

Third Biennial Report

Health Issues for the State of North Dakota

2015



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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
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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 would like to acknowledge the exceptional contributions of the following individuals in the preparation of this *Report*: Brad Gibbens and Mandi Peterson 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. We would also like to thank Dr. Gary Hart, Abdi Ahmed, Dr. Shawnda Schroeder, Lynette Dickson, and Jody Ward for their contributions.

This publication was printed by J&M Printing in Gwinner, N.D.

Introduction and Update

The *First Biennial Report on Health Issues for the State of North Dakota (Report)* 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 by the 2009 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 on Health Issues for the State of North Dakota* 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 on Health Issues for the State of North Dakota* was an update on the developments and changes 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 on Health Issues for the State of North Dakota*, 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: to 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 is scheduled to be completed in the summer of 2016, in time to welcome the incoming medical school class of 2020 and the health sciences classes that will start later that fall.

This latest *Biennial Report on Health Issues for the State of North Dakota*, the third iteration, uses the latest available data to assess the status of health and healthcare delivery throughout North Dakota. It incorporates the results of a statewide survey of all major healthcare providers that was completed during September 2014 to assess healthcare workforce needs. The *Report* provides updated information on healthcare needs and delivery in the Oil Patch in particular. It also analyzes in greater depth the use of nonphysician providers throughout the state. And it looks in greater detail than prior reports at a variety of related healthcare challenges, including oral health and behavioral and mental health needs.

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An electronic version of this *Report* is available at
www.med.UND.edu/about-us/_files/docs/third-biennial-report.pdf.

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 is not keeping 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. 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. Absent 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 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, and will be fully in effect by 2018. 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 SMHS facility is being built on the University of North Dakota's Grand Forks campus. It is scheduled for completion by the summer of 2016.

In accordance with the expectations specified in the North Dakota Century Code (NDCC 15-52-04), this *Third Biennial Report on Health Issues for the State of North Dakota 2015 (Report)* updates the first two 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 (27%) 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 second only to Rhode Island in the percentage of its population that is 85 years of age or older. Because demand for healthcare increases proportionately 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 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 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 might occur again. Nevertheless, 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. Rapid-growth models predict even greater growth, with one model indicating a population of nearly 1.2 million by as early as 2020. This would be associated with a dramatic increase in the number of young and middle-aged males.

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 population than the United States as a whole or the Midwest comparison group, although the gap has narrowed over the past three decades. Our physicians are older, less likely to be in a hospital-based practice, 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, about the same as the rest of the country. The University of North Dakota (UND) is an important source of physicians for the state, accounting for 45% 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 40% 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 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. Absent 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. And if the population grows to 1 million (as some have predicted), the state would need about 1,000 more physicians.

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 and the Midwest, North Dakota has more primary care physicians when normalized to the population size. Their density is significantly higher than either comparison group in both metropolitan and micropolitan regions; it is only in rural areas that North Dakota lags the Midwest comparison group, and only by a small percentage (2%). 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 or completed a residency or did both in the state.

North Dakota has relatively fewer specialists than the Midwest or the rest of the United States in certain specialties, including obstetrics/gynecology. We have more psychiatrists than 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 many more nurses (95%) and pharmacists (51%) than the national average, and they too are particularly distributed in the metropolitan areas. In the case of pharmacists, their relative scarcity in rural areas is balanced by a greater supply of pharmacy techs and by a robust telepharmacy program spearheaded by North Dakota State University. North Dakota has one-fourth fewer dentists than the United States as a whole, but almost one-fourth (22%) 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 a survey conducted by UND's Center for Rural Health, which 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 *Report* next analyzes the healthcare delivery system in North Dakota, which consists of 50 hospitals—36 smaller critical access hospitals 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, and one rehabilitation hospital—and about 300 ambulatory care clinics. Outpatient care is augmented by 57 federally certified rural health 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 84 skilled nursing, 64 basic-care, and 73 assisted-living facilities. There are 28 independent local public health units. There are 31 facilities or programs statewide that provide mental health services, but there are ongoing challenges to providing adequate services in the more rural regions of the state.

Another problem area for the state is oral health. The *Report* summarizes the results of an extensive study of North Dakota’s oral health needs and attendant policy implications undertaken by UND’s Center for Rural Health in 2014. 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 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 ninth in the country in one recent assessment undertaken by the Commonwealth Fund.

The *Report* concludes with a strong ongoing endorsement of the HWI and a recommendation to continue its funding by the 64th 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. Although the program at present has a number of unfilled positions, the *Report* urges expansion of the program if there is sufficient demand. The *Report* is quite supportive of the efforts of the SMHS to expand its presence westward, and commends Williston State College for developing a plan for collaborative and interprofessional healthcare education in Williston in conjunction with UND and other member institutions in the North Dakota University System.

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

policy makers 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, maximize 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 producing 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 will be combined with outcome-based payment through value-based purchasing or 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 a nation, 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. An area experiencing rapid population increases because of an expanding economy (such as in western North Dakota) may see a growing demand for family-centered health services encompassing a broader range of age-related care, urgent and emergency care, and the need for worksite wellness programs. 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, 8–10} The growth of the Oil Patch in western North Dakota has healthcare delivery implications. In the 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 population increasing by 7.6% from 2010 to 2013, 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 only 2.4%.⁷ North Dakota's growth mainly occurred in two locations: the cities (Fargo, Grand Forks, and Bismarck), and the western counties (related to oil drilling in the Bakken Formation). 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. 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 25%.^{6, 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 distribution is found in Slope County (0.6 people per square mile) and the most densely populated is Cass County (91 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 (50.5%) of the population of North Dakota is male.⁶ This likely reflects the employment patterns in the agrarian and oil boom regions and, to the extent it is tied to energy-related employment, the male population may increase over time.

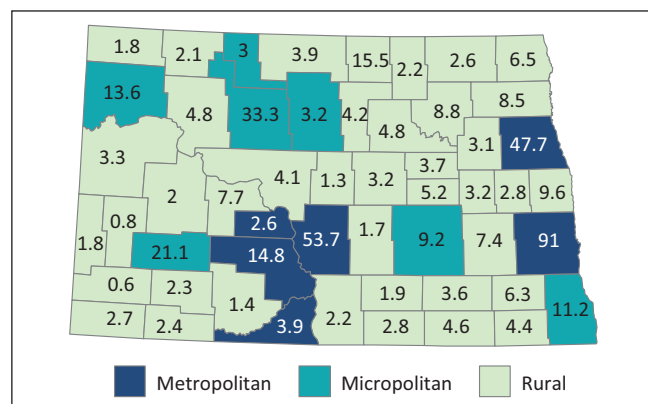


Figure 1a. Population densities of metropolitan, micropolitan (large rural), and rural counties in North Dakota.^{6, 11}

- According to the 2013 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 48% 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 27%, and the number of rural counties has declined from 39 to 37.

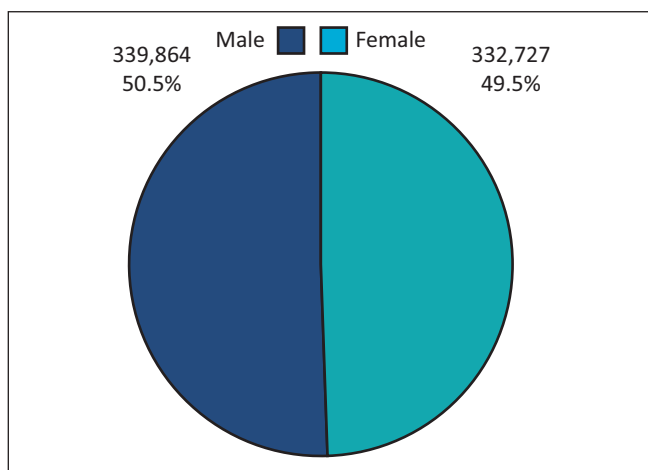


Figure 1b. Gender of North Dakota

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

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 second only to Rhode Island in the percentage of its population 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.¹²

As shown in Figure 3, 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, 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 4). 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.

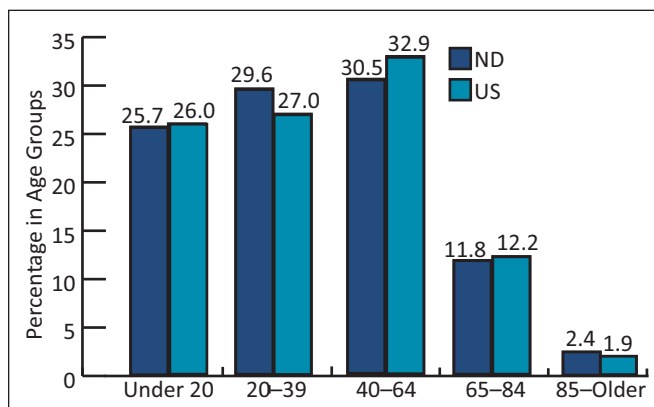


Figure 2. Age of people in North Dakota compared with U.S. in 2013.⁶

- There are more North Dakotans 85 and older compared with the U.S. population (second-highest percentage behind Rhode Island).
- North Dakota compared with the U.S. has 1.3 times the population aged 85 and older.
- There are fewer North Dakotans under the age of 20, and between the ages of 40 to 64 and 65 to 84 relative to the U.S. population.

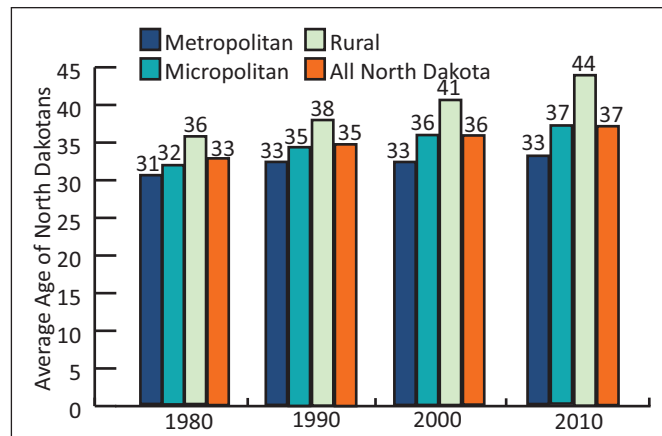


Figure 3. Average age of North Dakota residents from 1980 to 2010 by metropolitan, micropolitan (large rural), and rural counties.⁸⁻¹¹

- 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).
- In 2010, rural residents were about seven years older than those living in micropolitan areas and about 11 years older than the metropolitan residents.
- Rural North Dakota's average age has increased by eight years from 1980 to 2010, whereas metropolitan average age has increased by only approximately two years, and micropolitan age has increased by about five years.

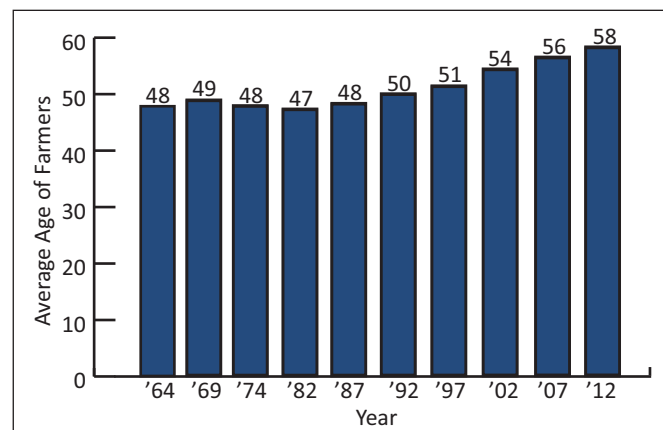


Figure 4. Average age of farmers from 1964 to 2012.¹³

- 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 5.5 years every 10 years.

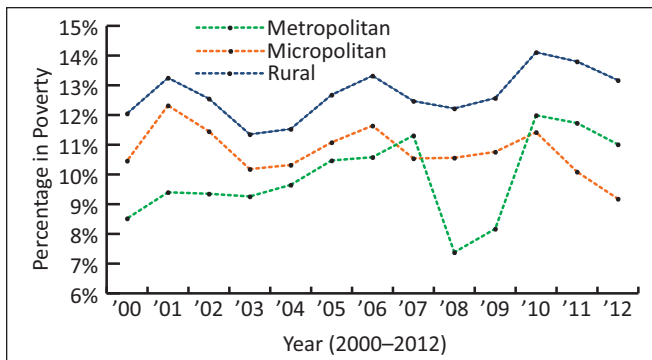


Figure 5. Poverty in North Dakota by rural, micropolitan (large rural), and metropolitan areas.^{11,18}

- Any person or family whose income falls below a threshold set by the federal Office of Management and Budget (OMB) is considered poor. In 2012, for a family of two this was \$15,130 and for a family of four it was \$23,050. For each additional family member, add \$3,960.
- In 2012, 11.2% of North Dakota residents were in poverty (U.S. had 15.3% in poverty) and lived in all regions of North Dakota.
- Poverty has risen from 8.5% to 11% in metropolitan areas since 2000, and in rural areas it increased from 12.6% to 13.2%.
- In every year, the poverty rate from 2000 to 2012 was higher in rural North Dakota than either micropolitan (large rural) or metropolitan areas.

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 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.¹⁴ 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.¹⁵

Poverty rates vary based on age, race, geography (Figure 5), and household composition. Poverty is higher in rural than urban North Dakota (about 14% compared to 12%). 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).¹⁶ 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 to 55% of children living with single mothers in urban areas.¹⁷

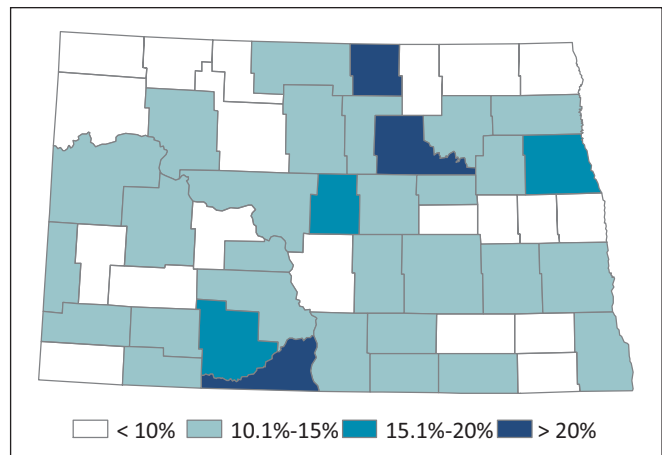


Figure 6. Poverty in North Dakota by counties.¹⁸

- Poverty in North Dakota counties has ranged from 6.7% to 41.4% from 2000 to 2012.
- 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 2012 of 30.1%), Benson County (32.5%), and Sioux County (35.4%).⁷ 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 20 counties with poverty rates less than 10%, based on 2012 data. In 2010, there were 14 counties.

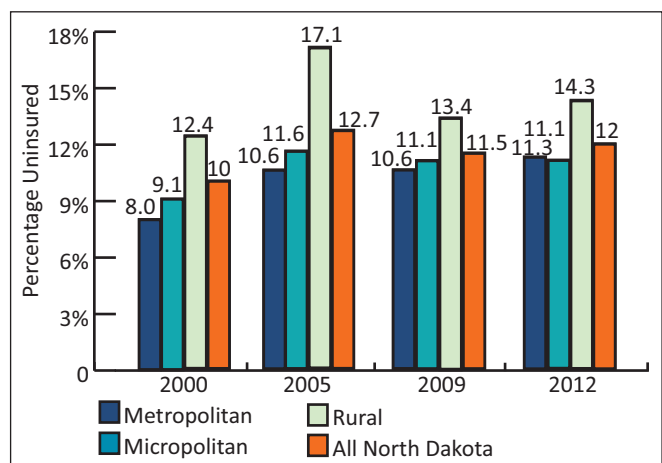


Figure 7. Percentage of North Dakota residents who had no health insurance in 2000, 2005, 2009, and 2012.²⁰

- Twelve percent of North Dakotans were uninsured in 2012, while 15.7% of the U.S. was uninsured in 2012.
- The percentage of uninsured North Dakotans dropped from 2005 to 2009 but rose slightly by 2012. The rural rate in 2012 was 15% higher than the rate recorded in 2000.
- The percentage of uninsured in metropolitan areas rose almost 3 percentage points from 2000 to 2012.
- In 2012, the micropolitan rate of uninsured was below the statewide, rural, and metropolitan (urban) rates.

The distribution of poverty across the counties of North Dakota is shown in Figure 6. 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.¹⁹ 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 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 to 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 the other states.²¹

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 2008.²² As shown in Figure 7, 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 insurance.²³

One of the strongest predictors of whether a person is uninsured is residence in a rural area. Figure 8a 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. Accordingly, the next (fourth) edition of the *Biennial Report on Health Issues for the State of North Dakota 2017* should provide a more comprehensive analysis of the impact of the ACA on the insurance status of North Dakotans.

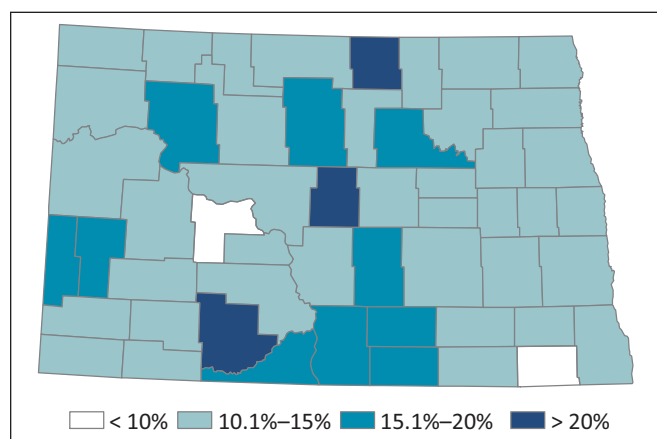


Figure 8a. Percentage of uninsured by North Dakota counties.²⁰

- Three counties have more than 20% uninsured (Sheridan 20%, Rolette 21.5%, and Grant 22.5%) and 13 counties have more than 15% uninsured. All 16 counties are rural.
- Only two counties have 10% or less uninsured (Mercer 10% and Sargent 10%). One of these counties is rural, and one is metropolitan. In the *Second Biennial Report*, three counties were below 10%.

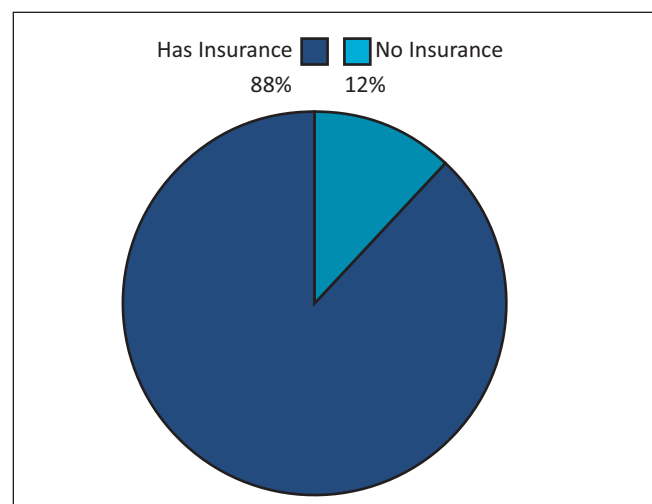


Figure 8b. Percentage of uninsured North Dakotans

- Most North Dakotans (88%) have insurance.

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). 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 actual 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 challenge of delivering 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.

Table 1. Summary of demographics in North Dakota's population by metropolitan, micropolitan (large rural), and rural areas.^{11, 18, 20}

	Metropolitan		Micropolitan		Rural	
	N	%	N	%	N	%
Total	355,759	49%	171,786	24%	195,848	27%
Gender						
Male	179,849	51%	90,181	52.5%	99,971	51%
Female	175,910	49%	81,605	47.5%	95,877	49%
Age						
Under 20	91,481	26%	44,369	26%	50,034	26%
20–39	118,797	33%	53,575	31%	41,689	21%
40–64	103,313	29%	51,193	30%	66,127	34%
65–84	35,355	10%	18,430	11%	31,350	16%
85 and Older	6,813	2%	4,219	2%	6,648	3%
In Poverty						
Yes	39,163	11%	15,762	9%	25,798	13%
No	316,596	89%	156,024	91%	170,050	87%
Uninsured						
Yes	40,165	11%	19,046	11%	28,097	14%
No	256,326	72%	119,009	69%	132,996	68%
Unknown	59,268	17%	33,731	20%	34,755	18%

- Almost half the state's population (49%) lives in a metropolitan area, and almost 27% are in a rural area of less than 10,000.
- Gender distinctions are slight with males outnumbering females in all three population classifications.
- A slightly smaller percentage of rural residents are 20 years of age or younger in comparison with the other two population classifications.
- A much smaller percentage of rural residents are young adults (age 20–39) at 21% in comparison with micropolitan (31%) and metropolitan (33%).
- A higher percentage of rural residents are older adults (65–84) and the percentage of rural people who are 85 and older is almost two 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 areas tend to be younger in comparison with both micropolitan and rural areas, but the micropolitan areas have the lowest levels of poverty and have a lower percentage without health insurance.

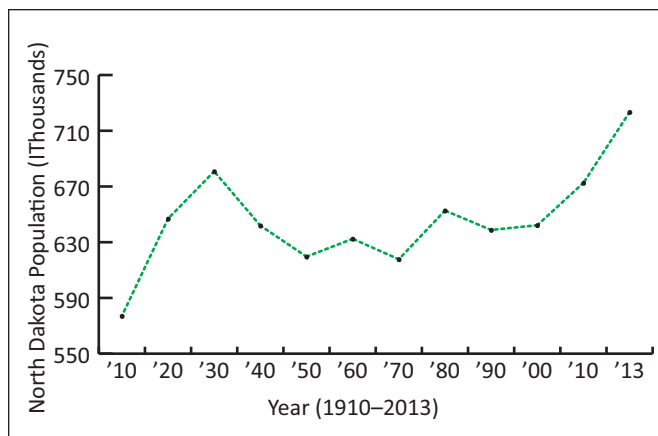


Figure 9. Population of North Dakota from 1910 to 2013.

- 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 2013 was 723,393, which potentially is a state record. North Dakota has gained about 50,000 residents since 2003, when the population was 632,809. The state potentially has gained over 50,000 residents since the 2010 census (7.5%), which is approximately twice the rate of increase found for the country (3%).⁶

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 9) 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 outmigration 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

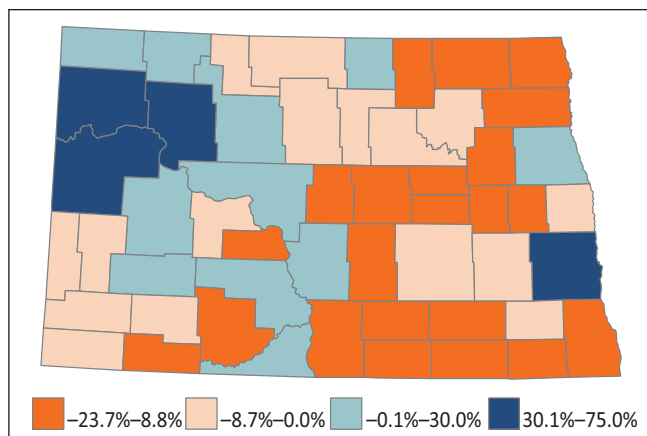


Figure 10. Percentage change in county population from 2000 to 2013.^{5, 6}

- Nine counties have increased their population by an average of 10% or more from 2000 to 2013.
- Six counties had population gains of less than 10%. From 2000 to 2013 28 counties have lost population. The largest gains seen from 2000 to 2013 were Cass, Williams, McKenzie, and Mountrail.

urban areas of the state actually grew.²⁴

From 1930 to 1950, the state's population declined from about 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 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%.²⁵ 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 10 shows the change in population by county from 1930 to 2010. The counties with the most significant increases from 1930 to 2010 were Cass, 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—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, 10} 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 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.²⁶

While the more urbanized areas continued to grow, the most rural and remote areas continued to decline in population. About one-half 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.^{5,8} 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 2010.²⁷ 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.²⁸ 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 outmigration 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 outmigration.

Growth of the American Indian population has been a 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.^{9,10} 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 11–14 show the progression of population change for people aged 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 seven counties with 27% or more of their population aged 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 37.0 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%).^{5,10} 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 aged 85 and older constitute 2.5% of the state's population (North Dakota is second only to Rhode Island as the state with the highest percentage of older adults). Nationally, 1.8% of Americans are aged 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).⁶ 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.

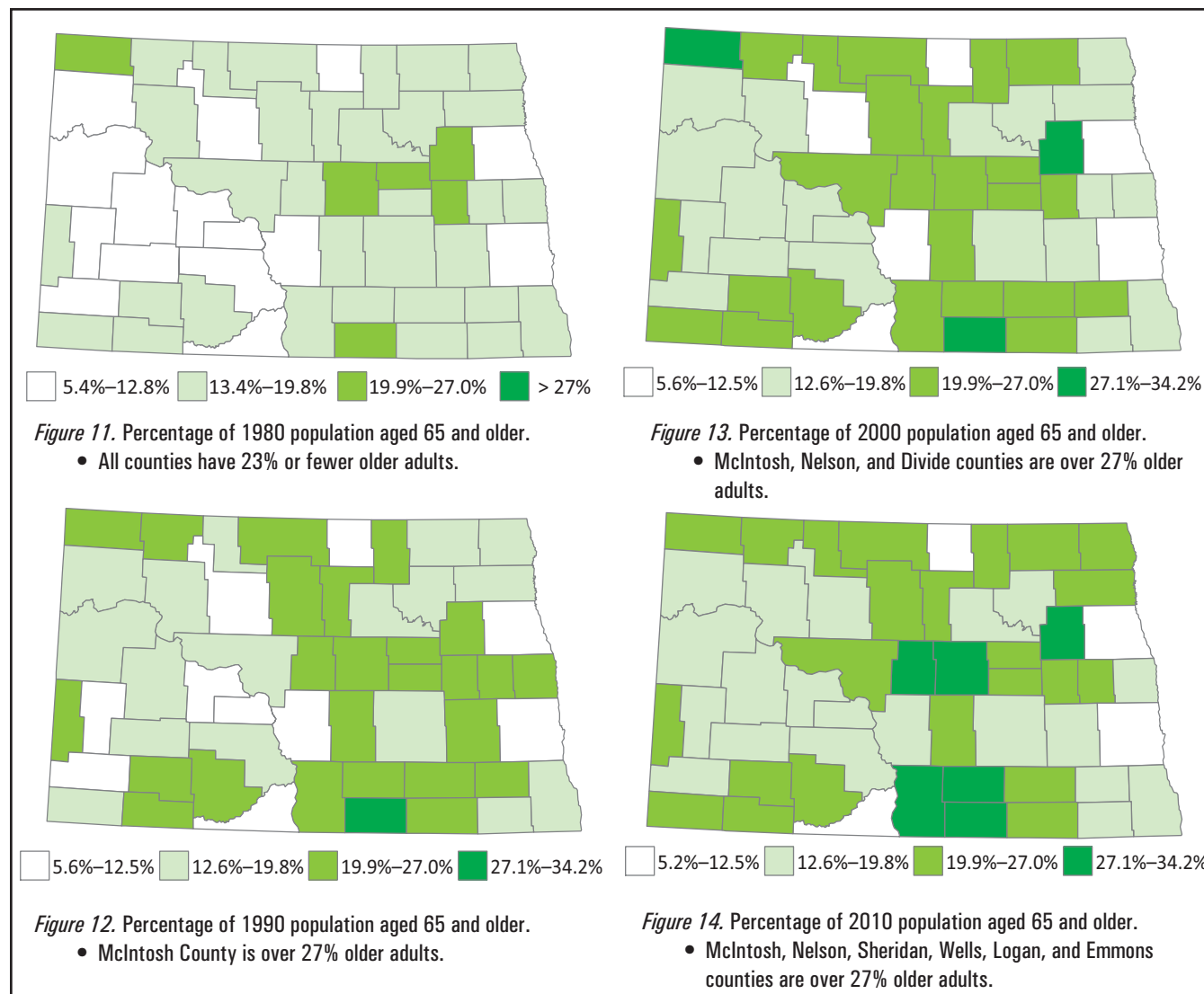
Change in Population by Metropolitan Status

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 15, of progressive urbanization of the state. In 1990, North Dakota became an urban state with more residents in

metro areas than found in rural. The outmigration from rural to urban has resulted in a 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



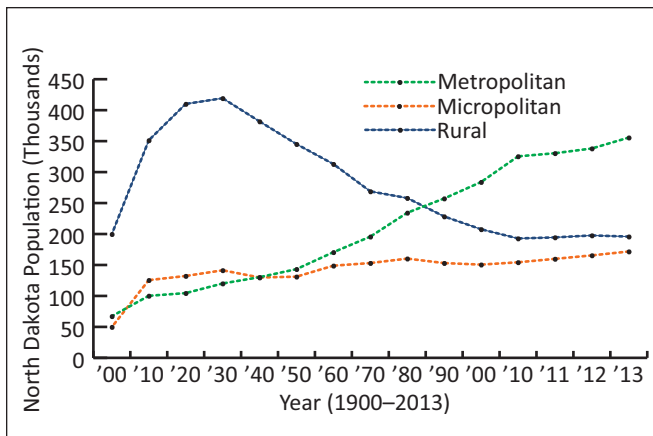


Figure 15. Population in North Dakota from 1900 to 2010 by metropolitan, micropolitan (large rural), and rural counties⁵

- Rural population has steadily decreased since 1930.
- 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.

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 2010 (see Figure 16).

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 54.4 births per 1,000 females of childbearing age in metropolitan areas, and 55.9 in rural areas. In 2010, there were 75.5 births per 1,000 females of childbearing age in rural areas, and 62.7 in metropolitan areas.

Metropolitan areas had 2,116 more births than deaths on average from 2000 to 2010. Micropolitan (large rural) areas had on average 617 more births than deaths. Rural areas have on average 186 fewer births than deaths on average. As a consequence of these two factors alone (apart from any migration effect), metropolitan population has increased more than micropolitan population has, and rural population has declined.

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 times greater than the rate for the United States as a whole.³¹ 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.

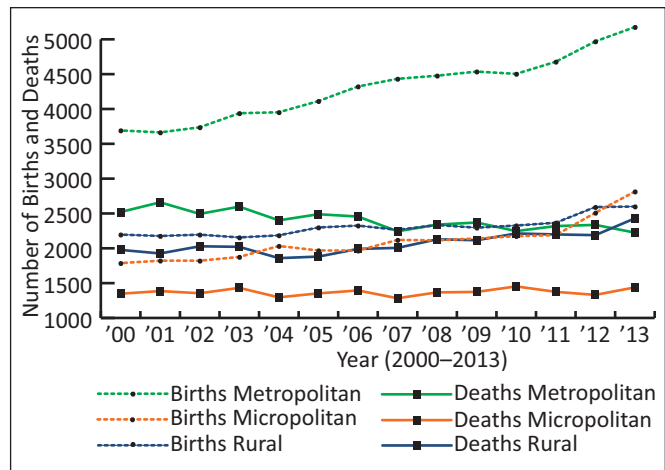


Figure 16. Number of births and deaths in North Dakota from 2000 to 2013 by metropolitan, micropolitan (large rural), and rural counties^{5, 11, 29, 30}

- Metropolitan births have been rapidly increasing.
- Rural births have been increasing slightly.
- Rural deaths have been slowly decreasing, while metropolitan and micropolitan deaths have increased.

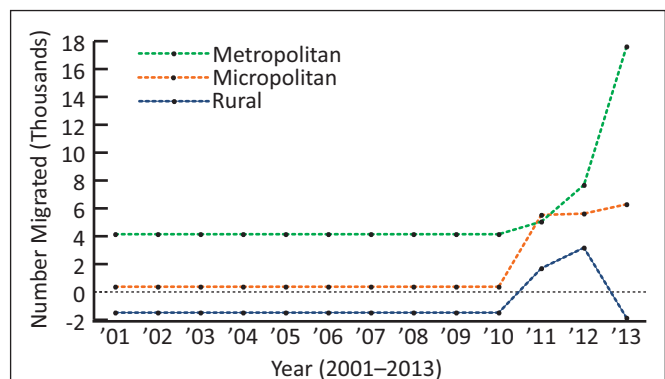


Figure 17. Net number of in- and out-migrations for metropolitan, micropolitan (large rural), and rural North Dakota.^{5, 6, 11}

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

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 5,526 people per year (see Figure 17).

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).^{6, 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.

Mindful of the skepticism regarding the reliability of economic and attendant population predictions and modeling, this *Third Biennial Report* will project future population estimates using two general approaches—a stable-growth model that utilizes data from the past to project forward, and a rapid-growth model that places more weight on the most recent changes in the state's population that are attributable to the current oil boom. The two prediction models can then be compared and contrasted.

In the discussion that follows, the first two sections address the stable-growth model, while the remaining sections deal with the rapid-growth model occasioned by the growth in the Oil Patch.

Projection to 2040 for Metropolitan, Micropolitan, and Rural Areas (Stable-Growth Model)

Based on historical trends from the prior century, there will be a continued loss of population in the rural areas and a major gain in the metropolitan areas over the next several decades (see Figure 18).

The population projection used in Figure 18 was based on Dr. Timothy Chapin's five-year cohort component projection model.⁵ This model uses historic birth rates for women of childbearing age, sex ratio of births, age-adjusted death rates, and migration rates to model future trends. The model allows growth to be projected into the future for metropolitan, micropolitan (large rural), and rural areas of the state separately (see Figure 19).

The 2010 census pegged North Dakota's population at about 672,000. The stable-growth model forecasts that North Dakota will have a population of about 796,000 in 30 years

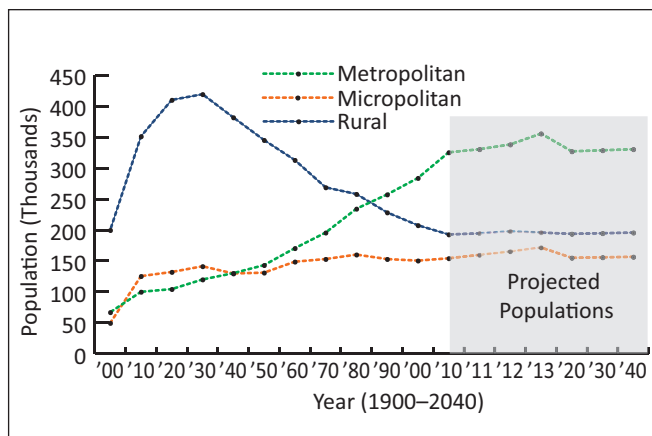


Figure 18. Projected population of North Dakota based on current trends to the year 2040 by rural, micropolitan (large rural), and metropolitan areas (based on decennial U.S. census data).⁵

- The total population in North Dakota is projected to be 746,971 by 2030, and 796,316 by 2040. By 2040, the metropolitan population will be 481,694, or 3.2 times higher than the rural county populations (projected to be 151,224).
- Rural population is expected to decline to 151,224 (-21.58%), micropolitan is expected to increase slightly to 163,339 (5.87%), and metropolitan is expected to increase markedly to 481,694 (48.02%) by 2040.

(2040). The stable-growth model predicts a significant growth in the metropolitan population of 48% with an urban population in 2040 of about 482,000. The metropolitan population under this historical growth approach would be approximately 61% of the state's population. The rural population would decline by roughly 22% to represent about 151,000 people or 19% of the state's population. The micropolitan population would have modest growth of about 6% to account for 163,000 people (21% of the population).

While a constrained historical-based approach, the stable-growth model still forecasts a profound change in the population base, one in which the gradual urbanization of the state's population accelerates over the next 30 years. This will have significant implications for policymakers as they analyze resource allocation, communities as they plan for growth (or in rural areas as they adjust to continued population decline), and the people of North Dakota as they recognize that the predominance of the state's rural orientation and culture must contend with a more urbanized composition.

Projection to 2040 for Age Groups (Stable-Growth Model)

The gradual aging of North Dakotans will place renewed 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

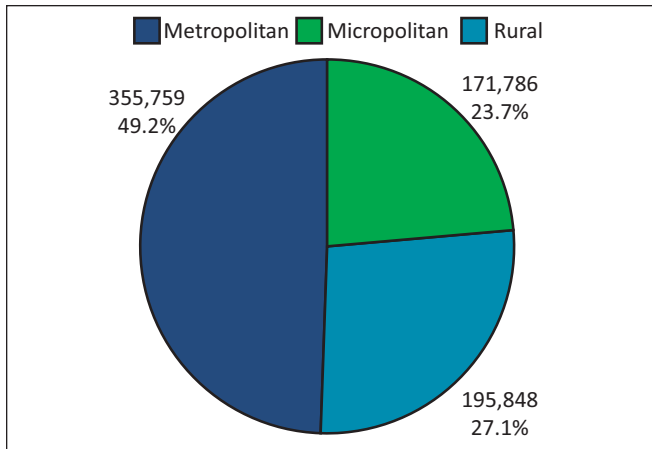


Figure 19a. Current population in 2013.^{6,11}

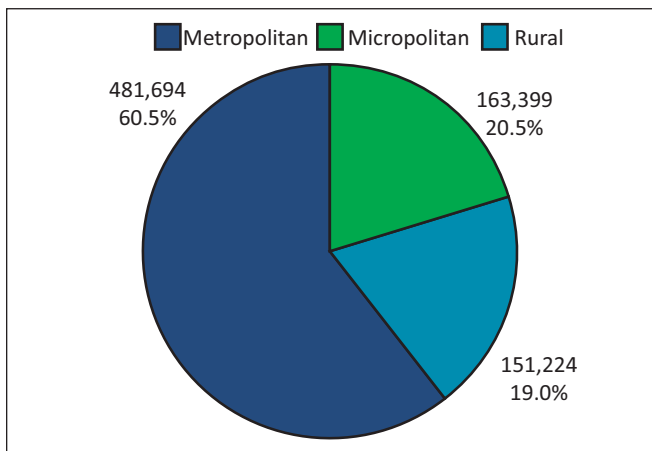


Figure 19b. Projected population in 2040.^{6, 11}

- Metropolitan counties are growing the most, while rural counties are shrinking in the North Dakota population.
- Counties with the greatest increase in older adults are more likely to be rural, especially in the center of the state.
- Births outnumber deaths 2 to 1 in metropolitan areas, while in rural areas deaths outnumber births 11 to 10.

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 2040; thus the effect of an aging population will continue (see Figure 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

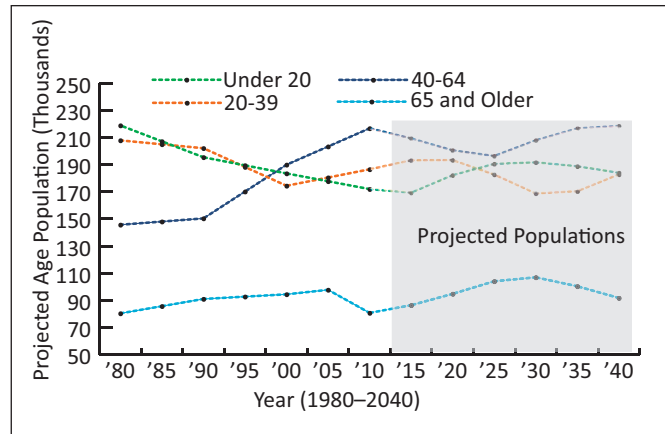


Figure 20. Projected population in North Dakota to 2040 by age groups.⁶

- The 40-to-64 age group shows the highest increase from 145,686 to 218,720.
- 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 2040.

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

Counties by Oil Production

The current oil boom has propelled North Dakota to being 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.³² All of the oil production is focused in the western half of the state, especially the far west counties (see Figure 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 a bust to the 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 continues unabated, then the younger working-age population moving in will seek not

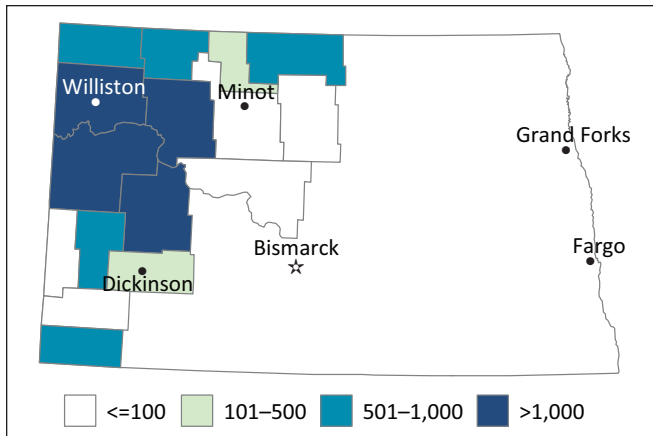


Figure 21. Oil Patch counties by number of active rigs.³³

- 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.

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 people fear a repetition. Figure 23 shows the boom-and-bust pattern over the past several decades. The current growth, however, dwarfs prior boom cycles, as shown in Figure 24.

The increase in population in the oil counties since 2000 is impressive, especially since about 2006. From the 2000 census to the 2013 census estimate, there has been an increase of about 31,845 people in the 17 primary oil-producing counties.⁶

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.³⁴ Thus the population growth and the corresponding effect on the area infrastructure, including health systems, likely will continue for many years.

Oil production continues to grow at a rapid pace. North Dakota produced more than 32 million barrels of oil in May 2014. This is an increase of more than 7% from the previous month, and an increase of more than 28% from 2013. Similarly, the number of oil and gas wells increased to 10,900 in 2014, an increase of 22% from 2013. Natural gas production increased as well by almost 33% from 2013 to 2014. The four core oil and gas counties (Dunn, McKenzie, Mountrail, and Williams) account for 87% of all oil and gas produced in North Dakota.³⁵

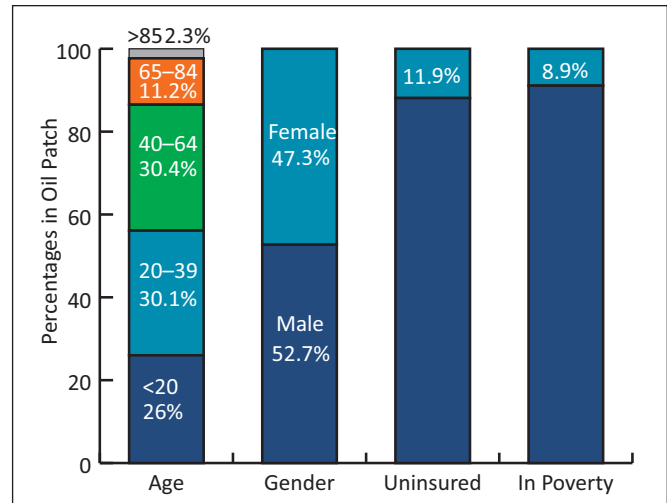


Figure 22. Age, gender, uninsured, and poverty in the Oil Patch.^{5, 15}

- 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.

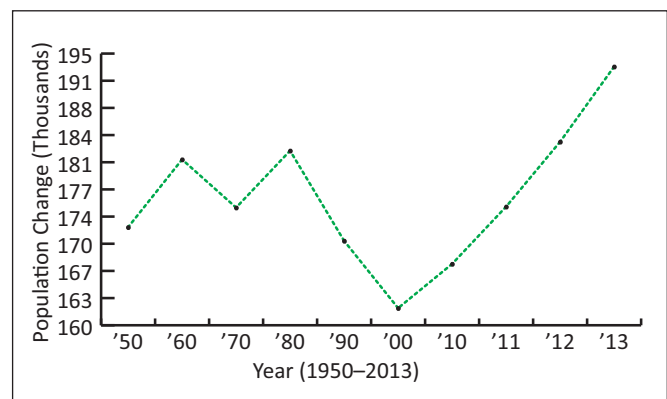


Figure 23. Change in population from 1951 to 2011.²⁸

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

Figures 25a and 25b 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 26). 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

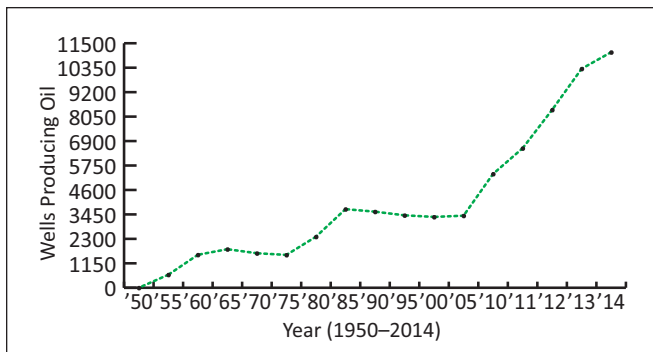


Figure 24. Number of wells producing oil in the Oil Patch since 1951.²⁷

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

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. 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.

Projected Population (Rapid-Growth Model)

In view of the current flurry of activity and growth in the oil boom counties, alternate growth scenarios to the stable-growth model have been developed that forecast a much more robust population growth over the next several decades. Part of the difficulty in modeling and predicting future growth is that traditional models make trend projections based on many years of past data. Since the current growth in Oil Patch counties has occurred in such a relatively short time, the effect of dramatic growth necessarily is underestimated in a stable-growth model. Other modeling techniques arrive at much different conclusions. Thus a stable-growth model predicts a population in North Dakota of about 725,000 people or growth of 6% by 2025, while a housing forecast (presumably using a rapid-growth model) from the 2012 North Dakota Statewide Housing Needs Assessment predicts about a 25% growth to 841,820.³⁷ Note that the 2013 population likely has already exceeded 723,000.

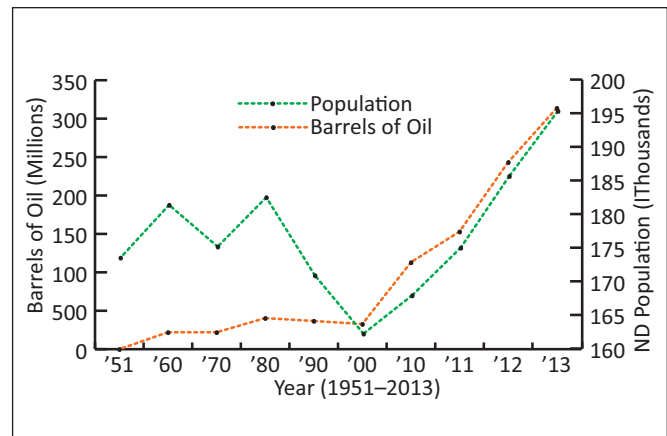


Figure 25a. Barrels of oil produced and population from 1951 to 2011 for all counties in the Oil Patch.

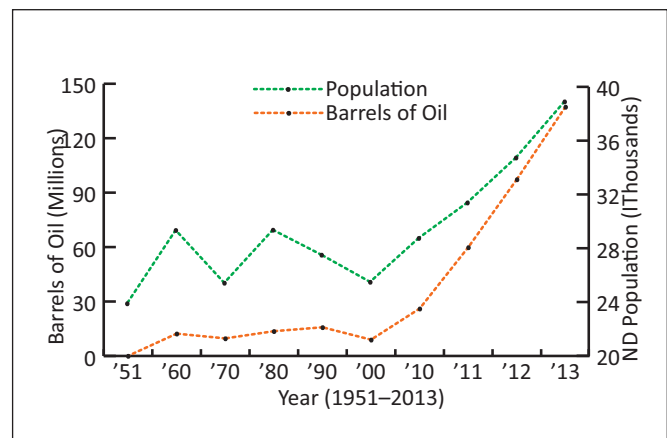


Figure 25b. Barrels of oil produced and population from 1951 to 2011 for counties with a history of high production of oil (McKenzie and Williams).²⁷

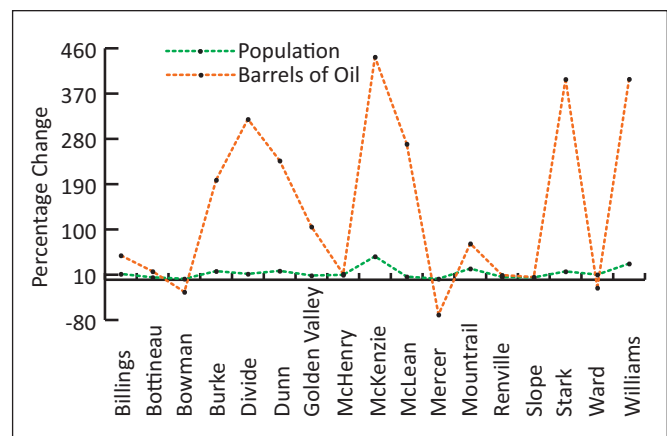


Figure 26. Percentage change in barrels of oil and population from 2008 to 2011 for counties in the Oil Patch.^{36, 37}

An even more dramatic degree of growth is predicted by a different modeling method using what is called a cohort component model. As shown in Figure 27, the population in Oil Patch counties may increase from the current level of about 160,000 to as much as 700,000. That would result in an overall North Dakota population of almost 1.2 million people by as early as 2020.

From a policy perspective, projections such as these can be used to assist in planning for future changes in needed healthcare infrastructure. Such a population increase would significantly affect service demand, with implications for hospitals, clinics, emergency medical services, public health, long-term care, and other health and medical providers. The healthcare workforce implications of population growth are enormous, as will be discussed in Chapters 3–5 and 9. But to outline the scale of provider resources required to service a significant population growth, a convenient rule of thumb is that every 100,000-person population uptick will require around 231 more physicians (not to mention the multiple other required members of the healthcare team such as nurses, nurse practitioners, and occupational therapists). Thus an increase in population to 1.16 million in the course of one short decade would require more than 1,000 more physicians above the shortfall of at least 260 that is already projected.

The cultural and social identity of a traditionally rural state will be challenged under rapid growth. Some of this is because of the influx of people who do not have a previous connection to the state (e.g., oil, energy, and related industries will continue to import new citizens as the state's economy continues to expand). The ongoing erosion of the Scandinavian and German cultures of the original settlers of the state (with the related effect on the cultural norms of rural North Dakota) will be felt as the state gradually becomes more diversified, and much more urbanized. Political ramifications will be experienced as the state Legislature that had strong rural representation will reflect the population shifts with legislative reapportionment reflecting urban majorities.

To some extent, one of the demographic changes at play is that for a number of decades there has been a fairly uniform depopulation of rural North Dakota (with the exception of counties with a significant American Indian population). In general, rural eastern, central, and western counties faced some degree of continual population loss, and it was essentially uniform across the state. Today, and for the foreseeable future, there are now two rural North Dakotas. One North Dakota, because of the changes in technology that have driven the oil expansion (and the resultant natural gas development), will feel the effect of population gain, both good and bad. The second North Dakota, based more on traditional economic structures, likely will experience a continued population loss. Each demographic scenario will have a lingering and profound effect on the rural

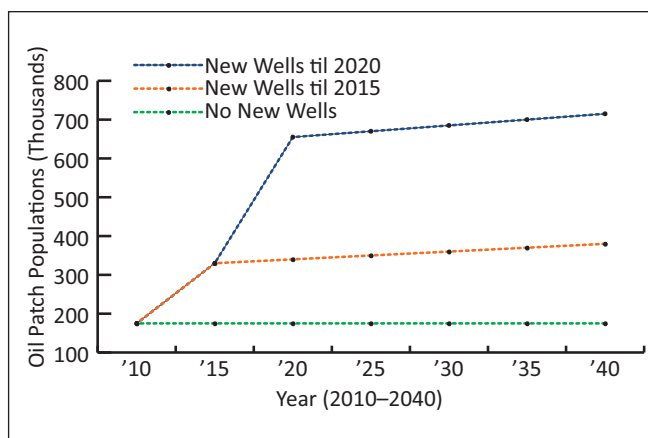


Figure 27. Oil Patch population projections using rapid-growth model (based on decennial U.S. census data).

- If no new wells were drilled, the population would stay nearly stable.
- If new wells are drilled at the current rate until 2015, the population would increase to approximately 334,000 and stabilize for the 17 oil counties. The state population would be approximately 840,000 in 2020, based on this more restrained growth projection.
- If new wells are drilled at the current rate until 2020, the population would increase to approximately 664,000 and stabilize for the 17 oil counties. The state population would be approximately 1,160,000 in 2020, based on this more optimistic growth projection.
- The population in the Oil Patch is highly related to oil production. If the current boom were to bust before any of the projected time frames, then the population likely would decline back to the stable projection.

communities that must contend with either of these new or established forces. For some, it will be the pressure of incorporating hundreds and even thousands of new people; for others, it will be the pressure to contend with a gradual decline in population. Both scenarios place stress and pressure on housing, schools, churches, healthcare systems, and physical and cultural infrastructure.

Figure 28 is a pyramid population graph based on an aggressive population impact model resulting from the oil boom, where the population of North Dakota is predicted to exceed 1 million. It is used to show how the total population of North Dakota might change over time for different age groups and gender. The oil boom would add a large number of males aged 20 to 54 over time (nearly double), while females would have a lesser increase. The population of older adults would decrease through outmigration.

SUMMARY AND OBSERVATIONS

The anticipated changes in population will have a significant 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.

Correspondingly, the continuing decline in the rural population outside of Oil Patch counties 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.

With the population growth in the western oil impact area will come new demands on local health systems. The

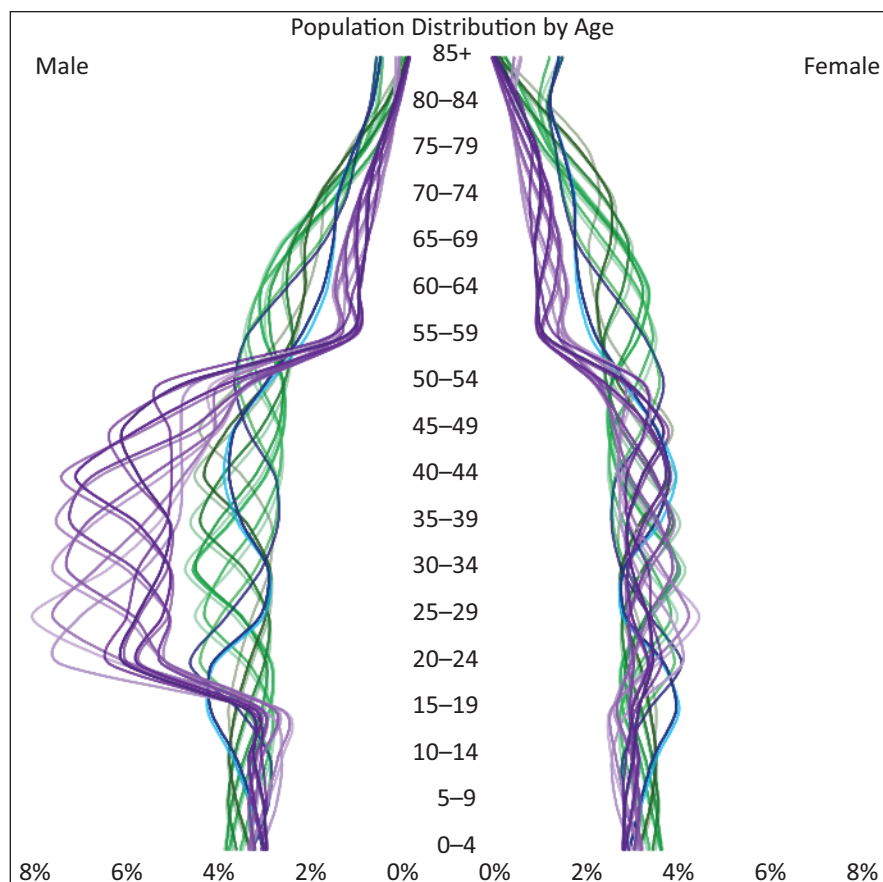


Figure 28. Population distribution by gender and age, showing the stable growth (unadjusted) distribution in green, and the rapid growth (adjusted for oil boom) demographics in purple.

- Dramatic increase in young and middle-aged males with the rapid growth model.
- Distribution of females by age is largely unaffected by the oil boom.

rapid-growth projection indicates significant population increases in the oil counties, and the overall state population could swell to almost 1.2 million. If the oil well expansion continues at its present pace, North Dakota could see its population almost double in a decade (i.e., by 2020). The ability of a healthcare delivery system that is already taxed to continue to provide quality care will be a challenge. There are needs for more providers, the emergency care system including emergency rooms is overburdened, and there are serious challenges related to reimbursement and payment. As the population expansion continues, this will only affect the delivery system to a greater degree.

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.

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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 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, delays in seeking appropriate care, unpreventable hospitalizations, and

excessive utilization of higher-cost access points such as an emergency room. Limiting access exacerbates impaired health status 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 status); 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; thus this is strong evidence of concern. The number one 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 to other countries, accounting for 17.7%⁷ of gross domestic product (GDP), which is a common and accepted measure of economic production and activity. In comparison, healthcare in the next most expensive countries of the Netherlands and France accounts for approximately 11.5% 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 8 percentage points higher than the OECD average of only 9.3%. Healthcare spending in the United States is expected to top 20% by 2021. In terms of per capita spending, the United States spent \$8,508 in comparison to the next highest countries of Norway (\$5,669) and Switzerland (\$5,643) in 2011 (most recent data year). Per capita health spending in the United States is roughly two-and-a-half times greater than the OECD average (\$3,322).⁸ At the same time, our high costs do not necessarily translate into the best health outcomes because the United States ranked 33rd in life expectancy (181

countries compared) and 48th in infant mortality (221 countries compared).⁹ In comparison to 1970, when the United States had a life expectancy rate that was one year *above* the OECD average, in 2011 the U.S. had a life expectancy that was more than one year *below* the OECD countries.^{10, 11} The United States is a higher user of healthcare services too. For example, 25% of Americans take four or more prescription drugs regularly compared to 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.¹² 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.¹³ 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.¹⁴

The fourth primary driver of health policy for improved population health is the availability of healthcare providers. This issue is a central subject of the *Third 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.¹⁵ 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.¹⁶ 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 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 *Second Biennial Report*, except at that time, females had a higher rate of not exercising. Rural women have higher rates for smoking, 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. Metropolitan women have higher rates of drinking alcohol, and drinking and driving than micropolitan and rural women. 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, the lack of exercise and attendant obesity is an increasing problem. Data from the 2010 Behavioral Risk Factor Surveillance System, reported in the *Second Biennial Report*, showed that the overall rate for not moderately exercising was 43.6%; however, the 2011 data indicated that this had increased to 57.9%.¹⁷ Further, there are some data that suggest that North Dakota is experiencing a continuing problem with alcohol use. The number reporting drinking alcohol in 2010 was 58.4%, with a slight

Table 2

Percentage of adults reporting behaviors ^{17,18}

N = ()	Total (540,271)	Female (268,529)	Male (271,742)	18–39 (204,716)	40–64 (216,454)	65–84 (92,652)	85+ (13,126)
Smokes	20.9	16.0	19.6	26.6	21.1	9.4	2.1
Metro	17.8	16.0	19.6	22.5	15.9	7.8	2.3
Micro	23.1	19.4	26.9	32.8	21.6	10.4	3.2
Rural	23.0	20.8	25.1	27.9	26.5	10.2	1.4
Drinks Alcohol	59.1	52.2	65.9	66.7	64.6	45.3	27.4
Metro	64.1	60.1	68.3	72.5	65.9	48.2	28.3
Micro	60.5	49.9	71.5	66.2	64.1	47.5	35.8
Rural	53.0	44.5	60.8	60.2	55.7	41.9	22.8
Binge Drinks	23.2	17.6	28.8	36.7	20.7	4.3	1.6
Metro	23.5	19.7	27.5	37.3	19.5	2.2	2.5
Micro	24.0	17.0	31.3	37.9	20.6	7.2	2.1
Rural	22.4	15.4	28.8	35.3	22.0	4.6	0.7
Drinks & Drives	3.2	1.1	5.3	4.1	3.7	0.3	-
Metro	3.0	1.6	4.4	3.6	2.8	0.2	-
Micro	3.8	0.8	6.9	4.3	5.1	0.8	-
Rural	3.2	0.7	5.4	4.5	3.8	0.1	-
Doesn't Always Wear a Seat Belt	33.9	24.8	42.9	38.9	31.9	27.6	28.3
Metro	31.2	17.8	34.1	30.8	23.6	17.2	17.5
Micro	19.3	20.5	43.3	35.1	32.0	26.1	25.4
Rural	49.5	35.3	51.4	50.6	40.7	36.7	38.9
Doesn't Exercise Moderately	57.9	56.6	59.2	55.2	58.2	60.2	66.8
Metro	54.9	55.8	53.9	51.1	57.1	56.2	64.5
Micro	60.1	55.1	65.4	60.0	60.3	63.9	64.8
Rural	60.1	58.6	61.5	59.9	58.2	62.2	69.4

Data for adults are from the CDC's 2010 Behavioral Risk Factor Surveillance System survey in North Dakota with the exception of exercise, which is from the 2009 survey.

- The prevalence of smoking in North Dakota is the same as the national prevalence (17.3%).
- Adults in North Dakota drink more on average than the nation (58.4% compared to 54.6%) and binge-drink slightly more (15.4% compared to 15.1%).

increase noted for 2011, (59.1%). Binge drinking in 2010 was 15.4% and increased to 23.2% in 2011. However, the number of people drinking and driving decreased slightly from 3.6% to 3.2%, respectively. This may be borne out in the number of DUI arrests as they decreased by 3.2% from 2010 to 2011 (7,322 to 7,086), according to the North Dakota attorney general's office.

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

- Drinking in younger (< 65) males in micropolitan (large rural) areas
- Smoking in younger (< 40) males in micropolitan (large rural) or rural areas (see Figure 30)
- Binge drinking in younger (< 40) males (see Figure 29) in micropolitan areas (see Table 2)
- Drinking and driving in younger (< 40) males and

those in micropolitan and rural areas

- Not wearing a seat belt in younger (< 40) males in rural areas
- Not exercising moderately in older (> 65) females in rural areas

BEHAVIORAL TRENDS

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 30). 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

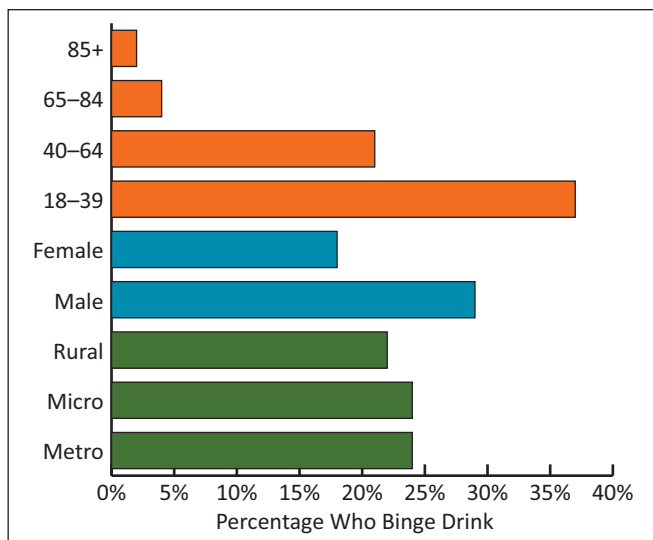


Figure 29. Binge drinking in North Dakota.¹⁷

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.^{19, 20}

GENERAL HEALTH

Table 3 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 when compared to

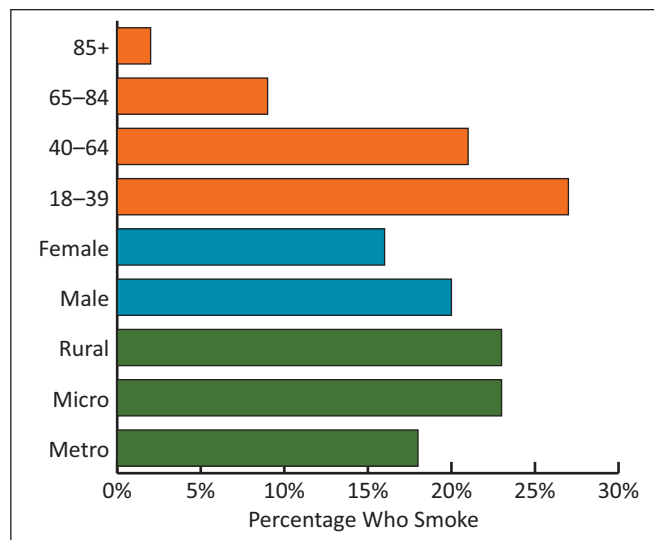


Figure 30. Smoking in North Dakota.¹⁷

the country as a whole (e.g., fair/poor health, high cholesterol, high blood pressure, diabetes, cholesterol screen, influenza immunization, asthma, and sigmoidoscopy/colonoscopy). However, in North Dakota, the number of people who are overweight and obese is higher, (62.2% vs. 60%), and the state has a lower pneumonia immunization rate (24.9% vs. 25.4%). In the *Second Biennial Report*, it was reported that North Dakota scored slightly better on overweight/obesity by having 62% of the population so classified versus a national rate of about 64%. Thus the North Dakota rate has stayed constant, but for the country, this has improved. This will be an issue for North Dakotans to monitor. In a similar manner, the percentage of North Dakotans viewing themselves as having only fair or poor health is roughly the same as was reported two years ago; however, the U.S. rate has worsened (18% versus 14.9% in 2012.)

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 31).

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.³ 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.²¹ 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

Table 3

Percentage of adults reporting health conditions.^{17, 18}

N = ()	Total (540,271)	Female (268,529)	Male (271,742)	18–39 (204,716)	40–64 (216,454)	65–84 (92,652)	85+ (13,126)
Disabled	16.0	16.6	15.5	8.5	18.8	25.6	30.5
Metro	16.3	15.2	16.4	8.2	21.5	25.1	25.7
Micro	14.0	15.6	12.3	4.2	16.0	30.2	32.6
Rural	16.9	17.7	16.2	11.3	17.4	23.8	33.7
Overweight/ Obese	62.2	51.9	72.4	54.4	70.4	67.8	49.0
Metro	60.1	49.3	71.5	52.7	69.8	67.1	45.0
Micro	63.4	49.2	78.6	59.1	69.5	68.7	48.4
Rural	63.7	56.6	70.0	53.6	71.6	68.0	52.7
General Health Fair/Poor	13.3	16.2	13.5	5.5	15.0	24.1	38.4
Metro	11.4	10.9	11.9	4.2	13.4	22.8	38.7
Micro	12.9	12.3	13.6	5.0	15.0	24.2	30.8
Rural	15.6	16.3	15.0	7.4	16.7	25.2	41.6
1+ Days Poor Health	19.0	21.7	16.4	19.1	19.5	17.1	24.3
Metro	19.1	21.8	16.4	16.9	21.4	19.4	22.6
Micro	21.2	23.0	19.4	31.0	21.5	19.1	27.1
Rural	17.8	20.9	15.0	20.6	16.5	14.3	24.6
1+ Days Poor Phys. Health	33.6	39.0	28.2	32.5	31.9	37.3	46.3
Metro	36.2	40.4	31.8	37.0	34.7	37.8	37.7
Micro	32.9	38.8	26.9	29.7	30.3	39.3	60.2
Rural	31.2	37.6	25.4	28.8	29.6	36.0	47.5
1+ Days Poor Mental Health	31.4	36.8	26.1	38.2	30.6	19.2	20.0
Metro	32.8	39.0	26.3	40.4	30.4	20.3	11.9
Micro	31.1	37.0	25.2	34.3	31.8	22.2	25.3
Rural	30.1	34.2	26.4	37.8	30.2	16.9	24.4

Note. Data for adults are from 2010 BRFSS survey in North Dakota.

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

- Disability—older (> 65) males in micropolitan (large rural) areas.
- Overweight/Obese—40- to 84-year-old males (see Figure 31) in rural areas.
- Fair/Poor Health—older females in rural areas.
- Days with Poor Health—older females in rural areas (see Figure 32).
- Days with Poor Physical Health—older females in metropolitan areas.
- Days with Poor Mental Health—younger females in micropolitan areas.

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

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 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 3) once again indicate concern for a specific subpopulation that rests in rural areas and to some extent

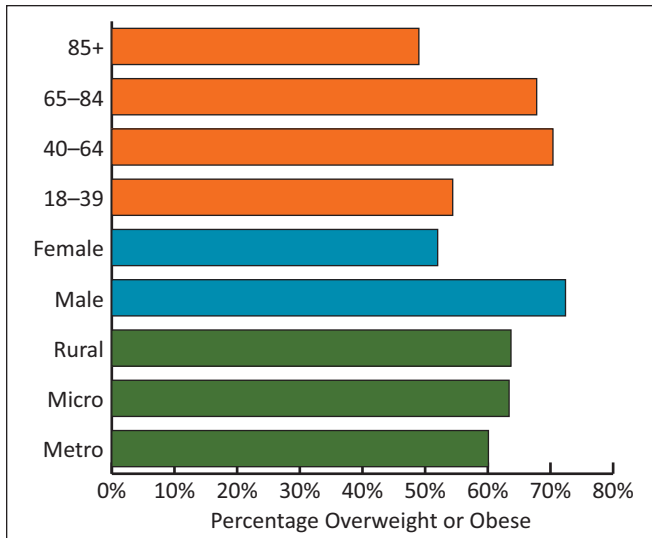


Figure 31. Overweight/obese in North Dakota.¹⁷

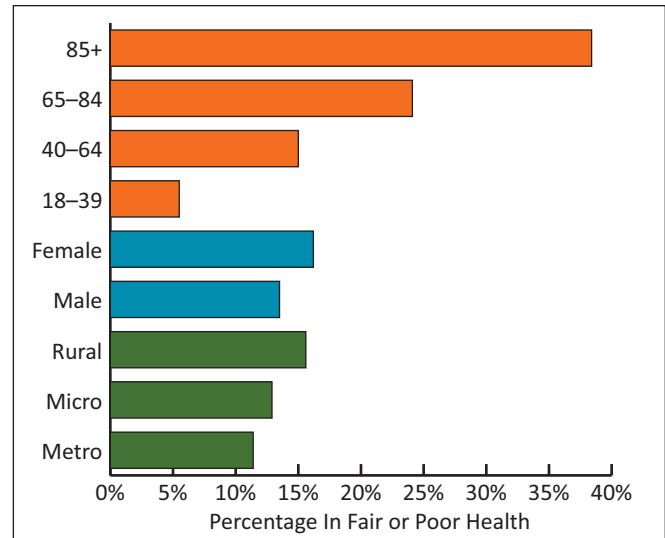


Figure 32. Fair/poor health in North Dakota.¹⁷

Table 4

Percentage of adults reporting chronic health conditions.^{17, 18}

N = ()	Total (540,271)	Female (268,529)	Male (271,742)	18-39 (204,716)	40-64 (216,454)	65-84 (92,652)	85+ (13,126)
High Cholesterol	23.5	27.2	25.7	6.3	35.6	50.7	39.4
Metro	27.3	28.0	26.6	7.3	38.6	49.4	39.9
Micro	25.1	26.3	23.8	5.8	35.7	48.8	33.6
Rural	26.3	27.0	25.8	5.2	32.0	52.8	41.2
High Blood Pressure	29.0	27.4	30.7	10.6	34.0	57.2	55.0
Metro	28.2	27.4	28.9	9.0	35.6	56.5	59.7
Micro	29.5	28.3	30.9	14.2	32.6	59.2	63.6
Rural	29.8	26.9	32.6	10.4	33.0	57.0	47.9
Arthritis	24.4	28.6	20.3	5.6	28.5	53.9	57.0
Metro	22.5	24.8	20.0	4.0	29.3	51.5	54.8
Micro	24.8	28.9	20.7	6.3	227.1	58.4	56.5
Rural	26.3	32.8	20.4	7.0	28.4	53.7	59.1
Asthma	10.5	11.6	9.4	16.4	8.00	10.5	7.7
Metro	9.4	11.4	7.3	11.8	7.3	11.3	5.9
Micro	11.0	11.9	10.0	13.3	9.5	9.0	8.7
Rural	11.5	11.7	11.3	16.4	7.9	10.5	8.8
CVD	4.1	3.0	5.2	0.4	3.7	12.3	15.5
Metro	4.3	3.2	4.0	0.8	3.6	15.1	14.7
Micro	3.6	3.3	4.9	-	3.1	11.9	15.1
Rural	4.2	3.3	4.9	0.1	4.2	10.2	16.4
Diabetes	8.6	8.2	9.0	1.5	9.5	21.8	18.7
Metro	7.2	7.2	7.3	1.6	7.8	20.0	22.7
Micro	8.4	6.0	10.8	1.8	8.0	22.7	25.0
Rural	10.2	10.6	9.8	1.2	12.1	22.8	12.4

Data for adults with asthma, CVD, and diabetes are from 2010 BRFSS survey in North Dakota. Data on cholesterol, blood pressure, and arthritis are from 2009 survey.

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

- High Cholesterol—older (65-84) females in rural areas
- High Blood Pressure—older (65+) males in rural areas
- Arthritis—older (65+) females in rural areas
- Asthma—younger (18-39) females in micropolitan (large rural) areas
- Cardiovascular disease—older (65+) males in rural areas
- Diabetes—older (65+) males in rural areas

micropolitan areas. Age appears to be a factor (particularly being older). In some cases, being a male presents more problems (e.g., overweight), while under different measures, being female is associated with negative health factors (e.g., general fair or poor health, mental health). Geographical location (e.g., rural) 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 4, 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 (23.5% compared to 29.6%), high blood pressure (29% compared to 31.5%), asthma (10.5% compared to 13.2%), and diabetes (8.6% compared to 10.2%) 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 33), while asthma is somewhat more common in younger patients (see Figure 34).

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 40% of the country's population) 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 75% of the cost of healthcare in the United States is related to chronic disease.^{22, 23}

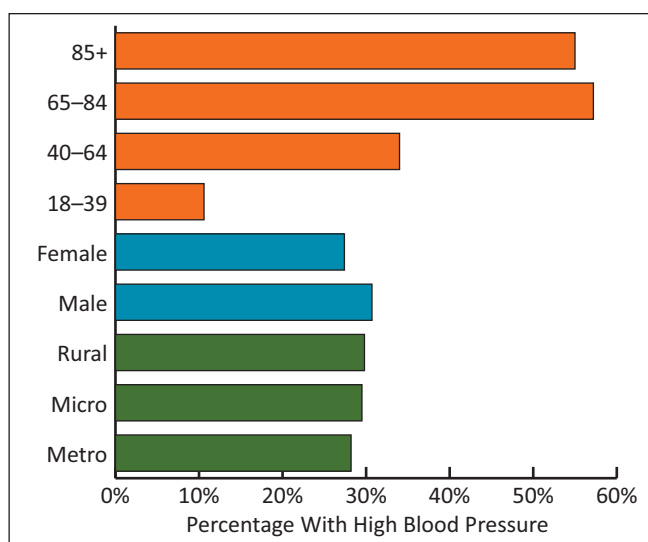


Figure 33. Prevalence of high blood pressure.¹⁷

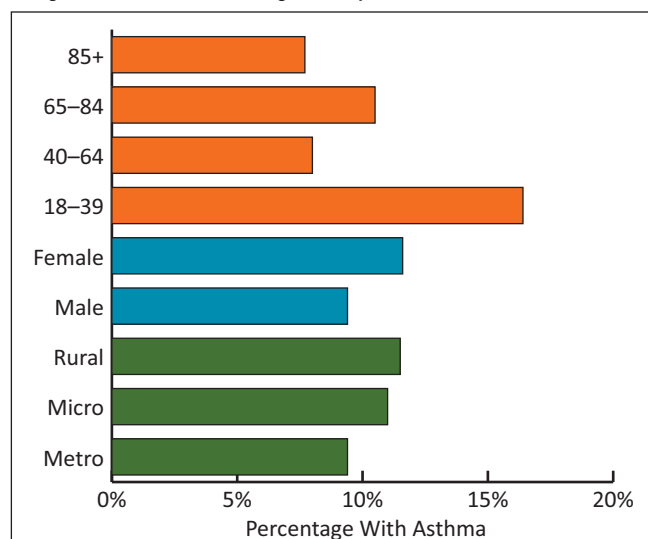


Figure 34. Prevalence of asthma.¹⁷

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.²⁴ 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.²⁵ Newer concepts such as patient-centered medical homes and health system delivery channels such as Accountable Care Organizations (ACOs) will be used to facilitate better care coordination and disease management (see Chapter 7 for more on health reform and ACOs).

Figures A–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 (> 30%) for the southwest region of the state. High blood pressure is prevalent (> 25%) in all four parts of the state with the highest level (over 31%) also in the southwest section. Cardiovascular disease also strikes the southwest area of the state the hardest (> 5%). Diabetes has the lowest prevalence in the northeast part of the state (4.7%). It is most prevalent (> 8%) in the southwest and northwest parts of the state. Arthritis is most prevalent (> 23%) in the west, the northwest and the southwest. Asthma is focused in the north, northwest and northeast (> 10%).

Chronic disease is both a national and statewide concern. In a recent analysis of the Community Health Needs Assessments completed from 2011 to 2013 by all nonprofit hospitals in North Dakota, the Center for Rural Health found that out of 21 community health needs identified by rural

and urban North Dakotans, obesity and physical inactivity was the second-highest concern, with chronic disease management being the fourth. The source of the data included community surveys, one-on-one interviews, and focus groups; thus, there is growing evidence that the chronic disease concerns expressed by health professionals has resonated with citizens. Throughout the state, community coalitions have been initiated to develop solutions to address chronic disease 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.

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:

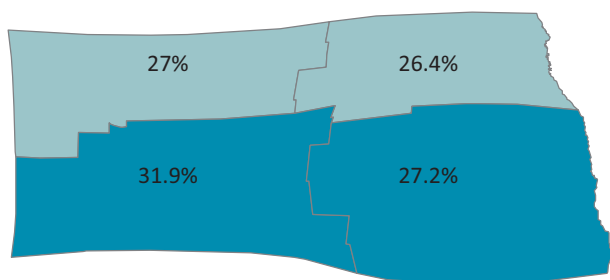


Figure A. High Blood Pressure.¹⁷

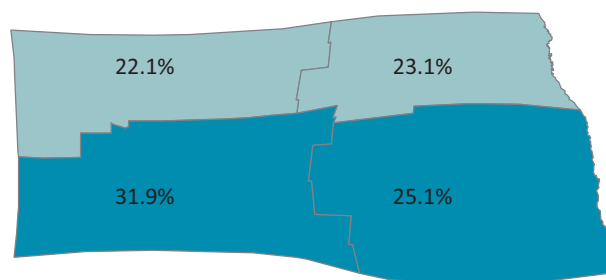


Figure B. High Cholesterol.¹⁷

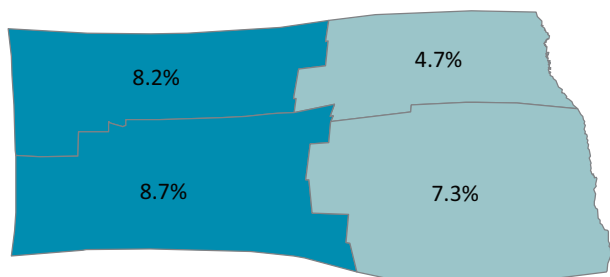


Figure C. Diabetes.¹⁷

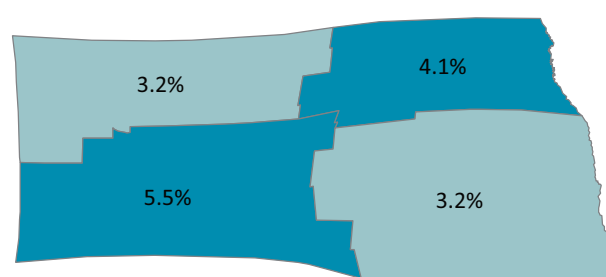


Figure D. Cardiovascular Disease.¹⁷

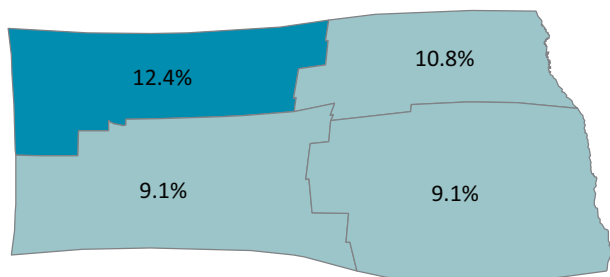


Figure E. Asthma.¹⁷

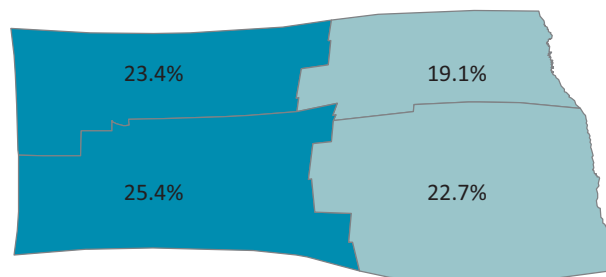


Figure F. Arthritis.¹⁷

Table 5

Youth risk behaviors.²⁶

N = ()	Total (43,385)	Female (21,335)	Male (22,050)
Smokes	25.7%	21.5%	29.7
Drinks	35.3%	35.9%	34.7
Drinks & Drives	10.7%	8.9%	12.4
Doesn't Always Wear a Seat Belt	11.6%	8.5%	14.5
Doesn't Exercise Moderately	49.4%	54.5%	44.6
Overweight/ Obese	28.6%	25.2	31.8
Has Long-Term Health Problems	14.7	16.2	13.1

Data for children middle school and high school age are from 2011 Youth Risk Behavior Survey in North Dakota.

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

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 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 5, adolescent females have a generally poorer behavioral risk profile than do adolescent males for drinking and not exercising moderately; however, adolescent males have greater issues with tobacco use, 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 one in three 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 13.7 million Americans with a history of cancer were alive in 2012.²⁶

An estimate from the American Cancer Society is that in 2014 about 176,000 cancer deaths (out of an estimated 585,700 cancer deaths) will be caused by tobacco use, which increased from the 173,000 reported for 2012 in the *Second 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.^{27, 28} 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 only fallen a little.²³ The American Cancer Society estimates that in 2014 there will be more than 1.6 million new cases of invasive cancer in the United States.²²

Age is a primary risk factor for most cancers, with about 77% of all cancers diagnosed among individuals ages 55 or older. Men have about a one in two lifetime risk of developing cancer whereas for women the risk is about one in three. 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.²²

According to the American Cancer Society, the disparities in the cancer burden among racial and ethnic minorities rests with 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 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.²⁷ 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.²⁹

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 objectives. For example, one objective is to reduce the overall cancer death rate by 10% (from 178.4 deaths per 100,000 to 160.6 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 6 and Figure 35).

Table 6
Cancer rates per 100,000 people.³⁰

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
15-19	29.3	14	-	-	-	-
20-24	32.7	20	36.7	12	-	-
25-29	68.2	35	54.6	15	83.9	20
30-34	115.1	50	113.1	26	117.4	24
35-39	140.9	52	83.0	16	204.4	36
40-44	224.1	86	101.3	20	354.2	66
45-49	362.0	160	268.9	60	356.8	100
50-54	638.3	322	566.1	144	711.7	178
55-59	911.8	435	950.6	233	870.8	202
60-64	1,323.1	507	1,512.8	297	1,123.8	210
65-69	2,026.2	545	2,289.8	304	1,769.2	241
70-74	2,007.0	421	2,572.5	252	1,511.5	169
75-79	2,497.5	456	3,223.4	260	1,923.1	196
80-84	2,521.5	387	3,386.3	211	1,930.5	176
85+	2,039.4	350	2,577.1	147	1,771.7	203
All ND	488.2	3,857	543.0	2,019	449.9	1,838

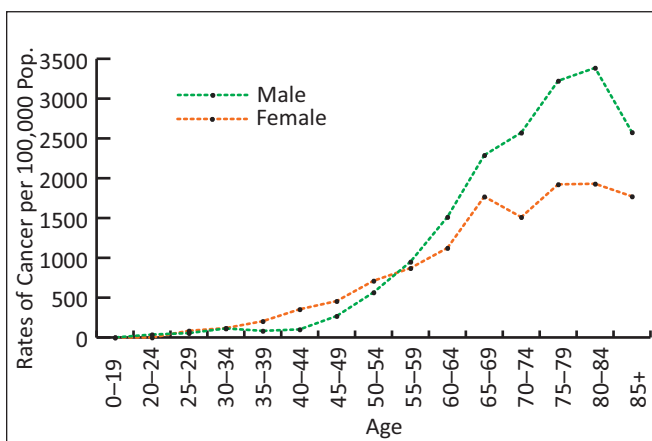


Figure 35. Rates of cancer per 100,000 people in North Dakota by age.³⁰

- 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.

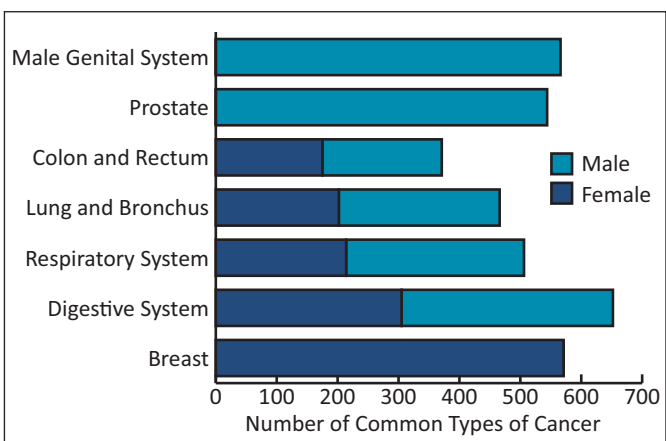


Figure 36. Incidence of most common types of cancers in North Dakota.³⁰

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

Digestive system cancer is the most commonly diagnosed cancer in North Dakota (see Table 7 and Figure 36), 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 (see Figures 37 and 38).

Screenings and Immunizations

Table 8 on page 35 shows the percentage of adults in North Dakota who have had screenings for high cholesterol (past five years), digital rectal exam (ever), 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.

Populations at risk for not testing include the following associations:

- High cholesterol—older (age 85+) females in metropolitan areas
- Prostate-specific antigen—older (65–84) males in metropolitan areas
- Blood stool test—older (85+) females in rural areas
- Sigmoidoscopy/colonoscopy—older (65–84) females in metropolitan areas
- Mammogram—older (65–84) females in rural areas
- Pap smear—older females in rural areas
- Yearly flu vaccine—older (85+) females in metropolitan areas
- Five-year pneumonia vaccine—older (85+) females in 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.

Table 7

Most common cancer rates ^{17, 18}

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

Rate = number of cases/population

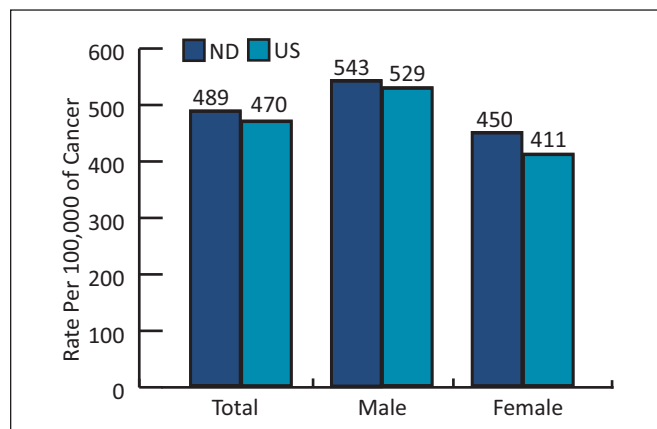


Figure 37. Rate of all cancers in North Dakota and the United States by gender.^{30, 31, 32}

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

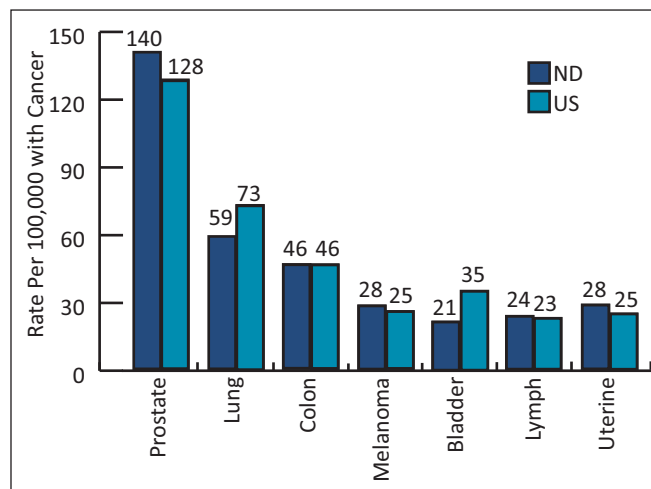


Figure 38. Rate of all cancers in North Dakota by cancer type.^{30, 31, 32}

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

Table 8
Screenings.^{17, 18}

N = ()	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	74.4	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	73.8	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	57.5	57.5	-	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	8.5	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	59.3
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 2010 BRFSS survey in North Dakota. Data on cholesterol are from the 2009 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.

- People in North Dakota were more likely to have blood stool screening compared to the United States (15.5% to 15.2%), Pap smear tests than the United States (88.7% to 86.6%), and flu (38.5% to 34.4%).
- Screenings were lower in North Dakota than the United States: cholesterol (75% compared to 77.4 %), sigmoidoscopy (27.4% compared to 28.3%), and mammograms (61.6% compared to 62.7%). Immunizations for pneumonia (24.9% compared to 25.4%) were lower in North Dakota.

According to Healthy People 2020, people in the United

States continue to develop diseases that are vaccine preventable. The increase in life expectancy (from about 49 years in 1900 to 78 years in 2000) 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 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).²⁸

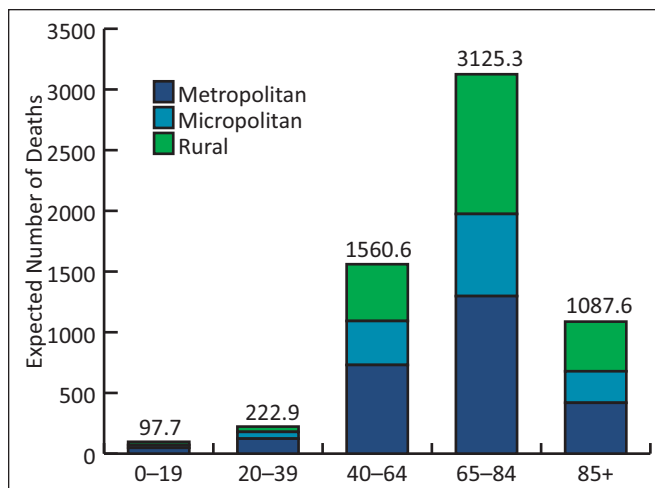


Figure 39. Expected number of deaths in North Dakota per age group after adjusting for demographic factors specific to each region.^{18, 36}

- Rural North Dakota had the most deaths in the 65 and older age groups.
- Metropolitan areas had the most deaths in the 40-64 age groups.

Vaccines are among the most cost-effective clinical preventive services and are a core component of any preventive services package. Childhood immunization programs provide a particularly high return on investment. According to the Centers for Disease Control and Prevention (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.³³

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).

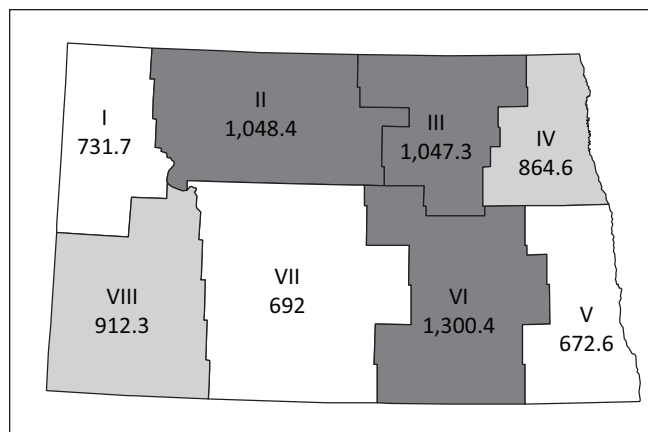


Figure 40. Mortality rate in North Dakota regions after adjusting for age.^{26, 31}

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

- Sixteen preventive services for adults, including the following:²⁵
 - Blood pressure screening
 - Cholesterol screening
 - Colorectal cancer screening
 - Diet counseling and obesity screening
 - Tobacco use screening
 - Specific immunizations (e.g., hepatitis A and B, influenza)
- Twenty-two covered preventive services for women, including pregnant women, including the following:
 - Breast cancer mammography screenings every one to two years for women over 40
 - Breast cancer chemoprevention counseling for women at higher risk
 - Cervical cancer screening
 - Domestic and interpersonal violence screening
 - Osteoporosis screening for women over 60
 - Tobacco use screening
- Twenty-seven covered preventive services for children, including the following:
 - Autism screening
 - Developmental screening for children under the age of 3 years
 - Behavioral assessments
 - Hearing screenings
 - 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), and screenings tend to increase with age (see Table 8).

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 41). 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 counties, and 12% higher than people in suburban areas. For the 25-to-64 age cohort, age-adjusted death rates in suburban areas was half that of urban counties and 20% lower than rural counties. The oldest age cohort, 65 and older, found the urban rate exceeded the rural death rate by about 2%.³⁶

U.S. mortality rates have trended lower since the 1960s for both urban and rural areas. But since the early 1990s, mortality rates in urban and rural areas have diverged somewhat. From 1990 to about 2006 (most recent data), rural mortality has declined at an average annual rate of 0.73%, which was significantly slower than the 1.27% decline noted for urban areas.^{34, 35}

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.

Motor vehicle crashes are a form of unintentional death and would likely be a contributing factor in geographical comparisons. The age-adjusted suicide rate for people age 15 and older was 37% higher in rural areas than in suburban regions. Rural males have a 47% higher mortality rate from suicide than suburban males. The chronic obstructive pulmonary disease death rate also was higher in rural areas. The rate for rural males was 32% higher than for urban males.³³

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, exacerbated by malpractice and liability concerns.^{34, 35}

Changes in Mortality

Although U.S. mortality rates have shown a steady decline for a number of years, mortality rates in North Dakota have been more variable (see Figure 41) 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 2011 (856.7). Mortality rates in rural North Dakota have consistently exceeded either the micropolitan or the metropolitan areas of the state. The 14-year period from

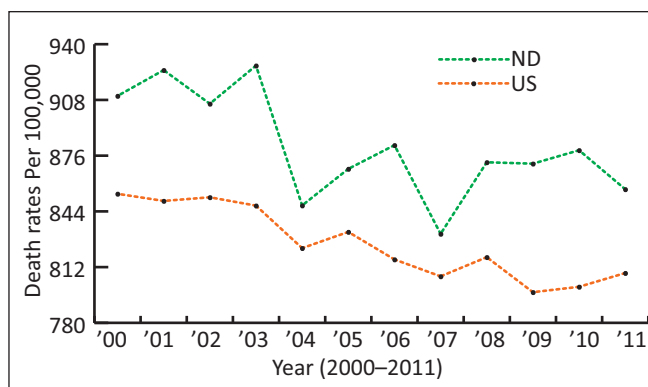


Figure 41. Changes in North Dakota mortality rates from 2000 to 2010 compared to the United States.^{36, 37}

- There was an increase in death rates for North Dakota since 2007.
- The metropolitan adjusted rate was 635.3, for micropolitan it was 948.1, and for rural it was 1,162.4.
- The age-adjusted death rate for North Dakota in 2010 was 857.2 deaths per 100,000 people. This was higher than the national rate of 790.5 deaths per 100,000 people.

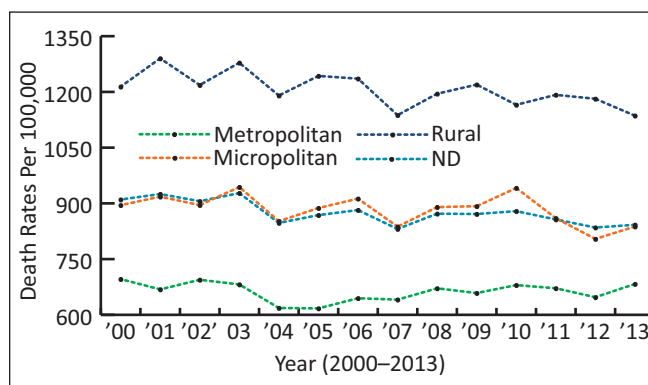


Figure 42. Changes in North Dakota mortality rates from 2000 to 2010 for metropolitan, micropolitan (large rural), and rural areas.^{18, 36, 38}

- The metropolitan adjusted rate was 635.3, for micropolitan it was 948.1, and for rural it was 1,162.4.

2000 to 2013 found the rural mortality rate exceeded the statewide rate in every year. Conversely, the metropolitan rate was lower than the state rate in all 14 years. The micropolitan rate exceeded the state rate in nine of 14 years. And 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 on evidenced-based medicine and the strategic linking of quality and medical outcomes to payment.

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 not exercising are most prevalent in rural areas. Smoking and binge drinking have the highest rates in the micropolitan areas. And drinking alcohol was highest in the metro areas. The rate of smoking in North Dakota is comparable to the United States, though drinking is higher. Smoking is decreasing in metropolitan areas.

Females in North Dakota tend to have poorer general health, especially females residing in rural areas. A greater percentage of North Dakota women than men were disabled, and had fair or poor health, 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 being disabled, overweight, and with fair or poor health. People in the largest communities (the metropolitan areas) had greater issues with one day or more of poor physical health and one or more days of poor mental health. A higher percentage of people in the micropolitan areas had to deal with one or more days of poor health.

In terms of behavioral risks, men led in all categories (smoking, drinking alcohol, binge drinking, drinking and driving, not wearing a seat belt, and not exercising). Rural residents had a higher rate of not exercising and not wearing a seat belt. The most urban North Dakotans (metropolitan residents) led the field in drinking alcohol, while micropolitan North Dakotans have more issues with smoking, binge drinking, and drinking and driving. However, drinking and driving is more of an issue in rural and micropolitan areas than in the urban areas of the state. This is true for smoking and not exercising too. There may be more resources available in the urban communities to educate and help residents. From an age perspective for behavioral health risks, being young (age 18–39) means more risk for smoking, drinking alcohol, binge drinking, drinking and driving, and not wearing a seat belt. Only 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 binge drinking with metropolitan 18- to 39-year-olds contending the most with drinking alcohol. Rural youth had the greatest problem

with not wearing seat belts, rural residents 85 and older had the highest rates of not exercising, and micropolitan residents aged 40–64 had the highest rates of with drinking and driving.

Health conditions are more prevalent in rural areas with the exception of high cholesterol (highest in the metropolitan areas), and are most common among North Dakotans age 65 or older. Many of these conditions are below national norms, though diabetes is rising. Women have higher rates of high cholesterol, arthritis, and asthma with men having to contend with high blood pressure and diabetes. With the exception of asthma (which was highest in the 18–39 age bracket) the remaining conditions were associated more with older population (65 years of age and older).

Cancer is higher for females in the 25- to 54-year-old age range, but male cancer rates are dramatically higher than females by the age of 65. 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/bronchus and corpus/uterus, 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. Rural people do so for mammography and pneumonia. 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. 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 14 years dating back to 2000.

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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 providers 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.

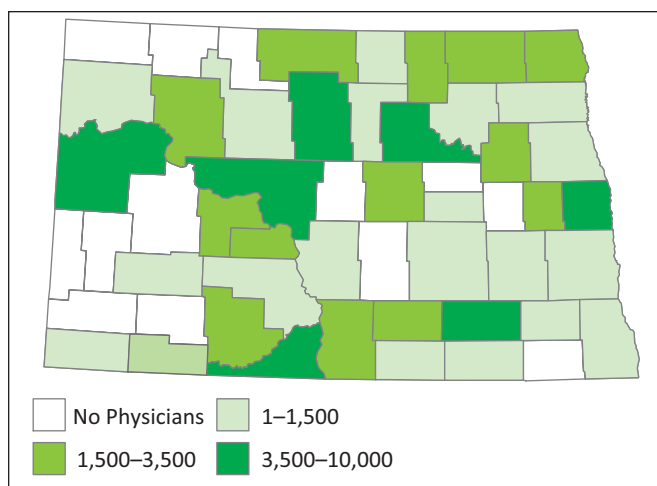


Figure 43. County population per physician for all specialties in North Dakota.^{1,2}

In this chapter, the composition and distribution of the physician component of North Dakota's healthcare workforce are described.

PHYSICIAN DISTRIBUTION

Physician distribution in North Dakota varies significantly by geography, with greater 2013 population per physician in rural counties than in counties with larger cities (see Figure 43). In fact, 13 of North Dakota's 53 counties, with a combined population of 29,830 (4.1% 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 43 (i.e., physicians per population times 10,000). Regardless of whether the metric is population/physicians or physicians/population, rural regions 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 currently are designated as micropolitan have been consistently considered rural (i.e., larger rural if you like) 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 has one of the state's six tertiary hospitals and because its population growth will necessitate it being reclassified as a metropolitan county in the near future.

Supply of Physicians Compared with the Nation

When comparing the availability of physicians to provide

Table 9

All medical doctor (MD) physicians per 10,000 population in North Dakota and U.S. by year.*

	North Dakota	United States	% 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)

* The rates are based on all AMA Masterfile physicians (AMA, Physician Characteristics and Distribution in the US, AMA, 2014).

** If doctors of osteopathy are included (not available for other years)

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, age, MD/DO status, federal/non-federal status, practice geography (e.g., metropolitan, micropolitan (large rural), and rural), 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 9 shows the allopathic physicians in North Dakota and the U.S. for the years 1985, 1990, 1995, 2000, and 2012. This table includes all U.S. allopathic physicians except for those from U.S. possessions. The table shows that across the years, North Dakota has trailed the U.S. in all physicians per 10,000 population but that the percentage of the national ratio compared to 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 23.1 (see Figure 44) for 2011. The U.S. ratio is also lower at 27.1 versus 32.3. The differences between Table 9 and Figure 44 are because the Figure 44 data excludes residents in training, includes MDs and DOs (the AMA reports that there are only 73 DOs active in North Dakota), and is for 2011. 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 has sometimes 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

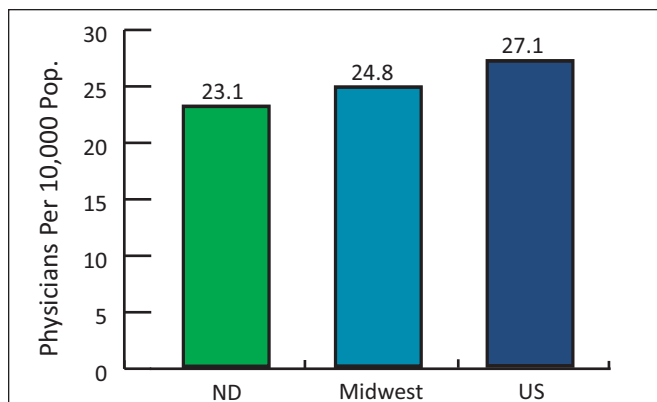


Figure 44. Number of physicians per 10,000 population for North Dakota, the upper Midwest, and the United States (excludes resident physicians).

place in the Report to another, though not meaningfully so. 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 to apples).

In 2013, North Dakota had more than 1,500 practicing patient-care physicians. Of these physicians, 40% graduated from the UND SMHS or a residency program or both. The difference in 2013 physician to population ratios per 10,000 population is illustrated in Figure 44. The ratio for North Dakota is 14.8% lower than for the U.S. as a whole and 6.7% lower than in the comparison Midwest states.

As for gender, North Dakota has fewer female physicians per 10,000 population than the Midwest and United States (see Table 10). Regarding female physicians per 10,000 population overall, North Dakota has 36% fewer female physicians than the United States and 23% fewer female physicians than for the upper Midwest. It will be interesting to observe the trend in the gender ratio of physicians in the future. The University of North Dakota School of Medicine and Health Sciences, like most medical schools in the country, currently graduates about equal numbers of men and women, so it could be anticipated that the number of female physicians in North Dakota will increase over time.

North Dakota has more male physicians per 10,000 population in metropolitan and micropolitan (large rural) counties, but fewer female physicians in metropolitan and rural counties. Overall, North Dakota has the same amount of male physicians per 10,000 population as the upper Midwest, but 5% fewer when compared with the United States.

The pattern of physicians per 10,000 population in North Dakota is more complex than described for physician gender. North Dakota has relatively more physicians in metropolitan and micropolitan (large rural) hospitals than in the comparison groups, but the reverse is true for rural counties (see Figure 45). Regarding hospital physicians per

Table 10

Male and female physicians per 10,000 population in North Dakota compared with upper Midwest states and the United States by urban/rural status.^{1, 3, 4}

	ND	Midwest	US
Female	6.2	7.8	8.9
Metropolitan	9.8	10.4	10.1
Micropolitan	4.4	4.1	3.4
Rural	1.3	2.2	1.9
Male	17.0	17.0	17.9
Metropolitan	26.5	21.4	19.7
Micropolitan	12.5	12.0	10.5
Rural	4.5	5.9	5.5

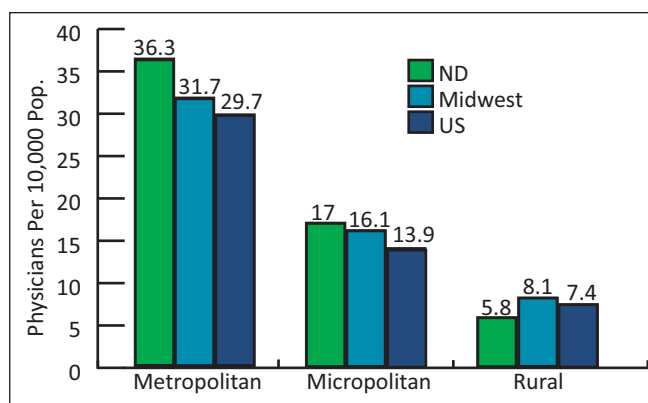


Figure 45. Physicians per 10,000 population for North Dakota, the upper Midwest, and the United States for metropolitan, micropolitan (large rural), and rural areas.^{1, 3, 4}

10,000 population overall, North Dakota has 16% fewer hospital physicians than the United States and 4% fewer hospital physicians than for the upper Midwest (see Table 11).

For office-based physicians per 10,000 population overall, North Dakota has 7% fewer office-based physicians than the United States and 5% fewer office-based physicians than for the upper Midwest, which are relatively small differences. The rates for metropolitan, micropolitan (large rural), and rural are higher, about the same as, and lower than the Midwest and U.S. rates. For instance, North Dakota rural areas are 37% and 24% lower than for the Midwest and the United States. Thus North Dakota has lower office-based practice in rural areas compared with the comparison areas, and higher office-based practice in metropolitan areas than the Midwest and the United States; however, North Dakota's micropolitan counties have more office-based physicians than the United States, but fewer office-based physicians than the Midwest.

Overall North Dakota has fewer physicians under the age of 55 per 10,000 population than does the Midwest and U.S. comparison groups, and this is especially true for the under-35 age group (see Table 12). Likewise North Dakota has relatively

Table 11

Physicians primarily in office or hospital practices per 10,000 population in North Dakota compared with upper Midwest states and the United States by metropolitan county status.^{1, 3, 4}

	ND	Midwest	US
Office	17.0	17.9	18.2
Metropolitan	26.3	22.1	20.0
Micropolitan	12.6	13.6	11.3
Rural	4.7	6.8	6.0
Hospital	4.6	4.8	5.5
Metropolitan	7.2	6.7	6.2
Micropolitan	3.7	1.8	1.8
Rural	0.7	1.0	1.0

fewer physicians in the 65-to-74 age group. However, North Dakota has relatively more physicians per 10,000 population in metropolitan counties for all but the oldest age groups. North Dakota has relatively fewer physicians in rural counties in all age categories than the Midwest and United States.

North Dakota has a significantly lower percentage of its physicians who are female than selected upper Midwest states (Iowa, Minnesota, Montana, Nebraska, South Dakota, Wyoming, and Wisconsin), and the United States as a whole (North Dakota 26.6% versus Midwest 31.5% and the United States 33.3%). The national trend over the past decades is for the percentage of physicians who are female to be increasing across the nation.

North Dakota physicians are less 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 (26.4% versus 15.6%) and 11% higher than the national average (26.4% versus 23.8%).

As shown in Figure 47, North Dakota's physicians are similar to those of the upper Midwest states and U.S. comparison groups, with a lower percentage of physicians less than 35 years of age than in the United States.

Origin 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 is 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 48 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

Table 12

Number of physicians of different age groups per 10,000 people in North Dakota compared with upper Midwest states and the United States by metropolitan status.^{1, 3, 4}

	ND	Midwest	US
< 35	3.7	4.1	4.7
Metropolitan	6.2	5.8	5.5
Micropolitan	2.5	1.3	1.1
Rural	0.5	0.6	0.5
35-44	5.5	6.4	6.8
Metropolitan	9.0	8.4	7.6
Micropolitan	3.8	3.7	3.0
Rural	1.2	1.7	1.5
45-54	6.3	6.7	6.6
Metropolitan	10.3	8.4	7.3
Micropolitan	4.3	4.7	3.9
Rural	1.1	2.4	1.9
55-64	6.0	6.1	6.2
Metropolitan	8.8	7.3	6.7
Micropolitan	5.3	5.2	4.4
Rural	2.0	2.7	2.5
65-74	2.6	3.0	3.6
Metropolitan	3.8	3.4	3.9
Micropolitan	2.3	2.8	2.6
Rural	1.0	1.6	1.7

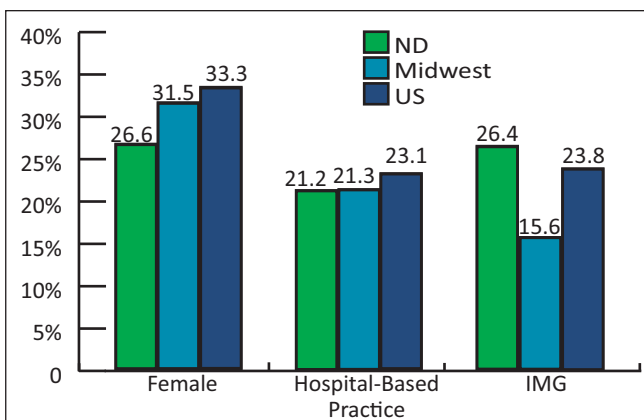


Figure 46. Percentages of female physicians, hospital-based physicians, and international medical graduates (IMGs) for North Dakota, upper Midwest states, and the United States.^{1, 3}

school now practice on the right side. This analysis permits a comparison of physician migration patterns.

In 2013, the balance of migration into and out of North Dakota by physicians based on medical school state location varies widely with respect to where the physicians are now practicing. This can be thought of as a "balance of trade" in medical school training and practice destination (excluding IMG graduates). North Dakota is a net physician exporter (i.e., more North Dakota SMHS graduates practice in other

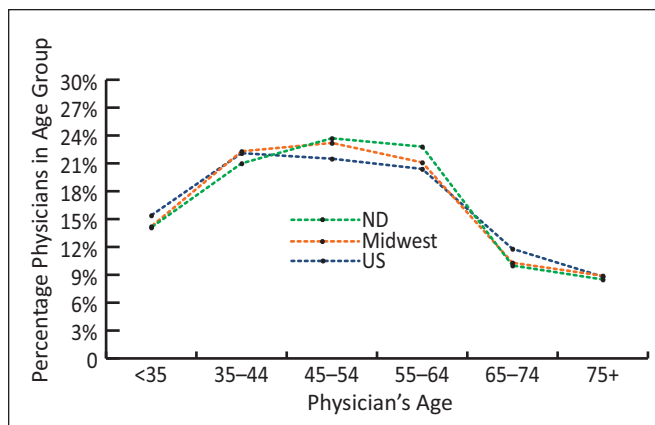


Figure 47. Percentage of physicians by age groups for North Dakota, upper Midwest states, and the United States.^{1,3}

state than other states' graduates are practicing in North Dakota; specifically, 978 SMHS medical school graduates practice outside North Dakota versus 591 graduates of medical schools outside of North Dakota who are practicing in North Dakota). However, there is great variation in the balance of medical student state of training versus practice state balances. The largest differences in other state to North Dakota net flows that favor other states are 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 graduates of the University of North Dakota who want to specialize in any given area have to go out of state for their residencies because the residency specialty they want 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 University of North Dakota graduates practice in Missouri. Of the 1,088 U.S. medical school graduates practicing in North Dakota (excluding graduates from Canada and other countries), 497 or 46% graduated from the UND School of Medicine and Health Sciences.

One important predictor of eventual practice location is where physicians obtain their residency training (others include location of medical school and where they grew up), since many physicians start practicing in the general vicinity of where they completed their post-medical school residency training. Figure 49 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 a North Dakota residency—nearly two-thirds of graduates from these residencies practice in North Dakota or Minnesota. Given how easily patients can cross the North Dakota and Minnesota border to receive healthcare, many of the Minnesota physicians are treating

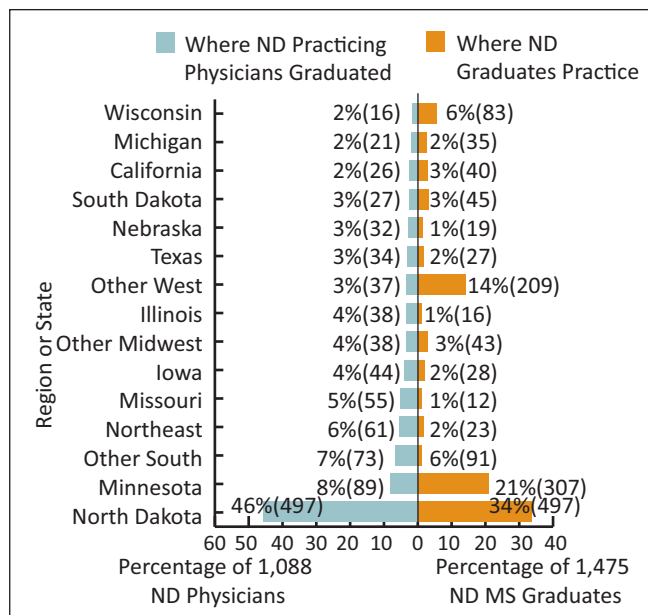


Figure 48. Percentage of North Dakota physicians who graduated from different states and where North Dakota physicians who graduated from the UND SMHS currently practice.^{1,2}

North Dakota patients. For example, the Sanford Health Clinic in East Grand Forks, while located in Minnesota, caters to many patients from just across the river who live in Grand Forks and surrounding counties in North Dakota.

Also note that North Dakota is a large net importer of other states' residency graduates. Of the 1,548 practicing North Dakota physicians, 315 (20%) completed a residency within North Dakota while 1,138 did not. Of the 778 North Dakota residency graduates, 463 practice in other states (143 in Minnesota).

Residency Training in North Dakota

Figure 50 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.⁵ Recently added residencies are available in hospitalist medicine, rural surgery, 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 13 shows the current numbers of residents in the programs.

As discussed in greater detail in Chapter 10, 17 additional residency slots per year have been added 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

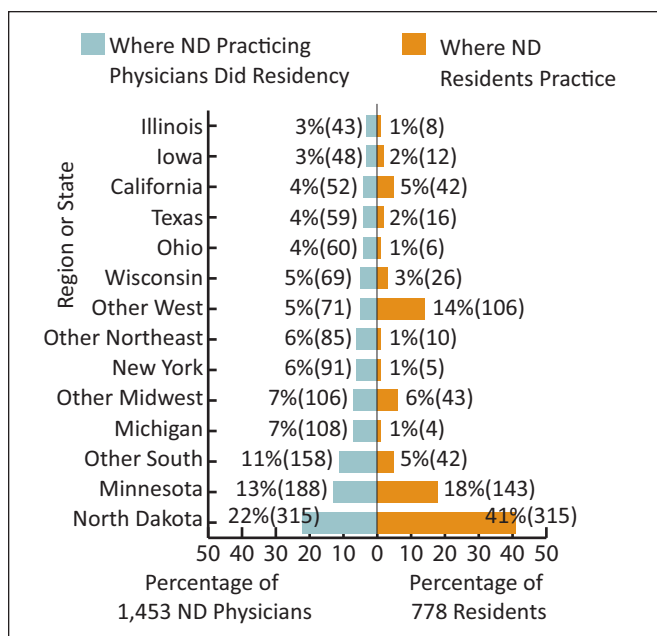


Figure 49. Percentage of North Dakota physicians who did residencies in different states and where North Dakota physicians who did residency at UND are currently practicing.^{1,2}

Williston); UND Department of Surgery (rural general surgery); UND Department of Psychiatry and Behavioral Science (rural psychiatry); St. Alexius Medical Center (hospitalist and geriatrics); and UND Department of Ob-Gyn (Ob-Gyn residency starting in 2017).

In 2013, there were 1,548 physicians practicing in North Dakota (including IMGs). Of these patient-care practicing physicians, 60% had not graduated from the SMHS or a North Dakota residency program (or both). The other 40% of practicing physicians are divided as follows regarding their North Dakota training: 12% graduated from both North Dakota's medical school and a residency program, 20% graduated from the SMHS, and 8% graduated from a North Dakota residency program. SMHS medical school graduates who also graduate from North Dakota residencies are more apt to choose to practice in North Dakota. For instance, an SMHS medical school graduate who obtains residency training in North Dakota is 463% more likely to practice in North Dakota than a graduate who obtains residency training out of state. The comparable number for psychiatry is 559%.

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

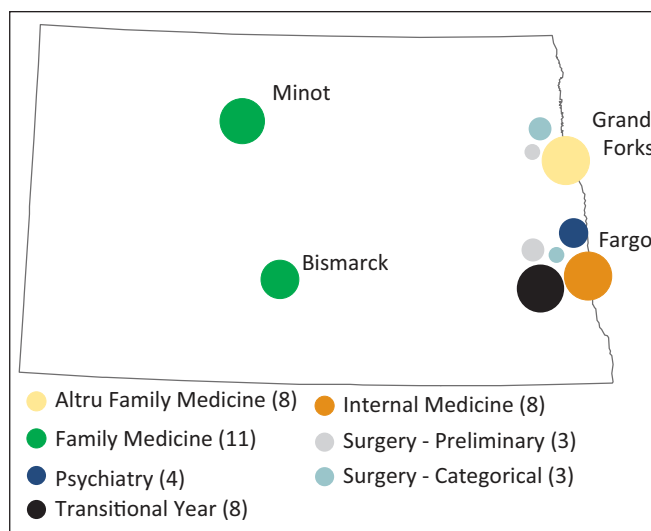


Figure 50. Number of residencies per year in North Dakota by location and type of residency prior to fall 2012.^{5,6}

Table 13

Number of current North Dakota residency slots by type of residency program prior to fall 2012.⁵

Residency	Number in Residency	Duration	Graduates per year
Family Medicine	57	3 years	19
Internal Medicine	24	3 years	8
Psychiatry	16	4 years	4
Surgery	18	1 or 5 years	6
Transitional Year	8	1 year	8
Total	123		45

different specialties. The most prevalent physician specialties practicing in North Dakota in 2013 were family medicine 336 (21.7%); general internal medicine 163 (10.5%); general surgery 107 (6.9%); psychiatry 84 (5.4%); and general pediatrics 83 (5.4%). These specialties account for nearly half of the practicing physicians (49.9%). None of the remaining specialties account for more than 5% of North Dakota's practicing physicians.

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 metropolitan cities where the populations are sufficiently large enough to support them.

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

Another aspect of the production of North Dakota patient-care physicians who are SMHS medical student 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). This narrow

adjacent band was examined because it is believed that North Dakota physician-graduates who practice within this area should be adjudged successes of the North Dakota training program because they serve some or many North Dakota residents.

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 or 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.

International Medical Graduates

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

All three 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 (e.g., 80% more in metropolitan counties than in Midwest counties).

There were more IMGs practicing in North Dakota in 2013 from India (7% of North Dakota's practicing physicians) than from any U.S. state other than North Dakota itself (Minnesota having the next highest percentage at 6%). The largest numbers of IMGs practicing in North Dakota come from India, Pakistan, and the Philippines (Figure 51).

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 surgery and other specialties). As shown in Table 14, IMGs are somewhat more likely to practice in rural and micropolitan (large rural) areas of North Dakota than IMGs do in the upper Midwest and United States. Thus they help reinforce the provider workforce in North Dakota's most needy regions.

Projection of Physicians in North Dakota

If not for the Healthcare Workforce Initiative (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

Table 14

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 metropolitan status.^{1, 3, 4}

	ND	Midwest	US
IMG	5.9	3.8	6.1
Metropolitan	9.0	5.0	6.8
Micropolitan	4.8	2.3	2.7
Rural	1.6	0.9	1.4
USMG	15.6	20.3	19.2
Metropolitan	24.5	25.3	21.0
Micropolitan	11.4	14.4	11.7
Rural	3.9	7.9	6.7

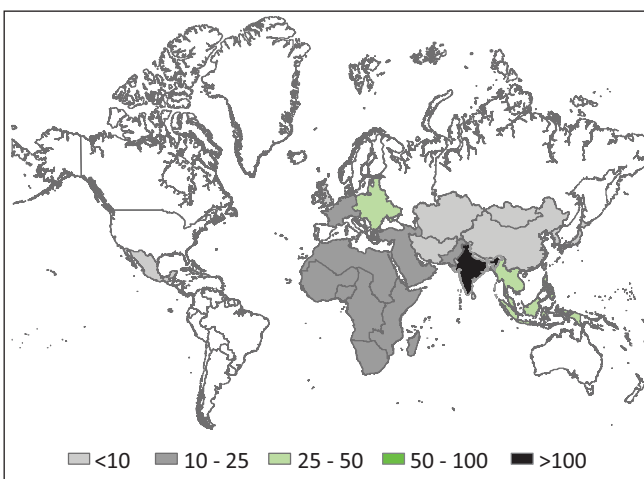


Figure 51. Country origins of IMG physicians practicing in North Dakota.²

10,000 population will increase slightly until 2020 and then drop again as the population in North Dakota continues to gradually increase. If there is a substantial population increase in the Oil Patch as projected in Chapter 1, there will be a sharp drop in the number of physicians per 10,000 population to about half of what it currently is (from 23 to 12). This is a statewide estimate, and the effect in the western part of the state will be much more pronounced. As shown in Figure 52, 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. If the strategies outlined in the HWI were not implemented on an ongoing basis, the relative supply of physicians would decrease precipitously. Such a precipitous drop in physician supply does in fact occur with the high population projection shown in orange. It is important to emphasize that the high population projection in orange, as bad as it is, assumes that there is full implementation of the HWI; without it, the relative supply of physicians would be even worse. It is only through increased retention of graduates along with class size expansion that

North Dakota has a reasonable chance of dealing with its healthcare workforce shortage. Fortunately, full and continuing implementation of the HWI will help ensure that adequate healthcare delivery teams will be available throughout the state.

SUMMARY

The supply of North Dakota physicians lags behind the nation, especially in rural areas (5.8 per 10,000 compared with 8.1 in other Midwest states). Aging is a problem because half of North Dakota's physicians are 45 to 64 years old. Though a large number of IMGs and Canadian physicians in 2013 were practicing in North Dakota (28%), the state lacks large numbers of physicians from other states. Physicians who graduated from medical school, did their residency training in North Dakota, or both supply about 40% of the state's practicing physicians.

As the physician population in the state continues to age, a large number will be retiring who 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 continued growth in population has the potential to reduce the number of physicians to serve people by nearly one-half.

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 in North Dakota for more physicians. 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 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 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 dramatically 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 fate by appropriately investing in the training of healthcare professionals, including physicians, who will practice within North Dakota by continuing to support the HWI.

For more detail on North Dakota's healthcare workforce, see the Center for Rural Health's Workforce Fact Sheet Series at <http://ruralhealth.und.edu/publications/health-workforce-factsheets>.

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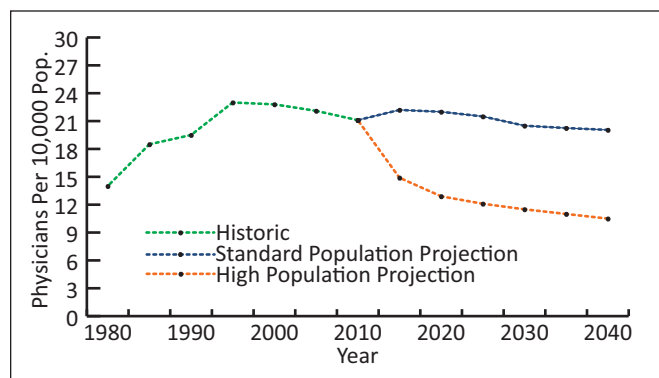


Figure 52. Projection of rate of physicians per 10,000 population for standard projection and rapid-growth projection with high Oil Patch population increase assuming implementation of Healthcare Workforce Initiative.^{1, 2, 7}

CHAPTER FOUR:

Primary Care and Specialty Physician Workforce in North Dakota

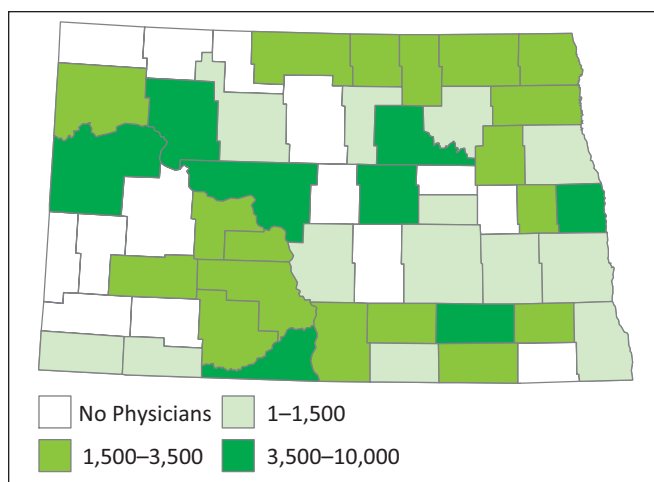


Figure 53. Population per primary care physician in North Dakota¹

While Chapter 3 addressed aspects of the total North Dakota physician population, this chapter concentrates on primary care physicians 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 a consensus goal. Of course, specialist physicians are critically important in their own right. In this report, primary care physicians are defined as those physicians in the specialties of family medicine, general internal medicine, and general pediatrics. Note that in some discussions other definitions of "primary care" are used, most notably the inclusion of obstetricians/gynecologists 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 conditions and health concerns). While specialist physicians (partialists) often provide some primary care services, they are focused by training 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 obstetrics/gynecology) than others (e.g., dermatology, ophthalmology, and urology).

Demographics of Primary Care Physicians

Of the 582 primary care physicians practicing in North Dakota in 2013, 57.7% (336) are family physicians, 28% (163) are general internists, and 14.3% (83) are general pediatricians.¹ The North Dakota population per primary care physician is shown in Figure 53. There are no primary care physicians in 14 counties whose combined population is over 35,752.^{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).

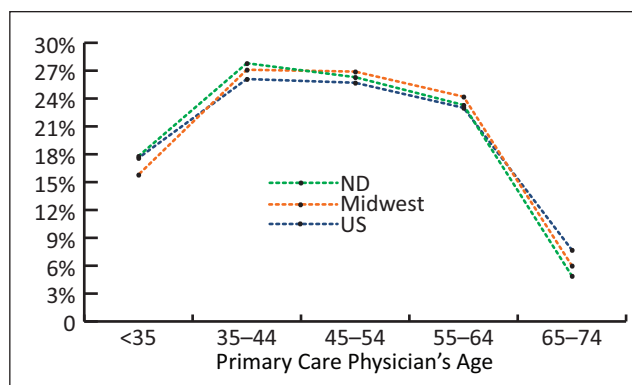


Figure 54. Percentage of primary care physicians for different age categories for North Dakota, other upper Midwest states, and the United States (2011).^{1,3}

Table 15

Percentage of primary care physicians in North Dakota that are female, have hospital-based practices, or are IMGs.^{1,3}

	N	Total	Female	Hospital Based Practice	IMG
Total	582		34.7%	13.2%	24.1%
Metropolitan	382	65.6%	35.3%	13.2%	24.6%
Micropolitan	110	18.9%	34.6%	13.6%	22.7%
Rural	90	15.5%	32.2%	12.2%	23.3%

Table 15 shows the 2013 number of primary care physicians in each demographic area broken down by sex, hospital-based practice, and international medical graduate (IMG) status. Of the 582 primary care direct patient-care physicians practicing in North Dakota, 65.6% are located in metropolitan counties, 18.9% in micropolitan (large rural) counties, and 15.5% in rural counties. Rural counties have a lower percentage of physicians who are female than urban counties (32.2% rural versus 34.6% micropolitan, and 35.3% metropolitan), though the differences are not large. The differences in the percentages of hospital-based practice by metropolitan status vary little, from 13.2% in metropolitan to 12.2% in rural counties. As shown in Table 15, the percentage of North Dakota physicians who are IMGs varies little by rural or urban status (22.7% up to 24.6%). In North Dakota, 24.1% 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 U.S. medical schools).

A comparison of the age structure of North Dakota's primary care physicians compared with those of the upper Midwest states and the United States is depicted in Figure 54. North Dakota's primary care physicians are slightly less likely than those in the two comparison groups to be in the oldest age categories. Note that the changing demography of North

Table 16

Percentage of primary care physicians in North Dakota by age category and area.^{1,3}

	N	<35	35–44	45–54	55–64	65–74
Total	582	10.7%	26.6%	26.1%	25.3%	11.3%
Metropolitan	382	11.5%	27.8%	27.8%	24.1%	8.9%
Micropolitan	110	9.1%	28.2%	20.9%	29.1%	12.7%
Rural	90	8.9%	20.0%	25.6%	25.6%	20.0%

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

Dakota related to the Oil Patch has caused some change in these findings since the previous *Biennial Report*.

The age distribution of North Dakota primary care physicians is shown by rural/urban status in Table 16. The percentage of primary care physicians for rural counties is dramatically higher for the 65–74 age category than for the micropolitan (large rural) and metropolitan county categories (20% versus 12.7% and 8.9%). The micropolitan (large rural) and metropolitan county categories are quite similar in their age structure. 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 rural counties.

Primary Care Physicians Workforce

The 2013 rate of primary care physicians (with residents included) in North Dakota per 10,000 population is a little lower than for the Midwest and slightly higher than for the United States (Figure 55). The practicing primary care physicians per 10,000 population are North Dakota (7.6), upper Midwest (7.9), and United States (7.4).

As can be seen from Figure 56, across North Dakota, the upper Midwest, and the United States, the practicing-primary-care-physician-to-population ratios are lower for rural counties. By metropolitan status, North Dakota's rate is higher than the upper Midwest and United States rates. North Dakota micropolitan and rural counties have lower ratios than the upper Midwest comparison group of states. North Dakota has a slightly lower ratio than the United States for rural counties and a slightly higher rate for micropolitan (large rural) counties. Within North Dakota, micropolitan (large rural) counties have significantly higher ratios of practicing primary care physicians than in rural counties (32% higher).

North Dakota has the same percentage of its direct-patient-care primary care physicians practicing in office-based practice as in the upper Midwest, but a higher ratio than in the United States as a whole (North Dakota, 11.5 per 10,000 population versus 11.5 in the upper Midwest and

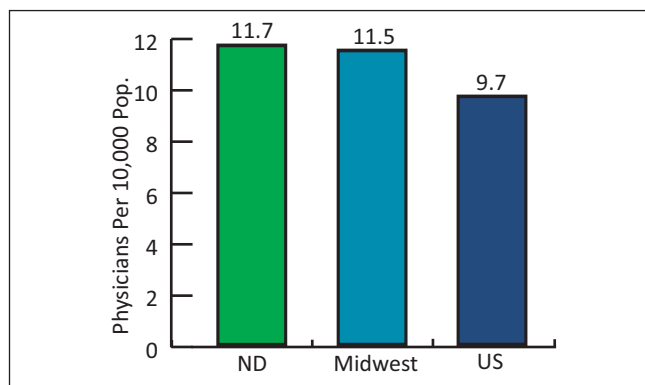


Figure 55. Primary care physicians per 10,000 population in North Dakota, the upper Midwest, and the United States.^{2,4}

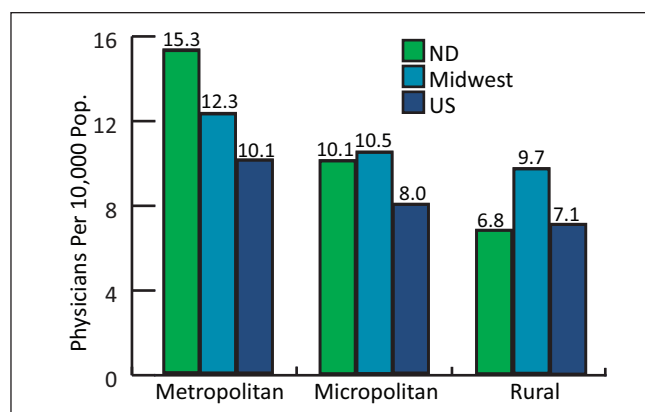


Figure 56. Primary care physicians per 10,000 population in North Dakota, the upper Midwest, and the United States by metropolitan status.^{2,3,4}

- North Dakota is ahead of other Midwest states by more than one primary care physician per 10,000 population in metropolitan areas.
- North Dakota is ahead of the United States in metropolitan and micropolitan areas.

9.8 in the United States (Table 17). North Dakota has a slightly higher percentage of its primary care physicians practicing in hospital-based practice than in the comparison groups. By rural or urban status, the ratios for all three groups generally are lower the more rural the county category.

Table 17

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 metropolitan status.^{2, 3, 4}

	ND	Midwest	US
Office	11.5	11.5	9.8
Metropolitan	15.6	12.5	10.1
Micropolitan	9.4	10.2	7.8
Rural	6.2	8.9	6.5
Hospital	1.0	0.9	0.8
Metropolitan	1.3	1.0	0.8
Micropolitan	0.9	0.7	0.6
Rural	0.7	0.8	0.6

Table 18 shows the practicing-primary-care physician per 10,000 population for North Dakota compared with the upper Midwest and United States by age and rural or urban status categories. Overall, North Dakota has comparatively more primary care physicians in the 35–54 age ranges and fewer in the younger age category for metropolitan areas than the United States as a whole. Likewise the results are almost the same for North Dakota's rural counties when compared with the United States as a whole. Results for the micropolitan (large rural) counties vary, probably because of differences across the nation and within North Dakota in the number of such large rural counties.

The federal Bureau of Primary Health Care in collaboration with North Dakota's Primary Care Office at the UND 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 pronounced. Four out of 10 (41.8%) primary care physicians in North Dakota graduated from its medical school (see Figure 57). Almost half (43.3%) of North Dakota's primary care physicians obtained their residency training from a residency program based in North Dakota (see Figure 58). Taking location of both medical school and residency training into account, more than half (57%) of the primary care physicians currently practicing in North Dakota received one or both types of training within North Dakota.

Table 18

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

	ND	Midwest	US
<35	1.7	1.5	1.7
Metropolitan	1.2	1.4	1.6
Micropolitan	0.4	0.1	0.1
Rural	0.1	0.1	0.0
35–44	2.7	2.5	2.5
Metropolitan	2.0	2.1	2.3
Micropolitan	0.4	0.3	0.1
Rural	0.5	0.2	0.1
45–54	2.6	2.6	2.5
Metropolitan	1.9	2.0	2.2
Micropolitan	0.5	0.4	0.2
Rural	0.2	0.3	0.1
55–64	2.3	2.3	2.2
Metropolitan	1.5	1.7	1.9
Micropolitan	0.4	0.4	0.2
Rural	0.4	0.3	0.1
65–74	0.5	0.6	0.7
Metropolitan	0.3	0.4	0.6
Micropolitan	0.1	0.1	0.1
Rural	0.1	0.1	0.0

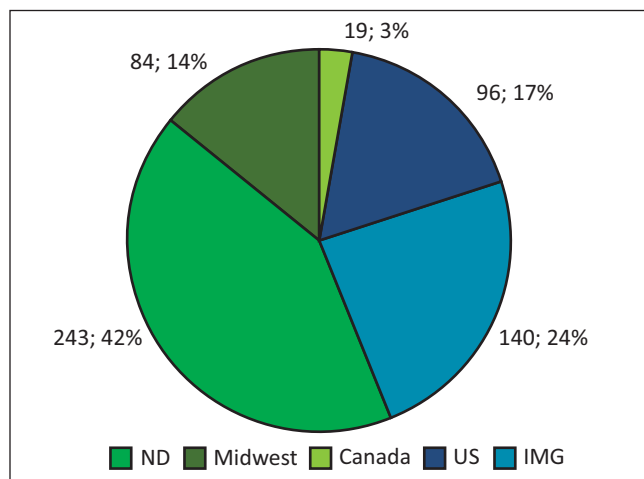


Figure 57. Locations where North Dakota primary care physicians graduated from medical school.¹

- North Dakota's primary care physicians graduated from medical schools from all over the United States and the world.
- University of North Dakota School of Medicine and Health Sciences graduates account for 41.8% of practicing primary care physicians in the state.
- IMGs account for 24.1% and Canadian medical school graduates account for 3.3% (combined 27.4%).
- The rest of the Midwest accounts for 14.4% while the rest of the United States accounts for 16.5% (combined 30.9%).

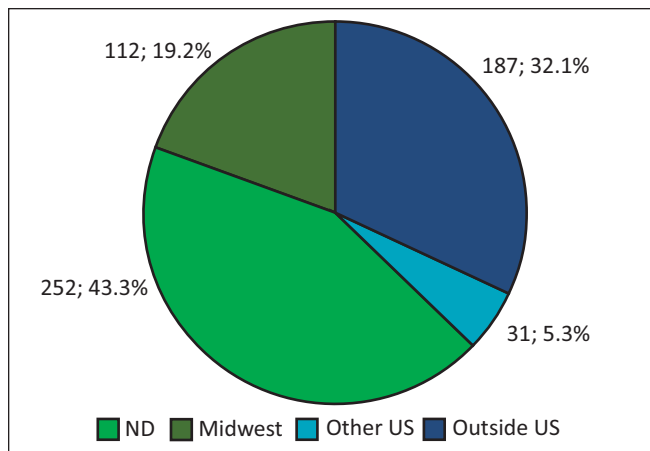


Figure 58. Locations where North Dakota primary care physicians did their residency.¹

- Nearly half (43.3%) of North Dakota's currently practicing primary care physicians did their residency training in North Dakota.
- Origins of primary care physicians who graduated from residency programs outside of North Dakota are Midwest (19.2%), other U.S. (32.1%), and Canada and other foreign (5.3%).

The population-per-primary-care-physician ratio varies greatly across the rural to urban categories. It is 2,176 for rural, 1,526 for micropolitan (large rural), and 931 for metropolitan counties (i.e., rural counties have greater than twice the population per physician than is true in urban tertiary counties, which are Burleigh, Cass, Grand Forks, and Ward). When the considerable travel times are considered in the rural areas of North Dakota, these differences are meaningful examples of the divergent geographic distribution of population per primary care physician, with it being twice as high in rural counties versus metropolitan counties (i.e., geographic maldistribution of North Dakota's practicing primary care physicians). This is an underestimate of the maldistribution because the rural areas have proportionally more of the elderly who require more primary care and, within the urban areas, the more abundant specialists provide some generalist/primary care physician services.

The location of where a physician completes residency training has a significant influence on subsequent practice destination. For instance, of the 368 UND SMHS medical student graduates who did their residency training in a family medicine residency within North Dakota, 63.6% (131 of 206) are practicing primary care in North Dakota versus only 17.9% (29 of 162) of those who did their family medicine residency outside North Dakota. The similar percentages for general internists are 73.8% and 23.9% (31/42 and 22/92). There is no pediatric residency within North Dakota. Of the 81 general pediatricians who are currently practicing, graduated from the UND SMHS, and did their residency training outside of North Dakota, 37% (30) currently practice within North Dakota. The total balance of

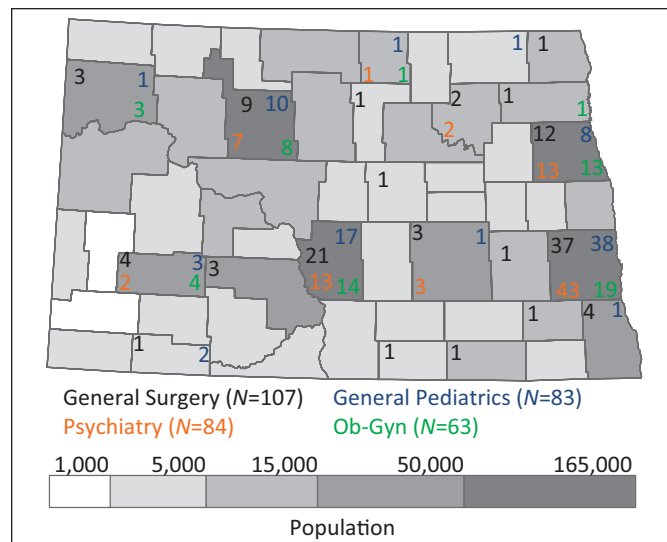


Figure 59. Location of specialty physicians in North Dakota.¹

trade for residency training of practicing primary care physicians is most unfavorable with Minnesota (115 of North Dakota residency trained primary care physicians practice in Minnesota, while only 50 of Minnesota's residency-trained similar physicians practice in North Dakota, a deficit of 65).

Demographics of Specialty Physicians

As can be seen in Figure 59, most of North Dakota's 2013 practicing specialists are located in Fargo, Bismarck, Grand Forks, and Minot, and along the Interstate 94 and Highway 2 corridors. Given the specialist geographic distribution and the generally low numbers of specialists per population, significant portions of North Dakota's population can be long distances and travel times from their nearest specialist physician. Note that in this specialist analysis, general pediatrics is considered a specialty and not part of primary care.

Within North Dakota, rural counties in 2013 have a lower percentage of their specialist-care physicians who are female than metropolitan counties, except for general pediatricians (Table 19). However, the very small number of rural county general pediatricians (four) renders any meaningful analysis suspect. Micropolitan (large rural) counties have similar percentages of female specialists as do metropolitan counties (except for general surgeons and Ob-Gyn physicians where they have lower percentages of females). With the exception of Ob-Gyn physicians, about 14% of specialty physicians work in hospital-based practice. General surgery, psychiatry, and general pediatric physicians are more apt to be in hospital-based practice in micropolitan (large rural) and rural practice than is true with metropolitan county physicians. IMG general surgeons account for more than half of rural county surgeons, which is a much higher percentage than for metropolitan and micropolitan (63.6% versus 8.2% and 17.4%, respectively). IMGs are underrepresented (expecting approximately one in four to be IMGs) in North Dakota's obstetric-gynecologist specialty and overrepresented in psychiatry in metropolitan counties.

Table 19

Percentage of specialist physicians in North Dakota who are female, have hospital-based practices, and are IMGs.^{1, 3}

	N	Female	% Hospital Based Practice	IMG
General Surgery	107	8.4%	15.0%	15.9%
Metropolitan	73	11.0%	12.3%	8.2%
Micropolitan	23	4.4%	21.7%	17.4%
Rural	11	0.0%	18.2%	63.6%
Psychiatry	84	38.1%	14.3%	36.9%
Metropolitan	69	39.1%	10.1%	40.6%
Micropolitan	12	41.7%	33.3%	25.0%
Rural	3	0.0%	33.3%	0.0%
Gen Peds	83	55.4%	13.3%	15.7%
Metropolitan	63	54.0%	11.1%	14.3%
Micropolitan	16	62.5%	18.8%	25.0%
Rural	4	50.0%	25.0%	0.0%
OB-GYN	63	57.1%	9.5%	6.3%
Metropolitan	46	60.9%	8.7%	4.3%
Micropolitan	15	53.3%	6.7%	6.7%
Rural	2	0.0%	50.0%	50.0%

Table 20

Percentage of specialists in North Dakota by age category and metropolitan status.^{1, 3}

	N	<35	35–44	45–54	55–64	65–74
General Surgery	107	1.9%	28.0%	28.0%	24.3%	17.8%
Metropolitan	73	1.4%	32.9%	34.3%	20.6%	11.0%
Micropolitan	23	4.4%	21.7%	17.4%	34.8%	21.7%
Rural	11	0.0%	9.1%	9.1%	27.3%	54.6%
Psychiatry	84	6.0%	16.7%	38.1%	31.0%	8.3%
Metropolitan	69	7.3%	17.4%	40.6%	31.9%	2.9%
Micropolitan	12	0.0%	8.3%	25.0%	25.0%	41.7%
Rural	3	0.0%	33.3%	33.3%	33.3%	0.0%
Gen Peds	83	12.1%	25.3%	22.9%	21.7%	18.1%
Metropolitan	63	14.3%	28.6%	17.5%	22.2%	17.5%
Micropolitan	16	0.0%	18.8%	37.5%	18.8%	25.0%
Rural	4	25.0%	0.0%	50.0%	25.0%	0.0%
OB-GYN	63	9.5%	34.9%	20.6%	23.8%	11.1%
Metropolitan	46	8.7%	37.0%	26.1%	23.9%	4.4%
Micropolitan	15	13.1%	33.3%	6.7%	20.0%	26.7%
Rural	2	0.0%	0.0%	0.0%	50.0%	50.0%

The percentage of specific specialty physicians by age and rural or urban county categories is portrayed in Table 20. For the four specialties, the percentages of physicians who are 55 and older are much greater in the rural and micropolitan (large rural) counties than for metropolitan counties and portends a major shortfall in the availability of specialty physicians in these areas in the future as these senior specialty physicians retire and leave direct patient care.

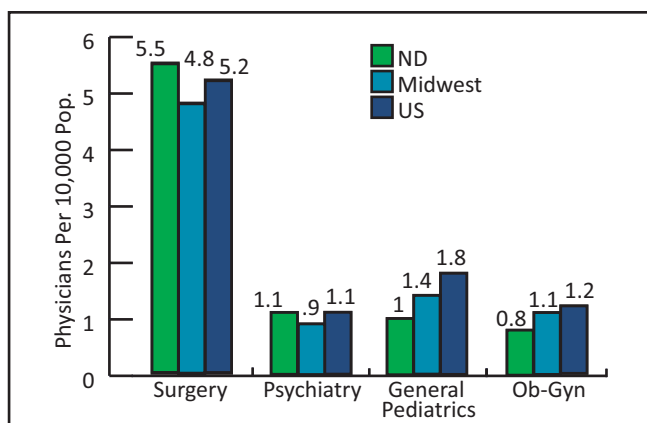


Figure 60. Surgeons, psychiatrists, general pediatricians, and Ob/Gyns per 10,000 population in North Dakota compared to other upper Midwest states and the United States.^{2, 3, 4}

Specialty Physicians per 10,000 Population

North Dakota's specialist-per-10,000-population ratios for general pediatricians and Ob-Gyns are lower than for the upper Midwest and U.S. ratios (Figure 60). The North Dakota ratio for general surgeons is 5% higher than for the nation as a whole, and its ratio for general pediatricians is 44% lower than for the nation. Despite a perceived shortage (at least in some regions), North Dakota's ratio for psychiatrists is about the same as for the upper Midwest and the United States.

The specialist-physician-per-10,000-population ratios by rural or urban status for 2013 are shown in Table 21. Across North Dakota and for each specialty, the rural counties have lower ratios than the micropolitan (large rural) counties and the metropolitan counties. For instance, for general pediatricians, the rural counties have 13% of the amount of metropolitan areas, and micropolitan (large rural) counties have 50% 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 obstetrician/gynecologists, except North Dakota rural counties have significantly lower ratios. For psychiatry, North Dakota has higher ratios for metropolitan and micropolitan (large rural) counties, while it has slightly lower ratios for the rural counties. And 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 in 2011, as anticipated, those UND SMHS medical school graduates who performed 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,

Table 21

Specialty physicians per 10,000 population in North Dakota compared to upper Midwest states and the United States by metropolitan status.^{2, 3, 4}

	ND	Midwest	US
Gen Surgery	4.6	4.7	5.0
Metropolitan	7.4	5.7	5.5
Micropolitan	4.0	3.5	3.1
Rural	0.6	1.3	1.2
Psychiatry	1.1	0.9	1.1
Metropolitan	1.9	1.1	1.3
Micropolitan	0.8	0.5	0.4
Rural	0.1	0.2	0.2
Gen Peds	1.0	1.4	1.7
Metropolitan	1.6	1.7	1.9
Micropolitan	0.8	0.8	0.9
Rural	0.2	0.3	0.4
Ob-Gyn	0.8	1.1	1.2
Metropolitan	1.2	1.3	1.3
Micropolitan	0.9	0.8	0.7
Rural	0.1	0.2	0.3

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 obstetrics/gynecology out-of-state, and only 26% (36/139) currently practice in North Dakota. The percentages for the next five most common analogous specialty out-of-state residencies (i.e., no internal North Dakota specialty residency opportunities) are radiology (29% [27/92] are practicing in North Dakota), anesthesiology (24% [15/63] returned), orthopedics (45.2% [19/42] returned), dermatology (41.7% [10/24] returned) and ophthalmology (42.9% [9/21] returned).

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 2013, there were 582 direct patient-care primary care physicians in North Dakota (i.e., 336 family medicine, 163 general internal medicine, and 83 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 (57%) of all primary care physicians in North Dakota graduated from the UND SMHS

or completed a residency in North Dakota.

In 2013, there were 107 general surgeons, 84 psychiatrists, 83 pediatricians, and 63 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 areas 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 primary care and specialist care physicians. 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 an important role in North Dakota's primary care access, as will be discussed in Chapter 5.

For more detail on North Dakota healthcare workforce, see the Center for Rural Health's Workforce Fact Sheet Series at <http://ruralhealth.und.edu/publications/health-workforce-factsheets>.

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CHAPTER FIVE:

Other Healthcare Workforce in North Dakota

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 *Report*, the *North Dakota Hospital Workforce Survey* was performed. It provides new information and complete data on many aspects of the rural and urban hospital workforce during September 2014. In this chapter, the results of 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.

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 were asked to participate and were sent a link to a Qualtrics electronic survey online questionnaire. The CEOs of the six large urban-tertiary hospitals were also asked to participate but were sent a paper questionnaire and an online link; they could choose to respond by either means. Nonrespondents were contacted by e-mail and phone, and the final response rate was 100% (see Figure 61).¹

In its paper form, the questionnaire is one page long (two sides). It has 14 questions; several have multiple

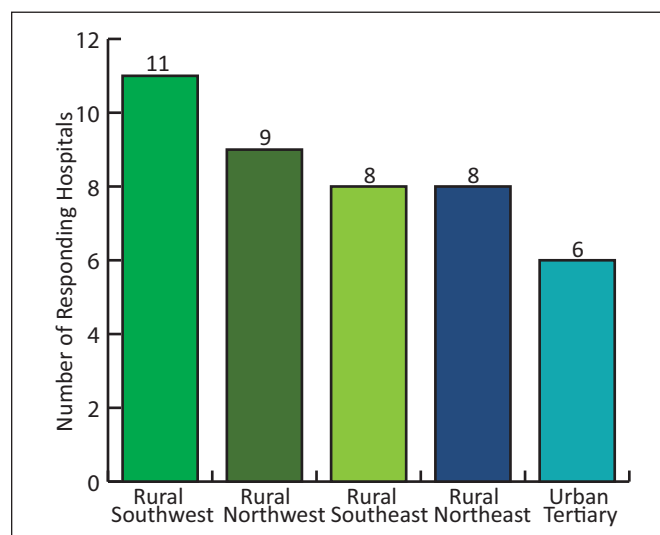


Figure 61. Hospital responses by type and location.

subquestions. The main feature of the questionnaire is a matrix that lists 25 hospital workforce types (e.g., ultrasound techs and registered nurses [RNs]). The questionnaire included other 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 full-time equivalent (FTE) employees, FTE positions being actively recruited, and provider-type-specific vacancy rates).

Because of the abundance of new 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 <http://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.

Survey Findings

North Dakota's September 2014 statewide vacancy rates for 25 hospital-staff types are presented in Figure 62. The statewide rates are calculated by dividing the FTEs currently being actively recruited for by the sum of the FTEs currently being actively recruited for and the current FTEs employed, then multiplying the quotient by 100, which results in the percentage of positions vacant.¹ As can be seen from Figure 62, 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 but not by much, 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

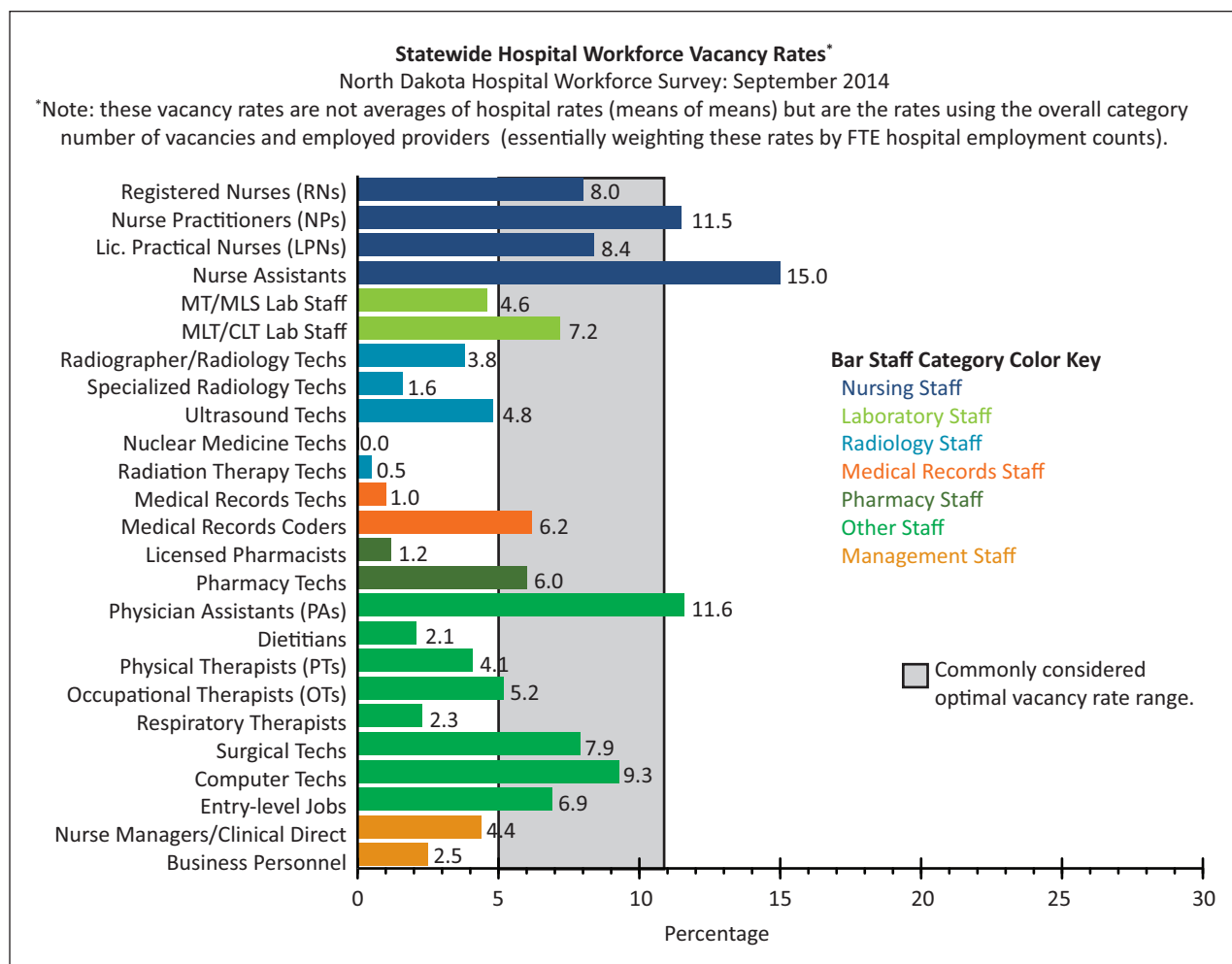


Figure 62. Statewide hospital workforce vacancy rates

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 prices. High provider vacancy rates (e.g., 25% and higher), a tight labor market, can cause salaries and other benefits to be increased 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).¹

The highest statewide vacancy rates are for nurse assistants (15%), physician assistants (PAs; 11.6%), and nurse practitioners (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.¹

What is most remarkable about Figure 62 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 63.¹

The statewide vacancy rates for rural counties, urban counties, and for North Dakota as a whole are shown in Figure 64 for the four nurse types (i.e., RNs, NPs, licensed practical nurses (LPNs), and nurse assistants). As can be seen, 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%–15% are regarded as only marginally high.¹

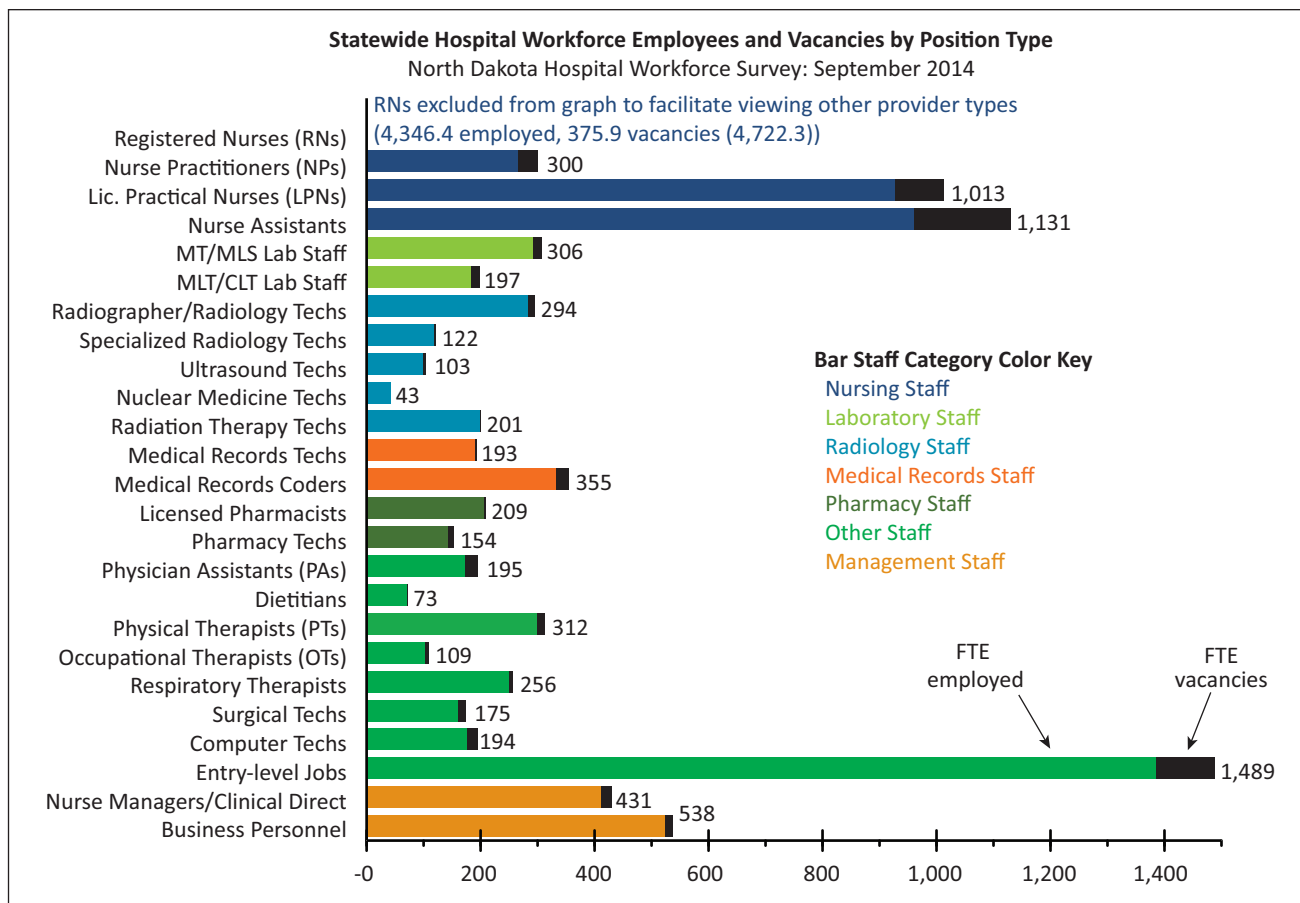


Figure 63. Statewide hospital workforce employees and vacancies by position type

Most of the remainder of the *North Dakota Hospital Workforce Survey* graphs (Figures 65, 68–69, 71–80) are calculated differently than the statewide graph information (Figures 61–64). The unit of analyses in Figures 65, 68–69, 71–80 is the hospital. Figures 66–67 and 70 contain data that are counts of the numbers of vacancies and employed staff by provider and rural or urban status type (not averages across hospitals).¹

In Figure 65, the highest nurse-type vacancy rate is for urban-tertiary county nurse assistants at 17%. This rate is calculated by summing the rates for each of the six urban-tertiary hospitals and dividing by six (the number of hospitals in this group) and multiplying by 100. The graphed rates are the mean of the rates of the hospitals in the labeled category. Thus these data can be used in a phrase such as “the average urban-tertiary hospital has a nurse assistant vacancy rate of 17%.” Note that graphs that depict the count (number) of employed and vacant positions are aggregate totals and not averages by hospital groups.¹

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%).¹

Interpreting Figure 65 requires some understanding of the number of vacancies and the number of employed nurses by type. As can be seen in Figure 66, 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 67 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, the volume of changes in numbers of RNs within North Dakota, and many other factors.¹

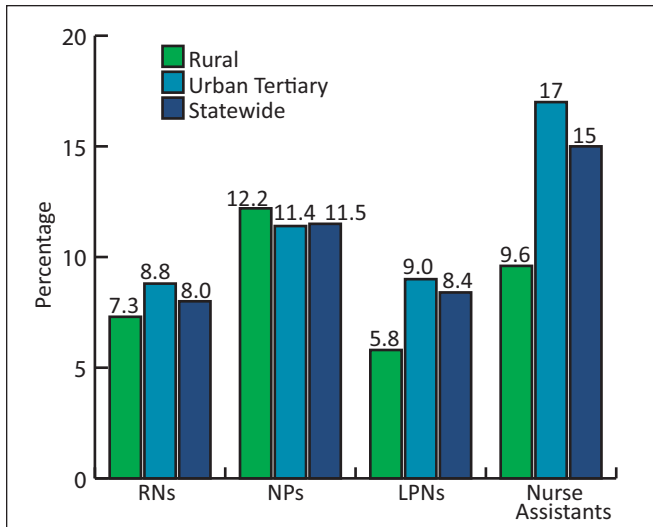


Figure 64. Nurse vacancy rates by rural/urban status and statewide

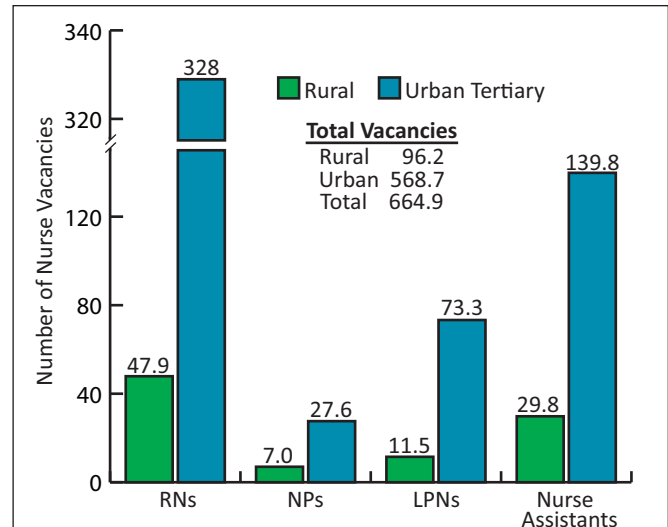


Figure 66. Number of nurse vacancies

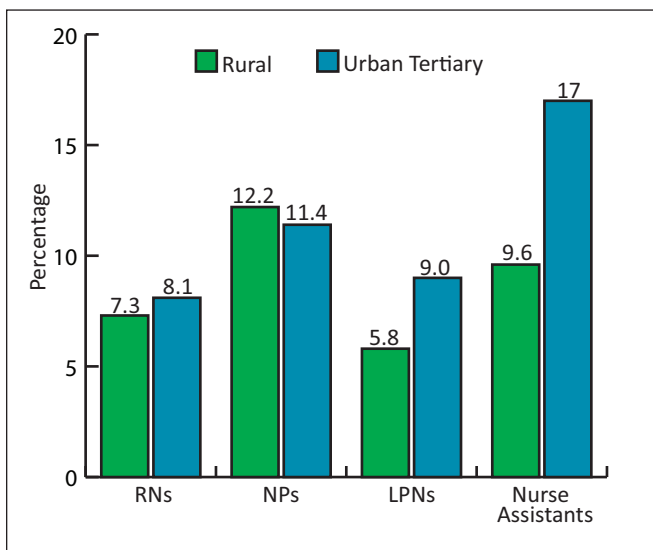


Figure 65. Nurse vacancy rates by rural/urban status and statewide

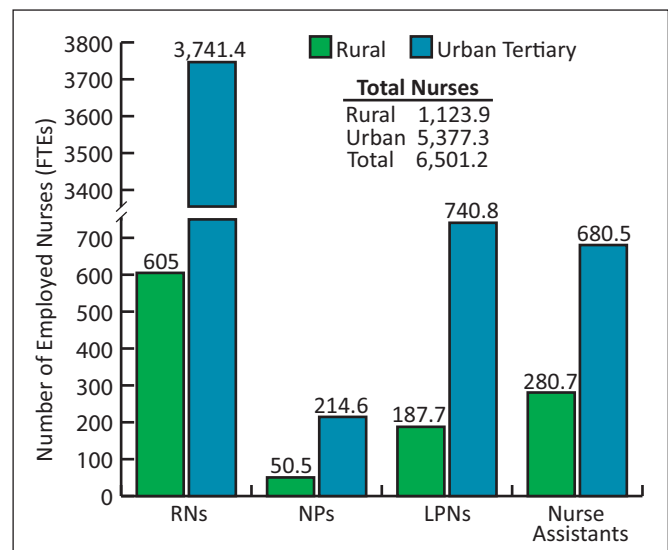


Figure 67. Current number of employed nurses

Figure 68 shows the median months recruiting for the current longest nurse vacancy by hospitals. The longest recruited for median months 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 lower for nurse assistants, who have the highest vacancy rates.¹

It is possible to depict the nurse vacancy rates by the four county quadrants of North Dakota and the urban-tertiary hospital counties separately (Figures 69–70). 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 69, 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 NPs at 21.2%) are a function of the small number of NPs and vacancies within that quadrant (i.e., 2 FTE vacancies; Figure 70). 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 71 and 72 show the rural and urban-tertiary county vacancy rates for lab personnel (two categories) and radiology staff (five categories). The two types of lab personnel are medical technologist and medical laboratory scientist (MT/MLS), and medical laboratory technician and clinical laboratory technician (MLT/CLT). The overall vacancy rates for lab personnel range from 4.5% in rural

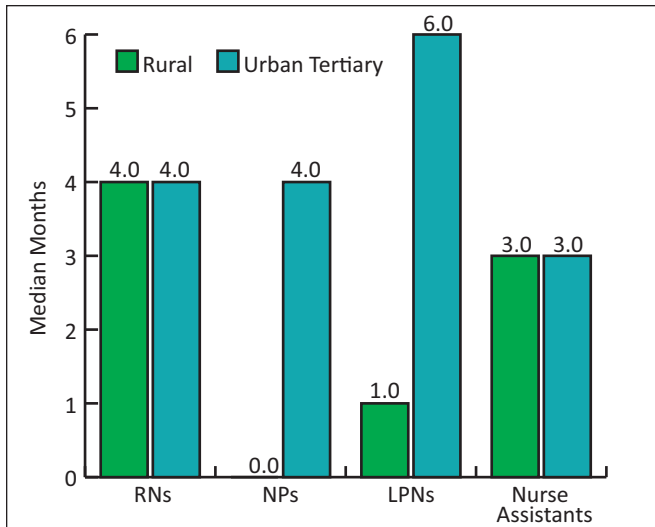


Figure 68. Median months recruiting current longest nurse vacancy

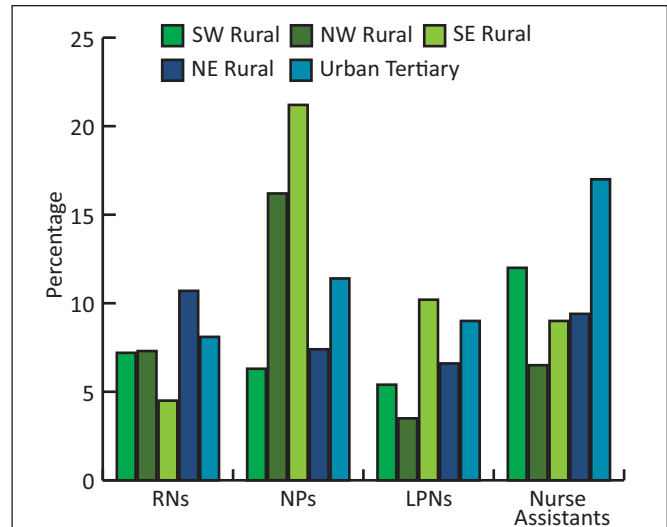


Figure 69. Nurse vacancy rates

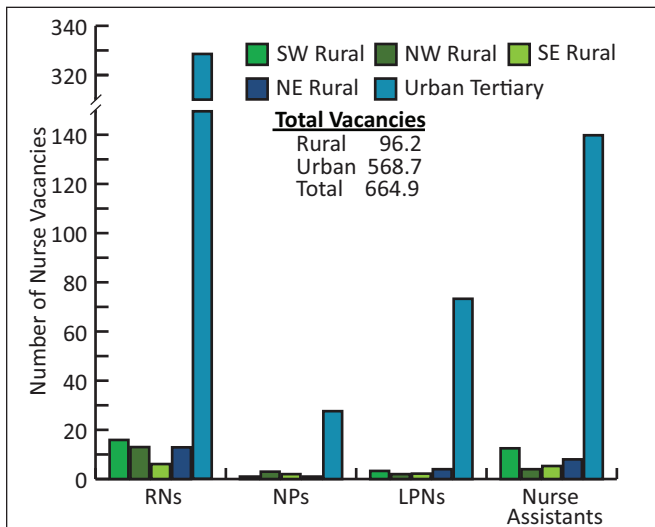


Figure 70. Number of nurse vacancies

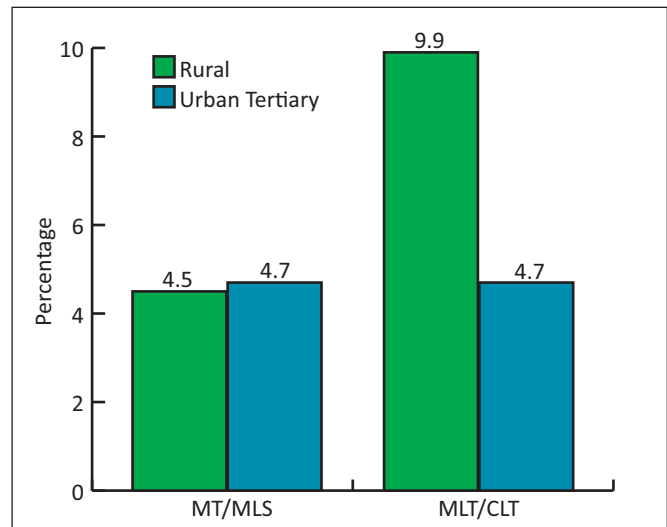


Figure 71. Lab staff vacancy rates

hospitals for MT/CLS 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). A look at Figure 63 provides information on the numbers of these provider types.¹

Figure 73 provides rural and urban information on pharmacy personnel (two types) and medical records personnel (two types). All of the vacancy rates fall below the 10% level, and two are even at 0%. The highest vacancy rate is for rural medical record coders at 7.5%, based on three FTE vacancies out of 40.3 positions.¹

Figures 74 and 75 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%).¹

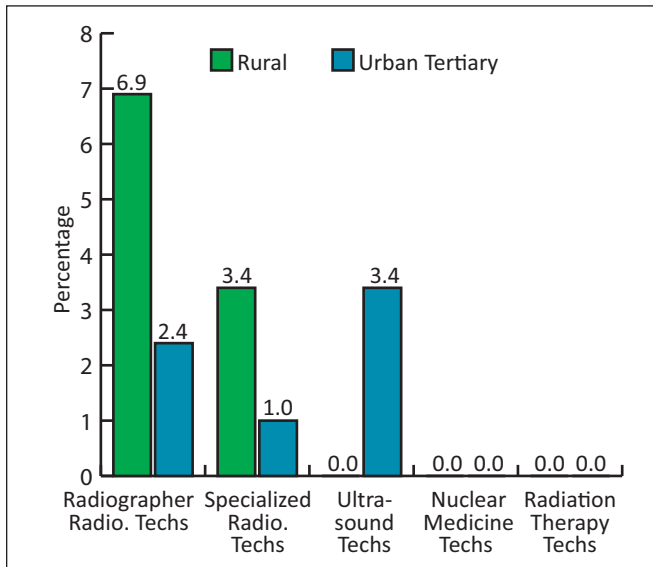


Figure 72. Radiology staff vacancy rates

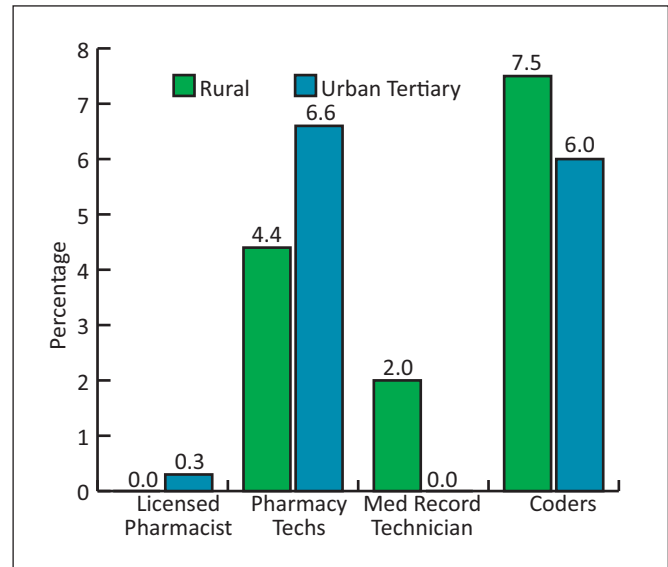


Figure 73. Pharmacy and medical records vacancy rates

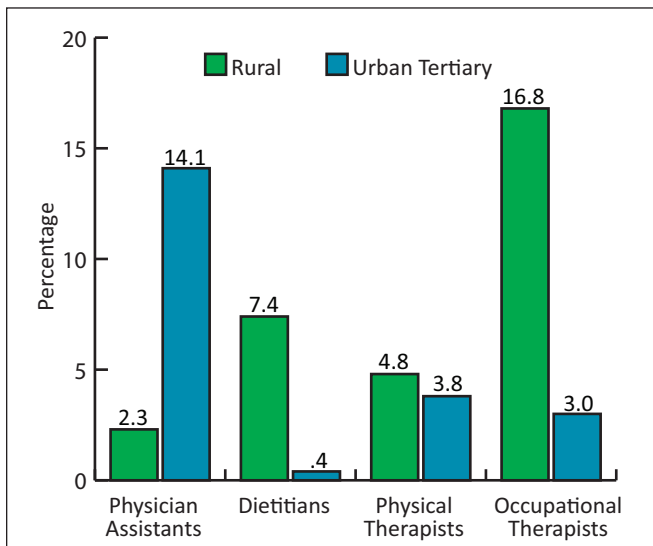


Figure 74. Other workforce vacancy rates (group 1)

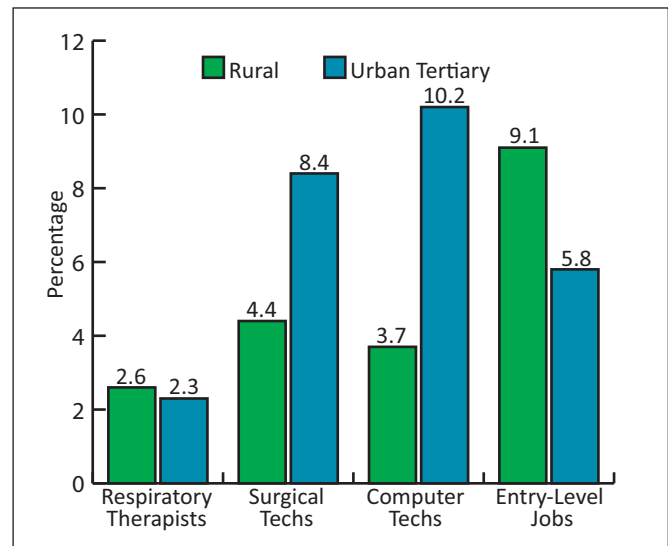


Figure 75. Other workforce vacancy rates (group 2)

The nurse managers/clinical directors and business personnel employee types are presented in Figure 76. 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 all together the two personnel types represent 936.4 FTE filled positions and 31.3 FTE vacancies).¹

The hospital respondents were asked to rank the difficulty of recruiting each of the 25 provider types. Figures 77 and 78 show the results for those rated as most difficult split out by urban (Figure 77) and rural (Figure 78). 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/CLS 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 lab tech personnel types, and a group of tied (3.3) provider types (licensed pharmacists, PAs, physical therapists, radiation therapy techs, and ultrasound techs).¹

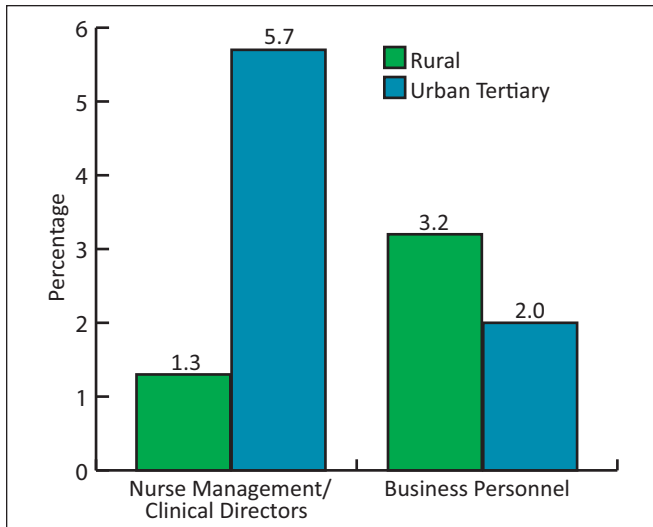


Figure 76. Management vacancy rates

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 contract 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 care physicians (total 1,197 physicians), and rural hospitals employed 29 specialists and 54 primary care physicians (total 83, and urban and rural grand total 1,280). On the same scale as described for Figures 77 and 78, 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 as most difficult for rural hospitals.¹

Of the hospitals that employ physicians, respondents were asked to rank on a four-point scale factors that contribute to their recruiting problems (Figure 79). The mean across category hospitals has a range of 1 through 4. As is apparent from Figure 79, rural county hospital respondents consistently responded 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 (1.1), 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

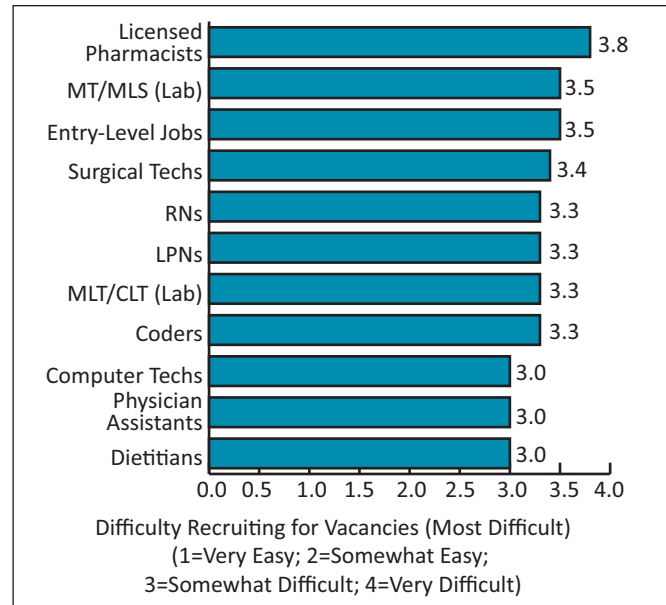


Figure 77. Very and somewhat difficult to fill urban vacancies by workforce type

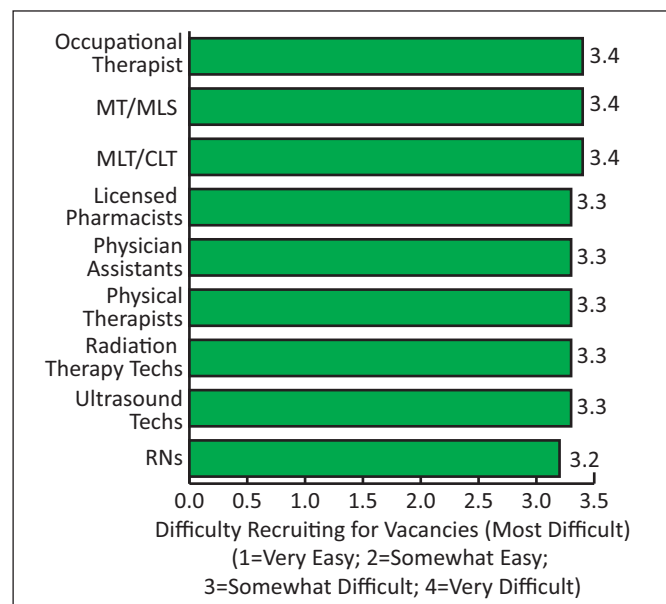


Figure 78. Very and somewhat difficult to fill rural vacancies by workforce type

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.¹

The hospital CEO respondents were asked to indicate how they staff their emergency departments with physicians on weekends (Figure 80). 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,

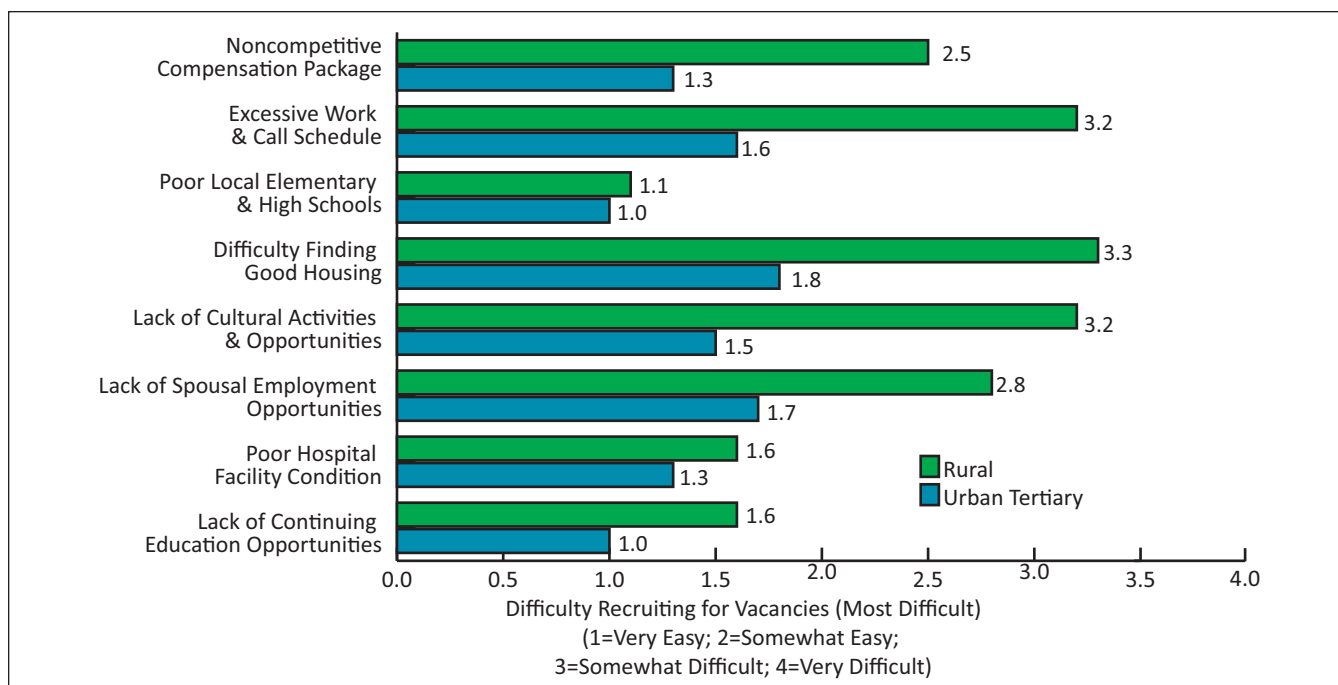


Figure 79. Rating of factors that contribute to problems recruiting physicians to hospitals by rural/urban status

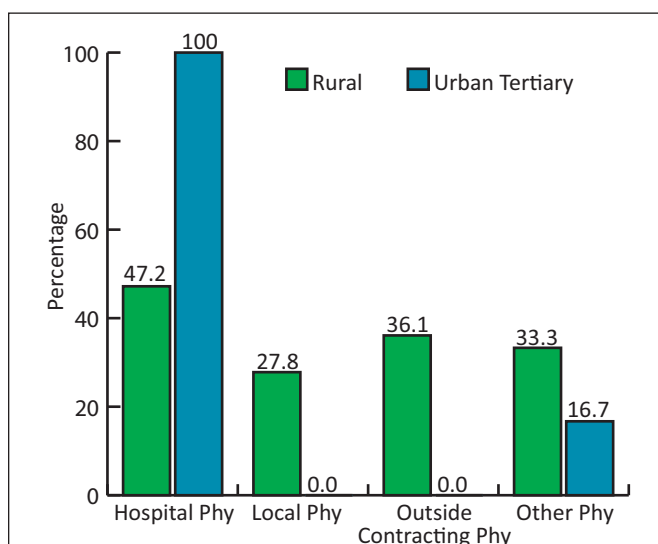


Figure 80. Physician staffing of emergency department on weekends

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 3.8.¹

Survey Results Summary

The *North Dakota Hospital Workforce Survey* provides a

picture of the hospital workforce in 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. Clearly the largest components of the hospital workforce are nurses, physicians, and business personnel. All in all, the hospitals reported that they currently employed 12,140.9 FTE personnel (not counting FTE vacancies). Sometimes hospitals are one of the largest employers in North Dakota's rural towns. North Dakota's total vacant positions at short-term, general hospitals in September 2014 was 963.1 FTEs. A little more than one-fifth (20.2%) of the vacancies are in rural county hospitals. In addition, the hospitals employed 1,280 physicians (31% of which were primary care physicians).¹

The most difficult provider types to recruit to fill hospital vacancies were reported to be licensed pharmacists, physicians, and lab personnel. In terms of the numbers of vacancies, nurses were most numerous. There were often substantial differences between the responses from rural and urban-tertiary county hospital respondents.¹

OTHER HEALTHCARE WORKFORCE PROVIDER TYPES

Mid-Level Providers (NPs and PAs)

There is a large cohort of medical providers that are positioned between doctoral-level providers (e.g., medical doctors, doctors of osteopathic medicine, dentists, PhDs) and

Table 22

Percentage of NPs in North Dakota by demographics^{2,3}

	N	Female	<35	35–44	45–54	55–64	65–74
Total	365	92.9%	19.7%	33.7%	23.6%	21.4%	1.3%
Metropolitan	232	92.2%	21.1%	36.6%	25.0%	16.8%	0.4%
Micropolitan	56	96.4%	19.6%	30.4%	19.6%	30.4%	0.0%
Rural	77	92.2%	15.6%	27.3%	22.1%	28.6%	6.2%

Table 23

Percentage of PAs in ND by demographics^{2,3}

	N	Female	<35	35–44	45–54	55–64	65–74
Total	213	74.6%	27.2%	24.9%	24.4%	20.7%	2.8%
Metropolitan	122	73.9%	34.4%	29.5%	21.3%	12.3%	2.5%
Micropolitan	38	81.6%	23.7%	23.7%	23.7%	23.7%	5.3%
Rural	53	71.7%	13.2%	15.1%	32.1%	37.7%	1.9%

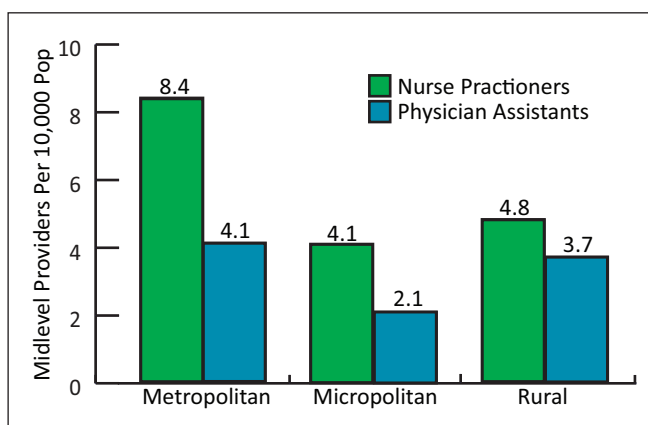
basic providers (e.g., licensed practical nurses [LPNs], nurse assistants, and occupational therapy assistants). These mid-level providers include nurse practitioners (NPs) and physician assistants (PAs).

There are about 365 licensed NPs in North Dakota. North Dakota NPs are predominantly female (> 90%) regardless of metropolitan status (Table 22). 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).²

According to Blue Cross Blue Shield of North Dakota, there are about 213 licensed PAs in North Dakota (Table 23). PAs in North Dakota do not vary much by metropolitan status (ranging from 71.7% female in rural counties to 81.6% female in micropolitan areas).²

PAs are older in rural and micropolitan counties (i.e., in rural counties, 37.7% of the PAs are in the 55-to-64 age group compared with 12.3% in metropolitan counties). The geographic distribution of mid-level providers across North Dakota is similar to the findings with physicians, with the highest density in the metropolitan areas. The expectation that mid-levels 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 compared with a rural counties.^{2,3}

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 (Figure 81). 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). North Dakota has significantly more NPs than PAs

Figure 81. NPs and PAs per 10,000 population^{2,3,4}

per population in all three of the rural/urban status categories than nationally. 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.^{2,3,4}

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 mid-levels is not available. There are currently about 365 NPs, 213 PAs, and 1,548 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.^{2,3,4,5}

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).⁶ 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). The UND SMHS PA Program has thoroughly evaluated the current admission structure, reviewed national admission standards and broadened admission criteria currently under institutional approval processes to increase North Dakota applicants to the program. Once approved, this would be effective for the fall 2015 admission cycle.

Practice characteristics include the following: 55% of respondents are working in outpatient group practice settings and only 10% are working in hospital settings. Additionally, 20% are working in a rural area (as defined by the Office of Management and Budget) and include 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 a rural area. Furthermore, 45% of respondents gained employment from their clinical preceptor (60% from the North Dakota

Program), of which 26% stayed in rural practice communities. With respect to specialty, 48% of the respondents indicated primary care (versus 27.7% nationally), including family medicine (35%), internal medicine/geriatrics (8%), and urgent care (5%) as their principal clinical position.⁷ Employment of physician assistants is projected to grow 38% from 2012 to 2022, much faster than the average for all occupations.⁸

As is shown from the September 2014 *North Dakota Hospital Workforce Survey* results, there were 265 FTEs of NPs employed by North Dakota's 42 short-term general hospitals and 172.8 PA FTEs. The rural and urban county vacancy rates for NPs were 12.2% and 11.4% as compared with the PA vacancy rates of 2.3% and 14.1%.¹

Significant aspects of the role of NPs and PAs are their specialization, clinical scope of practice and overlap with each other and physicians, and role in primary (generalist) healthcare. Although it is often difficult to develop a clear picture of the specializations of PAs and NPs 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. Those not involved in primary care are often 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.

Nurses

While the ratio of licensed practical nurses (LPNs) per 10,000 population has remained nearly steady during the recent past, as can be seen in Figure 82, the RN-per-10,000-population ratio increased by about 27% from 2005 through 2010.^{9,10} 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).¹¹ Another source shows North

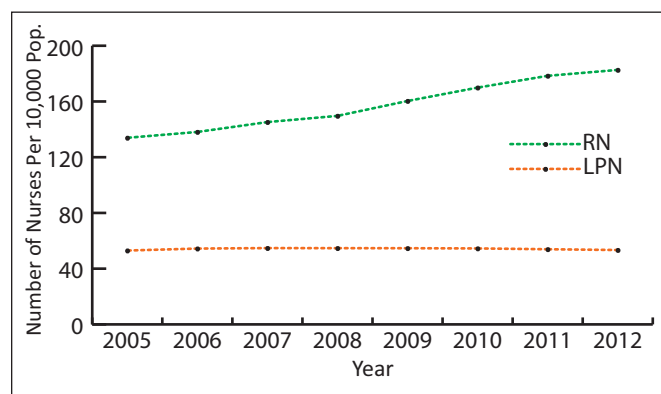


Figure 82. Registered nurses (RNs) and licensed practical nurses (LPNs) per 10,000 population in North Dakota from 2005 to 2012.^{4, 9,10}

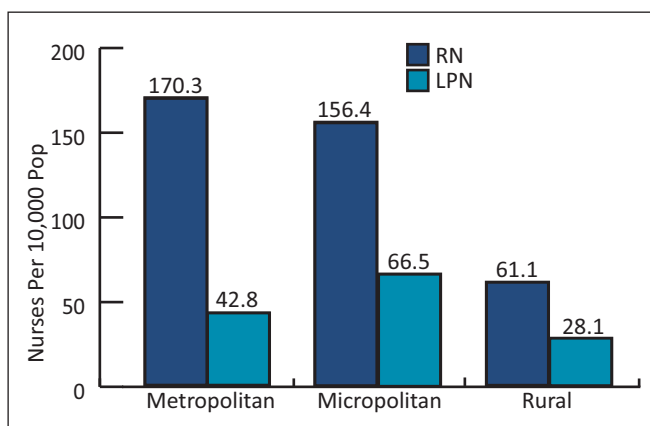


Figure 83. RN and LPN per population 2013

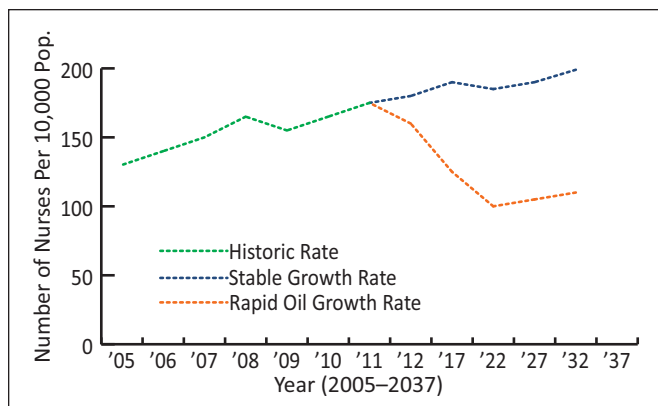


Figure 84. RN projection with oil population^{9, 10}

Dakota with 131 RNs per 10,000 population in 2014 (nationally ranked fourth-highest of the 50 states).¹² These data are of licensed RNs and do not take into account FTEs.

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.¹³

Within North Dakota, the RN-per-10,000-population ratio in 2013 was much higher for metropolitan counties than for micropolitan (large rural) and rural counties (more than twice as high): metropolitan, 170.3; micropolitan, 156.4; and rural, 61.1 (Figure 83). The LPN-per-10,000-population ratio in 2013 was higher for micropolitan, 66.5; followed by metropolitan, 42.8; and rural, 28.1.^{3, 4, 14}

Figure 84 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 likely 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 85). 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.^{9, 10}

Figure 86 illustrates the percentages of RNs and LPNs who work in hospitals, long-term care (LTC), clinics, and other. RNs are most likely (48%) to work in hospitals, 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 (28% versus 13%).^{9, 10}

Information from the 2014 North Dakota Hospital

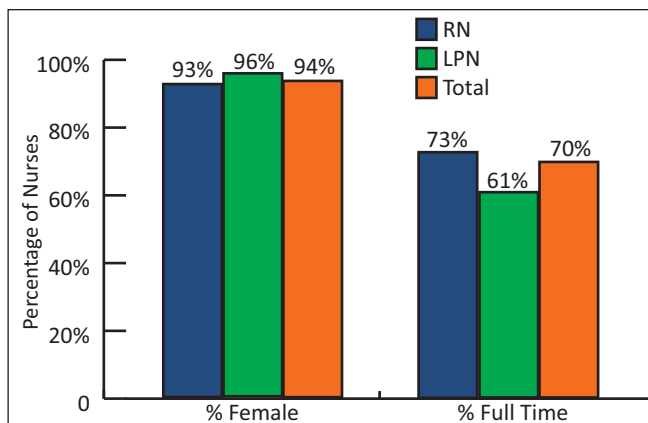


Figure 85. RN and LPN per gender, work time^{9, 10}

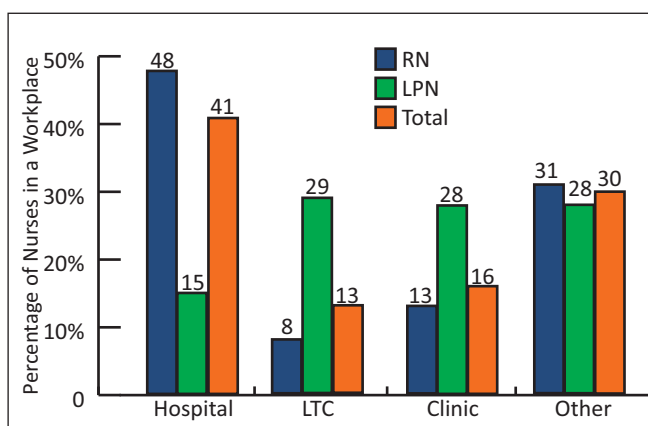


Figure 86. RN and LPN by facility.^{9, 10}

Workforce Survey shows that North Dakota's short-term general hospitals in 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% 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%, with the comparable rural county vacancy rates of 7.3% and 12.2%. In addition, North Dakota hospitals employed 961.2 FTEs of nursing 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 412.1.¹

Psychologists

The supply and distribution of licensed psychologists are similar to that seen with physicians and many other providers (see Figure 87). 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 metropolitan areas than in micropolitan (large rural) and rural counties (3.8 versus 2.3 and 0.5). If one compares the availability of psychologists in metropolitan

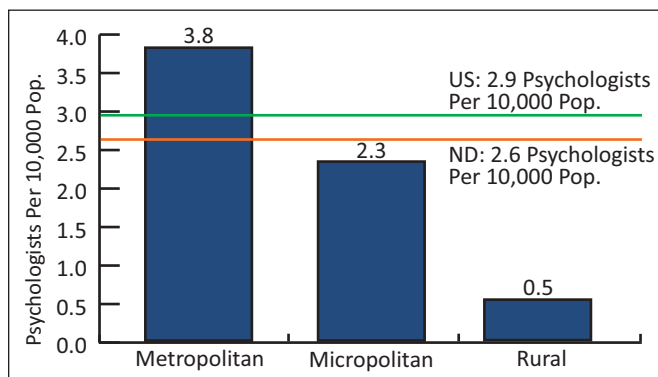


Figure 87. North Dakota psychologists per 10,000 population by rural/urban status^{3, 4, 14}

compared with rural areas, there are 87% fewer psychologists in the rural areas (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.^{3, 4, 14}

Oral Health Providers

North Dakota has an uneven distribution of oral healthcare providers across the state. North Dakota has 35 federally designated dental health professional shortage areas (DHPSAs); there are also 17 whole-county DHPSAs, including Benson, Billings, Dunn, Golden Valley, Grant, Griggs, Hettinger, Kidder, McKenzie, Mountrail, Nelson, Pierce, Rolette, Sioux, Slope, Steele, and Towner.^{16, 17} North Dakota is meeting roughly 53% of the oral health needs within the designated DHPSAs.¹⁸

Currently, 12 counties have zero dentists, nine have one, nine counties have two dentists, and five counties have not reported (Figure 88). Data on 2013 dentist licensures show that 67% of all the licensed North Dakota dentists work in the four largest counties (Burleigh, Cass, Grand Forks, and Ward). Furthermore, 79% of the counties in North Dakota have six or fewer working dentists (42 of 53 counties).¹⁹ The number of licensed dentists in North Dakota (with a practice address) has slowly increased from 2007 (327 dentists) to 2013 (380 dentists); however, 36% of those who are currently practicing plan to retire in the next 13 years.²⁰

North Dakota's dentist-to-population ratio is 6.1 per 10,000, which is below the national ratio of 7.6 per 100,000. Data from a less recent source show that North Dakota rural counties have 50% fewer dentists per 10,000 population than metropolitan counties (micropolitan 17% fewer).¹⁹ Ratios are based on total active dentists per county, do not differentiate between specialty and general dentists, and do not account for FTEs. The geographic distribution of dentists with an active license in 2014 in North Dakota counties is shown in Figure 88. Of those practicing dentists, 82% are male and 97% are non-Hispanic white.

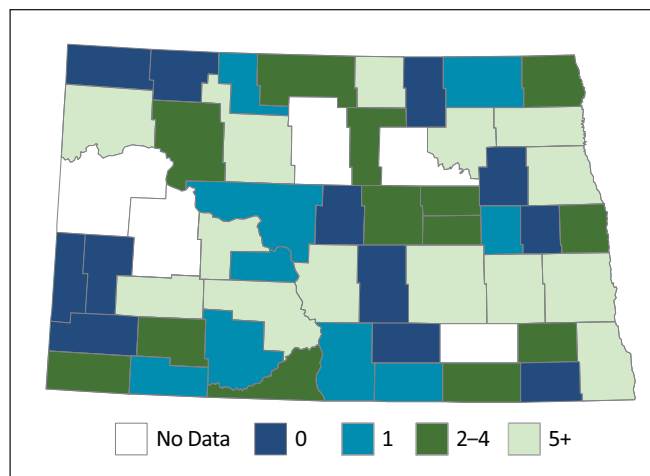


Figure 88. North Dakota number of dentists by county, 2014²¹

As of 2014, 47% of dentists practicing in North Dakota received their education at the University of Minnesota, 17% graduated from a dental school in Nebraska, and 4% graduated from Marquette University (Wisconsin).²¹

The number of licensed dental hygienists in North Dakota (with a practice address) rose from 468 in 2007 to 517 in 2013.

In North Dakota, there are two types of dental assistants, a registered dental assistant and a qualified dental assistant. A registered dental assistant (RDA) has formal training or certification or both; a qualified DA is trained chair-side. RDAs have a greater scope of practice than DAs. There are no data on the number of qualified dental assistants. In 2012, there were 472 RDAs with an address in North Dakota and 107 RDAs without an address. Furthermore, 89% reported working the right amount of hours, while 7% reported working fewer hours than desired. There are no comprehensive data on the FTEs for dentists, RDAs, and DAs practicing direct patient care within North Dakota. More information on oral health in North Dakota with an emphasis on the oral health workforce can be accessed at <http://ruralhealth.und.edu/projects/nd-oral-health-assessment>.

Pharmacists and Pharmacy Technologists

North Dakota has more pharmacists than the country as a whole (Figure 89).

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 (rural 10% lower than

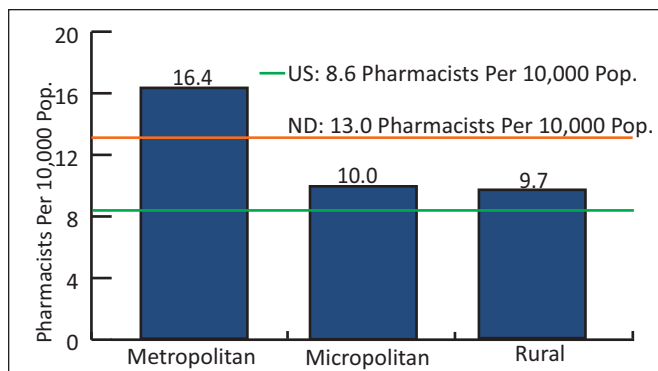


Figure 89. North Dakota pharmacists per 10,000 population by rural/urban status, 2010^{3, 4, 14}

metropolitan; Figure 90).

Information from the *2014 North Dakota Hospital Workforce Survey* shows that North Dakota's short-term general hospitals in September 2014 employed 206.1 FTEs of pharmacists and 144.3 FTEs of pharmacy technicians. The overall North Dakota vacancy rates for pharmacists and pharmacy technicians were 1.2% and 6%. The total number of vacancies for pharmacists was 2.5 FTEs and 9.2 FTEs for pharmacy technicians.

Physical Therapists

As with pharmacists, North Dakota has an adequate supply of physical therapists compared with the rest of the nation, although they are not evenly distributed across North Dakota (Figure 91). The national ratio of physical therapists is 6.2 per 10,000 population, while the North Dakota ratio is 59% higher at 9.9.^{3, 4, 22}

While this ratio appears to demonstrate an overall adequate supply of physical therapists, the distribution of physical therapists remains primarily in metropolitan counties (see Figure 91). Metropolitan counties have demonstrated a much higher ratio than rural counties at 9.7 versus 5.3 per 10,000 population in micropolitan (large rural) and 4.3 per 10,000 population in rural counties (micropolitan counties are 45% and rural counties are 56% lower than metropolitan counties).^{3, 4, 14}

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).²³ The numbers of physical therapists working in home healthcare and nursing care facilities was similar to national trends.²³ Notably, the percentage of North

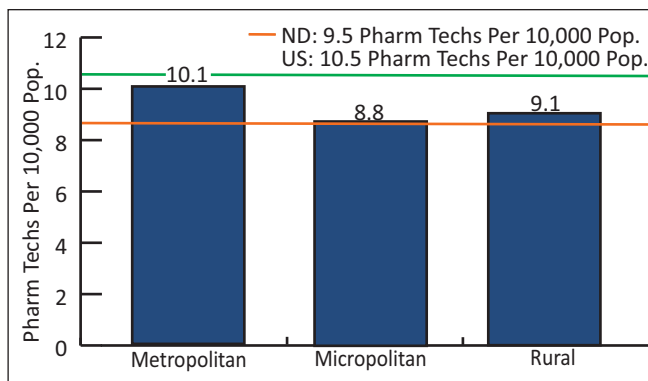


Figure 90. North Dakota pharmacy technicians per 10,000 population by rural/urban status, 2010^{3, 4, 14}

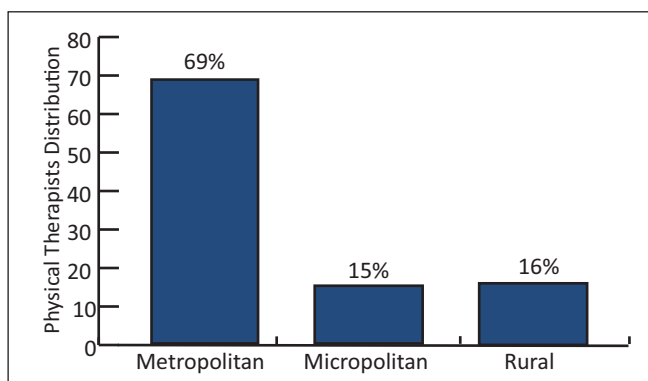


Figure 91. North Dakota physical therapists per 10,000 population by rural/urban status, 2009^{3, 4, 14}

Dakota physical therapists under age 35 was substantially higher than national data (49% versus 32%).⁴ 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 the University of North Dakota (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 in September 2014 employed 299.2 FTE physical therapists (230 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%).¹

Occupational Therapists

In July 2014, there were 665 licensed occupational therapy practitioners in North Dakota; 511 were licensed occupational therapists (OTs), and 153 were occupational therapy assistants (OTAs).²⁴ The SMHS Department of Occupational Therapy 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 demographics of the sample

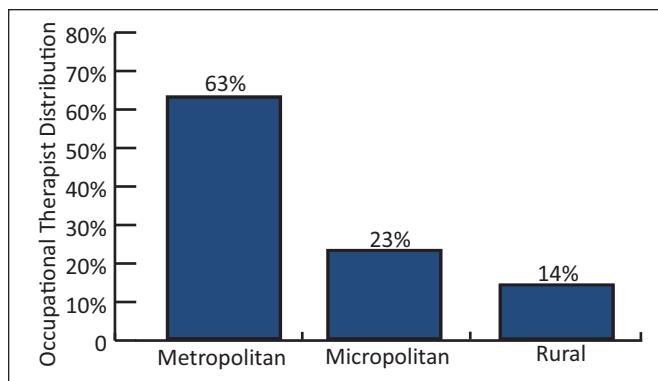


Figure 92. North Dakota distribution of occupational therapy personnel by rural/urban status, 2014

indicated the average age was 39.8 years (23 to 67), and 95% were female. Respondents reported that 58% grew up in a rural area, 44% graduated from a rural high school, and 14% currently live in a rural area. More than half (54%) graduated from a high school in the western half of North Dakota. Of the OT professionals responding to the survey, 60% graduated from the UND SMHS and 27% graduated from the University of Mary. Of the 30 OTAs responding to the survey, 73% graduated from the North Dakota State College of Science. OT personnel are not evenly distributed across North Dakota—14% work in rural counties, 23% work in counties classified as micropolitan, while 63% work in metropolitan counties (Figure 92).

In North Dakota, OT personnel reported that the most common practice settings were hospitals (34%), outpatient clinics (28%), skilled nursing facilities (19%), and schools (15%). This is a contrast to national statistics that indicate North Dakota has proportionately one percentage point fewer in schools and seven percentage points fewer in nursing facilities but eight percentage points more in hospitals and 19 percentage points more in outpatient clinics (Figure 93).²⁵ Coming from a rural area or graduating from high school in a rural area increased the likelihood of working in a rural county by two to four times, respectively.

Population trends in North Dakota indicate that with the growth in western North Dakota, there is an influx of 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 increases 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 communities.

Information from the 2014 *North Dakota Hospital Workforce Survey* shows that North Dakota's short-term general hospitals in September 2014 employed 103.2 FTE occupational therapists (urban, 88.4; rural, 14.8). There were 7.7 FTE vacancies (urban, 2.7; rural, 3.0). The overall vacancy

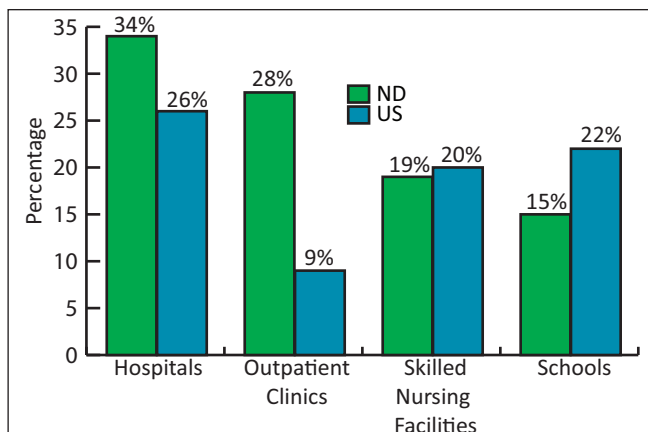


Figure 93. North Dakota most frequent occupational therapist practice settings compared with U.S. percentages

rate was 7.5% (urban, 2.7%; rural, 3.0%). The median number of months for the longest vacant position was 2.5.

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 laboratory scientists (MLS/CLS/MT) and 10 specialists. In 2014, the UND 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 low response rate, though these are the only such data presently available.

Medical laboratory professionals in North Dakota are older than the national median. The time to fill medical laboratory vacancies in North Dakota is much longer when compared with the United States. The projected vacancy rates for laboratory professionals is more than 50% across types.

North Dakota has two baccalaureate-level medical laboratory science programs accredited by the National Accrediting Agency for Clinical Laboratory Sciences (221 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 medical laboratory technicians (MLT/CLT), 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 medical laboratory scientists (MLS/CLS/MT) and a 78% increase in vacancies for medical laboratory technicians (MLT/CLT) as a result of current employees leaving positions because of retirement.

SUMMARY

North Dakota has a large number of NPs in metropolitan areas (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 physician assistants (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 areas. Rural areas 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 areas, 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 areas 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.

Physical therapists are primarily found in metropolitan areas, and the overall state rate per 10,000 is 59% higher than the national rate. Both categories of rural counties lag behind metropolitan areas and the United States as a whole.

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 likely population growth in the Oil Patch.

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CHAPTER SIX:

Healthcare Organization and Infrastructure in North Dakota Hospitals

Table 24

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 higher 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.

Figures 94 and 95 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. Nearly half of North Dakota’s HPSAs are located within the Oil Patch. 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” hospital systems (Altru Health System in Grand Forks, Trinity Health in Minot, Sanford Health in Bismarck and Fargo, St. Alexius Medical Center in Bismarck, and Essentia Health in Fargo) by providing hospital coverage elsewhere.

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

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 35 miles from another hospital, and reimbursement on an allowable cost basis as opposed to a prospective cost as are the Big Six tertiary hospitals. Nationally, about two-thirds of all rural community hospitals have converted to CAH status (1,326 out of 1,980 as of June 2014).^{1,2} All rural hospitals in North Dakota with the exception of the two IHS hospitals are CAHs.

All 36 CAHs have important networking relationships with 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 95, and Tables 24 and 25). 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 an older population than the Big Six (see Table 25).

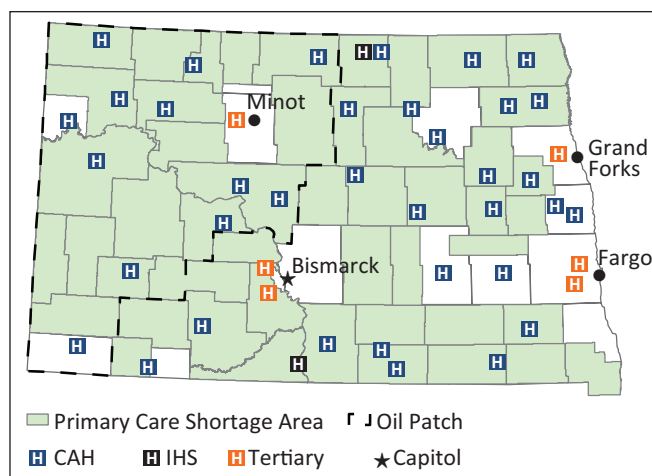


Figure 94. Hospitals in North Dakota

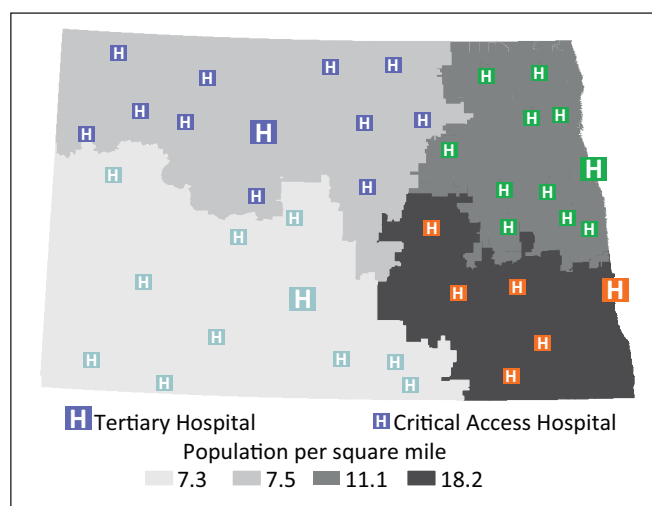


Figure 95. Critical access and tertiary network service areas

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, 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 2014 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. The actual financial condition of

Table 25

Tertiary hospital cities and CAH demographics.

Tertiary Hospital	Tertiary Beds	CAH Beds	Tertiary Average Age	CAH Average Age	Tertiary % Male	CAH % Male
Minot	416	233	36.4	50.5	50.7%	51.3%
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	51.4%	50.4%

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.

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 2011 (most recent released data year), CAHs in North Dakota had operating margins of -1.67% , which compares with $+0.68\%$ nationally. South Dakota ($+2.76\%$) and Minnesota ($+2.88\%$) had positive margins. This is a decline for North Dakota because in 2010 (as reported in the *Second Biennial Report*), the state's CAHs had an operating margin of -0.67 , but in the two previous years, the operating margins in North Dakota were about -2.5% . 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 2011, CAHs had a total margin of -0.02 , which compares with a national total margin rate of $+2.33$. The *Second Biennial Report* showed for 2010 a total margin rate in North Dakota to be positive, $+0.15$. In South Dakota, total margins were $+3.17\%$ and Minnesota $+3.45\%$.⁵ Under both the operating margin and the total margin measures, North Dakota's CAHs show financial stress and a step backward in comparison to the previous year. It is also distressing to note that North Dakota CAHs compare negatively not only with national data but also with CAHs in neighboring states where environmental conditions would likely be similar to North Dakota. The trend data are not encouraging. From 2004 to 2009, CAH total margins were negative in the state with a small positive increase in 2010, followed by the decline in 2011. This ranged from a low of -2.14% in 2009 to a high of -0.02% in 2011.⁵

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 CAH and PPS Hospital 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.⁶ 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 most 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 three of the 36 CAHs are stand-alone, sole entity hospitals offering exclusively traditional hospital services. This is down from five CAHs in the *Second 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. Most CAHs own and operate a primary care clinic (usually organized as a provider-based, federally certified rural health clinic [RHC]) or a nursing home or both, and many offer additional services. CAHs are a central access point to primary care services because the 30 CAHs (83% of all CAHs) operate 57 primary care clinics, with 43 of them being RHCs. Thus, these 30 CAHs are providing direct clinic access not only in these 30 communities with hospitals but in an additional 17 other communities. In addition, 14 CAHs (39%) operate nursing homes, nine operate ambulances, 10 own senior apartments, eight offer assisted living, six operate basic care centers, and three provide home care services.⁷ 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. More than 92% 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 financially vulnerable with statewide averages showing negative rates for both operating and total 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 2013 through September 2014, 24 rural hospitals have closed. This represents the largest wave of rural hospital closures since the early 1990s. During the 2013–2014 period, more rural hospitals closed than during the previous 15 years combined. At the national level, this rash of new closings is contributing to a growing concern over access to essential rural health services.^{8,9}

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 Affordable Care Act (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 will be announced in late 2014 or early 2015. 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.

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.¹⁰

Finally, it is important to understand some of the issues facing rural North Dakota hospitals. The 2014 CAH and PPS Hospital 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 Affordable Care Act for all nonprofit hospitals, the Center found the most pressing community health need to be “healthcare workforce shortages.” The third-highest need was “mental health (including substance abuse),” and the sixth-highest need was “financial viability of the hospital.” The data for the CHNAs were based on a variety of community member input techniques; thus community input is similar to hospital CEO impressions. The CHNAs were conducted from 2011 to 2013. Another research effort validated the issue of mental health. In a series of interviews of rural physicians and others in 16 rural North Dakota hospitals during 2010–2011, it was found that the lack of mental health services in rural areas served as an impediment to the recruitment of rural physicians if the physician believed that the primary care provider was to serve as the principal provider of mental health services. 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.^{11, 12}

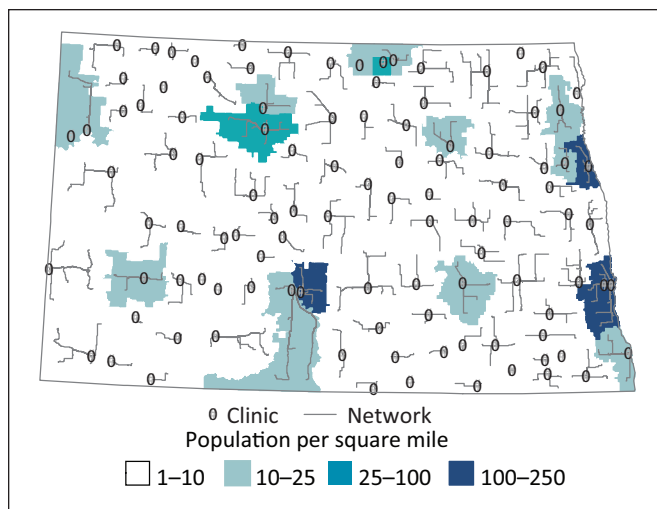


Figure 96. Clinics, networks, and population per square mile

Ambulatory Care

There are approximately 300 primary care and specialty clinics in the state (see Figure 96). Rural and urban hospitals or health systems account for more than 55% of these clinics.^{13,14}

There are 52 federally certified rural health clinics (RHCs) in the state (down from 57 reported in the *Second Biennial Report*). These are primary care clinics. CAHs own and operate 43 of the RHCs (83%) in the state as provider-based RHCs with the remaining RHCs being independent clinics generally owned by a physician or group practice. All of the North Dakota provider-based clinics are owned by 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.¹⁵

There are five federally qualified health centers (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 13 communities. Eleven of the communities are rural, and two are urban (Fargo has a CHC, and Grand Forks has a dental clinic and primary care clinics that are operated by Valley Community Health Center in Northwood). Northland Community Health Center, whose main clinic is in Rolla, expanded into the rural community of Bowbells and has a dental and primary care clinic in Minot. Three of North Dakota's largest communities are now served by a CHC (Fargo, Grand Forks, and Minot). There is a Migrant Health Center in Moorhead that also serves Grafton.^{16,17}

The 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 from site to site more efficiently. The nonphysician providers are supervised by a physician in a manner consistent

with state and federal laws. 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. Throughout the 1990s, the program expanded rapidly. At one point, there were about 90 RHCs in North Dakota. Since then, 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.

The federally-qualified-health-center (FQHC) model dates back to the Johnson administration's War on Poverty, having been 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. To illustrate the role FQHCs play in providing access to care for lower-income groups, nationally in 2012, 14.5% of the U.S. population was at or below the federal poverty level (in the *Second Biennial Report*, it was 15%). This marks the first time since 2006 that the U.S. poverty rate had declined.¹⁸ The patient base for FQHCs showed that about 72% of their client base was at or below the poverty level. For FQHC look-alikes (i.e., an FQHC that does not receive a federal grant but can operate and offer the same service arrangements as a grant-supported FQHC), the rate of poverty was 74%. RHCs, in contrast, do not 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 and 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 services.^{19,20}

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 constitutes a medical emergency.²¹ 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).

At the state level, the division with primary responsibility is the Emergency Preparedness and Response Section of the North Dakota Department of Health. The section has three divisions: Emergency Medical Services and Trauma, Hospital Preparedness, and Public Health Preparedness. The Division of Medical Services and Trauma has a wide jurisdiction of responsibility and service including licensing ground and air ambulances; 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; maintaining a relationship with the North Dakota EMS Association; and other functions. In addition, the Division of EMS and Trauma works closely with the Center for Rural Health on related matters. The Division also coordinates and manages the statewide critical incident stress management team; 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 SIM-ND program, which provides training and education in trauma events through the use of simulation, including four semitruck 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 semitruck 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

In North Dakota there are 4,482 licensed EMS providers.

- First responders: 95 (2.12%)
- Emergency medical responders (EMR): 1,781 (39.74%)
- Emergency medical technicians: 1,587 (35.41%)
- EMT-Basic: 220 (4.91%)
- EMT-Intermediate/85: 122 (2.72%)
- EMT-Paramedic: 589 (13.14%)²²

EMR is a new category of provider created in the past two years. Most of the EMS personnel that used to be thought of as first responders have been reclassified as EMR; thus, the first responder category that constituted more than 50% of all emergency providers before is now about only 2%. 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 even how people value personal time versus civic commitment. While the number of paramedics is relatively small (589), they constitute a growing provider base. In the previous *Biennial Report*, there were about 410 paramedics in the state, so there has been a 44% increase over the past two years. Since 2005, when there were 346 paramedics, this highest-trained EMS provider group has increased in number by more than 70%. Paramedics tend to be concentrated in urban areas, but the number of rural paramedics has increased (advanced life support [ALS] systems must be staffed by paramedics, and six of the state's 21 ALS units are in rural areas). There are 133 ground ambulance units in North Dakota with 114 being basic life support and 19 being ALS. In addition, there are three air ALS systems, two air critical-care services, and one air BLS system. There are 86 quick-response units.²²

Advanced EMS support is most available around the four major cities and in the Oil Patch (see Figure 97). Most of the EMS support throughout the state is ground-based and provides basic services (see Table 26). The average population served by an EMS unit is 5,212 people, with a median of 1,459 (range 124 to 138,538 people). Eighty percent (116) of the EMS units serve fewer than 5,000 people but cover an average of 524 square miles. Call volume is not evenly distributed because 11 ambulance services account for 73% of all calls (roughly 50,000), and the remaining 118 squads account for 27% (more than 18,000 calls).

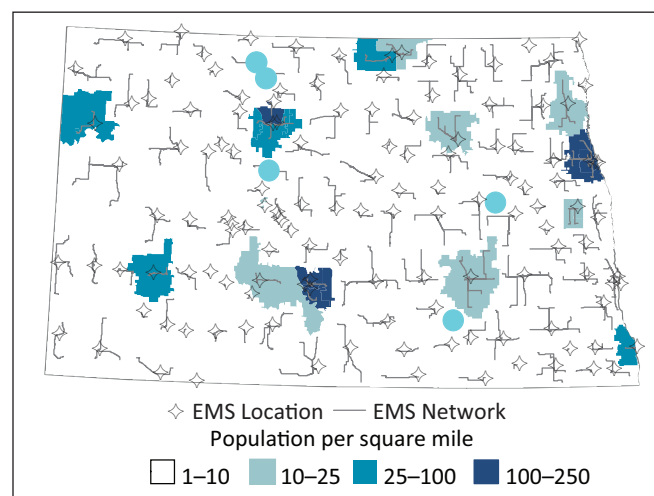


Figure 97. EMS networks and population per square mile

Table 26

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	-	-	3

The average EMS area is 560 square miles (range 14 to 2,420 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).

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 without an adequate supply of generational replacements
- Almost half (46%) of the volunteers listed on local service rosters were inactive
- Need to provide some level of financial incentives for volunteers was increasing
- 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 the week
- Some services reported that they expect to close within the next five years²⁴

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. During 2011 and 2012, North Dakota supported \$900,000 in training grants, and in 2012, the state supported \$1.25 million in staffing grants. More than \$3 million during that biennium was targeted to the Rural EMS Assistance Fund, which was focused on staffing, structural development, assessment/planning, and other activities to realign and restructure the rural EMS system. Overall, this fund has provided \$4.5 million in rural EMS assistance grants to 62 rural ambulances. During the 2013–2015 biennium, the Legislature supported \$940,000 in training grants, funded area grants for EMS at \$6.6 million and oil impact grants through the Energy Infrastructure and Impact Office of \$7 million.¹⁷ While the past three legislative sessions (2009, 2011, and 2013) have been supportive to 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. 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. The Medicare Rural Flexibility (Flex) Program, administered by the Center for Rural Health, has since the inception of the program in 1999 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. 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. The original CAH-EMS grants targeted efforts between a CAH and at least two ambulance services in an effort to build more of a multi-community or regional approach to EMS delivery. During the past three years (2012–

2014), Flex has provided grant funding to the North Dakota EMS Association to support EMS management training and EMS leadership development. About \$80,000 in Flex grants 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 215 rural EMS professionals to develop and enhance leadership skills. In 2014, 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/quality assurance, and other functions. Sixty-three EMTs attended the 2014 Management Academy. Regional EMS and CAH meetings were supported by the Center's Flex Program in 2013 and 2014. Six joint EMS/CAH meetings were held in 2013 followed by five meetings in 2014. The participants plan the meetings to meet local needs. Meetings have covered such subjects as the following: workforce needs, service reimbursement, health reform readiness, impact of the uninsured/underinsured, training needs, trauma designation, transport protocol and service, and HIT. The Flex Program also uses funds to support participation in the national Joint Committee on Rural Emergency Care (JCREC).²⁵

Another EMS effort supported through state policy is a community paramedic pilot program. The 2013 Legislature supported this effort, and in 2014, a pilot program was released. The Legislature called for a Community Paramedic Subcommittee to operate under the NDEMS 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 Billings County (Belfield, Medora, and Beach). In addition, other potential sites may be granted for Carrington and the Essentia Health Medicare Accountable Care Organization in Fargo. Thirteen 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. Discussions with third-party payers were commenced with Blue Cross Blue Shield of North Dakota and the North Dakota Department of Human Services, Medicaid.^{26, 27}

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 this 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.²⁷

In 2013, the state health departments in North and South Dakota received grants from the Leona M. and Harry B. Helmsley Charitable Trust to address cardiac care on a statewide basis. The North Dakota grant is administered by the health department's Division of Emergency Medical Services and Trauma. The \$7 million grants (for both states) have been used to place the LUCAS 2 Chest Compression System in more than 400 hospitals and ambulances in both states. The LUCAS 2 is a mechanical CPR device that delivers automated and consistent chest compressions for a patient suffering cardiac arrest. Being both lightweight and portable, the LUCAS 2 can be applied to a patient in less than one minute. For the health department, this new step in technology represents creating a statewide system for cardiac-arrest patients. The LUCAS 2 is seen as an important emergency device, particularly in frontier and rural areas. In 2014, the Center for Rural Health was contracted by the two health departments (and since then five other states that have received LUCAS 2 devices) to conduct statewide, hospital, and ambulance unit evaluations.^{28, 29}

Trauma System and Centers

In the United States, traumatic injuries are estimated to be responsible for more than 161,000 deaths a year with an estimated death rate of 55.9 per 100,000 persons. Trauma ranks as the fifth-leading cause of death and is the leading cause of death for people 44 years of age or younger.²¹

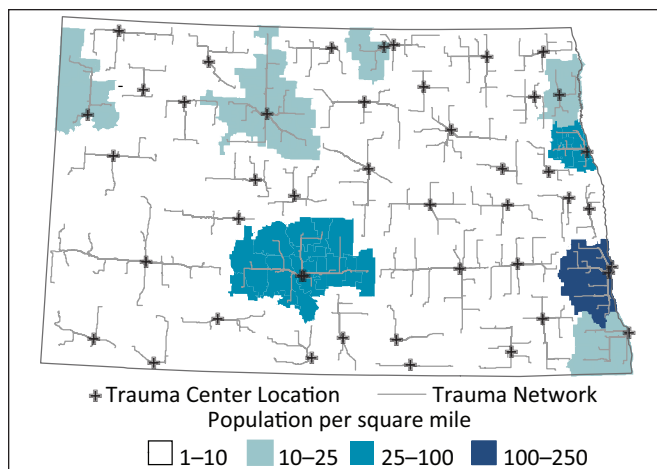


Figure 98. Areas served by trauma centers.

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.

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.”³⁰ Falls and motor vehicle crashes account for the majority of trauma in North Dakota. In 2012 (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 54% from 2008 to 2012 to a total of 6,227 events.^{31, 32} In examining the state by region, the area with the largest increase in trauma is the northwest quadrant, recording a 95% increase from 2009 to 2012. The southeast quadrant had a 31% increase, and the southwest area noted an increase of 20%. Only the northeast quadrant had a decline (6%). Likely because of the rapid expansion in oil and other energy development resources, the incidence of natural resources employment-related trauma increased by 291% from 2009 to 2011 (from 32 incidents in 2009 to 125 in 2011). In the 17 oil-producing counties, from 2007 to the first half of 2012, the trauma volume (i.e., the increase in the number of people in hospitals meeting trauma registry admission criteria) increased by 200%.³³

As was noted above, trauma is more prevalent in younger populations nationwide, and that is the case in North Dakota. In 2012, the age cohort with the highest level of trauma was people ages 20–29, followed by ages 30–39, and then 10–19. People 60 and older are much less likely to experience trauma than someone 20–29. Rural hospitals have

experienced a 44% increase in the number of patients they see and then refer to one of the state’s Level II trauma facilities from 2010 to 2012. Most trauma cases in the state’s registry were categorized as minor, as opposed to moderate, moderate-to-severe, or severe-to-critical. Construction is the most dangerous occupation in the state for trauma, followed closely by natural resources, and then agriculture. Likely associated with the oil expansion, the region with the most work-related injuries in 2012 was the northwest quadrant with 41%, followed by another oil-rich area, the southwest, with 29%.^{32, 33}

Forty-three of North Dakota’s 44 acute and critical access hospitals are designated as trauma centers (see Figure 98). 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. The North Dakota process uses teams from the American College of Surgeons (ACS) for verification of Level I, II and III trauma centers and utilizes state teams for designation of Level IV and V trauma centers. The process for Level I, II and III trauma centers to receive verification is accomplished through an application process, site visit, and review by a verification team from the American College of Surgeons. The Department of Health will issue a state designation to coincide with the dates of the verification from the ACS.²² A Level I trauma center provides the highest level of surgical care to trauma patients. From 2007 to 2013, the Center for Rural Health’s Medicare Rural Hospital Flexibility Program made funds available to CAHs to complete the process to be designated either as Level IV or Level V trauma centers. The remaining 10 CAHs made use of the grants. In addition, two rural hospitals in Minnesota and South Dakota that lie on the border with North Dakota are part of the North Dakota Trauma system, Breckenridge, Minn., and Mobridge, S.D. The state’s six largest hospitals and tertiary centers are all designated as Level II trauma centers. North Dakota does not have a Level I trauma hospital. Nine North Dakota CAHs are designated as Level IV trauma centers, and 27 CAHs and one IHS hospital have Level V designation.³⁴ 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:³⁵

- 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 the technology for preventive, educational, and health-related administrative activities. Both telemedicine and telehealth involve interactive medical equipment, computer technology, and telecommunications technology.³⁶

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.³⁷ 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.^{38, 39, 40}

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, 25 loans have been made for a total of \$12, 272,449.⁴²

In addition to the previously mentioned resources available for providers, the Center for Rural Health has partnered with the Quality Health Associates of North Dakota (formerly the North Dakota Healthcare Review, the state’s quality improvement organization) and the Regional Extension Assistance Center for HIT (REACH), which is funded by the Office of the National Coordinator of HIT. Since 2009, this entity has served both North Dakota and Minnesota in providing technical assistance for the

implementation of electronic health records and in assisting them in attaining the various requirements to meet meaningful use Stages 1 and 2. As of Sept. 31, 2014, REACH had service agreements to provide technical assistance to all 36 North Dakota CAHs and had worked with five of the six urban tertiary facilities in North Dakota. All 36 CAHs have implemented an electronic health record and computerized provider-order entry (CPOE), and are able to electronically report quality data. Lastly, 31 of 36 CAHs have met meaningful use Stage 1 requirements. REACH has service agreements with 638 primary care providers (PCP) in North Dakota, and 559 PCPs have implemented EHRs and e-prescribing, and are able to electronically report quality data. Of those, 242 have met the criteria for meaningful use Stage 1.

In order to further assess the progress in adoption and utilization of electronic health records and the development of the state health information exchange or North Dakota Health Information Network (NDHIN), the North Dakota Information Technology Department contracted with the Center for Rural Health to resurvey healthcare facilities, including hospitals, local public health units, long-term care facilities, and laboratories. New to the survey process were ambulance units, chiropractic offices, dental practices, home health agencies, mental or behavioral health facilities, optometry offices, nonaffiliated clinics, and pharmacies.

Longitudinal data were only available for hospitals, public health units, and long-term care facilities. Between 2008 and 2012, 42% of hospitals in North Dakota had gone “live” with an EHR (see Figure 99). In 2013, 83% of hospitals reported an ONC-certified* EHR, with 96% of the remaining hospitals indicating they would go live by 2015. Of those with

a certified EHR, 87% had reportedly attested to meaningful use; this rate was only 17% in 2012.⁴¹

In the 2012 survey, 37% of North Dakota’s public health units indicated having or being in the process of implementing an EHR. By 2013, 50% indicated they had an EHR, with an additional 20% anticipating implementation within two years.⁴¹

Long-term care (LTC) facilities in the state have seen similar growth in the adoption and use of EHRs. While no LTC facility had implemented an EHR in 2008, by 2012, 30% reported an active EHR. As of May 2013, 47% had an EHR, with an additional 33% indicating they would go live within two years. Point-Click-Share is the primary EHR product reported among LTC facilities.

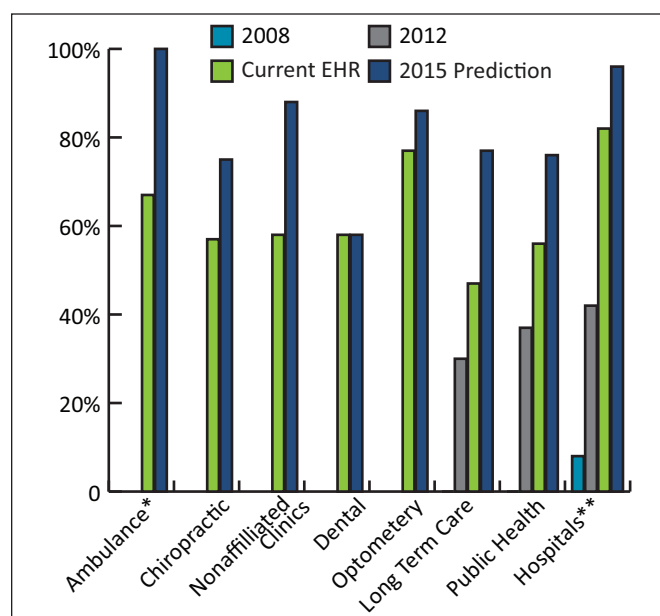
The North Dakota Department of Human Services has eight regional human services centers. They have implemented e-prescribing, which is integrated into their electronic health record.

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).”⁴²

Since 2005, every licensed ambulance service is required to submit data to the North Dakota Department of Health. However, the Division of EMS and Trauma 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 health information exchange, or 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.

“Certified” was defined as the following: Deemed acceptable by ONC (Office of the National Coordinator of HIT) for meaningful use and included in the CHPL (Certified HIT Product List).



* Ambulance units were surveyed on their use of electronic patient care reports (PCRs).

** Rate of implementation of ONC-certified EHRs

Figure 99. Rate of EHR implementation in North Dakota: 2008-2013, 2015 prediction

Barriers to EHR Adoption

In addition to the financial burden of implementing and upgrading their electronic health record systems, other barriers and challenges that organizations face are listed in Table 27.

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 electronic health record implementation among these types of providers. However, the state HIT Advisory Committee (HITAC) and HIT staff, within the North Dakota Information Technology Department (ITD), 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.⁴¹

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 national Surescripts data mirror the findings through the state survey of pharmacists when asked of their knowledge and capacity to e-prescribe (Surescripts is an e-prescription network that connects prescribers in all 50 states). In the 2012 survey, they 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.⁴³

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, Department of Health, and Department of Human Services, as well as stakeholders,

Table 27

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	

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) and query-based services. DSM is a simple, secure method for participants to send encrypted health information directly to known, trusted recipients. Approximately 800 individuals have accounts set up to use DSM. Some examples of information providers and payers exchange include documents, images, Health Level 7 message strings, claims attachments, and continuity-of-care documents.

Query-based services allow authorized individuals to use a robust bidirectional health information exchange to obtain medical information from numerous facilities with one query by securely connecting providers' electronic medical record systems. This query 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 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 Department of Health.

During the past year, the NDHIN infrastructure was installed, and connections to providers and the Department of Health were established. Connections have been made with the large healthcare providers in the state, and more than 30 other providers are being connected. Currently, the NDHIN is operating, and supporting meaningful use and health information technology requirements. The NDHIN team continues connecting, training and testing with providers on the query-based infrastructure.⁴⁴

Telehealth

According to the Great Plains Telehealth Resource and Assistance Center (GPTRAC), funded by the Health Resources and Services Administration, telehealth and telemedicine may appear to be very similar, but there are some important differences. *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 electronic health record implementation through the HITECH Act, telehealth has taken a bit of a back seat in the HIT arena. However, providers have continued to grow their utilization of videoconferencing beyond meetings and educational purposes.

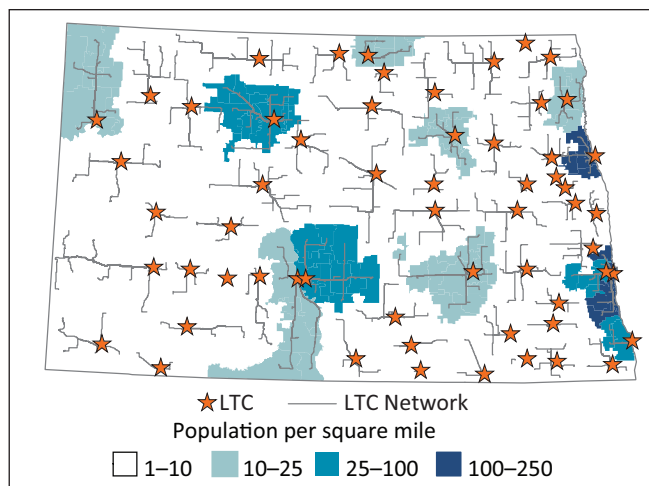


Figure 100. Long-term care in North Dakota

- 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.

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:

- 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, allowing 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 the much-needed telehealth to meet mental and behavioral care needs. 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 12 CAHs, seven of which are in North Dakota.

Telehealth has the potential, in a number of applications,

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 will serve to identify telehealth services being provided in the state; review state and federal regulations, and make recommendations for potential policy changes to achieve harmonization of state and federal laws; and inform and educate HITAC and interested stakeholders about telehealth.

Long-Term Care

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 or aging services are a function of healthcare that is directly affected by population factors, particularly the aging of the population.

According to the North Dakota Long Term Care Association, two out of every five 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.⁴⁵

Currently there are 81 skilled nursing facilities (with 60 or 74% located in rural areas). Ninety-two percent are nonprofit. There are 68 basic care facilities in North Dakota (with 47 or 69% located in rural areas). Seventy-four percent are nonprofit. North Dakota has 72 assisted living facilities (with 43 or 60% located in rural areas). Seventy-nine percent are nonprofit.^{46, 47}

Long-term care 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 nursing 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).⁴⁵ 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

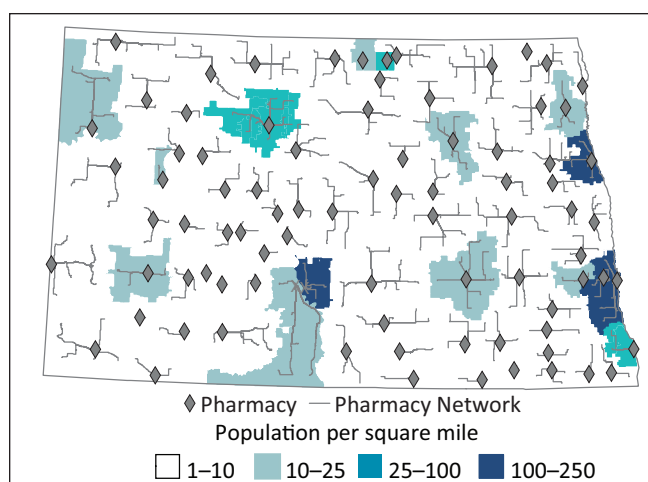


Figure 101. Pharmacies in North Dakota

- North Dakota currently has 254 pharmacies.
- 155 (61%) are rural or located outside of the metropolitan areas.
- There are 85 towns with at least one pharmacy.
- Five rural counties have no pharmacies.

years of age or older. The oldest caregiver working in LTC is a 99-year-old dietary aide. 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.⁴⁵

Pharmacies

North Dakota has more than 250 pharmacies with 155 (61%) being located in rural areas (see Figure 101). Five counties, all rural, have no pharmacies.⁴⁸ 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 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 increased competition and to decreases in reimbursement. 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, volatile economic conditions, and changes in technology. Nationally, from May 2006 to October 2010, there was a net closure of 119 sole community pharmacies, with 31 being located in a rural community where there was no other health or medical providers. The total number of independently owned rural pharmacies that were the only pharmacy in a community declined by 15% from 2003 to 2010 (2,060 and 1,759, respectively). A total of 268 rural communities with a single retail pharmacy in May 2006 had no retail pharmacy in December 2010, and nine communities with more than one pharmacy in May 2006 had none in December 2010. An additional 176 rural communities went from having more than one retail pharmacy in May 2006 to only one retail pharmacy in December 2010. During a part of this period, federal health policy created a new Medicare benefit in the form of Medicare Part D (the prescription drug benefit) and the issuance of prescription discount cards. 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., regulatory constriction and lowered reimbursement).^{49, 50} The Affordable Care Act may also have some future implications. One of the impediments in the creation of Part D was that there was a coverage gap created wherein once a Medicare recipient reached a certain level (in 2014 this was \$2,850) in drug costs, Medicare coverage ceased until it reached a higher level (\$4,550) and coverage kicked in again. The uncovered cost is referred to as the “donut hole.” One of the attractive features of the ACA for seniors receiving Medicare is that over a period the ACA gradually “fills in” the donut hole by 2020 when there will be a more traditional co-payment of 25%. Policy analysts see a continuing expansion in the role of the pharmacist in care consultation with patients because of the ACA, and as the donut hole shrinks, it is anticipated that this will help the individual Medicare recipient (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 but 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 interest is a federal discount drug program called the 340B Program (named after the section in the Public Health Service Act of 1992 that created the discount). 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 (added as part of the Affordable Care Act), disproportionate share hospitals, sole community hospitals, rural referral centers, family planning programs, homeless programs, 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 2,000 hospitals, and numerous clinics and other sites. Covered sales are expected to exceed \$16 billion by 2019, fueled by the Affordable Care Act’s Medicaid expansion. It is also estimated that the 340B discounts represent only 2% of the \$325 billion U.S. 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 Affordable Care Act 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.⁵¹ 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. There have been policy discussions to consider the inclusion of federally certified rural health clinics; however, as of 2014, federal policy has not changed.

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, there were 10 states with laws governing telepharmacies.⁵²

Telepharmacies have become a practical means to keep access to medications available in a growing number of rural locations (see Figure 102). A telepharmacy benefits the patient and the pharmacist, creates employment opportunities for health workers, supports local business and economic

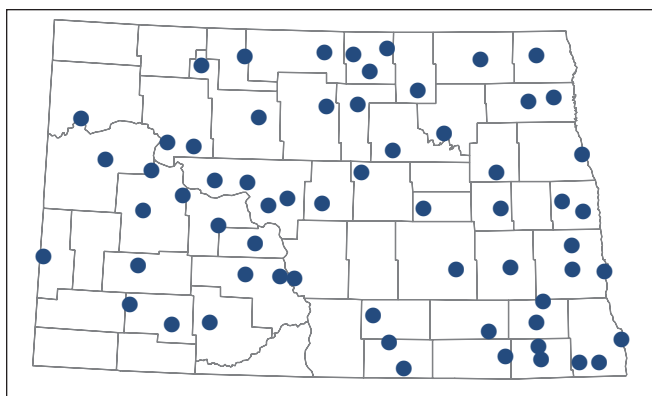


Figure 102. Telepharmacies in North Dakota.⁵¹

- North Dakota currently has 62 telepharmacies.
- Ten counties have no telepharmacies.

development, and supports local health providers and organizations such as CAHs, clinics, long-term care facilities, public health, and others.

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.⁵³

Rural North Dakota has felt the positive effect of telepharmacy. Thirty-eight (72%) of North Dakota's 53 counties are involved with the North Dakota Telepharmacy Project. As of 2014, there were 81 pharmacies involved in the Telepharmacy Project, including 25 central pharmacy sites and 56 remote telepharmacy locations. 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 81 sites, 53 are retail pharmacies and 28 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 Pharmacy, Nursing, and Allied Sciences; 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.⁵³

Public Health

Public health is an important and fundamental set of health services that has made significant contributions to

improving the health status of most Americans, rural and urban. At the same time, it 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, primary 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.

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 North Dakota Department of Health (see Figure 103). 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 28). 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

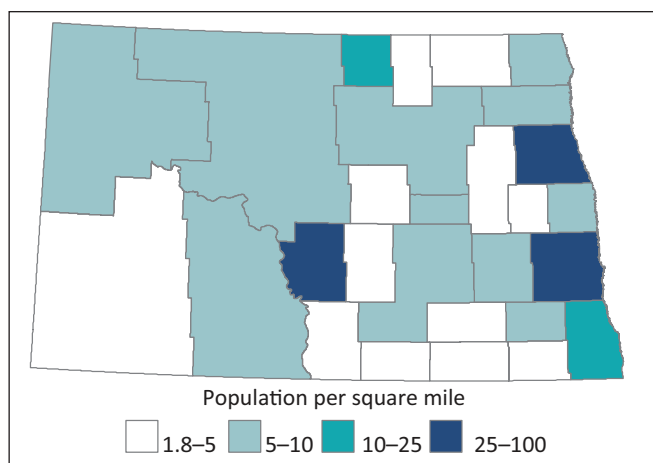


Figure 103. Local public health unit areas and population per square mile⁵⁴

There are 28 public health units in North Dakota, with 22 in the eastern half of the state.

- Twenty-one 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. Twelve have under five people per square mile.
- The average age of population for 18 public health units is more than 40.

Dickinson, which serves a large eight-county region, has used multiple federal Rural Health Outreach grants to create a health screening (e.g., various cancers and cardiovascular conditions) and education model that operated for more than 12 years. It 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 Pathways to Healthy Lives Program is a model both in terms of its community focus and network orientation but also in its ability to bring services into some of the most remote areas of the state, including parts of an American Indian reservation. The program began through a multi-organizational planning process about 12 years ago with strong public involvement and awareness. 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 Senior 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. The evaluation data (conducted by the Center for Rural Health)

Table 28

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

indicated that the program had a positive effect and is a model program for rural health providers. 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 part of the ACA-mandated Community Health Needs Assessment (CHNA) process for all nonprofit hospitals, it is stipulated that the process must involve “input” from public health. To some varying degree of involvement, public health was at the table in the development of the 41 hospital CHNAs during the 2011–2013 process. Following the CHNAs, the hospitals, along with community partners, had to develop a community health implementation strategy to determine a path to address and meet priority issues. All the hospitals are either initiating or are about to start a new three-year period of CHNAs. Some hospitals worked very closely with public health, having them as active, primary partners in developing and implementing a “community” approach to exploring community health needs. Others sought less involvement. The Center for Rural Health conducted 21 of the 36 CAH-based CHNAs for North Dakota. An observation from that 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 the Community Transformation Grant (funded by the Centers for Disease Control and Prevention and administered by the North Dakota Department of Health in partnership with the UND Center for Rural Health and the NDSU Master of Public Health Program), the Center for Rural Health conducted both a written electronic survey of public health directors and phone interviews. In addition to exploring the organizational functions of public health, the Center—because of the need for stronger local collaboration between partners—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 of the responding units (55% or 12 of 22) indicated that they planned to work with the local or area hospital on the ACA-mandated, hospital-initiated CHNA. Four units (18%) said they had moderate involvement, five (23%) indicated minimal involvement, and two (9%) said there was no involvement in the process. Public health directors were also

asked what the barriers were in completing a CHNA, 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. Local collaboration was also a focus in the one-on-one phone interviews. Center for Rural Health staff engaged 23 of the 28 directors during the phone interviews, conducted in 2013. Respondents were asked to discuss the level of ease in local or area collaboration. About two-thirds (65% or 15 of 23) 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. Four (17%) indicated that collaboration was dependent upon the situation and was more of a yes-or-no proposition.⁵⁵ Some of the hesitation was based on time factors, having the right people involved, and identifying the right issue. Two (9%) western public health units indicated that rapid population change was making collaboration harder, because organizations had to concentrate on issues immediately at hand or operate on more of a survival mode. One unit director said informal collaboration worked but if it was necessary to have a more formal relationship then it was harder. And only one public health unit director said area health organizations were independent and tended to go their own way; there was room for improvement.

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 discussed below) encouraging and even mandating more collaboration, it is important that the entities involved have the ability, desire, resources, and mindset 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 health indicators.

In addition to the hospital CHNA process, public health in North Dakota in 2014 started on a new path toward national accreditation through the Public Health Accreditation Board (PHAB). This is an accreditation standing that relies on standards and measures that a state or local public health department can use to address processes, procedures, and programs to increase performance in

providing the core functions of public health. It also leads to improved quality in public health, strengthened internal and external partnerships, better prioritized needs and goals, and improved overall organizational efficiency. According to the PHAB, 97% of health departments that went through the accreditation process improved their organizational performance.⁴¹ As part of the accreditation process, public health units must be engaged in a CHNA process and create a strategic implementation plan. Thus nonprofit hospitals must do this under healthcare reform, and public health must also pursue a similar path if it elects to pursue national accreditation. The Center for Rural Health, in 2014, assembled a work group of rural CAH administrators and rural public health directors to review and modify the survey instrument it had developed and used during the 2011–2013 hospital CHNA process. The work group developed a common instrument that can meet the needs of hospitals and public health alike. The Center is working directly with two public health units on the CHNA (with area hospital involvement) and has contracts to assist six public health units in the development of their strategic health improvement plans.

Public health in North Dakota, and certainly in rural areas, is taking a serious look at the challenges and limitations it faces, forging new partnerships and networks, and working to meet local health needs. It is encouraging that both federal health policy and national public health standards are converging in a manner that can create positive change not only for the organizational structure and efficacy of local health systems but also for the improvement of the health and health status of community members.

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. Across all four regions of the country, 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.^{56, 57}

North Dakotans tend to experience slightly higher rates of mental health problems than the national average. 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.⁵⁸

Throughout the state, there are more than 30 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 Stadter Center in Grand Forks. Most provide multiple forms of care services. Eight provide both inpatient and outpatient services; seven supply residential services; six offer residential and outpatient services; four have outpatient services; four provide general mental health services; and two supply inpatient, outpatient, and recreational services.⁵⁸

Rural health providers have been active in developing community-focused solutions to address mental health. The 2014 CAH and PPS hospital 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 have negative financial margins and are 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 services (e.g., CHNA aggregate data and the Community Apgar Project study related to facilitators and barriers to rural physician recruitment and retention).¹⁰ 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 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 in about 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. 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 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 (improving access to services, conflict-free case management, and access to crisis assessment), (2) expand workforce (changing oversight for licensing issues and concerns and increasing use of laypeople in expanding treatment options), (3) change insurance coverage (increasing funding options for services for youth and adults, and increasing behavioral health professional coverage in Medicaid and private insurance), (4) change the structure and responsibility of the North Dakota Department of Human Services (building transparency and choice in services and considering the structural change in state government), (5) improve communication (creating an integrated system of care, improving record sharing, and improving communication among mental health service providers), and (6) improve data collection and research

(determining what providers are available within the state and to map the gaps, determining what services are available outside the human service system for youth and adults, and using data to determine the best use of limited funding on treatment). The study also called for additional time and resources to address transportation, judicial matters, defining core services, tribal partnerships, and advocacy training.⁵⁵ The 2015 Legislature is expected to address these and other mental or behavioral health issues.

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, 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.⁵⁹

In North Dakota, 18 (34%) of 53 counties have been designated by the federal government as dental provider shortage areas.⁵⁹ In 2014, there were 12 counties that had no dentist (23%), nine had one, nine counties had two, and five counties had not reported. In 2013, 67% of all the licensed North Dakota dentists worked in the four largest counties of Burleigh, Cass, Grand Forks, and Ward. The dentist-to-population ratio was approximately 61:100,000 in the state, which is below the national rate of 76:100,000. The number of active-licensed dentists has slowly increased from 327 in 2004 to 380 dentists in 2013; however, 36% of those currently practicing plan to retire in the next 13 years.^{59, 60}

There has been an increase in the rate of use of dental sealants though the percentage of third-grade students with tooth decay has not changed (55% in 2010), and the percentage of third-grade students with untreated tooth decay has more than doubled from 17% in 2005 to 46% in 2010. There has been a decline in the number of Head Start children needing treatment who received the needed treatment (95% in 2010, declining to an annual rate of 75% in 2013). With regard to adults, 67% of those 18 years of age and older reported having been to the dentist in the past year.

Medicaid is an important subject in oral health. North Dakota leads the nation with one of the highest Medicaid dental reimbursement rates.⁵⁹

There are disparities in oral health status between American Indian third-grade students and their peers who are white and from other minorities. American Indians had higher reported rates of tooth decay, untreated decay, rampant decay, and need for treatment. Rural third-grade students had significantly worse oral health reported when compared with their urban peers.⁵⁹

As was the case with mental health, 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. With financial support from the Pew Charitable Trust, the Center for Rural Health was commissioned to conduct an extensive policy study on oral health needs and policy recommendations during 2014. Besides reviewing and analyzing existing secondary data sets, the Center assembled two expert panels to engage on the subject. One panel, the Oral Health Stakeholder Working Group comprised individuals in the state who were identified as active in and knowledgeable about North Dakota's oral health environment. Specifically, they represented organizations that served populations that either accessed or struggled to gain access to oral health services. The second panel, the Oral Health Input Working Group, consisted of organizations that worked in or with oral health, to include provider organizations and associations. The Stakeholder Working Group met regularly to identify and develop oral health best practices and models for North Dakota. From this process, 24 policy-relevant strategies were identified. The Stakeholder Group went through a series of rankings and votes, which resulted in merging some of the models into five recommendations.⁵⁹

The five recommendations that were presented to the Interim Health Services Committee, and were subsequently passed by the committee and referred to the Interim Management Committee of the Legislative Council, are the following:

1. Increase funding and reach of safety-net clinics to include providing services in western North Dakota
2. Increase funding and reach of the Seal! North Dakota Dental Sealant Program to include using dental hygienists to provide care and incorporating case management and identification of a dental home, where a patient receives oral healthcare in a coordinated manner on an ongoing basis (includes Medicaid reimbursement for services rendered)
3. 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
4. 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
5. Increase Medicaid reimbursement⁵⁹

The process used by the Center for Rural Health included a number of key oral health voices in the state—both groups that need oral health services (demand function) and organizations that contribute to the production of oral health resources (supply function). For two critical health functions (mental and oral health), the interim committee process was used to formulate possible policy

recommendations. It will be up to the 2015 Legislature to assess these recommendations for final policy change.

SUMMARY

Healthcare in North Dakota is delivered through more than 300 ambulatory care clinics, 52 hospitals (including 36 CAHs and two IHS hospitals), 81 skilled-nursing facilities, 68 basic-care facilities, and 72 assisted-living facilities, supported by an array of EMS providers, trauma centers, 28 public health units, oral health providers, mental health providers, and pharmacies. As a general rule, the more remote the facility is from a metropolitan area, the more its operation is threatened by financial and other pressures (including staff recruitment and retention). Rural health organizations tend to be small in size but have a significant effect on both the health of individuals and on the economic base of the community. Rural health providers do not operate in isolation. While most are independently operated or owned or both, they have forged generally positive working and referral relationships with more urban providers. There are numerous examples of collaboration, partnership, and networks. As more features of the Affordable Care Act come online, there will be additional opportunities to build networks between urban and rural North Dakota.

Fortunately, there are a wide variety of local, regional, state, and federal resources that support and sustain the most vulnerable of the rural operations.

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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 the 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 Affordable Care Act (ACA) of 2011. The former initiated quality data reporting for hospitals, pay for reporting, transparency through posting hospital-based data for public review, and development of pay-for-performance strategies. The latter 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 and collecting input, the NPP

developed the National Quality Strategy (NQS), which was released in March 2011. Better care, better health, and affordable care were identified as the primary aims of the NQS and represent essential elements for a transformative healthcare system.²

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.⁴ 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 efforts by 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 models⁴

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*,⁵ 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. 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.⁵

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. The IOM's Roundtable on Value & Science-Driven Health Care, along with the Patient-Centered Outcomes Research Institute's Research Network, in a 2014 summary report from two meetings, *Integrating Research and Practice: Health System Leaders Working Toward High Value Care*, 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.

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 rests 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 grows 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, (formerly the North Dakota Health Care Review, Inc.), the state's Medicare Quality Improvement Organization.

In the *2014 North Dakota State Snapshot* report, the AHRQ rated North Dakota as "average" in comparison with other states in regard to overall healthcare quality as documented in the *2014 National Health Care Quality Report* (see Figure 104).⁷ "Average" is the same rating reported two years ago in the *Second Biennial Report*. In the baseline year (2007), North Dakota had a "strong" rating. States are graded as very weak, weak, average, strong, and very strong. There are 109 measures that cover five areas:

- Overall healthcare quality
- Types of care (preventive, acute, and chronic)
- Settings of care (hospitals, ambulatory care, nursing home, and home health)
- Clinical conditions (cancer, diabetes, heart disease, maternal and child health, and respiratory diseases)
- Special focus areas (diabetes, asthma, Healthy People 2010, clinical preventive services, disparities, payer, and variation over time)

Of the 109 separate measures, North Dakota reached or surpassed the benchmark for 52 measures (48% of the measures). It was close to the benchmark on 44 measures (40%), and was "far away from the benchmark" on 13 measures (12%). The AHRQ looks at the strongest and

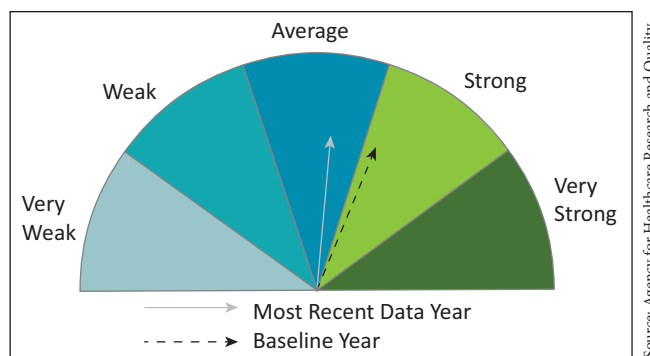


Figure 104. NHQR quality measures⁷

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; the state may be leading the way in quality for these measures. 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 81% better than the benchmark, and "persons aged 13–15 years who received one or more doses of meningococcal conjugate vaccine," 42% 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) "suicide deaths per 100,000 population," where North Dakota was 113% from the benchmark; and (2) "long-stay nursing home residents with physical restraints," which had the state at 121% from the benchmark.

In comparison to other states measured on this scale, North Dakota ranked 16th with a composite score of 53.45. This compares with top-rated Minnesota with a composite of 67.38 and the lowest-rated state West Virginia with 31.18. South Dakota ranked immediately above North Dakota, 15th overall, with a composite of 53.77. North Dakota's composite for 2014 (53.45) was below its 2012 composite (57.89), as was South Dakota's; however, Minnesota's had increased slightly.

When AHRQ data are grouped by diseases and conditions, priority populations, health insurance, type of care, setting of care, and access to care, North Dakota's best scores were found in diseases and conditions where the state was rated strong on two conditions: chronic kidney disease and diabetes in 2014; however, in the base year of 2007, the state had four conditions rated strong. Diabetes and kidney disease were strong in both the base year and 2014, but the state was rated strong in cancer and respiratory diseases in 2007. By 2014, cancer was assessed as average and respiratory disease was weak. In priority populations, North Dakota rated strong for the white population, but average for women and older adults. Data for this category were not available in the base year. Health insurance is a new category for the

AHRQ, and data are not available for North Dakota in 2014. For type of care, North Dakota was rated strong on chronic care in both 2014 and 2007, average for prevention in both years, and average for acute care in 2014, which is a decline from the very strong rating in 2007. “Setting of care” saw the state rated average in both years for ambulatory care, and average for hospital care, which was very strong in 2007. The final category, access to care, had North Dakota rated strong on patient centeredness in 2007 and 2014; however, structural access declined from a base-year rating of average to a 2014 rating of very weak.⁷ In the *Commonwealth Fund State Scorecard—2014*, North Dakota was ranked 14th overall, which is down from its position in 2009, which was 9th.⁸ 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 29 for both 2014 and 2009:

Based on The Commonwealth Fund assessment, North Dakota has experienced some decline on its main measures. The state’s overall ranking went down, as did the scores for prevention and treatment, avoidable hospital use and costs, equity, and healthy lives. Only the access measure improved by three positions from the previous time.

The *Commonwealth Fund Scorecard on State Health System Performance, 2014*, assesses states on 42 indicators of healthcare access, quality, costs, and outcomes over the 2007–2012 period.⁸ The report cautions readers that the period reflects the Great Recession and precedes the major elements of the Affordable Care Act, and this, overall, likely contributes to what was referred to as “mixed performance” during this period from the states. This may be a factor for North Dakota as well; however, the overall economic performance of the state during the recession was significantly better than found in other states. Other factors for North Dakota’s declining scores may need to be considered.⁸

North Dakota’s best category was improving access, where the state jumped from 12th to 9th. North Dakota ranked 1st on one measure: “adults who went without care because of cost in the past year.” It also ranked 4th overall on access for children, ages 0–18, who were uninsured. It was 7th for access for adults ages 19–64 who were uninsured and 7th for individuals under the age of 65 with high out-of-pocket medical costs. The state was in the middle of the pack ranking 24th on at-risk adults without a routine doctor visit in the past two years. 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.

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 2nd on a measure related to Medicare recipients with dementia receiving a prescription for drugs to treat chronic

Table 29

North Dakota rankings associated with Commonwealth Fund State Scorecard - 2014⁸

Category	2014	2009
Access	9th	12th
Prevention and treatment	17th	16th
Avoidable hospital use and costs	1st	8th
Equity	18th	9th
Healthy lives	29th	13th

renal failure. At the opposite end of the continuum, North Dakota ranked 49th for “home health patients who get better at walking or moving around.” There were 16 prevention and treatment measures. In comparison with the base year of 2007, North Dakota improved on six measures, stayed the same on three, worsened on two, and there were five that did not have a base period for comparison.

For avoidable hospital use and cost, North Dakota ranked high, with its best measure being “home health patients also enrolled in Medicare with a hospital admission” (2nd overall), and its worst measure (24th) on “total single premium per enrolled employee at private-sector establishments that offer health insurance.”⁸

The healthy lives band showed the state ranked 1st for “adults ages 19–64 who report fair/poor health or activity limitations because of physical, mental, or emotional problems,” and its worst ranking was 45th for “children ages 10–17 who are overweight or obese.”⁸

The final band of performance indicators—equity—showed that North Dakota improved on four of the 10 indicators, worsened on two, and for four, there were no baseline comparisons. North Dakota ranked 1st on “adults with poor health-related quality of life” and 3rd on “children without a medical home.” The state’s worst marking was 46th for infant mortality.⁸

According to the Quality Health Associates of North Dakota (QHAND), the state’s quality improvement organization, 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. HCAHPS data are now being collected, as directed under the Affordable Care Act, from all nonprofit hospitals. These are consumer-driven assessments of the hospital inpatient experience. The HCAHPS data also indicated that 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%).⁹

North Dakota CAHs and PPS hospitals both exceeded (performed better than) 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 to 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.¹⁰

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 to 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 to 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 to 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.¹⁰

With regard to Hospital Compare (i.e., a Centers for Medicare and Medicaid Services [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.¹¹

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.⁹

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 comprises organizations operating in each state, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands whose mission is to monitor and analyze the quality of care provided to Medicare and Medicaid recipients. 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.”¹¹ 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, and the North Dakota Hospital Association, 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 predominantly 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 Surgical Care Improvement Program (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 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 IT 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 systems among physician-based office practices is more than 90%, well above the national average.¹²

QHAND serves as the North Dakota subcontractor to the Great Plains Quality Innovation Network, the CMS Medicare Quality Innovation Network-Quality Improvement Organization (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 North Dakota Hospital Association. 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 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.¹¹

North Dakota CAH Quality Network¹²

The mission of the 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 staff

supports quality improvement activities of network members and assists them with the Medicare conditions of participation (CoP), benchmarking data, analysis of data, administration of an active e-mail list, connection with statewide and national quality-of-care-oriented committees and taskforces to facilitate communication, less duplication, and general technical assistance to the CAHs.

CMS CoP are essential for all hospitals, including 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 these standards. Network staff update the document for the CAHs when the CMS releases changes to the CoP.
- The network works closely and collaboratively with the North Dakota Department of Health serving as a liaison to share North Dakota CAH common deficiencies. The CAHs learn from each other by reviewing the deficiencies and determining how to make corrections.
- The network hosts quarterly CoP calls to facilitate sharing of resources and discussion around CAH regulation.
- The network developed a state-shared uniform credentialing form. The collaboration was statewide with stakeholders such as Blue Cross Blue Shield of North Dakota; Medicaid; Medica; Tri-West (an insurance company); the North Dakota Hospital Association; the North Dakota Department of Health; all North Dakota tertiary hospitals; and one CAH representative from each of the four state regions.

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 CAH Quality 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 CAHs belong to this network, although it coordinates closely with the six PPS hospitals. These tertiary hospitals have quality improvement agreements, and services are provided to the CAHs. The CAH Quality Network is staffed by Center for Rural Health personnel and supported with Flex Program funding. Oversight and direction are provided by an eight-member executive advisory board composed of representatives from CAHs (hospital CEOs, directors of nursing, and quality coordinators or directors). From 2013 to 2014, the executive advisory board, Network, and Flex staff met 10 times.

The CAH Quality Network, through the Center for Rural Health, has added more than 70 new resources to the CAH Quality Virtual Library of Shared Resource Tools. This is an online repository for CAHs and others to share quality

improvement tools, hospital policies, deficiencies, and other documents. Over the 2013–2014 period, more than 985 documents were viewed and accessed 340 times. To facilitate communication and information exchange, the Network operates a listserv, which in a typical year averages 50 or more messages. The program evaluation found it 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 the network. Each year, more than 50 people participate in the annual Flex 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 that are held multiple times a year in the state's four quadrants. The CAHs and the six tertiary hospitals plan the meetings to discuss hospital quality on a regional basis. This has proven to be one of the most supported efforts of the Network, by CAHs and PPS hospitals alike.

Currently there are six quality-improvement efforts or programs in which North Dakota CAHs participate. The six are administered through the North Dakota CAH Quality 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 (MBQIP)
2. Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)
3. State Stroke Program
4. Health Care SafetyZone Portal (HCSZ)
5. Benchmark for Excellence in Patient Safety (BFEPS)
6. Rural Health Network Development Grant for Computerized Provider-Order Entry and Emergency Department Transfers

Medicare Beneficiary Quality Improvement Program (MBQIP). MBQIP is funded by the Office of Rural Health Policy of the U.S. Department of Health and Human Services' Health Resources and Services Administration (HRSA). It is a Rural Hospital Flexibility (Flex) Program initiative charged with increasing Hospital Compare participation rates for CAHs and dedication to quality-improvement initiatives. 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. While participation in the project is voluntary, the MBQIP seeks to increase attention on quality healthcare for all CAH Medicare beneficiaries, both inpatient and outpatient. North Dakota CAH Quality Network staff work with CAHs to increase data submission on all measures and assist CAHs and regional CAH groups with data and identifying quality-improvement

projects. The North Dakota Flex Program in partnership with the ND CAH Quality Network and QHAND provided the following technical assistance: (1) to improve healthcare outcomes on Hospital Compare and other national benchmarks; (2) in accessing needed technical assistance around data collection and reporting; (3) in analyzing their own and comparative data via Hospital Compare; and (4) collaboration with CAHs to improve quality.

All 36 North Dakota CAHs are participating in MBQIP. Forty-four of 45 Flex states are participating. North Dakota was one of the first 10 participating states to have 100% of its CAHs participating in this nationwide effort to improve hospital quality of care. As was stated earlier, nationally only 21% of CAHs participate. Phase 2 of the MBQIP program, which began September 1, 2012, works with all participating CAHs to collect HCAHPS data. HCAHPS is a CMS standardized survey instrument and data collection method for measuring patients' perspectives on hospital care. All North Dakota CAHs (36) are publicly reporting to Hospital Compare for CMS and MBQIP inpatient (heart failure and pneumonia) and outpatient (emergency room heart attack and chest pain) clinical topics.

Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). HCAHPS is a requirement under the Affordable Care Act 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 their 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. HCAHPS is a core set of questions that can be combined with a broader, customized set of hospital-specific items. HCAHPS survey items complement the data that hospitals currently collect to support improvements in internal customer services and quality-related activities. 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 survey also includes four screener questions and five demographic items, which are used for adjusting the mix of patients across hospitals and for analytical purposes. The survey is 27 questions in length. The ND CAH Quality Network coordinator helps CAHs to

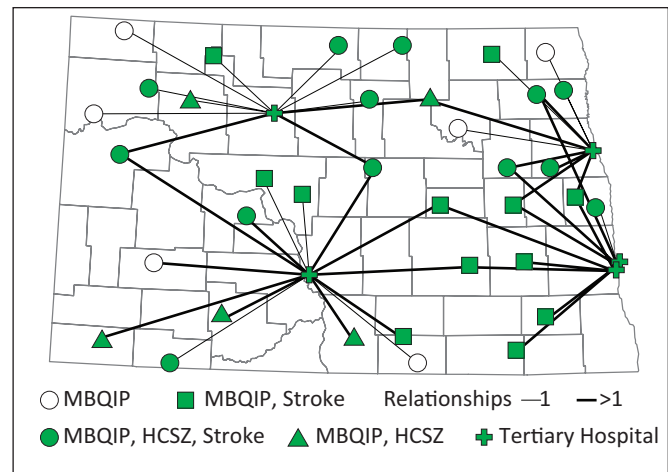


Figure 105. Quality initiatives and network referrals

understand the HCAHPS process, complete contracts, submit data, review reports, and review data regionally to identify areas for quality improvement as well as best practices.

HCAHPS is funded through the Flex Program and as of October 1, 2014, all 36 CAHs had identified a vendor; in the previous *Biennial Report*, there were 32 CAHs with a vendor.

State Stroke Program. The CAH Quality Network works collaboratively with other stakeholders to reduce the death and disability associated with heart disease. The network has been a key entity in the development of resources that help guide healthcare providers in the care of stroke patients. To do so, the network secured a subcontract under the North Dakota Department of Health's Heart Disease and Stroke Program. The State Stroke Program facilitates the on-boarding of North Dakota CAHs to the project, and provides 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 State Stroke Program participation. Under the program, the network does the following: (1) assists CAHs to establish use of the State Stroke Program, (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 North Dakota Department of Health Stroke Task Force held five meetings in 2013–2014. The Network has assisted in developing a state stroke toolkit, stroke protocols, CAH stroke readiness assessment, acute stroke treatment guidelines, and other functions. The PHAC involves a stroke coordinator from each of the six PPS tertiary hospitals and a CAH representative from each of the six regions. Twenty-nine CAHs participate.

Health Care SafetyZone Portal–Clarity Group. The Health Care SafetyZone (HCSZ) 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, 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 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, though Sanford Health System CAHs use a similar event-reporting tool (Midas), and Catholic Health Initiatives (CHI) facilities all use 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 CAH Quality Network assists with bimonthly meetings of SafetyZone Portal users via Webex, 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 during 2013–2014.

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 18 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.

Rural Health Network Development Grant Program for Computerized Provider-Order Entry and Emergency Department Transfers. In September 2014, the CAH Quality Network was informed that its federal Office of Rural Health Policy Network Development grant proposal was funded. This three-year initiative will focus on two important quality steps. The first is the use of computerized provider-order entry (CPOE) and telepharmacy to better facilitate pharmacist review of medication orders within 24 hours. The second is

improved care coordination related to outpatient emergency departments' transfers and enhanced data collection tools and methods (e.g., pharmacy reviews and outpatient emergency department transfer communication). This grant will facilitate North Dakota's ability to address what is called Phase 3 of the previously discussed MBQIP effort. Again, Phase 1 is recording inpatient pneumonia and heart failure measures in Hospital Compare; Phase 2 is recording outpatient measures and increasing HCAHPS participation. As was reported before, 100% of North Dakota CAHs are meeting Phase 1 and 2. Phase 3 relates to increasing data reporting related to pharmacist verification of orders within the 24-hour window and outpatient emergency department transfer communication. In addition to the 36 CAHs and the CAH Quality Network, partners will be the Center for Rural Health, QHAND, and Catholic Health Initiatives' ePharmacist Direct Program.

North Dakota Hospital Engagement Network (NDHEN)

The North Dakota Hospital Engagement Network is a collaboration of the North Dakota Hospital Association (NDHA), QHAND, and the Health Research & Educational Trust (HRET) of the American Hospital Association. North Dakota's HEN currently has 28 facilities enrolled. HRET was awarded a CMS contract to support the Partnership for Patients initiative.

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%.¹³

Meaningful Use of Electronic Medical Records Clinical Quality Measures (CQM)

This national effort, through the federal Office of the National Coordinator for Health Information Technology (ONC), is administered in the North Dakota HIT office. The concept of *meaningful use* was discussed to some degree under the HIT section in Chapter 6 on health infrastructure. Here 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 and value-based purchasing.

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 CQM are the outcome measures. As was reported in Chapter 6, as of 2014, 31 of 36 CAHs had met meaningful use under Stage 1 requirements.

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 is 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 most deadly 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 (PCI), 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 North Dakota Department of Health's Division of EMS and Trauma. The Cardiac System of Care includes STEMI, chest pain, and cardiac arrest.¹⁴

MediQHome

MediQHome is based on the joint principles of the Patient-Centered Medical Home (PCMH). 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.¹⁵ The overriding goal of MediQHome is to provide the right care at the right time for the right reason, resulting in a healthier North Dakota. Specifically, it works 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 Blue Cross Blue Shield of North Dakota (BCBSND) in 2005 with an expansion in 2007; the statewide launch was in 2009. MediQHome allows providers to focus on their patients' health outcomes through the use of MDinsight, an interactive decision-support tool. MDinsight helps the provider identify care opportunities by organizing all available patient clinical data to create patient-specific clinical summaries and quality reports. Having this information allows the provider to identify current and missed care opportunities in individual patients or groups of patients with specific chronic conditions.

Physicians, clinics, and networks use the quality program's reporting capability to design and implement care processes that lead to improved care for all patients. BCBSND analyzes the data within the database and, when appropriate, provides comparative clinical, outcome, and economic reporting of the MediQHome quality program. Overall, 80% of BCBSND members residing in North Dakota are in the MediQHome program. More than 75% of the primary care physicians in North Dakota participate in MediQHome.

In terms of the effect of MediQHome, one of the most significant has been coronary artery disease (CAD). CAD admission had declined by 38% from 2009 to 2012 with an estimated cost savings of \$7.2 million. The number of emergency visits associated with CAD also declined by 19% from 2009 to 2012. Other key clinical measures include the following: (1) from 2010 (base year) to 2013, the number of patients in compliance for CAD increased from 15% to 31%, (2) during this period, the number of patients in compliance for diabetes increased from 20% to 21%, and (3) the number of patients with hypertension in compliance increased from 66% to 75%. BCBSND believes that the PCMH model and MediQHome have brought forward the beginnings of successful implementation of alternative models of reimbursement to providers, have created a focus on clinical quality outcomes, and set the stage for an important feature of the ACA: accountable care organizations.¹⁵

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 North Dakota Department of Human Services (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 assure 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 reviewing 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.^{16, 17, 18}

Healthy Steps connects with the BCBSND MediQHome process because MediQHome provides primary care physicians with all the necessary information to coordinate Healthy Steps children care. This assures that each child enrolled in Healthy Steps has access to primary care services. BCBSND also uses the MediQHome to monitor provider quality of care and efficiency.

At the end of 2013, there were almost 5,000 North Dakota children enrolled in Healthy Steps. 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 Affordable Care Act extended federal funding of CHIP through September 2015. The ACA has also increased the federal matching rate by 23% (if Congress appropriates funding for the program after Sept. 30, 2015), bringing the average federal matching rate to 93% (meaning for every dollar used by CHIP to cover children's services, 93 cents is paid by the federal government with 7 cents being paid by the state). The ACA also provided an additional \$40 million in federal funding to continue efforts to promote enrollment in Medicaid and CHIP.¹⁶

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. As of December 2013, 40,667 North Dakotans were enrolled in the Medicaid PCCM program.¹⁷

Medicaid Health Management Program (HMP)

In 2007, the North Dakota Department of Human Services 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.¹⁹

Rare Disease Management

BCBSND offers a disease-management program that addresses 16 rare diseases. Accordant Health Services is a company that provides disease management services for complex and rare conditions and works with BCBSND. The 16 diseases managed are amyotrophic lateral sclerosis (ALS), chronic inflammatory demyelinating polyradiculoneuropathy (CIDP), Crohn's disease, cystic fibrosis, dermatomyositis, Gaucher disease, hemophilia, lupus, multiple sclerosis, myasthenia gravis, Parkinson's disease, polymyositis, rheumatoid arthritis, scleroderma, seizure disorders, and sickle cell anemia.

Accordant offers personalized counseling and health evaluation to identify potential complications, a 24/7 nurse line, member education and self-management techniques, and guidance-finding resources. The company focuses on proactive care to avoid hospital admissions, emergency room visits, and crises. Accordant nurses and social workers encourage BCBSND member self-monitoring and management of disease-related symptoms and monitor compliance with current standards of care for the condition. Quality-of-life indicators show positive improvement and a decline in admissions and emergency room visits.²⁰

North Dakota State Plan to Prevent and Manage Chronic Disease

The North Dakota Department of Health 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

In 2013, the North Dakota Department of Health formed a coordinated chronic disease evaluation team to guide chronic disease surveillance and evaluation. The team issued in 2014 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.²¹

Worksite Wellness Programs

Worksite wellness has become a strong focus to foster better health, and better and more affordable care. Healthy North Dakota (North Dakota Department of Health), BCBSND, and the Dakota Medical Foundation in Fargo initiated a statewide effort in 2009 and have created an online tool kit to help the business community initiate worksite wellness activities. According to the state health department, more than 80% of North Dakota employers believe in the benefits of worksite wellness but seek more support and guidance. The tool kit 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.²²

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 meet cost measures to address the market demand for affordable healthcare for a total value program.

BCBSND recognizes centers in the following fields: bariatric surgery, cardiac care, complex and rare cancers, knee and hip replacement, spine surgery, and transplants. For example, recognized Cardiac Distinction Centers in North Dakota are found at Altru Health System, Grand

Forks; Sanford Health, Bismarck; St. Alexius Medical Center, Bismarck; and Trinity Hospital, Minot. 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.²³

HEALTH REFORM

Health reform, the Affordable Care Act (ACA), Obamacare—whatever terminology is used—represents a significant change in the healthcare landscape for America. Topical yet 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, to improve quality of care, and to control costs. For some others, it simply does not go far enough (possibly favoring a single-payer system as opposed to more incremental policy change). Regardless, the 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 “donut hole” in the prescription drug benefit, making it illegal for insurance companies to deny health insurance for children if they have a pre-existing condition, and forbidding insurance companies from rescinding insurance coverage or the practice of denying coverage to someone insured based on a technical mistake).

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. Again, 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 2014, 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.²⁷ This has had effects nationally, and North Dakota has experienced the effect of healthcare reform as much as any other state.

Health Reform in North Dakota

Let's start with some of the numbers, at least as they relate to Medicaid expansion and Marketplace enrollment. Most assessments of the online enrollment process for the Marketplace would be charitable in referring to it as a disaster. The technology simply could not meet the demand in part because 36 states elected to use the federally facilitated or national marketplace and only 14 states developed their own. Some have argued that the federal system was not designed to address this many states; nevertheless, the serious problems in delay and frustration were noted in October 2013 when access to the system (federal and state model) was opened. In North Dakota, as of April 2014 (most recent data), there were 10,597 North Dakotans who had gained access through the Marketplace for private insurance coverage.²⁴ Correspondingly, the other enrollment option, Medicaid expansion, saw 12,850 individuals enrolled as of September 1, 2014 (most recent data).²⁵ Thus, as of October 2014, at least 23,447 more North Dakotans had health coverage. The number for the Marketplace could be slightly higher. Even though the enrollment period for 2014 had ended, some people could still enroll under extraordinary circumstances (e.g., their current employer drops insurance coverage or a change in jobs). Also, enrollment for Medicaid does not close, so there could be additional enrollments past September 1, 2014. The North Dakota Hospital Association has estimated the positive impact on the state's hospitals since Medicaid expansion to be approximately \$68 million, close to the amount of reimbursement the six PPS hospitals receive from another ACA benefit, the Frontier Amendment (benefiting hospitals in North Dakota and three other states) that brings in roughly \$65 million a year for 10 years. Nationally, hospitals' uncompensated-care burden has declined because of the ACA by \$5.7 billion, with 74% of the savings being associated with hospitals in states that have Medicaid expansion.²⁶

The estimate for the number of North Dakotans without insurance has tended to be around 10%–12%. The North Dakota Insurance Department estimates it at 10%.^{27, 28} With an estimated 2014 population of more than 723,000, there could be approximately 72,000 to 87,000 North Dakotans without health insurance. The Kaiser Foundation found the estimated number of potential Marketplace enrollees to be 77,000 in 2014.²⁹ The addition of more than 23,000 people with insurance results in a reduction of almost 30%, a solid start in reducing the number of uninsured in North Dakota. Many people enrolling through the Marketplace are eligible for a federal subsidy to help buy down the cost of their premiums. (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 2013, this would mean up to an income of \$94,200).³⁰ The Kaiser Foundation estimates that 85% of North Dakotans enrolled through the Marketplace were eligible for a subsidy (more than 9,000 people).²⁹

It is also important to understand the resources available to assist North Dakotans with enrolling in the Marketplace and Medicaid expansion. The ACA supports private contracts to organizations to serve as *navigators*. North Dakota is served by two. One is the North Dakota Center for Persons with Disabilities (NDCPD) located at Minot State University in Minot. This \$400,000 contract with CMS allows the NDCPD to have 13 navigators working throughout the state. The navigators are trained in the enrollment process and can provide direct one-on-one assistance to people seeking help. As of July 2014, the NDCPD navigators assisted 4,000 North Dakotans either through face-to-face contact or over the phone. Additionally, NDCPD distributed over 6,000 brochures, 1,100 fliers, 2,500 handouts, and 150 posters in an effort to get the word out to North Dakotans. According to program director Neil Scharpe, the NDCPD found public libraries and county extension offices to be good dissemination sites.³¹ Human Service Centers, tax preparers, local health insurance companies, and county social service offices were also reliable places to partner.²⁸ The second navigator organization serving North Dakota is the Great Plains Tribal Chairman's Health Board in Aberdeen, South Dakota. 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 worked 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 (e.g., UND Center for Family Medicine in Minot and the North Dakota Indian Affairs Commission in Bismarck). In addition, other central sources for CACs were the four community health centers (Fargo, Rolla, Hazen, and Northwood) and their clinic locations, serving a total of 13 communities. The CHC CACs provided approximately 7,000 one-on-one consumer assists and accounted for roughly 2,100 of the applications submitted.³²

There are other key features to healthcare reform that affect North Dakotans. One of these is "filling the donut 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 about \$2,800 (with a deductible and coinsurance), and the Medicare recipient was responsible for 100% of the cost up to about \$4,800 when the coverage would be applied again (with a nominal coinsurance). The gap between the \$2,800 and the \$4,800 was referred to as a “donut hole.” A requirement of the ACA is to “fill in” the donut hole. This will be gradual with more of the gap filled each year. In 2011 and 2012, more than 9,000 North Dakota Medicare recipients received \$14.6 million from the federal government as part of this process (about \$1,610 each). Nationally, about \$5.7 billion was paid back to America’s seniors, representing 3.5 million Medicare recipients.³³

Another ACA Medicare benefit is access to free prevention services. In North Dakota, this affected more than 98,000 Medicare recipients with more than 71,000 utilizing the free benefit by 2012, and more than 7,000 using the free annual wellness benefit. Nationally, more than 35 million Medicare beneficiaries were eligible in 2012. This benefit 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. 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.^{34, 35}

A commonly discussed benefit from the Affordable Care Act relates to pre-existing conditions. Somewhere between 50 and 129 million non-elderly Americans (19%–50%) have some form of pre-existing 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 rescissions, was also 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, 132,000 residents had a pre-existing condition that is now protected under federal law. About 17% of North Dakotans 18–24 years of age had a pre-existing condition, 36% ages 45–54, and 47% ages 55–64.³⁶ 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.

A final discussion point relates to healthcare system reform or that part of the ACA that addresses organizational structures and costs, or how we pay providers. Under the ACA, there is a gradual movement from a strict fee-for-service payment structure to one where there is more reliance on linking reimbursement to some measure of health and medical outcomes. In other words, fee-for-service is essentially reimbursing providers for each encounter, test, or procedure. It is a volume-based reimbursement model. The outcome or impact approach is based on rewarding providers for improved patient outcomes. This is a value-based

reimbursement model. Fee-for-service will not go away but will over time be combined more with value-based payments. Currently in North Dakota, the six PPS hospitals are receiving some payments under this value-based purchasing program. The hospitals are evaluated on 12 clinical metrics and eight that relate to patient experience of care. Hospitals that score well receive a positive adjustment in their reimbursement; hospitals that perform worse than national averages have some reimbursement withheld.³⁷ Thus the gradual movement is to include more incentives or conversely disincentives for changes in patient outcomes.

The previous discussion on national and state efforts on quality directly relates to this discussion on payment. Even for CAHs (not required to post quality-related indicators in Hospital Compare, not eligible for quality- or outcome-related reimbursement, and not part of the development of accountable care organizations [ACOs]), 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. It should also be pointed out that this 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 rewards for better outcomes). Nationally, there are approximately 428 ACOs covering about 4 million Medicare enrollees and another 40 million Americans (about 14% of the U.S. population). The number of ACOs is fluid. Some start and other groups of providers drop out. For example, the number of Pioneer Medicare ACOs has declined to 19 from the original 32 (many switched to the Shared Savings Medicare ACO because it has less risk associated with it than the Pioneer model). According to the CMS, in the first year of Medicare ACOs, provider groups saved \$380 million. This is a savings to the overall healthcare system. But not all ACOs will save money. Of the 114 Shared Savings Medicare models, in the first year, 54 had lower spending than projected but only 29 generated enough savings to qualify to keep some of it. Risk is one of the factors to monitor as the ACO movement evolves. Also there are some concerns about how patients are attributed to a provider within an ACO model (e.g., how patients are grouped along medical condition lines and how long they are considered to be part of the treatment effort). Concerns also revolve around what is an accepted volume level. The Medicare plans mandate a patient base of 5,000; however, private providers (physicians, hospitals, health plans) can use the numbers they agree to, and the debate rests on how valid and critical the 5,000 threshold is and under what conditions.

Finally, for providers in North Dakota and in other states with a significant rural population, how open will the ACO model be to including not only rural patients but also rural providers such as a CAH with one primary care physician and two nurse practitioners or physician assistants? Can some of these high-volume models be inclusive of rural health?³⁶

It is also very likely that the ACO and other efforts to move from volume to value will change and be modified in an effort to find models that improve patient outcomes, benefit providers, and lower the overall cost curve.

The final note on healthcare reform is the interest of the formal North Dakota policy process. The 2013 Legislature passed a study resolution to look at healthcare reform in North Dakota. Since the summer of 2013, the Interim Committee on Health Reform Review has met and taken testimony on a number of subjects, including insurance implications, effect on the individual and employer, healthcare workforce, access and cost, and other areas. It will issue recommendations for legislation in the 2015 session by December 2014.

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CHAPTER EIGHT:

Conclusion

Using updated employment and demographic data sets and incorporating the results of several recent comprehensive statewide cross-sectional healthcare workforce and related studies, this *Third Biennial Report: Health Issues for the State of North Dakota 2015* concludes with a similar takeaway bottom line message as the *First* and *Second Biennial Reports* did—that without the potential substantial ameliorating effects of the Healthcare Workforce Initiative (HWI), North Dakota faces a major gap now and increasingly in the future between the societal demands for healthcare and the capacity of the healthcare system to deliver that care. It is thought that continued full implementation of the HWI will have a significant positive effect to help narrow the gap between the demand for and the supply of finite healthcare resources.

As Chapter 2 demonstrates, the general level of health in North Dakota is reasonably good, although it has declined relative to other states in the recent past for unclear reasons. Another possibly related and disturbing finding that merits further study is that the age-adjusted mortality rate for North Dakotans has exceeded the national average for the past decade and a half, again for unclear reasons.

As was found in the *First* and *Second Biennial Reports* that were released in 2011 and 2013, 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 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 largely is distributional: North Dakota is generally not notably short of providers overall, although the healthcare providers we do have are distributed disproportionately in the metropolitan areas in excess of what the population demands or 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 challenges remain in recruiting and retaining providers in more remote areas. Note that family physicians constitute the 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 other nonphysician providers 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—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. However, 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 as a consequence of the phenomenal development in the Oil Patch.

The predicted continued population growth associated with the Oil Patch has major implications for workforce planning. As we found in the two 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.

But the 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. 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. The updated workforce projections contained in the *Second Biennial Report* continue to resonate in this *Third Biennial Report* and appear to be as accurate as planning models allow.**

We were quite conservative in estimating physician needs in the *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 such a proportionately 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 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.

Utilizing updated census data and population growth modeling, the *Second Biennial Report* found that the then-current 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 effect of even more rapid population growth than anticipated would require additional physicians and other healthcare providers. The magnitude of the additional physician workforce required to meet various levels of future population growth is shown in Table 30, which shows various levels of the future population of North Dakota and the associated additional physician resources required.

Given a recent population determination of 723,393 people (2013 U.S. Census Bureau data), we conclude in this *Third Report* that 500 is a conservative estimate of the number of additional physicians needed in North Dakota by 2025 if the population continues to grow as many anticipate. This number does not include the need for replacements for physicians who retire, leave the state, or cease practicing medicine for other reasons. Both prior *Biennial Reports* concluded with a strong endorsement of the HWI, a multifaceted plan to address the healthcare needs of North Dakota that emphasizes necessary steps to reduce disease burden, increase the healthcare workforce through enhanced retention of graduates as well as expansion of class sizes, and improve healthcare delivery through more cooperation and coordination of the various healthcare delivery systems.

In view of the realization that the workforce needs likely are larger than previously estimated, those recommendations are reinforced in this *Third Biennial*

Table 30

Estimated number of additional North Dakota physicians needed by 2025 related to further potential population growth.

Population	Additional Physicians Needed
684,000 (Updated baseline prediction from <i>First Biennial Report</i>)	260–360
800,000	514
900,000	733
1,000,000	952

Report with added emphasis on the necessity of continuing full implementation of the Healthcare Workforce Initiative. It is imperative that the three major stakeholder groups involved in the HWI—the North Dakota Legislature that provides the funding; the UND School of Medicine and Health Sciences (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.

A second major conclusion of this *Third Biennial Report* is that further attention and planning (by the healthcare enterprise as a whole, the North Dakota Legislature, the UND SMHS, and other stakeholders) is needed to address three particularly pressing and challenging healthcare delivery needs in North Dakota:

- Improvement in the state's provision of emergency medical services.
- 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:
 - Increase funding and reach of safety-net clinics to include providing services in western North Dakota.
 - Increase funding and reach of the Seal! North Dakota Dental Sealant Program to include using dental hygienists to provide care and incorporating case management and identification of a dental home.
 - 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.
 - 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.
- 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 legislative branch, will be based on the recently released *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.

Finally, a variety of other health-related possible action items are recommended for further consideration by policymakers and others:

- North Dakota state income tax credit for healthcare practitioners who volunteer to teach healthcare students.
- Expansion of the RuralMed Program if it reaches full enrollment (32 slots).
- 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, since all currently funded state-supported residency slots have been allocated as of the fall of 2014.
- Endorsement and support of the request for a collaborative interprofessional healthcare educational campus at Williston State College (and perhaps elsewhere in the western part of the state); funding for this proposed venture is included in the SBHE budget request.

CHAPTER NINE:

Workforce Development

The two prior editions of the *Biennial Report* considered healthcare workforce issues, and the 2013 edition assessed 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 was concluded that the best plan for the state's healthcare workforce development would be one that combined increasing the number of graduates and increased retention of practitioners, and those two precepts became fundamental building blocks of the Healthcare Workforce Initiative (HWI) that subsequently was proposed by the UND School of Medicine and Health Sciences Advisory Council, endorsed by the North Dakota Board of Higher Education, and approved and funded by the 62nd and 63rd Legislative Assemblies. One important reality is that any plan such as the HWI that relies on educational programs to match the supply of healthcare professionals with the need for their services must take into account the long time necessary to effect change, since the training of additional physicians, for example, takes seven or more years from the time a medical student enters medical school until that doctor is ready to see patients in the community.

While the HWI that has been implemented utilizes approaches 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 felt 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 part in filling the state's workforce complement, and it is assumed it will continue to play a more limited role with full implementation of the HWI as an ongoing component of the effort to supply healthcare workforce demand. It includes the replacement of healthcare providers because of normal turnover in the workforce, which for physicians typically is at least 5% per year. For North Dakota, this means that at least 85 new physicians are needed annually 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). Currently, about 1 in 4 physicians practicing in the United States as well as in North Dakota are IMGs.¹ Some but not all studies 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 trend for IMGs will be dissimilar to USMGs, whose career choices do not typically gravitate toward primary care and especially rural primary care practice. Rules regarding J-1 visa waivers may change and have an effect 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 Put another way, is it 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?

Importantly, when recruiting outside the state, North Dakota communities compete on the world market for professional talent. 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 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 considerations that bear analysis. 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 re-recruit twice as often will add considerable financial pressure to the already constrained financial resources of hospitals operating on slim operating margins. Additionally, it takes a while 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. This approach has a 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. 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 ultimate career pathway 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 1,765 or 262 per 100,000 population. This compares with the U.S. average of 267. The current number of active patient-care physicians in North Dakota in primary care is 582 or 80 per 100,000 population (compared with the U.S. rate of 90).³ While this might indicate that North Dakota is doing reasonably well, the United States is currently experiencing a decreasing and aging workforce with a geographic maldistribution that is not meeting the current needs of many communities. This is also true for North Dakota. Rural communities have experienced a chronic shortage of primary care physicians. 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 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. Family physicians provide the broadest care to all segments of the population and are essential to addressing the healthcare care needs of North Dakota's rural and remote communities.

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 care workforce is aging, and younger healthcare professionals typically seek more specialization and better work-life balance. Healthcare service needs must change to address the increasing demand for the management of chronic disease, care of the aging with increasing dementia, and the need for addressing significant health issues such as obesity. This complex and challenging reality requires thoughtful strategies (such as the HWI) to ensure

the right healthcare care 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. Because GME or residency training is a requirement for licensure in the United States, increasing the number of medical students without assuring a commensurate number of residency training positions will not address the need. However, the number of federally sponsored GME positions was frozen by the Balanced Budget Act of 1997, and the growth of GME slots since then has been slow.

Many experts have reviewed the background for this recommendation for an increase of 30%. Estimating the most effective response to address a current and future need can never be absolutely accurate, but this recommendation 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 increasing demand:²

- Aging of the population will drive demand sharply upward.
- The U.S. population is projected to grow by more than 50 million by 2025.
- Increased health coverage (including the Affordable Care Act) will increase demand.
- Increased clinical productivity is harder to accomplish with increasing complexity of care.
- Increasing the numbers and roles of physician assistants and nurse practitioners may help, but the full effect is difficult to predict.
- Effects of the shortage will include longer wait times, increased travel distances, shorter visit times, expanded use of nonphysicians, higher prices, and possible loss of access.
- Shortages are expected to continue to be especially problematic in poor rural and urban communities.
- A 30% increase in medical students and increase in GME positions will not eliminate but only moderate the need.

North Dakota's Production of Medical Students

The University of North Dakota School of Medicine and Health Sciences (UND SMHS) is the only medical school in North Dakota. The number of students enrolled in medical school in the years 2008–09 was 249 or 38.8 per 100,000 population. This ranks nationally as 12th out of the 50 states (3rd out of 50 for public medical schools). Of those matriculating at that time, 72% were students from North Dakota, which ranks at 14th out of 50 for in-state matriculation

(over the past five years, more than 80% of medical school enrollees were from North Dakota). North Dakota had 116 residents in training, which ranked at 42nd out of 50 states but had 78 primary care residents, ranking 18th out of 50.³ Compared with the national benchmark, the UND SMHS is doing a very good 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.

The UND SMHS has consistently 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. The School has done very well in producing primary care physicians 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 decline in national and local medical student interest in primary care residencies has been the increased number of international medical school graduates (IMGs) in these residency programs. In North Dakota, the number and percentage of residents who are IMGs is 74 and 63.8%, which ranks first 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.⁶ As IMGs become settled in the United States, they tend to move away from their initial practice. 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.⁷

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. A 2009 report from the Robert Graham Center suggests that two things are clear: (1) There is a problem with sufficient access to primary care physicians in rural and impoverished areas; and (2) current practice configurations or organizations will have great difficulty absorbing all uninsured patients if universal

access is 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 assure the right number of the right physicians? Studies have shown that medical students' choices of primary care or specialty careers are influenced by the following:⁸

- 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 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.⁹ The most successful outcomes for addressing the rural physician shortage have been the employment of comprehensive medical school rural programs. 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.¹⁰

In 2000, a national survey reported predictors of generalist physicians' decision to care for underserved populations (most rural areas are underserved), identifying four independent factors:¹¹

- 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 (NHSC).

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. Note that all of these factors are identifiable at the time of admission to medical school, and thus could be influenced by admission criteria.¹² **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 significantly 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 poor self-reported 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 is also 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.¹³

- 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.¹⁴ 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.¹⁵

Challenges to Addressing the Healthcare Workforce Pipeline and the Need for Healthcare Professionals

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, 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.¹⁶

Increasing the Number of Healthcare 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%.

Assuring an increase in the number of students interested in primary care and rural practice will also require some additional operational changes. These will require ongoing revision of the School's admissions criteria, continued support and possible expansion 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. The addition of geriatric and public health programs is underway 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 physicians will be done 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 will be considered 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 general surgery. There is a corresponding need for other healthcare professionals to complement the work of physicians, and the numbers needed will require ongoing assessment. Meeting those needs successfully 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 the needs by partnering with North Dakota Area Health Education Centers 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 is revising the curriculum to assure 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 residents 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 in rural practices and communities.

Factors Affecting Retention

The first, and necessary, step in addressing the

healthcare needs of rural North Dakotans is to recruit 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 selection¹⁶ also may affect retention:

- 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 (NHSC) 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 low income.¹⁷

Approaches to Improving Retention

Using repeated surveys, a study by Pathman and colleagues¹⁷ 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.¹⁸

Another international study addressed whether compulsory programs such as NHSC work in retaining providers in rural or remote areas. The conclusion was that no rigorous study 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.¹⁹

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 practice a wider range of procedures, play an important role in 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. 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 very 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.²⁰

Increased Retention of Graduates

We know that medical students have an increased likelihood of practicing in the location 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. 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. To be successful in keeping a quality healthcare workforce, however, there are modifiable factors related to 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. We will continue to advocate for and administrate funding for scholarships or loan repayment for students who commit to rural practice such as the RuralMed Program. We 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. We 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.

USE OF ADVANCED PRACTICE PROVIDERS

Increased deployment and utilization of nonphysician providers, including physician assistants and nurse practitioners, is an important component in addressing North Dakota's healthcare workforce needs now and in the future. Such advanced practice providers (APPs) are especially important in the most rural communities, where their increased deployment could ameliorate some level of physician shortage. The training and use of APPs in North Dakota are explored in more detail in Chapter 5 of this *Biennial Report*.

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CHAPTER TEN:

Recommendations: Healthcare Planning for North Dakota

The proactive approach taken by the 62nd and 63rd North Dakota Legislative Assemblies to address the current and especially the future healthcare workforce and healthcare delivery challenges facing the state should begin to have a positive effect as the Healthcare Workforce Initiative (HWI) becomes fully implemented over the next few years. 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 in the state, 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 allowed for additional expansion of the class and residency cohort, along with continued support for the multiple other provisions of the HWI. Because of the multiyear duration of health educational programs, the authorized full cohort of students will not be in place until 2018.

Full implementation of the HWI also required the construction of a new facility for medical and health science education that would accommodate the increased class sizes and permit consolidation of previously scattered academic UND health sciences programs into one building, thus facilitating interprofessional education. The building is scheduled to open in July 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 (see Appendix B).

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.

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 over the next 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:

- Inaugurate a new Department of Population Health at the UND School of Medicine and Health Sciences (SMHS), with a focus on developing programs that positively influence the health-related behaviors of North Dakotans.
- Continue to expand the Master of Public Health Programs at UND and North Dakota State University.
- Institute a geriatrics training program at the UND SMHS, with implementation 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).
- Recruit a chair for a new academic Department of Geriatric Medicine. The founding chair will start in 2015.

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 (CDC) 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 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 will be focusing on

public education and other efforts to positively affect the health-related behaviors of North Dakotans. In addition to these efforts by the UND SMHS, we recommend that public and private agencies and citizens groups be encouraged to form collaborative approaches to attack these issues.

Master of Public Health Programs

One of the most practical approaches to improving health education and other public health initiatives in our state is to prepare our health professionals to undertake these roles as they enter practice in our communities. Specifically, having individuals with graduate training in public health (master's in public health) can augment capacity and reduce disease burden.

The University of North Dakota and North Dakota State University have partnered to create two collaborative graduate-level programs in public health that are truly 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 in the communities of North Dakota and the region.

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 SMHS has recently recruited a noted gerontologist to lead the School's geriatrics program, which will include a variety of programs to assist practitioners throughout North Dakota to optimize their care of seniors. Additionally, the recently approved 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.

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 already 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. Because the RuralMed Program is off to such a promising start, policymakers should give consideration to expanding it beyond its current quota of 32 students if the demand warrants.

- 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 a 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." The Association of American Medical Colleges has called for an increase in U.S. medical school class size by 30%. An increase in the medical class size by roughly that magnitude (as is now in effect as a consequence of full implementation of the HWI) should help ensure an adequate physician workforce for North Dakota when coupled with the increased retention 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 post-graduate training. The optimal retention of physicians occurs when the students go to school and enter residency within the same state; in those cases, about two out of three students remain in-state. Simply increasing class size will result in about one out of three physicians remaining in-state for ultimate practice. Accordingly, the HWI incorporates a total of 17 new residency slots per year. Following the most recent allocation of residency slots by the School and its Advisory Council, all available slots have been committed.

Consideration should be given by policymakers to further expand the state-funded residency program, perhaps by utilizing joint funding through the Medicaid program.

Two criteria have been used to determine the specifics of the residencies that are funded by the UND SMHS and the state of North Dakota (i.e., type and location of specialty training): 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 (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 have already ramped up their class sizes.

IMPROVE THE EFFICIENCY OF THE HEALTHCARE DELIVERY SYSTEM

There are numerous health system initiatives already underway—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. Although the future of the Affordable Care Act is unclear, the bill 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 is being redesigned to encourage and permit broadened interprofessional education, and 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 HEALTHCARE WORKFORCE NEEDS

Ongoing funding for the HWI by the 64th Legislative Assembly and others to follow is absolutely essential, as is funding for the second half of the new building construction costs (the initial half of the needed funding was provided by the 63rd Legislative Assembly). North Dakota is one of the few states in the nation that has taken such a forward-looking and proactive approach to healthcare needs, and it is poised to reap the benefits of the HWI in the next few years. 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 and Devils Lake among other communities that have labored for

years heretofore to attract physicians.

In addition to continuing to endorse and support the HWI, there are a variety of other approaches that policymakers might consider during the 64th Legislative Assembly:

- **North Dakota state income tax credit for healthcare practitioners who volunteer to teach healthcare students.**
- **Expansion of the RuralMed Program if it reaches full enrollment (32 slots).**
- **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 nurse assistants).**
- **Expansion of residency slots available through the HWI.**
- **Support for expanded mental and behavioral healthcare.**
- **Endorsement of the request for a collaborative interprofessional healthcare educational campus at Williston State College, and perhaps elsewhere in the western part of the state (funding for this proposed venture is included in the SBHE budget request).**

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 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

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 (numbering several to perhaps many hundred) also 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 available for educational operations 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, contributions from the federal government to fund certain residency training costs, etc. Currently, the SMHS generates more than \$100 million biennially in additional revenue that would be lost to the state’s economy if the School did not exist. 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. Thus, over the course of the next three biennia, the SMHS estimates that it will generate more than \$90 million biennially in incremental direct economic activity for the state. The total direct economic impact of the SMHS over the next three biennia should exceed \$400 million.

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 other than Grand Forks County. Table 31 outlines the expected distribution of the appropriated dollars available from the HWI and planned for distribution to the four corners of the state.

A final positive direct impact will be an additional facility and administration (F&A) indirect cost return associated with federal and other research grants. Current estimates suggest that UND could garner almost \$1 million per year in additional revenue through this mechanism simply as a result of the construction of a 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 current research space was constructed on the basis of “earmarks” and other federal dollars, which renders the

Table 31

Anticipated Distribution of Additional Appropriated Funds as a Consequence of Expansion of Class Sizes

Region of North Dakota	Incremental Funds
Northeast quadrant	\$1,900,000
Southeast quadrant	\$1,900,000
Southwest quadrant	\$1,150,000
Northwest quadrant	\$847,435

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 should 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 30 to 50 years, the increased F&A rate alone should generate an addition \$30 million to \$50 million (assuming consistent research grant productivity).

The last benefit anticipated as a consequence of the HWI is the indirect economic impact that would accrue through additional tax collections and indirect economic activity that would emanate from the anticipated growth of the state’s economy as a result of the stimulatory effect of the funds disbursed through the HWI.

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Appendix A:

Healthcare Workforce Pipeline Activities Affiliated with University of North Dakota 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 post-secondary 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 11–15, 2014	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	CRH, CTE, and health occupation instructors
In-A-Box and other Educational Materials Loan Program	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	CRH (federal: HRSA ORHP)
159 student members, nine advisors 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)
Numbers not available	Not available	CRH/AHEC (federal: HRSA BHW and ORHP)

Healthcare Workforce Pipeline Activities

Affiliated with University of North Dakota School of Medicine and Health Sciences (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 our 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	
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 2014, the program has graduated 206 medical doctors. The program has also graduated 235 students in nursing, clinical psychology, and various other health sciences. A total of 441 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 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

Affiliated with University of North Dakota School of Medicine and Health Sciences (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>Adams, Alexander, Ashley, Beulah, Bisbee, Bottineau, Buxton, Cando, Carson, Carrington, Cavalier, Clifford, Colfax, Edmore, Egeland, Elgin, Dakota Prairie, Dawson, Devils Lake, Ellendale, Fairmont, Finley, Flasher, Four Winds, Galesburg, Garden Valley, Glen Ullin, Grenora, Hankinson, Hatton, Hope, Jamestown, Lakota, Langdon, Leeds, Lidgerwood, Lisbon, Maddock, Mayville, Michigan, Minnewaukan, Munich, Newburg, New Leipzig, Niagara, Northwood, Oakes, Osnabrock, Page, Park River, Petersburg, Pettibone, Portland, Ray, Reynolds, Robinson, Rolette, Round Prairie, Rugby, Sharon, Starkweather, Steele, Tappen, Trenton, Tolna, Tuttle, Wahpeton, Walhalla, Warwick, Westhope, Williston, Wolford, Wyndmere</p>	<p>AHEC/CRH (federal: HRSA BHW and ORHP); (state) appropriated funds designated for workforce development</p>
<p>Four Scrubs Academies have been held at the UND School of Medicine and Health Sciences (SMHS). 2011: 38 students from 21 communities; 2012: 45 students from 22 communities. 2013: 56 students from 27 communities; 2014: 51 students from 25 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

Affiliated with University of North Dakota School of Medicine and Health Sciences (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.	
Simulation Training	Healthcare training using human simulators.	Post-secondary education	Mayville State University, Lake Region State College, VA Hospital, Dickinson State, NDSU

Total Participants	Communities Reached	Lead SMHS Program/ Funding Source
Two Scrubs Academies have been held at the UND SMHS. 2013: 23 students from 14 communities; 2014: 21 students from 14 communities	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; 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, NPs and PAs. Nurses, nursing leadership and administration. EMS providers, leadership and medical directors.	NDDOH, Mission: Lifeline, American Heart Association

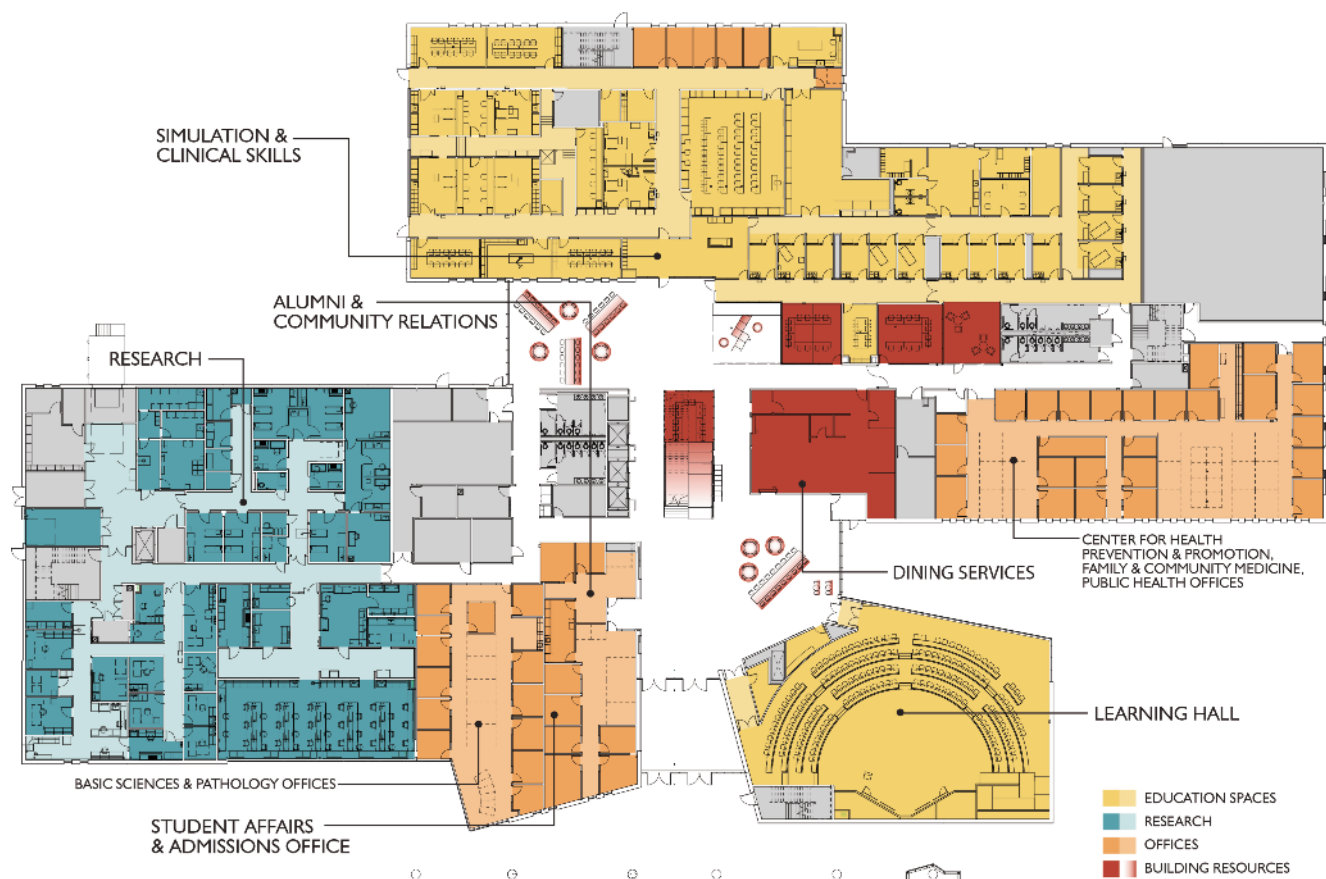
Total Participants	Communities Reached	Lead SMHS Program/ Funding Source
2013: 258 attendees; 2014: 312 attendees	2013 Mandan (statewide representation) 2014 Grand Forks (statewide representation)	CRH: Funded by sponsorship and registration
2013: 111 attendees; 2014: 112 attendees	2013 Bismarck (statewide representation) 2014 Fargo (statewide representation)	CRH: Funded through a subcontract with the North Dakota Department of Human Services
2013: 250 attendees; 2014: 280 attendees	2013 Bismarck (statewide representation) 2014 Fargo (statewide representation)	CRH: Funded through a subcontract with the NDDOH Division of Emergency Medical Services (EMS) and Trauma

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 physician 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 and Trauma
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 and Trauma
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 University system
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	AHEC

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 and Trauma.
96	Statewide	CRH (federal: HRSA ORHP and Rural Hospital Flexibility Grant Program
130 providers currently serving (56 NHSC; 35 state loan repayment (NP, PA, DDS, MD); 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.

Appendix B: Floor Plans for New Building

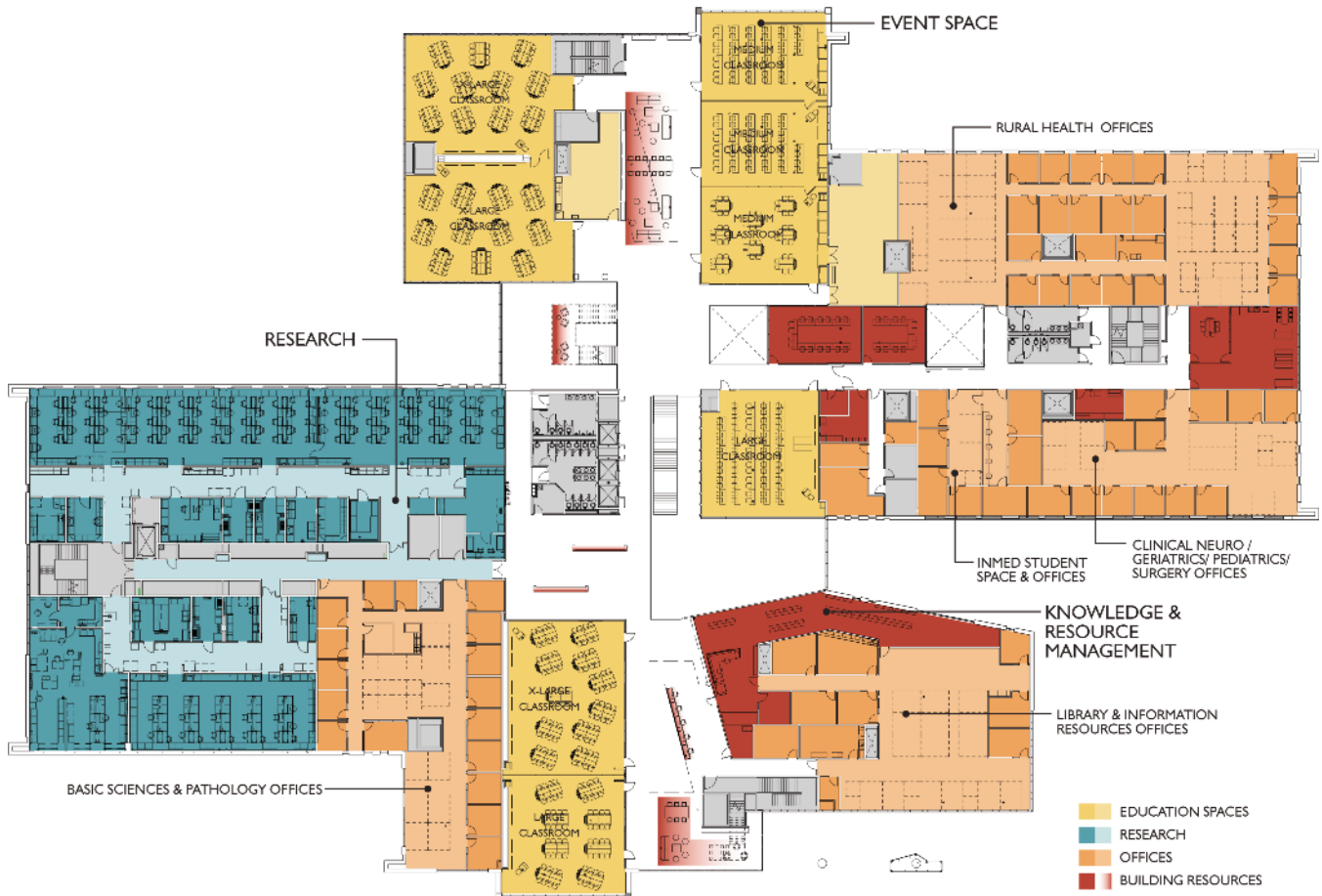
FIRST LEVEL



STUBERG
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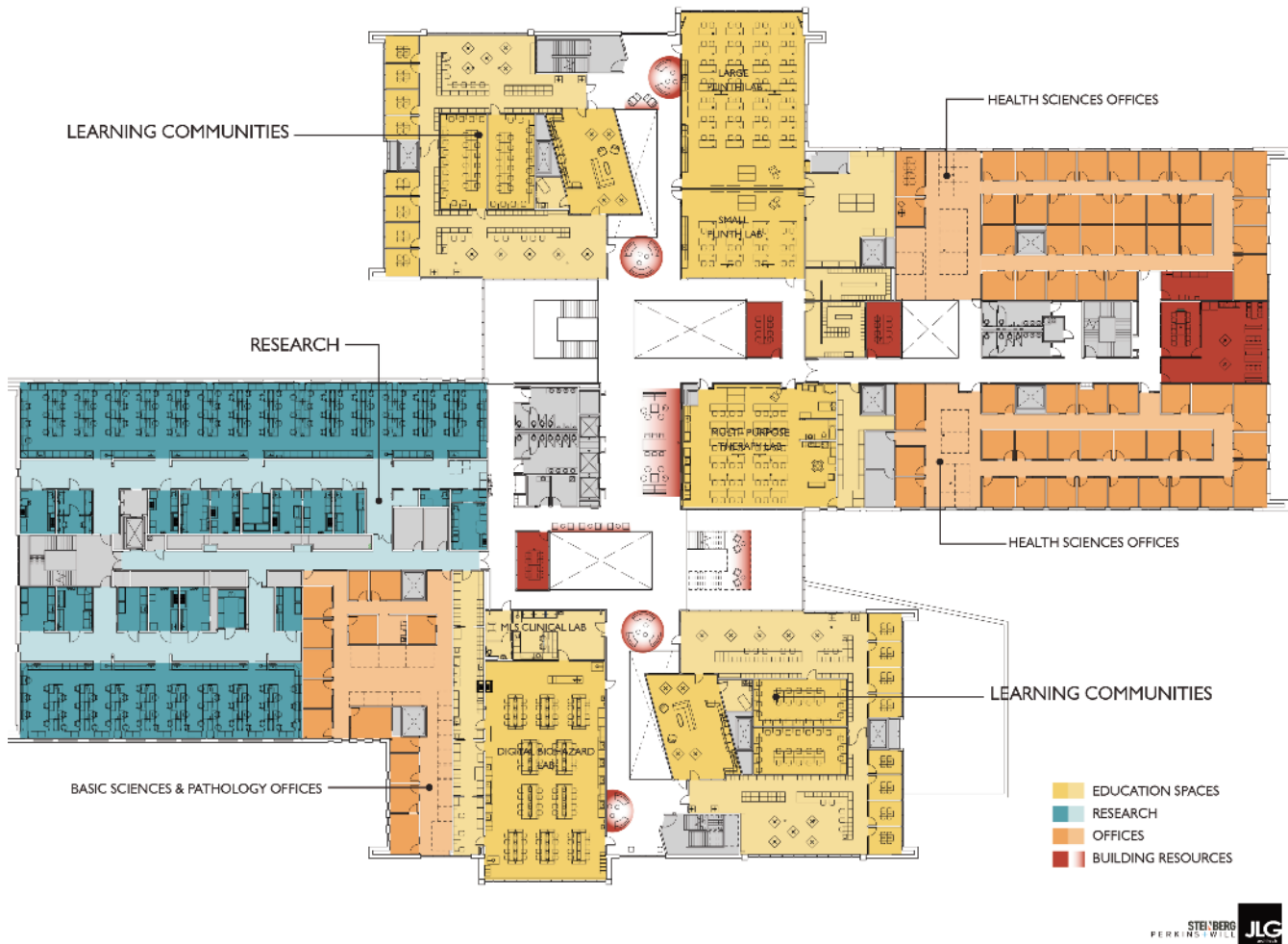
Key features of the first floor are the two office suites that are right by the front door to welcome the building's two most important constituencies: the students who will occupy the building, and the community members (the citizens of North Dakota) who are paying for the building. The Student Affairs and Admissions Office, along with the Alumni and Community Relations Office, will be staffed to welcome these and other visitors to the building. The Learning Hall will be used to teach students, but also will be available for community activities related to health promotion and wellness. And the large Simulation Center on the north side of the building will be a marvelous resource for educating medical, health sciences, and other students in an interprofessional environment.

SECOND LEVEL



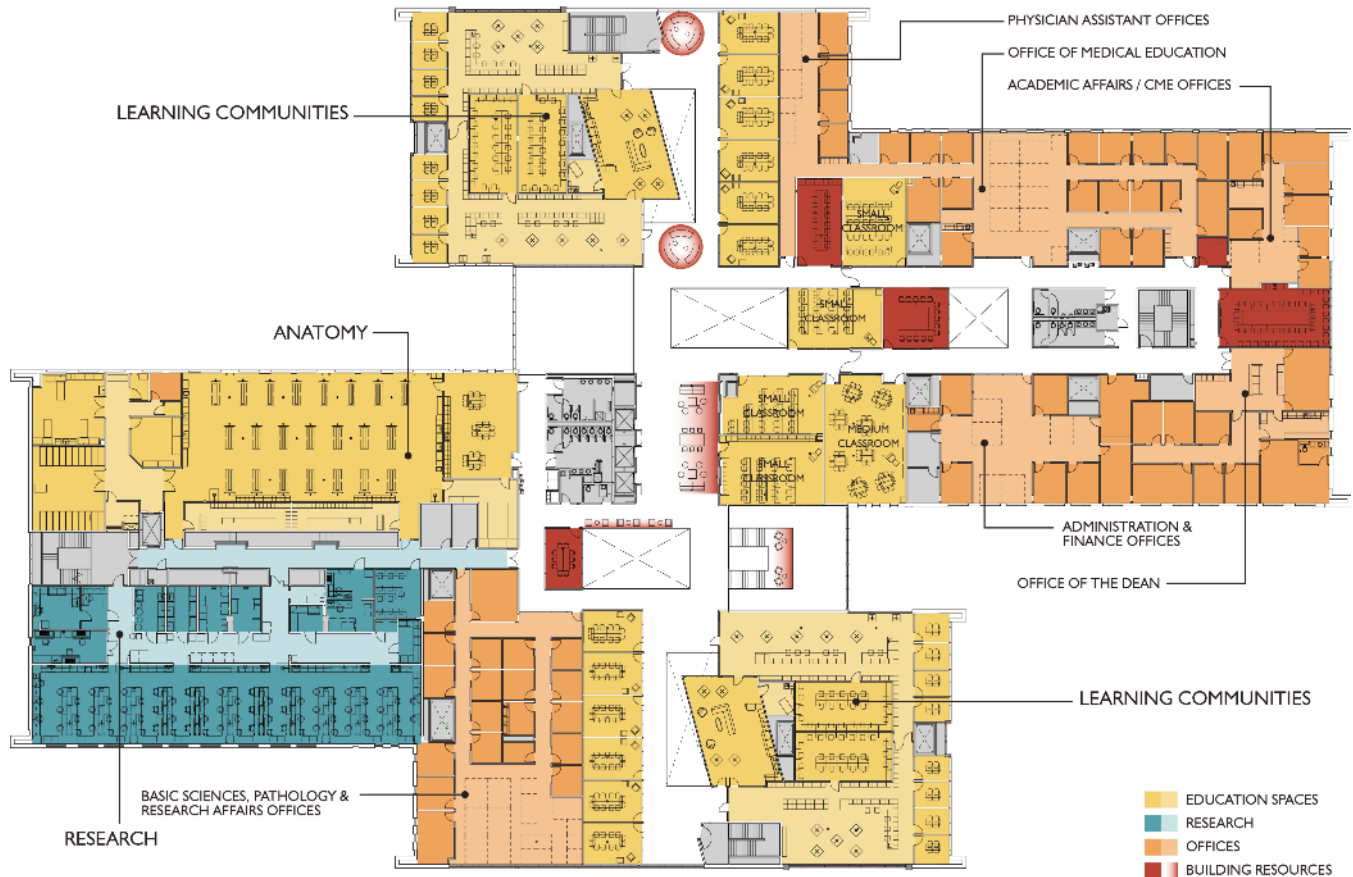
Key features of the second floor are the larger classrooms that are designed to be multifunctional and adaptable to different sized groups. Much of the space will be adaptable for SMHS events. Strong support for student learning will be provided by the Knowledge and Resource Management Office. Faculty offices will be located in both the northeast and southwest corners of the building.

THIRD LEVEL



The key features of the third floor are the four Learning Communities that will be the foundation of the School's interprofessional teaching. A wide variety of health professions students will learn together in common shared space consisting of small-group and individual study spaces, common lounge and discussion areas, and shared support functions. Faculty offices for the health sciences will be located in the northeast corner of the building.

FOURTH LEVEL



As on the third floor, the key features of the fourth floor are the four Learning Communities that will be the foundation of the School's interprofessional teaching. A wide variety of health professions students will learn together in common shared space consisting of small-group and individual study spaces, common lounge and discussion areas, and shared support functions. The School's administration will be housed in the northeast corner of the floor, and the gross anatomy laboratory will be in the southwest corner.