coordination is a second service. The concept of care coordination is fundamental within an ACO model because it is the effort where real cost savings can accrue because of better engagement with the patient, monitoring and management of their conditions, and integration with other providers and specialists. Awareness of the social determinants of health (e.g., poverty, housing, transportation, and social contact) come into play in addressing better population health. Care coordination, integrated with an annual wellness visit and patient data analytics, drives improved patient management. Health experts and analysts have stressed the importance of the annual wellness visit. It is much more than a physical exam since it is a planning process for the patient. During these encounters, the provider can assess and code or recode the patient and the conditions. Patients who are not seen on an annual basis can result in the facility losing revenue. The care coordination and wellness visits obviously help the patient, but they also contribute to the facility's bottom line. As much as 75% of chronic diseases are not coded or miscoded every year, resulting in significant revenue loss. A consultant has commented that “high-cost patients [are] an opportunity to control costs,” which now leads to a better bottom line. The Sierra ACO nurses and others receive 27 hours in care coordination training, including patient coaching, motivational interviewing, the relationship of social determinants of health to patient/population health, and more. Following this, they are certified, which is part of the formal ACO process. A third service provided from Caravan Health is a 24-hour nurse advice hotline, which assists in addressing health needs of patients with comorbidities and high users of the health system. Workflow redesign is a fourth service and is essentially the umbrella concept for specific services like care coordination, using quality and utilization metrics, and annual wellness visits. This entails learning how as a health facility organization to better manage care for the patient and the facility.^{74, 75, 76}

A final note on the High Sierra Rural ACO, based on an insight from a financial consultant working with the ACO relates to the idea of the type of patient interaction and cost. Granted “volume to value” implies that frequent patient contact adds cost to the system. In reality, it is the type of contact that is important. In order to have better patient outcomes, there is a need for appropriate care services that are seen as investments in health status, are less costly to the system, and produce better outcomes and cost savings. The consultant summed it up in this manner: “We are seeing a lot more follow-up care. You do see more clinic visits, but that is good as ambulatory is cheaper than an inpatient

stay, readmission, or heavy [emergency department] use. So more clinic contact is good, with more contact leading to [a] better opportunity to monitor and manage the patients. Then you have better outcomes, which means an increase in revenue. Physician compensation needs to tie into wellness and incentivize the physician to do more wellness.”⁶⁵

A second Medicare Shared Savings ACO, directly involving rural providers, is operating in North Dakota through the CHI-St. Alexius Health System in Bismarck. The Primecare Select ACO involves the tertiary PPS and clinic system in Bismarck along with 10 North Dakota CAHs and their related clinics (that are part of the CHI-St. Alexius network), the Bismarck Cancer Center, the Bismarck Bone and Joint Center, Heart and Lung Clinic, and a CAH in South Dakota. The ACO has been operating for a year and has operational statistics. The High Sierra Rural ACO, under the AIM grant, is being developed or prepared to become an ACO over a three-year grant period, whereas the Primecare Select ACO is already operating as an ACO. The two are in different stages of development. Medicare has assigned 14,000 Medicare beneficiaries to the Primecare ACO. These beneficiaries are not all in Bismarck but would be beneficiaries who are treated by CHI-St. Alexius and the 10 North Dakota CAHs and one South Dakota CAH. As was previously stated, geographical location is immaterial for ACO operations. Under the Shared Savings model, the ACO must achieve 3% in savings in order for the ACO to “share” in the savings. For the first year, the Primecare Select ACO was able to produce and show a significant savings; however, it was below the “3% save.” The Primecare Select ACO had \$1.6 million in savings owing to increased efforts in care coordination, patient management, and readmission and emergency department interventions. However, the 3% save rate was set at \$2.5 million. If they would have met that, Medicare would have awarded \$1.25 million as a bonus to Primecare Select. This is a good example of how the restructuring can work to the benefit of the providers. Still, the ACO produced \$1.6 million in savings for the Medicare program, which is a significant start for the first year. As part of the ACO framework, Medicare determines per member/per month (PMPM) costs for a patient. One of the hurdles for North Dakota providers is that the economic efficiency attributed to North Dakota healthcare can be problematic. The PMPM for the Primecare Select ACO was \$8,200–\$8,500 in comparison with many other places with a \$16,000 or more PMPM. It has been stated that it is harder to show savings in North Dakota because the efficiency is already high enough; it is more difficult to identify ways to save resources.

For rural CAHs and providers, the Primecare Select ACO is offering assistance on care coordination, patient coaching, and data analytics. The focus is on the highest PMPM, as a means to improve the medical outcomes and lower the costs. Most of the cost savings experienced in Year One were associated with readmissions and emergency department changes. Emergency department visits are tracked, for example, and if a patient has three or more visits in a six-month period, that activates a higher level of care coordination, such as health coaching and patient encouragement. Primecare Select ACO contacts indicated that there are examples of anxiety, stress, housing, and transportation issues being a part of a patient’s life that activate more emergency department contact. That is part of a growing awareness on the part of providers as to how social determinants intervene and influence population health. There is now an incentive in the

health system for health providers to be more engaged on these matters. It was stated, “Why would we not intervene and help before a patient has a crisis? That is the real change in the system response. We are looking at prevention now, to help the patient before things worsen. It is a more humane way of healthcare, being proactive with them before and after a hospitalization. We put more emphasis on case management now. This saves money and [addresses] growing or worsening health problems for the patient. We have had it backward before. We need case management to be active and engaged in the clinic, community, senior centers, basically everywhere.”⁷⁷

Another ACO model was started in July 2016 by Altru Health System in Grand Forks, N.D., and Medica, a nonprofit health company operating health plans, a foundation, and research efforts. This will be referred to as the Altru-Medica ACO. It operates as a private ACO. Nationally, about 47% of all ACOs are private or non-Medicare. The ACO is marketed to businesses and groups. Altru and Medica operate through an integrated service model or network. It accepts all insurance plans, so employers could have insurance with one company but contract with the ACO for service delivery for their employees. The ACO would work to provide better coordination and care management for the employees. As was previously stated, the private-based ACOs appear more open to accepting some level of financial risk. Under the Altru-Medica ACO, risk is gradually phased in, with Altru being open to 15% risk in year one, 30% in year two, and 50% for year three and the following years. ACO contacts indicated that interest from the business community in northeastern North Dakota and northwestern Minnesota, the market area, has been high. The Altru-Medica ACO is “relying heavily on [data] analytics to look at the best outcomes for the patient and productivity for the facility.” They are using the ACO model to better understand care and quality metrics to provide better care and to improve health status. It was stated that the “view of the health business is changing as there is movement from a volume payment to outcome payment. You need to grow outside your market not through hospital inpatient services but other services like outreaching occupational therapy, physical therapy, and more. Hospital inpatient will continue to decline, but there is a need for revenue, so you have to find other non-inpatient services that benefit the patient, make their health better, and lower the overall cost.”⁷⁸ How the Altru-Medica ACO works to help the patient is emphasizing the workflow redesign. There is health coaching with a certified health and wellness coach to address nutrition, fitness, stress, sleep, and more; a weight management program; a bone and joint program, including joint replacement, cartilage restoration, concussion management, and more; the MyHealth online patient portal for medical records and communication; and online care options such as E-visits and telehealth for rural and urban patients. Medica is also offering a lifestyle education program.

Previously, the BCBSND MediQHome was discussed as a statewide platform that initiated data analytics for population health in North Dakota. It paved the way in many respects for where we are today. In July 2016, BCBSND unveiled its new Blue Alliance, which is another type of APM. Technically, it is not an ACO; however, it is an APM. BCBSND describes this effort as a process of transitioning to a value-based system, moving from a disease model (like the data in MediQHome) to a population-based model. All BCBSND beneficiaries can participate, but it is voluntary for the providers. This is not a

Medicare model; it is developed by BCBSND for its business and to benefit its subscribers. The model employs a care-management fee so providers can use funds to cover new services that are required in working with the patient base. This can cover care coordination and patient coaching. It is a data-driven process. BCBSND recognizes that providers are in different places with regard to their ability to adapt to system changes; thus Blue Alliance is offered at three levels with each level building on the previous level, and Level III providing the most risk (and potential benefit) to the provider. Level I focuses on prevention and patient satisfaction and does not include financial risk to the providers. It operates as a patient-centered medical home and includes a number of process measures that relate to how the patient experiences care, the type and number of services provided, and more. At this stage, it is not focused on the outcomes, because it is the introductory level and concentrates on doing and measuring the process steps. A care-management fee is provided. It concentrates on changing the nature of the provider-patient relationship by incorporating care coordination and data analytics to lower inpatient utilization, readmissions, and emergency department visits. Level II builds on Level I in that it operates as a patient-centered medical home, provides care management, and does not include risk. The difference is that it also incorporates shared savings. Each provider, such as a hospital, has its own target or share for a “save.” This is based on the history of the provider in terms of services and costs. Thus, if the provider meets its target, maybe a reduction in costs of 1%, it shares in that savings with BCBSND. Some funds are returned to the hospital. Level III is a risk model. No providers in North Dakota are at this stage as of 2016. This is Level I and Level II with the addition of risk sharing. Under this, the provider would not only have the opportunity to share in financial savings but would be held accountable if costs increase. The additional costs would be deducted in payments.⁷⁹

A final North Dakota example of health system transformation is found in the community health centers (CHCs) or FQHCs. North Dakota has five FQHCs with four being CHCs operating in 14 communities (11 rural and three urban). The five FQHCs are involved with a TCPI, are in a PTN, and involve CMS, so Medicare and Medicaid services and payments are impacted. These are clinic-based networks set up as learning networks designed to coach, mentor, and assist clinicians in developing core competencies specific to practice transformation. This includes clinician-patient communication, care coordination, use of the emergency medical record, patient information/data analytics, and more. The CHCs have been early adapters of quality metrics for integration into care planning and management. They have been using 16 quality metrics for a number of years so they have been poised to adjust to new systems. The CHC model has been steered more directly via public policy into adapting quality metrics than federally certified RHCs or CAHs. So the CHCs have more experience and built-in capacity to adapt to the APM climate. Coal Country Community Health Center in Beulah, which is part of the High Sierra Rural ACO, participates in a BCBSND value-based purchasing effort that rewards providers on a set of treatments (e.g., emergency department utilization, avoidable inpatient admissions, and readmissions). Coal Country and the neighboring Sakakawea Medical Center, a CAH in Hazen, are collaborating on improved transfers and in-home services.⁷⁵

References

1. Institute of Medicine. (2001). *Crossing the Quality Chasm: A New Health System for the 21st Century*. Retrieved from <https://www.nationalacademies.org/hmd/~media/Files/Report%20Files/2001/Crossing-the-Quality-Chasm/Quality%20Chasm%202001%20%20report%20brief.pdf>.
2. U.S. Department of Health and Human Services. (2016). *National Quality Strategy: Overview*. Retrieved on September 19, 2016 from <http://www.ahrq.gov/workingforquality/nqs/overview.htm>.
3. National Quality Forum, National Priorities Partnership. (2010). *Input to the Secretary of Health and Human Services on Priorities for the 2011 National Quality Strategy*. Retrieved on September 13, 2016, from <http://www.ahrq.gov/workingforquality/nqs/nqs2011annlrpt.htm>.
4. Institute for Healthcare Improvement. (2014). *A Primer on Defining the Triple Aim*. Retrieved on September 15, 2016, from http://www.ihc.org/communities/blogs/_layouts/ihc/community/blog/itemview.aspx?List=81ca4a47-4ccd-4e9e-89d9-14d88ec59e8d&ID=63.
5. The National Priorities Partnership. (2008). *Aligning Our Efforts to Transform America's Healthcare*. Retrieved from http://www.qualityforum.org/Setting_Priorities/NPP/Input_into_the_National_Quality_Strategy.aspx.
6. Institute of Medicine. (2012). *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*. Retrieved from <http://www.iom.edu/Reports/2012/Best-Care-at-Lower-Cost-The-Path-to-Continuously-Learning-Health-Care-in-America.aspx>.
7. National Academies of Sciences, Engineering, and Medicine. (2016). *The Private Sector as a Catalyst for Health Equity and a Vibrant Economy: Proceedings of a workshop*, 31-42.
8. U.S. Department of Health and Human Services. (2015). *AHRQ State Snapshots*. Retrieved from https://nhqrnet.ahrq.gov/inhqrdr/North%20Dakota/snapshot/summary/All_Measures/All_Topics.
9. The Commonwealth Fund. (2015). *Commonwealth Fund Scorecard on State Health System Performance*. Retrieved from http://www.commonwealthfund.org/~media/files/publications/fund-report/2015/dec/2015_scorecard_v5.pdf.
10. McCarthy, D., Radley, D., Hayes S. (2015). *Aiming Higher: Results from a Scorecard on State Health System Performance, 2015 Edition*. The Commonwealth Fund Retrieved on September 17, 2016, from <http://www.commonwealthfund.org/publications/fund-reports/2015/dec/aiming-higher-2015>.
11. Gibbens, B. (Personal communication, October 16, 2014.)
12. The American Health Quality Association. (2014). Retrieved on October 13, 2014 from <http://www.ahqa.org/find-your-qio/qio/north-dakota>.
13. Quality Health Associates of North Dakota. Retrieved on October 13, 2014 from <http://www.qualityhealthnd.org/>.
14. Center for Rural Health. (2014). Rural Hospital Flexibility Program, CAH Quality Network. Unpublished internal program information.

15. U.S. Department of Health and Human Services, Center for Medicare and Medicaid Services. Retrieved on October 11, 2016 from <https://www.medicare.gov/hospitalcompare/search.html>.
16. North Dakota Health Engagement Network. Retrieved on October 16, 2014, from https://www.ndhcri.org/Healthcare_Professionals/hospitalengagementnetworks/HEN.html.
17. ND Mission: Lifeline Transition to ND Cardiac System of Care. Retrieved on October 17, 2016, from <https://www.yourethecure.org/nd-mission-lifeline-transition-to-nd-cardiac-system-of-care>.
18. Blue Cross Blue Shield of North Dakota. (2014). North Dakota Legislature, Interim Health Care Reform Review Committee. (2014, March 19). (E. Fisher, MD).
19. North Dakota Department of Human Services. (2014). Interim Health Reform Review Committee. (2014, March 19). (Testimony of Julie Schwab, Director of Medical Services).
20. Centers for Medicare and Medicaid Services. (2014). Keeping America Healthy. Retrieved on October 13, 2014, from <http://www.medicaid.gov/medicaid-chip-program-information/by-topics/childrens-health-insurance-program-chip/childrens-health-insurance-program-chip.html>.
21. Georgetown University Health Policy Institute. (2014). *Center for Children and Families, Medicaid and CHIP Enrollment*. Retrieved on October 18, 2014, from <http://ccf.georgetown.edu/medicaid-facts-statistics/medicaid-chip-enrollment/>.
22. Kaiser Family Foundation. (2016). *Monthly Child Enrollment in Medicaid and CHIP*. Retrieved on September 29, 2016, from <http://kff.org/other/state-indicator/total-medicaid-and-chip-child-enrollment/?currentTimeframe>.
23. National Academy for State Health Policy. (2014). *North Dakota 2014 CHIP Fact Sheet*. Retrieved on September 29, 2016, from <http://www.nashp.org/north-dakota-2014-chip-fact-sheet/>.
24. Georgetown University Health Policy Institute, Center for Children and Families. (2015). *The Bump in Federal CHIP Funding: A Chance to Invest Freed-Up State Funds in Kids*. Retrieved on September 29, 2016, from <http://ccf.georgetown.edu/medicaid-facts-statistics/medicaid-chip-enrollment>.
25. North Dakota State Plan to Prevent and Manage Chronic Disease 2012–2017, Annual Progress Report. (2014, February).
26. North Dakota Department of Health Community Health Section, Division of Chronic Disease. (2016). *Chronic Disease Fact Sheet*. Retrieved on October 11, 2016, from <https://www.ndhealth.gov/ChronicDisease/ChronicDiseaseDivisionFactSheet.pdf>.
27. Blue Cross Blue Shield of North Dakota. (2014). *Worksite Wellness Program*. Retrieved on October 19, 2014, from <http://www.ndworksitewellness.org/>.
28. Blue Cross Blue Shield of North Dakota. (2016). *7th Annual Worksite Wellness Summit*. Retrieved from <https://www.eventbrite.com/e/7th-annual-worksite-wellness-summit-registration-26882065983> on September 30, 2016.
29. Blue Cross Blue Shield of North Dakota. (2014). *Blue Distinction Centers of Excellence*. Retrieved on October 19, 2014, from <https://www.bcbsnd.com/web/providers/blue-distinction>.
30. Kaiser Family Foundation. (2011). *Health Care Spending in the United States & Selected OECD Countries. Monthly Child Enrollment in Medicaid and CHIP*. Retrieved on October 08, 2016, from <http://kff.org/health-costs/issue-brief/snapshots-health-care-spending-in-the-united-states-selected-oecd-countries/>.
31. United States Department of Labor, Bureau of Labor Statistics. (2009). *Spotlight on Statistics, Health Care*. Retrieved on October 1, 2016, from http://www.bls.gov/spotlight/2009/health_care/.
32. Gallup. (2016). *U.S. Uninsured Rate at 11.0%, Lowest in Eight-Year Trend*. Retrieved on October 1, 2016, from <http://www.gallup.com/poll/190484/uninsured-rate-lowest-eight-year-trend.aspx>.
33. The Commonwealth Fund. (2011). *Issues in International Health Policy, The U.S. Health System in Perspective: A Comparison of Twelve Industrialized Nations*. Retrieved on October 8, 2016, from http://www.commonwealthfund.org/~media/Files/Publications/Issue%20Brief/2011/Jul/1532_Squires_US_hlt_sys_comparison_12_nations_intl_brief_v2.pdf.
34. Mukau, L. (2009). American Health Care in Crisis: Fundamentals of Health Care Reform. *American Journal of Clinical Medicine*, 6 (4). Retrieved from <http://www.aapsus.org/articles/38.pdf>.
35. Henry J. Kaiser Foundation. (2016). *Marketplace Enrollees by Financial Assistance Status*. Retrieved on October 14, 2014, from <http://kff.org/health-reform/state-indicator/marketplace-enrollment-as-a-share-of-the-potential-marketplace-population-2015/>.
36. National Center for Health Statistics, National Health Interview Survey Early Release Program. (2016). *Health Insurance Coverage: Early Release of Estimates from the National Health Interview Survey, January–March 2016*.
37. Obama Care Facts Dispelling the Myths. (2014). Retrieved on October 19, 2014, from <http://obamacarefacts.com/obamacare-subsidies.php>.
38. Kaiser Family Foundation (2016). *The Coverage Gap: Uninsured Poor Adults in States that Do Not Expand Medicaid – An Update*. Retrieved on September 19, 2016, from <http://kff.org/health-reform/issue-brief/the-coverage-gap-uninsured-poor-adults-in-states-that-do-not-expand-medicaid-an-update>.
39. Barry-Jester, A., Casselman, B. (2015). *33 Million Americans Still Don't Have Health Insurance*. Retrieved on September 19, 2016, from <http://fivethirtyeight.com/features/33-million-americans-still-dont-have-health-insurance/>.

40. Dranove, D., Garthwaite, C., Ody, C. (2016). Uncompensated Care Decreased at Hospitals in Medicaid Expansion States but Not at Hospitals in Nonexpansion States. *Health Affairs*, 35 (8): 1471-1479. Retrieved from <http://content.healthaffairs.org/content/35/8/1471.full>.
41. Daly, R. (2016). *Hospital Uncompensated Care Drops in 2014*. [web log post] Retrieved from <https://www.hfma.org/Content.aspx?id=46104>.
42. Reiter, K., Noles, M., Pink, G. (2015). Uncompensated Care Burden May Mean Financial Vulnerability for Rural Hospitals in States That Did Not Expand Medicaid. *Health Affairs*, 34 (10): 1721-1729. Retrieved from <http://content.healthaffairs.org/content/34/10/1721.full>.
43. Henry J. Kaiser Foundation. (2016). *Marketplace Enrollment as a Share of the Potential Marketplace Population*. Retrieved on August 17, 2016, from <http://kff.org/other/state-indicator/marketplace-enrollees-by-financial-assistance-status/>.
44. Norris, L. (2016). *North Dakota Health Insurance Marketplace: Most enrollees will see a slight rate decrease in 2017*. Retrieved on September 20, 2016, from https://www.healthinsurance.org/north_dakota-state-health-insurance-exchange/.
45. Waloch, S., Anderson, M. (Testimony). (2016). *North Dakota Department of Human Services, Health Care Reform Review Committee* [pdf]. Retrieved from Presentation Notes Online: www.nd.gov/dhs/info/testimony/2015-2016-interim/healthcare-reform/2016-5-18-medicare-expansion-update.pdf.
46. Kiernan, J. (2016) *2016's State Uninsured Rates*. Retrieved on October 12, 2016, from <https://wallethub.com/edu/uninsured-rates-by-state/4800/>.
47. Skopec, L., Holahan, J., and Solleveld, P. (2016). *Changes in Coverage by State and in Selected Metropolitan Areas*. Retrieved on September 29, 2016, from http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2016/rwjf431339.
48. Gibbens, B. (Personal communication, August 14, 2016.)
49. North Dakota Navigator Project, Healthcare Marketplace. (2016). *Avoid a Tax Penalty*. Retrieved on September 21, 2016, from <http://www.ndcpd.org/navigator/penalty.html>.
50. Henry J. Kaiser Foundation. (2014). *Explaining Health Care Reform: Questions About Health Insurance Subsidies*. Retrieved on August 17, 2016, from <http://kff.org/health-reform/issue-brief/explaining-health-care-reform-questions-about-health/>.
51. North Dakota Navigator Project. North Dakota Legislature, Interim Health Care Reform Review Committee. (2014, July 23). (Testimony of Neil Sharpe).
52. Henry J. Kaiser Foundation. (2014). *Health Insurance Coverage of the Total Population*. Retrieved on August 17, 2016, from <http://kff.org/other/state-indicator/total-population/>.
53. Community Healthcare Association of the Dakotas. North Dakota Legislature, Interim Health Care Reform Review Committee. (2014, July 23). (Testimony of Dana Schaar Jahner).
54. U.S. Department of Health and Human Services. (2015) *5 Years Later: How the Affordable Care Act is Working for North Dakota*. Retrieved August 17, 2016, from <http://www.hhs.gov/healthcare/facts-and-features/state-by-state/how-aca-is-working-for-north-dakota/index.html>.
55. U.S. Department of Health and Human Services. (2014). *At Risk: Pre-existing Conditions Could Affect 1 in 2 Americans*. Retrieved on October 15, 2014, from <http://aspe.hhs.gov/health/reports/2012/pre-existing>.
56. Schramm, J. (2010). *Pre-Existing Condition Coverage Will Affect North Dakota*. Minot Daily News.
57. Quality Health Associates of North Dakota. (2013). North Dakota Legislative Management Health Care Reform Review Committee. (2013, July 9).
58. Mercado, D. (2016). *Expect your health insurance costs to rise in 2017*. CNBC Personal Finance. Retrieved from <http://www.cnbc.com/2016/08/11/expect-your-health-insurance-costs-to-rise-in-2017.html>.
59. Barr, L. *Pathway to Sustainability* (Webinar). National Rural Accountable Care Consortium. Retrieved on October 10, 2016, from <http://www.nationalruralaco.com/presentations.shtml>.
60. U.S. Department of Health and Human Services. (2016). *HHS reaches goal of trying 30 percent of Medicare payments to quality ahead of schedule*. Retrieved on October 10, 2016, from <http://www.hhs.gov/about/news/2016/03/03/hhs-reaches-goal-tying-30-percent-medicare-payments-quality-ahead-schedule.html>.
61. U.S. Department of Health and Human Services. (2015). *Progress Towards Achieving Better Care, Smarter Spending, Healthier People*. Retrieved on October 10, 2016, from <http://www.hhs.gov/blog/2015/01/26/progress-towards-better-care-smarter-spending-healthier-people.html>.
62. Department of Health and Human Services, Centers for Medicare and Medicaid Services. (2015) *Better Care, Smarter Spending, Healthier People: Improving Our Health Care Delivery System*. Retrieved on October 8, 2016, from <https://www.cms.gov/Newsroom/MediaReleaseDatabase/Fact-sheets/2015-Fact-sheets-items/2015-01-26.html>.
63. Kaiser Health News. (2016). *Medicare's Readmission Penalties Hit New High*. Retrieved on October 8, 2016, from <http://khn.org/news/more-than-half-of-hospitals-to-be-penalized-for-excess-readmissions/>.
64. Health Affairs, Health Policy Brief. (2015), *Bundled, Payments for Care Improvement Initiative. The Center for Medicare and Medicaid Services is Testing How to Pay Providers for Episodes of Care Instead of for Individual Services*. Retrieved at http://healthaffairs.org/healthpolicybriefs/brief_pdfs/healthpolicybrief_148.pdf.
65. Gibbens, B. (Personal communication, October 4, 2016.)
66. Robert Graham Center. (2007). *The Patient Centered Medical Home: History, Seven Core Features, Evidence and Transformational Change*. Retrieved on October 9, 2016, from <http://www.aoa.org/documents/advocacy/Patient-Centered-Medical-Home-History.pdf>.

67. Friedberg, M., Schneider, E., Rosenthal, M., et al. (2014). Association Between Participation in a Multipayer Medical Home Intervention and Changes in Quality, Utilization, and Costs of Care. *JAMA*, 311 (8): 815-825. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24570245>.
68. Faster Cures. (2015). *A Closer Look at Alternative Payment Models*. Retrieved on October 9, 2016 from <http://www.fastercures.org/assets/Uploads/PDF/VC-Brief-AlternativePaymentModels.pdf>.
69. U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services. (2016). *Shared Savings Program*. Retrieved on October 9, 2016, from <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/index.html>.
70. Milliman Healthcare Reform Briefing Paper. (2012). *The Medicare Shared Savings Program and the Pioneer Accountable Care Organizations*. Retrieved on October 10, 2016, from <http://us.milliman.com/uploadedFiles/insight/healthreform/medicare-shared-savings-program.pdf>.
71. U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services. (2016). *Next Generation ACO Model*. Retrieved on October 9, 2016, from <https://innovation.cms.gov/initiatives/Next-Generation-ACO-Model>.
72. Accountable Care Learning Collaborative, Policy Brief. (2016). *CMS Announces 2016 ACOs*. Retrieved on October 9, 2016, from <http://www.accountablecarelc.org/sites/default/files/CMS%20Announces%202016%20ACOs%20Brief.pdf>.
73. U.S. Department of Health and Human Services. (2016). *New Hospitals and Health Care Providers Join Successful, Cutting-Edge Federal Initiative That Cuts Costs and Puts Patients at the Center of Their Care*. Retrieved on October 9, 2016, from <http://www.hhs.gov/about/news/2016/01/11/new-hospitals-and-health-care-providers-join-successful-cutting-edge-federal-initiative.html#>.
74. Gibbens, B. (Personal communication, August 15, 2016.)
75. Gibbens, B. (Personal communication, August 26, 2016.)
76. Gibbens, B. (Personal communication, September 13, 2016.)
77. Gibbens, B. (Personal Communication, September 6, 2016.)
78. Gibbens, B. (Personal Communication September 20, 2016.)
79. Gibbens, B. (Personal communication, September 8, 2016.)

CHAPTER EIGHT:

Conclusion

Using updated employment and demographic datasets and incorporating the results of several recent comprehensive statewide cross-sectional healthcare workforce studies, this *Fourth Biennial Report: Health Issues for the State of North Dakota 2017* concludes with a similar takeaway bottom line message as the *First, Second, and Third Biennial Reports* did—that continued implementation of the Healthcare Workforce Initiative (HWI) is having and increasingly will have a significant positive effect on helping to narrow the gap between the demand for and the supply of finite healthcare resources. Furthermore, absent full implementation of the HWI, North Dakota likely will face a major gap between the societal demands for healthcare and the capacity of the healthcare system to deliver that care.

As Chapter 2 demonstrates, the general level of health in North Dakota is reasonably good, and for eight of 10 general health measures (including metrics like cholesterol level and the frequency of high blood pressure, diabetes, and colon cancer screening), North Dakota fares better than the rest of the country on average. However, a disturbing finding that merits further study is that the age-adjusted mortality rate for North Dakotans has exceeded the national average for the past 15 years, and although the gap in mortality has begun to narrow, it is more the result of increasing national mortality rates than decreasing state-level deaths.

As was found in the three previous *Biennial Reports* that were released in 2011, 2013, and 2015, rural depopulation, out-migration of the young from the state, an increasingly older adult population, low population density, and recent localized population growth in the major cities and in the Oil Patch are exacerbating the imbalance between a rising demand for healthcare and the available supply of providers. The imbalance between supply and need for healthcare resources is both quantitative (to a relatively minor degree) and distributional (to a major degree), in that while North Dakota is short of specific providers, the healthcare providers we have are distributed disproportionately in the metropolitan areas in excess of what population demands would otherwise require. Some of the apparent maldistribution is entirely appropriate, since it is desirable to have specialists regionalized in more urban areas to maximize the efficient delivery of healthcare services.

However, since even family physicians—the bulwark providers of care in rural areas—are disproportionately found in metropolitan areas, it is clear that major challenges remain in recruiting and retaining needed providers in more remote areas. Importantly, family physicians constitute the physician group whose geographic distribution is the most optimal compared with all other physician provider groups. A similar pattern of more providers relative to the population in urban compared with rural regions is found for nonphysicians as well. Advanced-practice providers like physician assistants and nurse practitioners also are disproportionately distributed in the metropolitan areas of North Dakota, although physician assistants show the least maldistribution of any healthcare provider group.

The *First Biennial Report* concluded that North Dakota had a paradox regarding its healthcare workforce, which it characterized as shortages in the midst of plenty. The size of the physician workforce in North Dakota in 2011 was found to be at or better than national norms for many specialties, but with maldistribution of providers resulting in shortages especially in micropolitan and rural areas. As was emphasized in subsequent

Biennial Reports and confirmed in the current *Fourth Biennial Report*, North Dakota may have slipped as to the size of its physician workforce relative to the population and lags the rest of the United States in the number of physicians relative to its population. Thus, the baseline shortage of 50 physicians estimated in the *First Biennial Report* likely has grown to somewhere between 100 and 200 physicians currently. One important reason for the increase in the shortfall has been the significant population growth in western North Dakota and the urban areas that occurred not long ago as a consequence of the development in the Oil Patch.

As we found in the three prior *Biennial Reports*, the current shortage of physicians is only going to increase as the population grows and ages in the future if there is not continued implementation of the HWI. And the shortage of workers in the healthcare field over the next 15 years will not be limited to physicians. An entire cadre of additional healthcare providers—from nurses to physician assistants to occupational and physical therapists to medical laboratory specialists and others—will be needed to ensure that effective, efficient, and appropriate healthcare is available to all North Dakotans, as is envisioned in the HWI.

The population projection model used in the *First Biennial Report* was predicated on an assumption of modest population growth based on forward trending of historical patterns, and a major influence from the aging of our current population. In our *First Biennial Report*, we underweighted (relative to national projections) the effect of population growth, since we assumed (as others did at the time) that the stable-growth model would continue to apply in the future. As discussed in detail in Chapter 1, the stable-growth model that we utilized predicted a population increase to only 796,000 people by 2040, which is a slower growth rate than the country as a whole (note that the population of North Dakota was estimated to be about 757,000 people in 2015, which would imply a growth rate of only 0.2% per year over the 25 years from 2015 to 2040). The workforce projections that we utilized in the initial report were based on that stable- (and slow) growth model. Any significant population growth in excess of that previously projected will necessitate even larger growth in the health workforce than previously anticipated.

We were intentionally conservative in estimating physician needs in our *First Biennial Report*—in retrospect, probably too conservative. We adapted and applied national workforce predictions to North Dakota, but intentionally adjusted the calculations downward so as to not overestimate healthcare workforce needs. The national workforce modeling calculations anticipate that future workforce needs are driven primarily by population growth (about two-thirds of the effect in the model) and less so by the aging of the population (about one-third of the effect). Since North Dakota has a disproportionately large older adult population (more than the national average), we overweighted the effect of aging in our modeling of healthcare workforce needs for the state at the same time that we underweighted the effect of population growth. Thus, we used a model that applied national estimates to the North Dakota population, and then we reduced the predicted shortage by 50% to account for lower anticipated population growth. The *First Biennial Report* estimated that the physician shortage by 2025 would be 210 physicians—50 short as of the 2011 baseline, and 160 more needed by 2025, for a total shortage of at least 210 by 2025.

Utilizing updated census data and population growth modeling, the *Second Biennial Report* found that the shortage in 2013 likely had grown to between 100 and 200 physicians (not to mention other healthcare workers). Thus, using our old estimates of future population growth, the revised estimate provided in the *Second Biennial Report* was that 260 to 360 more physicians will be needed by 2025 (i.e., 100 to 200 needed immediately plus 160 needed by 2025).

The *Third Biennial Report*, issued in the midst of the oil boom, concluded that 500 additional physicians likely was a conservative estimate of the number of additional physicians needed in North Dakota by 2025 if the population continued to grow as rapidly as it did at the peak of the boom. The number did not include the need for replacement of physicians who retire, leave the state, or cease practicing medicine for other reasons. As discussed in Chapter 3 of this current *Report*, the age at which North Dakota's physicians retire will have a significant effect on future healthcare workforce size and the extent of the physician shortage. Delaying or accelerating retirement age by only two years, for example, can have almost a 10% effect on future workforce size.

All three prior *Biennial Reports* concluded with a strong endorsement of the HWI, a multifaceted plan to address the healthcare needs of North Dakota, and emphasized necessary steps to reduce disease burden, increase the healthcare workforce through enhanced retention of graduates as well as expansion of class sizes, and achieve a better-functioning healthcare delivery system through more cooperation and coordination.

In view of the realization that the state's workforce needs likely are larger than previously estimated, those recommendations are reinforced in this *Fourth Biennial Report* with added emphasis on the imperative to continue with full implementation of the Healthcare Workforce Initiative. It is important that the three major stakeholder groups involved in the HWI—the North Dakota Legislature that provides the funding; the UND SMHS that does the training and provides the programmatic support for the HWI; and the healthcare enterprise and local communities throughout the state that provide essential partnerships that are vital to the success of the HWI—continue to work together in a cohesive and effective manner to ensure the ultimate success of the HWI.

Full implementation of the HWI is threatened, however, by the budgetary constraints placed on the UND School of Medicine and Health Sciences (SMHS) during the 2015–2017 biennium and planned for the 2017–2019 biennium. Effectively about a 10% cut, the budgetary constraints have forced a delay in the implementation of 19 planned and approved residency slots (post-MD degree training); if the required funding is not restored by the 65th Legislative Assembly, the residency slots will not be able to be funded through the HWI, and this will exacerbate the future shortage of physicians in the state (especially in rural regions).

A second major conclusion of this *Fourth Biennial Report* is that further attention and planning (by the healthcare enterprise as a whole, the North Dakota Legislature, the UND School of Medicine and Health Sciences, and other stakeholders) are needed to address two particularly pressing and challenging healthcare delivery needs in North Dakota:

- A pressing need to address a variety of mental and behavioral health issues throughout the state, but especially in the more rural regions. It is presumed that

further action, at least by the Legislature, will be based on the recently completed *Behavioral Health Planning Final Report* and its 51 suggested strategies for addressing the state's mental and behavioral health challenges (the Schulte Report, as it is known, was authorized and subsequently commissioned by the North Dakota Legislature).

- Increased attention to oral and dental health issues (especially in the more rural regions of the state), presumably centered on the five core action items contained in a report prepared in 2014 by the UND SMHS Center for Rural Health with support from the Pew Charitable Trust. Those recommendations consisted of the following:
 - o Increase funding and reach of safety-net clinics to include providing services in western North Dakota.
 - o Increase funding and reach of the Seal! North Dakota Dental Sealant Program to include using dental hygienists to provide care, and incorporate case management and identification of a dental home.
 - o Expand the scope of dental hygienists and use them at the top of their current scope of practice to provide community-based preventive and restorative services, and provide education to populations of high need.
 - o Create a system to promote the dentistry profession among state residents and encourage the practice in North Dakota through a consolidated loan repayment program and partnership, and look for student spots at schools of dentistry.
- Increase Medicaid reimbursement.

CHAPTER NINE:

Healthcare Workforce Development

All three prior editions of the *Biennial Report* have considered healthcare workforce issues in considerable detail. The third edition in 2015 reassessed the various options available to increase the in-state healthcare workforce: recruit from outside the state, increase the number of trainees, and retain more graduates for practice within North Dakota. It concluded that the best plan for the state's healthcare workforce development would be an approach that combined increasing the number of graduates and increasing the retention of practitioners. Those two concepts became two of the four important building blocks (along with reducing disease burden and improving the efficiency of our healthcare delivery system) of the Healthcare Workforce Initiative (HWI) that subsequently was proposed by the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) Advisory Council, endorsed by the North Dakota State Board of Higher Education, and approved and funded by the 62nd, 63rd and 64th Legislative Assemblies. Most of the components of the HWI have been implemented by UND under the oversight of its Advisory Council. For example, medical and health sciences class sizes have been expanded to the desired and approved levels on schedule. However, the notable outlier at present is that the residency slot expansion (a residency is post-MD degree graduate medical training required of all physicians before they can get a full license to practice medicine) envisioned under the approved HWI plan has been truncated owing to budget challenges in the interim following the 64th Legislative Assembly; both the approved new family medicine and geriatrics residencies to be based in Fargo have been put on hold by the Advisory Council because of the funding shortfall.

The residency expansion issue notwithstanding, one important aspect of any plan such as the HWI that relies on educational programs to balance the supply of healthcare professionals with the need for their services is that it necessarily requires a relatively long lead time to achieve its goal, since the training of additional physicians, for example, takes a minimum of seven (and often more) years from the time a student enters medical school until that doctor is ready to see patients in the community.

Since the HWI plan that has been implemented utilizes a variety of approaches both to increase retention and expand class sizes, it might be useful to review the rationale for those approaches and to reevaluate why recruitment of healthcare professionals from outside the state is believed to be an inferior option.

RECRUIT FROM OUTSIDE NORTH DAKOTA

One approach to meeting workforce needs is to recruit physicians and other healthcare professionals from training programs or employed positions outside of North Dakota. Indeed, this approach has always played a role in filling the state's workforce complement, and it likely will continue to play an ongoing (albeit more limited) role as full implementation of the HWI occurs. Even if the current healthcare workforce were adequate, however, there would be an ongoing need to replace a portion of current healthcare providers resulting from normal and expected turnover in the workforce (from retirement, death, relocation, or change in job status), which for physicians typically is at least 5% per year. For North Dakota, this means that at least 88 new physicians are needed annually—whether locally produced or recruited externally—just to maintain physician workforce levels.

Recruitment may come from physicians located in other states or other countries. Particularly important for filling a gap in rural primary care needs has been the recruitment of international medical graduates (IMGs).¹ Currently, about 1 in 4 physicians practicing in North Dakota are IMGs.¹ Some but not all analyses have suggested that proportionally more IMGs than U.S. medical graduates (USMGs) practice in underserved settings. Recent studies have indicated that graduates in general are trending away from practice in rural underserved areas. A state comparison of the percentages of generalist IMGs and USMGs shows that North Dakota has significantly fewer IMG physicians in metropolitan areas, relatively more IMGs in micropolitan areas, and significantly more IMGs in rural areas.¹

IMGs have filled an important and essential role in providing primary care to North Dakota rural communities for many years. However, relying on an increased effort to recruit additional IMGs to meet current and future needs is likely to be difficult for several reasons. First, there is no reason to assume that the national trend for IMGs will be dissimilar to USMGs, whose career choices typically do not gravitate toward primary care and especially rural primary care practice (physicians who graduate from the UND SMHS tend to buck the national trend; our graduates are much more likely to go into family medicine (99th percentile), primary care (98th percentile), or practice in a rural area (97th percentile) than graduates of all other medical schools).²

Rules regarding J-1 visa waivers may change and have an effect (positive or negative) on the availability of IMGs. IMGs often come from developing nations, and there is a continuing debate over the effect of retaining IMGs for service in the United States rather than encouraging service to their own countries of origin.¹ The question has been posed whether it is proper and ethical to encourage a “brain drain” whereby the best and brightest physicians from developing countries come to the United States rather than remain home and help to provide for even more pressing medical needs there?

It is important to note that when North Dakota communities recruit for professional talent from outside the state, they compete on the world market. Intense competition for scarce human resources often requires that healthcare facilities offer premium compensation to attract workers, which in turn raises costs to North Dakota patients. This is particularly true in the most rural of our communities, where the work is demanding and professionals have access to fewer support mechanisms than they could find in larger communities. Cost considerations aside, in order to meet additional future shortages through external recruitment, North Dakota would have to recruit more successfully against other competitors than it does at present.

There are additional factors that bear consideration. Anecdotal data suggest that the turnover rate of physicians recruited from out of state is about double that of locally produced physicians. Given the substantial expense of physician recruitment that has been estimated at \$250,000 or more per physician, the need to recruit twice as often does and will add considerable financial pressure to the already constrained financial resources of hospitals operating on slim operating margins (especially the critical access hospitals in rural North Dakota). Additionally, it takes additional time for nonresident physicians to acculturate to the North Dakota experience, and the longer this process takes, the more likely there will be turnover of the position.

INCREASE THE NUMBER OF HEALTHCARE PROFESSIONALS TRAINED IN NORTH DAKOTA

A second strategy (one that is a benchmark of the HWI) is to grow our own physicians and other healthcare professionals by increasing the number of health professionals trained in the state. As noted above, this approach has a built-in time lag of a minimum of seven years for physicians to complete education and training, and a somewhat shorter time frame for other healthcare professionals.³ However, the educational process itself does not necessarily guarantee a specific number or type of physicians or healthcare professionals to meet the healthcare needs of rural North Dakota communities, since a trainee's choice of career pathway ultimately is a matter of personal choice that can be influenced but not dictated.

What are the Needs of North Dakota?

To understand the need, we first must review the current status of the healthcare workforce in North Dakota in comparison to the national situation. In North Dakota, the current number of active patient-care physicians is 1,759 or 238 per 100,000 population. This compares with the U.S. average (median) of 251. The current number of active patient-care physicians in North Dakota in primary care is 666 or 90 per 100,000 population (which is identical to the U.S. rate).⁴ While these data suggest that North Dakota is doing reasonably well, the United States currently is experiencing an aging healthcare workforce with a geographic maldistribution that is not adequately meeting the current needs of many communities, especially rural. This is especially true for North Dakota. Rural communities have too small a population to support specialists, and they rely on primary care physicians and other providers to adequately and affordably meet healthcare needs. Nationally, one-third of all physicians are in primary care, while almost one-half of physicians in primary care (mostly family physicians) are in rural communities.⁴ Family physicians provide the broadest care to all segments of the population and are essential to addressing the healthcare needs of North Dakota's rural and remote communities. But rural communities have experienced a chronic shortage of primary care physicians for many decades.

The challenge for rural communities is to attract and retain healthcare professionals to areas where technology is less advanced, salaries may be less competitive, and geographic or other challenges exist (especially spousal ones). The current healthcare workforce is aging, and younger healthcare professionals typically seek more specialization and a better work-life balance. Healthcare delivery methods will need to change to address the increasing demand for management of chronic disease; care of the aging with increasing dementia; and the need to address significant population health issues such as obesity, physical inactivity, and cigarette smoking. This complex and challenging reality requires thoughtful strategies (such as the HWI) to ensure the right healthcare professionals with the right skills are available to keep our citizens and populations healthy.

National Recommendations for Increasing Health Professions Students

In June 2006, the Association of American Medical Colleges (AAMC) recommended a 30% increase in U.S. medical school enrollment and an expansion of graduate medical education (GME) positions to accommodate this growth.⁵ The AAMC has updated its workforce predictions and recommendations periodically. Its most recent analysis in 2016 found that the recommended 30% increase in medical school slots had been achieved, and thus the AAMC moderated its projection of future workforce shortages accordingly.⁶ Nevertheless, the AAMC still is predicting a shortage of between 61,700 and 94,700 physicians by 2025, with primary care practitioners and surgeons the specialties with the greatest predicted shortages. Because GME (residency training) is a requirement for licensure in the United States, the AAMC and others have emphasized that simply increasing the number of graduating medical students without ensuring a commensurate growth in the number of residency training positions will not eventuate in more physicians; there will be a bottleneck at the residency level. However, the number of federally sponsored GME positions has been frozen since 1997 by the Balanced Budget Act, and the growth of GME slots since then has been slow—less than half the rate of growth of medical student positions.

There has been much debate by experts regarding the AAMC recommendation for a 30% increase in the number of first-year medical school slots. Estimating the most effective response to address a current and future need can never be absolutely accurate, but this recommendation likely is a conservative estimate that takes into account many factors and variables. A 2008 report on the complexities of projecting physician supply and demand includes the following findings that support the prediction of increasing demand:³

- Aging of the population will drive demand for healthcare services sharply upward.
- The U.S. population is projected to grow by more than 50 million by 2025.
- Increased health coverage (including expanded insurance coverage as a consequence of the Affordable Care Act) will increase the demand for healthcare services.
- Increased clinical productivity (that is to say, more efficient healthcare delivery) is hard to accomplish because of the increasing complexity of care of current (and future) patients.
- Increasing the numbers and roles of physician assistants and nurse practitioners may help, but the full effect is difficult to predict.
- Effects of the healthcare workforce shortage will include longer wait times, increased travel distances, shorter visit times, expanded use of nonphysicians, higher prices, and possible reduced access to the healthcare system.
- Shortages are expected to continue to be especially problematic in poor, rural, and urban communities.⁷
- A 30% increase in the number of matriculated medical students and a commensurate increase in GME positions will only moderate but not eliminate the mismatch between the demand for and the supply of healthcare services.

North Dakota's Production of Medical Students

The UND SMHS is the only medical school in North Dakota. The number of students enrolled in medical school in the years 2014–2015 was 279 or 37.7 per 100,000 population. This ranks nationally as 18th out of the 50 states.⁴ For the freshman medical student class of 2020, 89% of the seats (not including the seven seats committed to the federally funded Indians Into Medicine Program) were occupied by students from North Dakota or Minnesota (with ties to North Dakota). North Dakota had 133 residents in training, which ranked at 44th out of 50 states, but had 86 primary care residents, ranking 21st out of 50.⁴ Compared with the national benchmark, it is evident that the UND SMHS is doing an excellent job of educating North Dakota students in medicine. Compared with other states, North Dakota has more capacity for training residents and, with the state-supported expansion of residency training slots through the HWI, will be graduating more North Dakota-trained physicians in the coming years (although as noted previously, two approved new residency programs—family medicine and geriatrics, both to be based in Fargo—are on hold at present because of the current budget shortfall and attendant allotment process that has sharply reduced the funding available to support those residency programs).

The UND SMHS consistently has ranked in the top five schools in the country for the percentage of students choosing a family medicine residency program; in the past several years, it has ranked No. 1. In a recent study of medical schools that looked at social mission based on producing primary care physicians, physicians who serve Health Professional Shortage Area (HPSA) communities, and educating students from underrepresented minorities, the UND SMHS ranked in the top 20% of schools.⁸ The School has done very well in producing primary care physicians (98th percentile) and educating students from underrepresented minorities. The diversity of its students is primarily a result of its nationally recognized Indians Into Medicine (INMED) Program that ranks first in the United States in graduating students from federally recognized tribes.

One result of the general countrywide decline in medical student interest in primary care residencies has been the increased number of international medical school graduates (IMGs) in these residency programs.^{9,10} In North Dakota, the number and percentage of residents who are IMGs is 64 and 48.1%, which ranks 10th out of 50 states. While IMGs are more likely to choose primary care and to practice in HPSAs, they are somewhat less likely to stay in practice in rural or underserved areas than U.S. graduates.⁷ As IMGs become settled in the United States, they tend to move away from their initial practice site. One longitudinal comparison of U.S. medical graduates with IMGs showed that almost 90% of U.S. graduates were practicing in urban settings in the United States.⁹

Factors Affecting the Selection of Primary Care and Rural Practice

Rural communities in North Dakota will continue to need high-quality physicians and, in particular, primary care physicians and other healthcare professionals who can provide primary care. There are many personal and experiential factors that affect an individual's decision to choose a specialty and to select a practice site. But the two enduring factors that best predict a student's residency choice (and eventual practice) have been found repeatedly to be the "fit" of the particular specialty with the

interests of the student and the right work-life balance associated with that specialty choice.

A 2009 report¹¹ from the Robert Graham Center suggests that two things are clear regarding primary care: there is a problem with sufficient access to primary care physicians in rural and impoverished areas, and current practice configurations or organizations will have great difficulty absorbing all currently uninsured patients if universal access to healthcare insurance coverage were to be achieved. For these reasons and others, it is especially important to understand the factors that influence the decision of medical students and residents in their choice of where to practice, and we need to consider providing further opportunities for support and encouragement in this decision.

What can be done to help ensure the right number of the right physicians? Studies have shown that medical students' choices of primary care or specialty careers beyond the considerations of specialty "fit" and work-life balance are influenced by the following:^{11–15}

- Student-related factors such as gender, race and ethnicity, socioeconomic status, rural or urban background, and attitudes and values.
- Exposure to required family medicine curriculum during the third or fourth year of medical school.
- Income differences between specialties.
- Institutional factors such as state funding, Title VII Health Professions Student Loan funding, and the strength of family medicine departments.

Each one of these items is important, but not a direct or certain predictor of career choice. Awareness of the personal factors helps to identify the potential influences on choices and may help in addressing these factors through the recruitment and admissions process. Educational experience throughout medical education and residency can be designed to assure quality experiences in primary care and at rural sites.

One systematic review of the literature has shown that medical students with experience in a rural setting are more likely to choose a career in primary care and are three times more likely to practice in a rural community compared to the national average.¹² The most successful outcomes for addressing the rural physician shortage have been the employment of comprehensive medical school rural programs.¹² There are six U.S. programs that met the criteria (developed by the authors of a recent article) that included the primary purpose of increasing the supply of rural physicians. These criteria are having a defined cohort of students, having a focused admissions process, and having a specific rural curriculum or an extended full-time required rural clinical curriculum. These programs are similar to the UND SMHS Rural Opportunities in Medical Education (ROME) Program. All of these programs increased the supply of rural physicians with an average of 53% to 64% of their graduates in practice in rural communities. This compares with the national rate of 3% for recent medical school graduates planning on rural practice or the 9% of physicians currently practicing in rural communities.^{13,14}

In 2000, a national survey reported predictors of generalist physicians' decisions to care for underserved populations (most rural areas are underserved), identifying four independent factors:¹⁴

- Identifying oneself as a member of an underserved ethnic or minority group.
- Growing up in a rural or inner-city area.

- Strong interest before medical school in practicing medicine in underserved areas.
- Participation in the National Health Service Corps.

Another survey done recently confirmed the factors of coming from a rural background and being a member of an underrepresented minority, and also included the factor of older age.¹⁵ Note that all of these factors are identifiable at the time of admission to medical school, and thus could be influenced by admission criteria. The SMHS has, over the past few years, modified its admission process to give further weight to rural origin, rural experience, and rural commitment as it considers student applicants to its medical school curriculum.

Why Does Primary Care Matter?

How important is it to have adequate numbers of primary care providers in our communities? Studies have shown that a greater supply of primary care physicians is associated with lower mortality from all causes, whereas a greater supply of specialty physicians is associated with higher mortality. States with higher ratios of primary care physicians to population had better health outcomes, including lower rates of death from heart disease, cancer or stroke; infant mortality; low birth weight; and self-reported poor health. This was even after controlling for sociodemographic measures that can be related to poorer health (such as age, education, income, and unemployment) and lifestyle factors (seat belt use, obesity, and smoking). This relationship of improved health with increased primary care also is demonstrated in international studies. In addition to health benefits, there are reductions in healthcare system costs and reductions in disparities across population subgroups.

What is it about primary care that results in these improved health outcomes? Six mechanisms are thought to account for the beneficial effect of primary care on population health:^{16, 17}

- Greater access to needed services.
- Better quality of care.
- Greater focus on prevention.
- Early management of health problems.
- Cumulative effect of the main primary care delivery characteristics.
- Role of primary care in managing and avoiding unnecessary and potentially harmful care.

The United States ranks behind other developed countries in health and healthcare system performance, partly because of a long decline in the interest in and vitality of primary care. The suggestion has been made that the United States should move toward having 50% of active patient-care clinicians (physicians, nurse practitioners, and physician assistants) in primary care practice.¹⁶ A recent comparison of health and healthcare systems in the United States and Canada demonstrates these differences. In the United States, there are 50% more specialists than primary care physicians, compared with 10% more specialists than primary care physicians in Canada. Costs have been approximately \$2,500 less per person per year in Canada than in the United States. Canada ranks significantly higher in most measures of health outcomes than the United States and has fewer social disparities in healthcare and health outcomes. This is attributed to specific healthcare system characteristics and the strong primary care infrastructure in Canada.¹⁸

Challenges to Addressing the Health Workforce Pipeline and Need for the Health Professions

Seeking and encouraging applicants from rural communities to apply to healthcare professions schools is an important part of any plan to improve healthcare workforce needs,¹⁹ as has been done at the UND SMHS. Some rural educational systems are not able to provide the strong science and math background necessary for success in medical school, and this challenge may increase as a result of recent economic challenges. Additional potential challenges for rural students include coming from a lower educational and socioeconomic status, having fewer role models in healthcare, experiencing less encouragement for attaining advanced degrees, less technology familiarity, and the need to travel to obtain a medical education. It is important to note, however, that studies have shown no significant academic performance differences between students from rural or urban backgrounds.

Increasing the Numbers of Health Professions Students and Residents

Recognizing the healthcare workforce needs in North Dakota and the nation, the UND SMHS, through the HWI, is implementing a process to increase the number of its healthcare professions students and residents by around 25%.

Ensuring an increase in the number of students interested in primary care and rural practice will require some additional operational changes. These will require ongoing revision of the School's admissions criteria, continued support of the RuralMed Program, curricular changes in the early years to assure the development of competency in primary care, and additional rural community sites and rural physicians for clinical training. Geriatric, population health, and public health programs have been added at the SMHS and will be a critical factor in this growth to support educating and attracting students interested in addressing the important healthcare needs of the state. These programs will enhance the experience of primary care for interested students and physicians while developing specific skills for the care of aging individuals and for addressing population health effectively.

Increasing the number of resident training slots in North Dakota is being undertaken specifically to attract the interest of our medical school graduates and to assure an effective workforce for North Dakota. Adding more students to our primary care programs with an option for further training in geriatrics, public health, management of chronic disease or mental health, and disease prevention and health promotion is a priority.

Conclusion

The decision to increase the number of healthcare professionals trained in North Dakota ("growing our own") to meet the current and future healthcare needs of the population is a critically important component of the HWI. There is a need for all physicians but particularly in the specialties of primary care and surgery. There is a corresponding need for other healthcare professionals to complement the work of physicians, and the numbers needed will require ongoing assessment. Successfully meeting those needs will result in improved population health status, help to control costs, and improve quality. While there is a significant time lag in "growing our own," the selection of students from rural North Dakota communities with a commitment to

rural practice will increase the likelihood of successful rural and primary care recruitment. The SMHS can best meet current and anticipated workforce needs by partnering with North Dakota Area Health Education Centers (AHECs) and others to address the resources and opportunities required to increase the number of North Dakota students interested in and prepared for a healthcare professions education. There are a wide variety of programs and activities in place across North Dakota to encourage students to pursue healthcare careers, and even more are planned (see Appendix). The UND SMHS has modified its admissions process to seek and select students with the qualities and experience that result more frequently in their selection of primary care training and rural practice. The UND SMHS has revised its medical student curriculum to ensure the development of primary care competencies and to increase the experience of students in longitudinal clinical care in rural communities. The UND SMHS has increased the number of resident slots in primary care and is offering additional training in the needed areas of geriatrics, public health, surgical skills, obstetrics, and mental health.

INCREASING THE RETENTION OF HEALTHCARE PROFESSIONALS

Successful recruiting of students and residents into primary care and rural practice is one step in addressing the workforce needs of North Dakota. An equally important step is to improve the retention of healthcare professionals who graduate from a North Dakota program for rural practices and communities within the state.¹⁹

Factors Affecting Retention

The first, and necessary, step in addressing the healthcare needs of rural North Dakotans is to recruit and retain physicians and other healthcare professionals to practice primary care in rural communities. If they don't stay and practice in those communities, we will not be effectively meeting the needs of those communities. Factors that affect students' specialty selection also may affect retention:²⁰

- Start-up grants or practice development subsidies.
- Tax credits for rural or underserved area practices.
- Providing substitute physicians (locum tenens support).
- Malpractice immunity for providing voluntary or free care.
- Payment bonuses or other incentives by Medicaid or other insurance carriers.
- Subsidies for the installation of effective electronic health records.

Very few studies have been done regarding retention of physicians in communities beyond the study of the effects on physicians of mandatory service for the National Health Service Corps or other obligations. In a recent study, it appears that recruiting and retention are distinct processes. Generally, the factors that influence recruitment are not directly related to retention. Physicians have reported over time that staying in practice in a rural community is affected by local poverty, social and professional isolation, a lack of amenities, and the hardship of rural practice—long hours, frequent on-call shifts, and lower income than in more urban settings.²⁰

Approaches to Improving Retention

Using repeated surveys, a study by Pathman and colleagues²⁰ compared the retention of physicians in rural HPSA communities with rural non-HPSA communities and found no significant difference between the two. The conclusion of this study confirms other studies that found that the principal factor affecting rural physician shortages is that too few physicians are recruited there in the first place, and not that there are more problems retaining those successfully recruited. There were two characteristics of the physicians who remained in rural practice longer—owning their practice and being on-call fewer than two times a week. Even though recruitment may be the primary factor, these issues affecting retention are more modifiable than many of the issues affecting recruitment. Suggestions to improve retention include the following:

- Promoting practice ownership through low-interest loans and start-up guarantees.
- Offering leadership opportunities.
- Providing a greater voice in clinic policies and work schedules.
- Reducing on-call frequency by coordinating cross-coverage.
- Providing telephone triage systems.
- Providing full-time physician staffing in local emergency rooms.

The Need to Study and Evaluate the Effectiveness of Programs

There continues to be a need to study and to better understand the factors or approaches that positively affect retaining quality physicians in a community. An international report that included an extensive review of the literature has shown that while most studies on retention are done on physicians, there is little information on financial incentives and there is a lack of coherence between the strategy to retain physicians and the factors that matter to healthcare workers in choosing and remaining in a location.²¹

Another international study addressed whether compulsory programs such as the National Health Service Corps are effective in retaining providers in rural or remote areas.²² The conclusion of the study was that no rigorous assessment has been done to compare the outcomes between workforce disparities in countries with compulsory service to those without compulsory service. Conclusions, in addition to further evaluation, are that for success in any compulsory program, good planning and transparency of the rationale and requirements are important. Also, successful retention depends on the support of the healthcare system and the benefits to the healthcare worker: pay, housing, continuing education, and clinical backup or supervision.

Continuing Professional Development

Communities can help retain good physicians and healthcare professionals by being aware of the challenges and needs for their continuing education and development. Two unique aspects of rural medical practice are the scope of practice and the distance from major urban centers with specialist services. Rural practice includes clinic, house calls, nursing home care, hospital admissions and care, emergency room care, obstetric care, general surgery, and anesthesia. Rural physicians perform a wider range of procedures than providers in more urban settings, play an important role in the initial management of trauma,

and have to provide care unique to location, such as wilderness or industrial areas, specific cultural groups, or agricultural medicine. The reality of rural practice attracts certain types of individuals interested in this breadth and variety. Continuing in this practice requires the confidence and skills that come from support and access to continuing professional development.²³ Learning new information or skills and spending time away with peers is essential to continuing a healthy and rewarding practice. One challenge is that rural physicians generally cannot leave their community for continuing education or professional development. Medical schools can be helpful in retention of rural physicians by creating programs for education and training that provide content that is needed by rural physicians, methods that are accessible through outreach to the community or distance technology, or immersion retraining experiences. Communities can support their physicians by providing financial support for professional development, arranging for physician coverage, and arranging for interesting exchange opportunities between rural and urban physicians. The needs of rural physicians are unique and can only be met successfully if there is flexibility and variety to address different needs. An example of how the UND SMHS can help in this regard is its Rural Surgery Support Program, where the School provides on a temporary basis a highly qualified general and trauma surgeon to local (typically rural) communities in need of such services for a limited time. The School thus functions to provide a local and internal locum tenens service to the communities of North Dakota.

Increased Retention of Graduates

We know that medical students, especially those interested in primary care, have an increased likelihood of practicing in the vicinity of where they did their residency training. One approach to increasing the needed workforce is to attract students to and retain individuals from our own residency programs. There are a variety of interventions that are likely to increase the retention of graduating physicians within the state. These include revising and refining the admissions process to select students most likely to remain within the state to practice and revising the curriculum to ensure optimal exposure to primary care experiences. We feel that it is important to provide increased longitudinal clinical experiences in rural communities. Reducing debt burden through the RuralMed Program, where the four-year tuition costs are defrayed if the physician agrees to practice in a rural area of North Dakota for five years, addresses one issue that may affect the decision to practice rural primary care—that of extensive debt load from medical school tuition. Role models are extremely important and influential in decision-making for our students and residents.

Conclusion

Research has shown that the principal factor in addressing a physician shortage is successful recruitment.²⁰ To be successful in keeping a quality healthcare workforce, however, there are modifiable factors related to educational and work experience that will lead to better retention that should also be considered. Increasing the types and length of experience in rural communities during education and training will help develop more confident, informed decision-making about choosing rural practice. Many graduates and clinical faculty currently practice in our rural communities, and we hope to increase those numbers. The SMHS will continue to advocate for funding for

scholarships or loan repayment for students who commit to rural practice (such as the RuralMed Program). It will work in partnership with rural health systems and physicians to encourage and support mentoring. The UND SMHS can work to inform and advocate for issues related to reimbursement and practice support in partnership with healthcare systems and local and state government. The SMHS can develop and provide continuing health professions education and training opportunities to meet the specific needs of rural practitioners and encourage collaboration for learning and for coverage of physicians' practices so physicians can pursue training.

ROLE OF ADVANCED PRACTICE PROVIDERS

Increased deployment and utilization of nonphysician providers, especially physician assistants and nurse practitioners, is an important component in addressing North Dakota's healthcare workforce needs now and in the future. The training and use of such providers in North Dakota is explored in more detail in Chapter 5 of this *Biennial Report*. Precisely what role such advanced practice providers (APPs) fill, however, remains unclear. The hope and expectation is that APPs would complement physician providers by providing needed basic clinical services to patients who are otherwise underserved; thus, APPs are especially important in the most rural communities, where their increased deployment would ameliorate some level of physician shortage. It is hoped that an APP might, in effect, be a substitute for a physician. And while APPs do provide such a service especially in rural areas of North Dakota, it is not clear what fraction of APPs function in this role. From a national perspective, many APPs are providing other non-primary care services to patients; many APPs, for example, work in subspecialty areas.²⁴ While these services may well be needed and important, they do not necessarily alleviate the problem of physician shortages in rural areas. Thus, APPs are not the answer to the problem of healthcare provider shortages in rural regions of North Dakota, but they are a component of the solution. To what extent they will be an even more effective positive force in the future remains to be seen.

References

1. Thompson, M. J., Hagopian, A., Fordyce, M., & Hart, L. G. (2009). Do International Medical Graduates (IMGs) "Fill the Gap" in Rural Primary Care in the United States? A National Study. *Journal of Rural Health*, 25(2), 124–134.
2. Association of American Medical Colleges. (2016). Missions Management Tool.
3. Association of American Medical Colleges. (2008). The Complexities of Physician Supply and Demand: Projections Through 2025. Retrieved on August 20, 2016, from <https://members.aamc.org/eweb/upload/The%20Complexities%20of%20Physician%20Supply.pdf>.
4. American Association of Medical Colleges. (2015). State Physician Workforce Data Book 2015. Retrieved on August 20, 2016, from [http://members.aamc.org/eweb/upload/2015StateDataBook%20\(revised\).pdf](http://members.aamc.org/eweb/upload/2015StateDataBook%20(revised).pdf).
5. Association of American Medical Colleges. (2006). Retrieved on August 8, 2016, from <https://www.aamc.org/newsroom/newsreleases/2006/82904/060619.html>.

6. Association of American Medical Colleges. (2016 Update). The Complexities of Physician Supply and Demand: Projections from 2014 to 2025. Retrieved on August 8, 2016, from https://www.aamc.org/download/458082/data/2016_complexities_of_supply_and_demand_projections.pdf.
7. Fordyce, M. A., Chen, F. M., Doescher, M. P., & Hart, L. G. (2007). 2005 Physician Supply and Distribution in Rural Areas of the United States. Retrieved on August 20, 2016, from <http://depts.washington.edu/uwrhrc/uploads/RHRC%20FR116%20Fordyce.pdf>.
8. Mullan, F., Chen, C., Petterson, S., Kolshy, G., & Spanola, M. (2010). The Social Mission of Medical Education: Ranking the Schools. *Annals of Internal Medicine*, 152(12), 804–11.
9. Hart, L. G., Skillman, S. M., Fordyce, M., Thompson, M., Hagopian, A., & Konrad, T. R. (2007). International Medical Graduate Physicians in the United States: Changes Since 1981. *Health Affairs*, 26(4), 1159–1169.
10. Akl, E. A., Mustafa, R., Bdair, F., & Schunemann, H. J. (2007). The United States Physician Workforce and International Medical Graduates: Trends and Characteristics. *Journal of General Internal Medicine*, 22(2), 264–268.
11. Robert Graham Center. (2009). *What Influences Medical Student and Resident Choices?* Retrieved on August 20, 2016, from <http://www.graham-center.org/dam/rgc/documents/publications-reports/monographs-books/Specialty-geography-compressed.pdf>.
12. Barrett, F. A., Lipsky, M. S., & Lutfiyya, M. N. (2011). The Impact of Rural Training Experiences on Medical Students: A Critical Review. *Academic Medicine*, 86(2), 259–263.
13. Rabinowitz, H. K., Petterson, S., Boulger, J. G., Hunsaker, M. L., Diamond, J. J., Markham, F. W., Bazemore, A., & Phillips, R. L. (2008). Medical School Programs to Increase the Rural Physician Supply: A Systematic Review and Projected Impact of Widespread Replication. *Academic Medicine*, 83(3), 235–243.
14. Rabinowitz, H. K., & Paynter, N. P. (2000). The Role of the Medical School in Rural Graduate Medical Education: Pipeline or Control Valve? *Journal of Rural Health*, 16(3), 249–253.
15. Wayne, S. J., Kalishman, S., Jerabek, R. N., Timm, C., & Cosgrove, E. (2010). Early Predictors of Physicians' Practice in Medically Underserved Communities: A 12-Year Follow-up Study of University of New Mexico School of Medicine Graduates. *Academic Medicine*, 85(10, supplement), S13–16.
16. Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of Primary Care to Health Systems and Health. *Milbank Quarterly*, 83(3), 457–502.
17. Sandy, L. G., Bodenheimer, T., Pawlson, L. G., & Starfield, B. (2009). The Political Economy of U.S. Primary Care. *Health Affairs*, 28(4), 1136–1145.
18. Starfield, B. (2010). Reinventing Primary Care: Lessons from Canada for the United States. *Health Affairs*, 29(5), 1030–1036.
19. Rosenblatt, R. A. (2010). Commentary: Do Medical Schools Have a Responsibility to Train Physicians to Meet the Needs of the Public? The Case of Persistent Rural Physician Shortages. *Academic Medicine*, 85(4), 572–574.
20. Pathman, D. E., Konrad, T. R., Dann, R., & Kock, G. (2004). Retention of Primary Care Physicians in Rural Health Professional Shortage Areas. *American Journal of Public Health*, 94(10) 1723–1729.
21. Dolea, C., Stormont, L., & Braichet, J. M. (2010). Evaluated Strategies to Increase Attraction and Retention of Health Workers in Remote and Rural Areas. *Bulletin of the World Health Organization*, 88(5), 379–385.
22. Frehywot, S., Mullan, F., Payne, P. W., & Ross, H. (2010). Compulsory Service Programmes for Recruiting Health Workers in Remote and Rural Areas: Do They Work? *Bulletin of the World Health Organization*, 88(5), 364–370.
23. Curran, V., Rourke, L., & Snow, P. (2010). A Framework for Enhancing Continuing Medical Education for Rural Physicians: A Summary of the Literature. *Medical Teacher*, 32(11), 501–508.
24. Dill, M. (2016). *Annual Address on the State of the Physician Workforce*. Association of American Medical Colleges Annual Meeting, Seattle, WA, Nov. 13, 2016.

CHAPTER TEN:

Recommendations: Healthcare Planning for North Dakota

The proactive approach taken by the 62nd, 63rd, and 64th North Dakota Legislative Assemblies to address the current and especially the anticipated future healthcare workforce and healthcare delivery challenges facing the state should begin to have a positive effect as the Healthcare Workforce Initiative (HWI) becomes more fully implemented over the next few years. However, because of the current budgetary uncertainty, portions of the HWI currently are on hold, and thus full implementation of the plan may well be at least delayed. Phase I of the HWI began in 2011, following the 62nd Legislative Assembly with an initial increase in medical and health science student class sizes, provisions for additional residency positions (post-MD degree clinical training required for state licensure), implementation of coordinated Master of Public Health degree programs at the two research universities (the University of North Dakota [UND] and North Dakota State University [NDSU]), and expansion of the RuralMed Program (which encourages physician graduates to set up their practices in rural areas of North Dakota). Phase II of the HWI began in 2013, following the 63rd Legislative Assembly and provided support for additional expansion of the class and residency cohort along with continued support for the multiple other provisions of the HWI. Implementation of the HWI was continued with support from the 64th Legislative Assembly, although as noted above, full implementation of the residency expansion has been placed on hold owing to the current budget allotment (the family medicine and geriatrics residencies in Fargo are proceeding with the planning phases, but funding is not available at present because of constrained HWI appropriations). Because of the multiyear duration of health education programs, the authorized full cohort of students (including residents) will not be in place until well beyond 2018 (since the proposed residencies that are on hold wouldn't be fully subscribed until 2020 even if they are fully funded in 2017).

Implementation of the HWI also required the construction of a new facility for medical and health sciences education that would accommodate the increased class sizes and permit consolidation of previously scattered UND health sciences programs into one building, thus facilitating interprofessional education. The move into the new building started in May 2016, just in time to welcome the medical student Class of 2020 as well as the health sciences students starting their classes later that fall. The Healthcare Workforce Initiative is designed to help meet North Dakota's healthcare delivery issues by utilizing four foundational approaches:

- Reduce disease burden, thus lowering the demand for healthcare services and related costs.
- Retain more physician and other healthcare provider graduates for clinical practice within the state.
- Train more physicians and other healthcare providers by increasing the medical, health sciences, and resident class sizes.
- Improve the efficiency of the healthcare delivery system in North Dakota principally through the training of healthcare providers who are proficient in team-based, interprofessional healthcare delivery methods.

This combination of reducing demand and increasing supply of various healthcare resources, along with necessary improvements in the healthcare delivery system, should bring the healthcare demand and supply equation into significantly better balance in North Dakota over the next 10 to 15 years.

REDUCE DISEASE BURDEN

It is axiomatic to say that the best way to treat disease is to prevent it in the first place. Although simple in concept, disease prevention has proved to be much more difficult to achieve in practice. Nevertheless, the HWI incorporates several concrete steps to encourage and highlight disease prevention and reduction. The HWI includes these strategies to reduce chronic and acute disease, all of which have been implemented:

- A new Department of Population Health at the UND School of Medicine and Health Sciences (SMHS) has been inaugurated under the leadership of Dr. Gary Schwartz, chair of the department. The department's focus is on developing programs that positively influence the health-related behaviors of North Dakotans.
- The Master of Public Health Programs at UND and NDSU continue to grow.
- A geriatrics training program at the UND SMHS has been developed and is awaiting accreditation. It consists of a special advanced clinical training residency program in geriatric medicine for physicians who have recently completed a family medicine or internal medicine residency (i.e., a one-year residency in geriatrics following the completion of the standard three-year family medicine or internal medicine residency). Note that this residency is on hold because of the budget and funding issues extant.
- Donald Jurivich, DO, has been successfully recruited as the chair of a new academic Department of Geriatrics.

Health-Related Behaviors

Many of the most serious health problems affecting North Dakotans (and all Americans) are caused, or at least made worse, by the personal choices we make about eating, smoking, physical inactivity, and other considerations.¹ In fact, these health-related behaviors account for nearly 40% of all deaths in the United States.²

As an example, chronic diseases such as heart disease, type 2 diabetes, and cancer are among the most common and costly health problems. However, they are also among the most preventable because they share—as common contributing causes—undesirable health-related behaviors. One of the best ways to “cure” these widespread diseases is to improve health literacy and the choices people make that affect their health.

The potential effect of prevention is substantial. The U.S. Centers for Disease Control and Prevention estimates that if tobacco use, poor diet, and physical inactivity were eliminated in the United States, it would prevent 80% of heart disease and stroke, 80% of type 2 diabetes, and 40% of cancer.³

In North Dakota, there is good evidence that we can improve health-related behaviors through public education and collaboration. Through the combined effort of many agencies and individuals, the percentage of North Dakota youth who currently smoke cigarettes decreased significantly from 40.6% in 1999 to 22.1% in 2005.⁴

Successful improvement of health-related behaviors can avoid not only an enormous toll of suffering and death from disease but also can be accomplished at far less expense than treating the resulting diseases.¹

Based on the foregoing factors, the new Department of Population Health and the Master of Public Health Programs and

their respective faculty members at UND and NDSU are focusing on public education and other efforts to positively affect the health-related behaviors of North Dakotans.

Master of Public Health Programs

One of the most practical approaches to improving health education and other public health initiatives in the state is to prepare its health professionals to undertake these roles as they enter practice. Specifically, having individuals with graduate training in public health (Master of Public Health degree) can augment capacity and reduce disease burden.

UND and NDSU have partnered to create two collaborative graduate-level programs in public health that truly are cooperative. Since the programs began accepting students in 2012, they have grown and matured. The first graduates of the programs are now beginning to have a positive effect on the health of the public.

Geriatrics Training Program

As outlined previously, the population of North Dakota is going to age markedly in the next decade. To provide for this increasingly older population, it will be essential to greatly expand training in the field of geriatrics. To accomplish this, the UND SMHS recruited noted gerontologist Dr. Donald Jurivich to lead the School's Department of Geriatrics, which will include a variety of programs to assist practitioners throughout North Dakota in optimizing their care of seniors. Additionally, the recently developed geriatrics residency for recent family or internal medicine graduates shows considerable promise to provide greater in-state practitioner expertise in chronic-disease management, fall and injury prevention, and more appropriate health-related decision-making in elderly patients (assuming that funding can be identified to allow the program to begin accepting trainees).

RETAIN MORE GRADUATES

As outlined previously in this *Report*, there are a variety of interventions (many of which are accepted best practices based on national consensus) that the UND SMHS has implemented that are likely to increase the retention of graduating physicians for eventual clinical practice within the state. These include the following:

- A revised and refined medical school admission process designed to select students most likely to remain within the state to practice.
- A revised curriculum to ensure optimal exposure to primary care experiences and to provide increased longitudinal clinical experiences in rural communities, actions that are associated with an increased retention rate.
- Reduced debt burden through the RuralMed Scholarship Program, where the four-year tuition costs of medical school are defrayed if the physician agrees to practice in a rural area of North Dakota for five years.
- Partnerships with physicians and healthcare systems to optimize and enhance mentoring and affinity relationships.

TRAIN MORE PHYSICIANS AND HEALTHCARE PROVIDERS

Increasing retention efforts is a necessary but not sufficient approach to meeting the state's healthcare workforce shortage. Accordingly, an essential component of meeting the healthcare workforce needs of North Dakota is to expand class sizes or, to use the colloquial expression, "widen the pipeline." In response to a charge from the Association of American Medical Colleges, total medical school class size across the United States has been increased by about 30% over the past decade. The UND SMHS now has successfully increased medical class size by roughly that same magnitude as a consequence of the HWI, and this should help ensure an adequate physician workforce in the future for North Dakota when coupled with the other efforts already underway and planned.

But simply increasing the medical student class size will be insufficient to meet the needs of North Dakota unless additional residency slots are available in the state for postgraduate training. The optimal retention of physicians occurs when the students go to school and enter residency within the same state; in those cases, about 2 out of 3 students remain in-state. Simply increasing class size will result in only about 1 out of 3 physicians remaining in-state for ultimate practice. Accordingly, the HWI as originally proposed incorporates a total of 17 new residency slots per year (total of 51 slots overall). Following the most recent allocation of slots by the SMHS and its Advisory Council, all available residency slots have been committed to a total of nine different residency training tracks (four rural family medicine, one rural general surgery, one rural psychiatry [using telemedicine], two geriatrics, and one hospitalist). However, 19 of the 51 total slots (15 for the proposed Fargo family medicine track and four for the proposed Fargo geriatrics track) currently are on hold due to the current budget allotment.

Consideration should be given by policymakers to fully fund (and even consider further expansion of) the state-funded residency program, perhaps by utilizing joint funding through the Medicaid program. At the very least, the SMHS and its Advisory Council feel that it is essential that funding for the 19 approved but currently unfunded residency slots be provided urgently. The SMHS and its Advisory Council have prioritized approval of proposed residency training programs based on an assessment of which program is most likely to result in an augmentation of North Dakota's physician workforce. Thus, two fundamental criteria have been used to determine which residencies are approved and funded by the HWI: first, what residencies best support the healthcare needs of North Dakotans; and second, what residencies would be most attractive to UND SMHS graduating medical students?

The healthcare workforce shortage is not limited to physicians. Accordingly, the HWI also provides for an expansion of 30 students per year (total of 90, or an increase of about 15%) for health sciences students trained by the UND SMHS. Why 15% for health sciences students and almost 30% for medical students? Because most surveys have suggested that the health sciences workforce shortfall may be more modest than the physician shortfall, since some of the health sciences programs around the country ramped up their class sizes before the more recent increase in medical school class size.

IMPROVE THE EFFICIENCY OF THE HEALTHCARE DELIVERY SYSTEM

There are numerous health system initiatives already underway locally, regionally, and nationally—and many others proposed—that strive to improve the efficiency of our healthcare delivery system, with a goal of providing better care at lower cost in a more patient-friendly manner.

Additionally, especially given the unique and difficult challenges of depopulation and low population density in rural North Dakota, alternative healthcare delivery models, including enhanced use of nonphysician providers, telemedicine, home care, and medical homes, need to be explored and expanded. Although the future of the Affordable Care Act remains unclear, the act does offer support for some of these approaches, which may work to the advantage of North Dakota and its citizens.

One of the prime ways in which the UND SMHS intends to improve the efficiency and effectiveness of the state's healthcare delivery system is by better training of a wide spectrum of healthcare students in optimal methods of interprofessional healthcare delivery. But working together in effective interprofessional teams doesn't just happen; team members need to learn about each other's discipline and practice working together. So before we can expect to have effective healthcare teams taking care of actual patients, we need to properly train students in an interprofessional environment. The School's curriculum (along with the specially designed space in the new facility) has been redesigned to encourage and permit broadened interprofessional education. In support of interprofessional education, the new building has eight learning communities that will provide the physical spaces where students from a variety of professions will learn together.

RECOMMENDATIONS FOR MEETING NORTH DAKOTA'S HEALTHCARE WORKFORCE NEEDS

Ongoing (and full) funding for the HWI by the 65th Legislative Assembly and others to follow is absolutely essential. At a minimum, it is imperative for the 65th Legislative Assembly to restore the funding that has resulted in placing 19 residency slots on hold. North Dakota is one of the few states in the nation that has taken a forward-looking and proactive approach to healthcare needs through the HWI, and it is poised to reap the benefits of this approach in the next decade and beyond. Early indicators are quite positive; there are young physicians who are recent graduates of the UND SMHS, its residency programs or both who are or will be moving to Hettinger, Devils Lake, and Williston among other communities that have labored for years heretofore to attract physicians.

In addition to continuing to endorse and support the full implementation of the HWI, there are a variety of other approaches that policymakers might consider during the 65th Legislative Assembly:

- North Dakota state income tax credit for healthcare practitioners who volunteer to teach healthcare students.
- Creation of a RuralMed-like (or other financial incentive) program to encourage rural practice for other needed nonphysician providers (e.g., addiction counselors, medical laboratory technicians, and nursing assistants).
- Expansion of residency slots available through the HWI.
- Support for expanded mental and behavioral healthcare.

CONCLUSION

The HWI has provided the state of North Dakota with a blueprint for disease prevention, healthcare workforce development, and healthcare delivery system optimization that should have a significant positive effect on the healthcare delivery challenges faced by the state. The HWI is only part of the solution, but it is a crucial element since it primarily addresses the educational foundation upon which the entire healthcare delivery system is based. Coupled with synergistic approaches by insurers, healthcare delivery institutions, other educational organizations, and policymakers, it will form part of the foundation of a revised and improved healthcare delivery system in the state.

Deliverables

Full implementation of the HWI will help achieve a variety of goals that should be considered the deliverables to be received in exchange for funding of the HWI.

The most important deliverable will be an adequate supply and distribution throughout North Dakota of caring, team-oriented primary and subspecialty-care practitioners schooled in interprofessional care. About half of the needed practitioners will result from a variety of increased retention efforts, and the other half will come from the expansion of class sizes and additional residency slots. Inherent in the plan is the anticipation that it will address the twin challenges of provider availability in North Dakota—an adequate supply of providers, as well as an appropriate distribution of those providers throughout all three population areas of the state—metropolitan, micropolitan (large rural), and rural. In addition to the obvious and necessary improvement in healthcare delivery throughout North Dakota, the increased number of healthcare providers will have a direct positive effect on the economic environment in the state as a result both of their increased employment and the “halo” effect that has been reported to generate \$1 million or more annually as a consequence of each additional physician practitioner employed.

It is further anticipated that the SMHS will generate \$2 of additional revenue for every \$1 appropriated by the Legislative Assembly. This is deemed a conservative estimate, since current data indicate an even greater return on investment of \$2.63 for every state dollar committed. The additional revenue is composed of \$0.63 as a result of tuition, \$1 in grants and contracts (usually federal funds), and \$1 in ancillary income, such as from physician practice plans and contributions from the federal government to fund certain residency training costs. Currently, the UND SMHS generates almost \$150 million biennially in additional revenue to that provided by the State of North Dakota. The School predicts that with the expansion of class sizes, the incremental economic impact would be about three-quarters of the current return, or greater than a \$2 return for every appropriated dollar invested. The total direct economic impact of the UND SMHS over the next three biennia should be well over a half a billion dollars.

Because much of the budget of the HWI is being allocated to cover clinical training in the community, a substantial portion of the appropriated and ancillary funds will be expended in areas other than Grand Forks County.

A final positive direct impact of the HWI (specifically because of the new building) will be an additional facility and administration (F&A) indirect cost return associated with federal and other research grants. Current estimates suggest

that UND will garner almost \$1 million per year in additional revenue simply as a result of the construction of the new building that incorporates research space. This is because the F&A rate that any university receives is the result of a calculation by the federal government as to the indirect costs associated with its sponsorship of research at that institution. Much of the School's former research space was constructed on the basis of earmarks and other federal dollars, which renders the space exempt from the calculation of F&A. With the construction of additional research space using nonfederal dollars (as was done in the new building), the F&A rate will increase, thus generating additional income for UND for as long as part of the building is used for research. Thus, given an expected building life of 50 years, the increased F&A rate alone should generate an additional \$50 million (assuming consistent research grant productivity).

Given the track record to date of the HWI and the predicted long-term positive impact on healthcare delivery in the state, it is essential that the School of Medicine and Health Sciences receives ongoing and continued support and funding from the North Dakota Legislature. For the 65th Legislative Assembly, the highest HWI imperative is to restore funding for the 19 approved but currently unfunded residency slots. In the long term, it will be important to develop a more stable HWI funding mechanism that avoids the vagaries of short-term funding fluctuations such as the HWI recently experienced.

References

1. Robert Wood Johnson. (2009). *Beyond Healthcare: New Directions for a Healthier America*. Retrieved from <http://www.rwjf.org/en/research-publications/findrwjfresearch/2009/04/beyond-health-care.html>.
2. Institute of Medicine. (2012). *Living Well with Chronic Illness: A Call for Public Health Action*. Washington (DC): The National Academies Press.
3. Centers for Disease Control and Prevention. (2009). *The Power of Prevention: Chronic Disease...the Public Health Challenge of the 21st Century*. Retrieved from <http://www.cdc.gov/chronicdisease/pdf/2009-power-ofprevention.pdf>.
4. North Dakota State Epidemiological Outcomes Workgroup. (2010). *Alcohol, Tobacco, and Illicit Drug Consumption and Consequences in North Dakota*. Retrieved from <http://www.nd.gov/dhs/services/mentalhealth/prevention/pdf/2010-epi-profile.pdf>.

Appendix

Healthcare Workforce Pipeline Activities

Affiliated with University of North Dakota (UND)

School of Medicine and Health Sciences (SMHS) programs K–16 Activities

Activity	Description	Target Audience	Partner(s)
Career and Technical Education (CTE)—Crash Courses	Area Health Education Center (AHEC) staff provide information related to health careers. North Dakota College Access Network has developed partnerships across North Dakota to help navigate postsecondary preparation and opportunities.	Students (Grades 7–12) and parents	North Dakota CTE
Health in Partnership with Education (HIPE) Week	Teachers, healthcare providers, and organizations team up to promote health careers. March 9–13, 2015, and March 14–18, 2016	All ages	Schools, healthcare facilities
Health Insurance Portability and Accountability Act (HIPAA) Training (online)	Training on privacy and security of protected health information available at no cost, which is required for job shadowing in healthcare facilities.	High school students	AHEC
Health Occupations Students of America (HOSA) Future Health Professionals	A student organization that promotes career opportunities in the healthcare industry.	High school students	Center for Rural Health (CRH), CTE, and health occupation instructors
In-A-Box and other educational materials loan programs	In-A-Box Program includes health and science activities. In addition, the AHEC and CRH have a number of resources available to schools, youth organizations, etc.	Grades 4–12	CRH/AHEC

Total Participants	Communities Reached	Lead SMHS Program/ Funding Source
411	Devils Lake, Ellendale, Garrison, Hillsboro, Towner	AHEC (federal: Health Resources and Services Administration [HRSA] Bureau of Health Workforce [BHW])
Numbers not available	Statewide	Center for Rural Health (CRH)/AHEC (federal: HRSA BHW and Office of Rural Health Policy [ORHP])
1,292	Not available	High school students
159 student members, nine advisers Total = 168 and 8 chapters	Bismarck (Bismarck Public and Century High School/Missouri River Area Career and Technical Center), Langdon, Grafton, West Fargo, Hettinger, Grand Forks (Red River and Grand Forks Central high schools)	AHEC (federal: HRSA BHW) CRH/AHEC (federal: HRSA BHW and ORHP)
	Not available	

Healthcare Workforce Pipeline Activities cont.

Affiliated with UND SMHS programs K–16 Activities

Activity	Description	Target Audience	Partner(s)
Indians Into Medicine (INMED) Programs	A comprehensive program designed to assist American Indian students who aspire to be health professionals to meet the needs of tribal communities.	Indian students who are preparing for health careers. The Summer Institute program is a six-week academic enrichment session for junior and senior high school students; the Med Prep and Pathway components provide opportunities for college-level students.	Tribal communities and other national education organizations
Market Place for Kids	An opportunity to explore creativity and inspire entrepreneurship in students. AHEC staff participate by providing health-career-related information and resources.	Upper-elementary and middle-school students	N/A
North Dakota Science Teachers Conference	Introduced AHEC to North Dakota Science Teachers Association in a breakout session.	High school science instructors	North Dakota Science Teachers Association
Other health career fairs	Local career fairs to inform and encourage students to pursue a career in healthcare. AHEC staff participate by providing health-career-related information and resources.	All ages	Schools statewide

Total Participants	Communities Reached	Lead SMHS Program/ Funding Source
As of spring 2016, the program has graduated 228 medical doctors. The program has also graduated 261 students in nursing, clinical psychology, and various other health sciences. A total of 489 Indian health professionals have graduated through the program, in addition to 51 Summer Institute, six Med Prep, and four Pathway.	Not available	Indian Health Service (IHS) grant, National Institutes of Health grant, (federal) from the IDeA (Institutional Development Award) Network for Biomedical Research Excellence (INBRE) Program of the National Center for Research Resources; and (state) SMHS
1,705	Bottineau, Devils Lake, Dickinson, Jamestown, Minot, Northwood, Wahpeton, Williston	Market Place for Kids is a nonprofit established by elementary teachers in North Dakota and Minnesota.
8	Valley City	AHEC (federal: HRSA BHW)
319	Bismarck, Fort Totten, Dickinson, Devils Lake	AHEC (federal: HRSA BHW)

Healthcare Workforce Pipeline Activities cont.

Affiliated with UND SMHS programs K–16 Activities

Activity	Description	Target Audience	Partner(s)
Rural Collaborative Opportunities for Occupational Learning in Health (R-COOL-Health) Scrubs Camps	A competitive mini-grant program intended to increase awareness, interest, and understanding of health careers available in rural North Dakota through creative and interactive activities. Program established in 2010.	Grades 5–12	Schools, health facilities, and job development authorities statewide
Rural Collaborative Opportunities for Occupational Learning in Health (R-COOL-Health) Scrubs Academy I	This four-day, three-night program is intended to provide hands-on activities from a wide variety of health professionals and an opportunity to experience campus living. Program began in 2011.	Grades 6–8	AHEC

Total Participants	Communities Reached	Lead SMHS Program/ Funding Source
<p>50 camps to date hosted a total of 3,208 students</p> <p>2010: 14 camps funded; 1,016 students from 61 communities;</p> <p>2011: Nine camps funded; 433 students from 36 communities;</p> <p>2012: Nine camps funded; 407 students from 54 communities.</p> <p>2013: Nine camps funded; 680 students from 58 communities;</p> <p>2014: Nine camps funded; 672 students from 70 communities.</p> <p>2015: Nine camps funded; 844 students from 56 communities.</p>	<p>Adams, Alexander, Aneta, Ashley, Beulah, Bisbee, Bottineau, Burke, Buxton, Cando, Carson, Carrington, Cavalier, Center, Clifford, Colfax, Crosby, Edmore, Egeland, Elgin, Dahlen, Dakota Prairie, Dawson, Devils Lake, Ellendale, Fairmont, Finley, Flasher, Fort Totten, Four Winds, Galesburg, Garden Valley, Glen Ullin, Grenora, Hamar, Hankinson, Hatton, Hazen, Hettinger, Hope, Jamestown, Klotten, Lakota, Langdon, Leeds, Lidgerwood, Lisbon, Maddock, Mandaree, Mayville, McVie, Michigan, Minnewaukan, Munich, Newburg, New Leipzig, New Town, Niagara, Northwood, Oakes, Osnabrock, Page, Park River, Parshall, Pekin, Petersburg, Pettibone, Portland, Powers Lake, Ray, Reynolds, Robinson, Rolette, Round Prairie, Rugby, Scranton, Sharon, Stanley, Stanton, Starkweather, Steele, Tappen, Tioga, Trenton, Tolna, Tuttle, Wahpeton, Walhalla, Warwick, Watford City, Westhope, Whitman, Williston, Wolford, Wyndmere</p>	<p>AHEC/CRH (federal: HRSA BHW and ORHP); (state) appropriated funds designated for workforce development</p>
<p>Six Scrubs Academies have been held at the UND SMHS with a total of 300 students attending.</p> <p>2011: 38 students from 21 communities;</p> <p>2012: 45 students from 22 communities;</p> <p>2013: 56 students from 27 communities;</p> <p>2014: 51 students from 25 communities;</p> <p>2015: 55 students from 27 communities;</p> <p>2016: 55 students from 26 communities</p>	<p>Argusville, Arthur, Beach, Beulah, Bismarck, Bottineau, Carrington, Cavalier, Devils Lake, Dickinson, Drayton, Ellendale, Emerado, Enderlin, Esmond, Fargo, Fordville, Frontier, Grafton, Grand Forks, Grandin, Harvey, Harwood, Hazen, Horace, Hunter, Jamestown, Lakota, Leeds, Leonard, Mandan, Manning, McKenzie, Mekinock, Milnor, Minot, Minto, Mohall, Mott, New Rockford, Northwood, Oakes, Oriska, Park River, Reile's Acres, Rolla, Rugby, Towner, Valley City, Voltaire, Wahpeton, West Fargo, Wilton</p>	<p>CRH (federal: HRSA ORHP) and State Office of Rural Health Grant program; (state) appropriated funds designated for workforce development; UND and Education Council grant</p>

Healthcare Workforce Pipeline Activities cont.

Affiliated with UND SMHS programs K–16 Activities

Activity	Description	Target Audience	Partner(s)
Rural Collaborative Opportunities for Occupational Learning in Health (R-COOL-Health) Scrubs Academy II	This three-day, two-night program is intended to provide hands-on activities from a wide variety of health professionals and an opportunity to experience campus living. Program began in 2013.	Grades 9–11	Schools statewide, CRH
Rural Clinical Rotation Support	Travel assistance for rural clinical rotation.	Post-secondary health profession students	N/A
Simulation Training	Healthcare training using human simulators.	Post-secondary education	Mayville State University, Lake Region State College, VA Hospital, Dickinson State, North Dakota State University

Total Participants	Communities Reached	Lead SMHS Program/ Funding Source
Two Scrubs Academies have been held at Bismarck State College. 2013: 23 students from 14 communities; 2014: 21 students from 14 communities; 2015 - No Scrubs Academy II; 2016 - No Scrubs Academy II	Baldwin, Beach, Bismarck, Bowman, Carrington, Cooperstown, Crystal, Fargo, Fessenden, Granville, Harwood, Hazen, Hunter, Larimore, Minot, Mohall, New Rockford, Reeder, Reynolds, Richardton, Scranton, Watford City, West Fargo, Williston, Wilton	AHEC (federal: HRSA BHW)
33	Baldwin, Beach, Bismarck, Bowman, Carrington, Cooperstown, Crystal, Fargo, Fessenden, Granville, Harwood, Hazen, Hunter, Larimore, Minot, Mohall, New Rockford, Reeder, Reynolds, Richardton, Scranton, Watford City, West Fargo, Williston, Wilton	AHEC (federal: HRSA BHW)
112	Mayville, Dickinson, Bismarck, Fargo	AHEC (federal: HRSA BHW)

Healthcare Professional Continuing Education and Training

Activity	Description	Target Audience	Partner(s)
Dakota Conference on Rural and Public Health	Annual conference to share strategies for building and sustaining healthy communities in North Dakota.	Healthcare administrators, professionals, students, educators, legislators, and state agencies.	UND; UND College of Nursing and Professional Disciplines ; Altru Health System; North Dakota Rural Health Association; North Dakota Public Health Association
Mind Matters Conference on Brain Injury	Conference to share assistive technology for survivors; covers vestibular disorders and brain injury, pediatric brain injuries, sports concussions, effects of brain injury on vision and substance abuse; also loss, grief and passion fatigue felt by family members and caregivers; neuropsychological exams, and the importance of hospital rehabilitation.	Survivors, family members, caregivers, professionals	Head Injury Association of North Dakota, North Dakota Protection and Advocacy, St. Alexius and MedCenter One (2013); Sanford Health (2014)
North Dakota Mission: Lifeline STEMI and Acute Stroke Conference	State conference to share and discuss best-practice models from across North Dakota with reference to the American Heart Association's Mission: Lifeline and North Dakota Department of Health (NDDOH) stroke initiatives; and pre-hospital STEMI and stroke assessment to augment rural and urban hospital clinicians in diagnosing and triaging patients to improve myocardial infarction and stroke outcomes for North Dakota patients.	Cardiologists, emergency medicine physicians, nurse practitioners (NPs) and physician assistants (PAs). Nurses, nursing leadership and administration. EMS providers, leadership and medical directors.	NDDOH, Mission: Lifeline, American Heart Association

Total Participants	Communities Reached	Lead SMHS Program/ Funding Source
2013: 258 attendees; 2014: 312 attendees 2015: 396 attendees 2016: 399 attendees	2013 Mandan (statewide representation) 2014 Grand Forks (statewide representation) 2015 Minot (statewide representation) 2016 Grand Forks (statewide representation)	CRH: Funded by sponsorship and registration
2013: 111 attendees; 2014: 112 attendees 2015: 110 attendees 2016: 130 attendees	2013 Bismarck (statewide representation) 2014 Fargo (statewide representation) 2014 Grand Forks (statewide representation)	CRH: Funded through a subcontract with the North Dakota Department of Human Services
2013: 250 attendees; 2014: 280 attendees 2015: 111 attendees 2016: 198 attendees	2013 Bismarck (statewide representation) 2014 Fargo (statewide representation) 2015 Bismarck (statewide representation) 2016 Fargo (statewide representation)	CRH: Funded through a subcontract with the NDDOH Division of Emergency Medical Services (EMS)

Recruitment and Retention

Activity	Description	Target Audience	Partner(s)
Community Apgar Project	A study of recruitment and retention issues using five focus areas: geographic, economic, scope of practice, medical, hospital and community support.	Rural hospital administrators, board of directors and lead primary care physicians involved in recruitment	Boise State University, Idaho, and Boise Family Medicine Residency Program
Community Paramedicine Workshop	Two workshops held to explore the expanded role of a paramedic; CRH staff participate in ongoing subcommittee meetings.	EMS and other stakeholders	North Dakota EMS Association and NDDOH Division of EMS
EMS Leadership Training	Series of training workshops conducted to develop leaders among North Dakota EMS professionals	EMS professionals	North Dakota EMS Association and NDDOH Division of EMS
Primary Care Office (PCO)	State-level office located in the NDDOH. Purpose is to provide technical assistance to organizations and communities in their efforts to expand access to primary care, oral health, and mental health services for underserved populations. PCOs work with National Health Service Corps (NHSC) providers, sites, state loan repayment and J-1 visa waiver programs and conduct health profession shortage area designations.	Sites: Rural health clinics, CAHs, tertiary care centers, IHS, federally qualified health centers, human service centers, and private practice mental health sites. Students and providers: primary care, oral health, nursing, mental and behavioral health	NDDOH, HRSA BHW Division of Regional Operations Denver; Community Healthcare Association of the Dakotas; PCO Network; academic partners in the North Dakota University System AHEC
Rural Recruitment and Retention Network (3RNet) Membership	A national Web-based network helping health professionals find jobs in rural and underserved areas throughout the country.	Health professionals and healthcare organizations	

Total Participants	Communities Reached	Lead SMHS Program/ Funding Source
Completed August 2014: 16 administrators; primary care providers; board of directors. Beginning 2nd round: 8–10 new CAHs	16 (rural) critical access hospitals (CAHs)	CRH (federal: HRSA, ORHP, and State Office of Rural Health Grant Program); (state) appropriated funds designated for workforce
75	Statewide	CRH (federal: HRSA, ORHP) and State Office of Rural Health Grant Program. Main funding through NDDOH Division of EMS
96	Statewide	CRH (federal: HRSA, ORHP, and Rural Hospital Flexibility Grant Program)
130 providers currently serving (56 NHSC; 35 state loan repayment [NPs, PAs, doctors of dental surgery, medical doctors]; 39 J-1 visa providers)	130	UND SMHS Department of Family and Community Medicine: through an NDDOH subcontract; (federal: HRSA BHW)
3,081 health profession candidates connected to rural healthcare entities. 17 (MD, PA, NP) providers placed in communities.	36 (rural) CAHs, two IHS, three (rural) community health centers	CRH (federal: HRSA, ORHP) State Office of Rural Health Grant Program; (state) appropriated funds—designated for workforce.

