SEVENTH BIENNIAL REPORT | 2023

HEALTH ISSUES FOR THE STATE OF NORTH DAKOTA

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Advisory Council

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Disclaimer

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

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INTRODUCTION AND UPDATE

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

1. The advisory council, in consultation with the school of medicine and health sciences and the other agencies, associations, and institutions represented on the advisory council, shall study and make recommendations regarding the strategic plan, programs, and facilities of the school of medicine and health sciences.
2. Biennially, the advisory council shall submit a report, together with its recommendations, to the agencies, associations, and institutions represented on the advisory council, to the University of North Dakota, and to the legislative council.
3.a. The report must describe the advisory council's recommendations regarding the strategic plan, programs, and facilities of the school of medicine and health sciences as developed under subsection 1. The recommendations for implementing strategies through the school of medicine and health sciences or other agencies and institutions must:

(1) Address the healthcare needs of the people of the state
(2) Provide information regarding the state's healthcare workforce needs

b. The recommendations required under subdivision 3a may address:

(1) Medical education and training
(2) The recruitment and retention of physicians and other healthcare professionals
(3) Factors influencing the practice environment for physicians and other healthcare professionals
(4) Access to healthcare
(5) Patient safety
(6) The quality of healthcare and the efficiency of its delivery
(7) Financial challenges in the delivery of healthcare

4. The council may consult with any individual or entity in performing its duties under this section.

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

growth in the major cities and in the Oil Patch would result in an increasing imbalance between the demand for healthcare and the supply of providers that would necessitate the need for more physician and nonphysician providers in North Dakota and better healthcare delivery systems.

The *Report* concluded that North Dakota had a paradox regarding its healthcare workforce, characterized as shortages amid plenty. The size of the physician workforce in North Dakota was found to be at or better than national norms for most specialties, including all the primary-care disciplines. Despite this, there was a significant distribution problem, with the greatest number of providers located in the urban regions of the state and a shortage (especially primary-care providers) in the rural areas.

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

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

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

The Second Biennial Report: Health Issues for the State of North Dakota was an update on the developments and changes that occurred between 2011 and 2013. It reanalyzed the health of the citizens of North Dakota and the status of our healthcare delivery systems, utilizing updated data and more refined projection

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

Following the release of the *Second Biennial Report*, North Dakota's 63rd Legislative Assembly endorsed full implementation of the second phase of the HWI. Authorization and funding were forthcoming to permit complete implementation of the four core strategies of the HWI: reduce disease burden, retain more graduates for direct patient care in North Dakota, increase class sizes, and improve the efficiency of healthcare delivery in the state. Accordingly, medical student class size subsequently was increased by 16 students per year, health sciences students by 30 students per year, and a variety of rural-focused residencies added. Coincident with the growth in class sizes, construction began on a new SMHS building designed to accommodate the increased class sizes. The building was completed on time and on budget, and opened during the summer of 2016 to welcome the incoming medical school Class of 2020 and the health sciences classes that started later that fall.

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

The Fourth Biennial Report: Health Issues for the State of North Dakota, released in 2017, updated the previous three editions with the latest available demographic and census data and incorporated the results of several healthcare workforce surveys, especially a comprehensive study of nursing facility workforce in North Dakota that was compiled and completed in September 2016. The study analyzed the responses obtained from 81 rural and urban nursing facilities and assessed such issues as vacancy rates, recruitment issues, and retention

strategies. Along with a study of the hospital workforce in North Dakota that was completed in September 2014, the two studies provide a comprehensive overview of the status of the nonphysician healthcare workforce throughout the state that complements the updated data available in the latest Report regarding the physician workforce.

The *Fifth Biennial Report: Health Issues for the State of North Dakota*, released in 2019, updated the previous four editions with a comprehensive examination of healthcare workforce licensure data. Data were gathered in January 2018 and examined number of licensed professionals, locations, specialties, and demographics. The result of this informed two new chapters including a comprehensive chapter on nursing workforce in North Dakota and a second chapter on psychiatrists, behavioral health, and non-physician workforce. A second study of hospital workforce in North Dakota was completed in July 2018, this study updated the previous 2014 study and is presented alongside the nursing facility study of 2016 to provide an updated comprehensive overview of health facility workforce in North Dakota.

The *Sixth Biennial Report: Health Issues for the State of North Dakota*, released in 2021, updated the previous five editions with a comprehensive examination of healthcare workforce licensure data. Data were gathered in January 2020 and examined number of licensed professionals, locations, specialties, and demographics. The result of this informed a new chapter on social determinants of health which serves to tie the population and socioeconomic influences of the state on health outcomes.

The latest version, the *Seventh Biennial Report: Health Issues for the State of North Dakota*, updates the previous six editions with a comprehensive examination of healthcare workforce licensure data. Data were gathered through June of 2021 and examines number of licensed professionals, locations, specialties, and demographics. A new chapter on pandemic planning and public health addresses the national and state response to the SARS-CoV-2 pandemic as well as the School of Medicine and Health Sciences, UND College of Nursing and Professional Disciplines, and North Dakota State University Pharmacy program’s academic response to the pandemic.

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EXECUTIVE SUMMARY

North Dakota, like the rest of the country, continues to grapple with a major healthcare delivery challenge—how to meet a burgeoning demand for healthcare services now and especially in the future with a supply of physicians and other healthcare providers that has not always kept pace with growing demand. The problem is exacerbated by the strain on healthcare workers from the SARS-CoV-2 (COVID) pandemic, potentially leading to "burnout" and departure of vital healthcare providers from the healthcare field. The need for healthcare workers is particularly important in rural and western parts of North Dakota, where there has been a shortage (especially of primary care providers) since the start of statehood. The data that were reviewed for this *Biennial Report* (and prior reports) illustrate two major long-standing problems in North Dakota. One problem is an inadequate number of healthcare providers; however, the larger problem is a maldistribution of providers. The data show that healthcare providers are disproportionately located in the larger urbanized areas of the state, leaving many rural areas with a shortage. Without direct intervention, the difficulty of providing adequate healthcare in North Dakota will worsen over the coming decades from the aging of the population (including aging and eventual retirement of the healthcare workforce) that will increase the demand for healthcare services in those areas.

However, unlike much of the rest of the country, North Dakota has been directly addressing its healthcare delivery challenges over the past decade through the 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 Report 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 (post-MD degree training) slots, has already been fully implemented. Phase II of the plan, which includes further growth of residency slots, currently is being implemented. When fully implemented, the HWI should, in the future, decrease North Dakota's healthcare delivery challenges through attainment of its four goals: 1) reducing disease burden, 2) retaining more healthcare provider graduates for care delivery within the state, 3) training more healthcare providers, and 4) improving the efficiency of the state's healthcare delivery system through an emphasis on team-based care delivery approaches. To accommodate the substantial class size expansions associated with the HWI, a new University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) facility was constructed on UND's Grand Forks campus. The building was completed in 2016 and is fully functional. The largest government-funded building construction project in the state's history, it was completed on time and on budget.

In accordance with the expectations specified in the North Dakota Century Code (NDCC 15-52-04), this *Seventh Biennial Report on Health Issues for the State of North Dakota* (Report) updates the first six 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 will continue to have access to high-quality healthcare at an affordable cost now and in the future.

The Population of North Dakota: The current Biennial 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 a population below 10,000 (*see Figure 1.1*). Half of North Dakota's current population resides in metropolitan areas, with a little more than a quarter (26%) located in rural areas (*see Figure 1.10*). This represents a dramatic change since only a few decades ago when 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 48th in population density, and tied for fourth in the country in the percentage of its state population that is 85 years of age or older. Because demand for healthcare increases proportionally with age, demand for healthcare services is especially pronounced in North Dakota. Such needs will only increase as the state's citizens grow older. People in rural regions of North Dakota generally 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 (*see Figure 1.3*). Rural regions continue to experience depopulation that will only exacerbate the current problem of healthcare access and delivery.

Social Determinants of Health in North Dakota: Various external factors, referred to as social determinants of health (SDOH), can affect health status and explain why some people are generally healthier than others (*see Figure 2.1*). SDOH include conditions where people live, work, learn, and socialize. Circumstances that may impact health outcomes of individuals include the current social structure, economic factors, and physical aspects of a person's environment (*see Figure 2.2*). Environments include home, school, workplace, neighborhood, city, and other community settings where a person spends a significant amount of time. Resources that contribute to an enhanced quality of life for a given population are likely to have a significant influence on positive health outcomes of the population. Examples of quality of life enhancing resources include safe and affordable housing, access to education, public safety, availability of healthy foods, local health services, and environments free from life-threatening toxins. Six factors are recognized as core social determinants of health (*see Figure 2.5*). They are the individuals' economic circumstances, their education, food access, the physical infrastructure of their environment, the social and community context in which they live, and their overall health and access to healthcare.

The Health of North Dakota: The health of North Dakotans, in comparison with the rest of the United States, is relatively good. When examining general health measures, North Dakotans are relatively healthier than the country as a whole. These general

Dakotans had higher rates of influenza and pneumonia compared to the country as a whole. North Dakotans have a slightly lower prevalence of diabetes than the rest of the United States and are less likely to report fair or poor health (*see Table 3.2*). However, North Dakotans tend to have a higher risk of some types of cancer. Additionally, North Dakota has led the nation in the number of deaths attributed to Alzheimer's disease. Previously, North Dakota had a higher mortality rate than the U.S. but that trend has shifted in a better direction in recent years. Nonetheless, the mortality rate in the U.S. and North Dakota has worsened recently, likely due both to the direct impact of the pandemic along with the indirect impact of the pandemic in delaying necessary care for other conditions (*see Figure 3.6*).

SARS-CoV-2: In early 2020, the state of North Dakota, like the rest of the country, was in the early phases of preparing for the arrival of a global pandemic, SARS-CoV-2. The virus's arrival in North Dakota was slightly behind the rest of the country and that allowed for the state to focus on readiness strategies including prevention and overall mitigation (*see Figure 4.1*). While these efforts were focused on public health and safety, they were being conducted at a point in time when no vaccines were available. The state adopted strategies based on public health best practices that focused on reducing the spread within the state of North Dakota while allowing the state to operate as normally as possible. As in the rest of the country, North Dakota saw a widespread outbreak prior to vaccines becoming available that resulted in taxing the health infrastructure within the state towards the end of 2020. When vaccines became available in 2021, the state had a comprehensive vaccination plan including identifying priority groups as well as establishing public health and health system partnerships to coordinate vaccinations. As of this writing, North Dakota had 68% of the eligible population vaccinated with at least one round of vaccine compared to the United States at 80%.

Physician Workforce: The physician workforce in North Dakota has somewhat fewer physicians per 10,000 population than the United States as a whole or the Midwest comparison group (*see Figure 5.2*), and although the gap had narrowed over the past three decades, it recently has widened. Our physicians are more likely to be male than elsewhere in the United States (*see Figure 5.5*), although female physicians in North Dakota are more evenly distributed across the state when compared to the rest of the United States. Previously the physicians in North Dakota have been older when compared with the rest of the country, but a trend of younger physicians is beginning to emerge (*see Figure 5.4*). About one-fourth of the physician workforce is made up of international medical graduates, a little higher than the rest of the country. The UND SMHS is an important source of physicians for the state, accounting for 47% of the more than 1,000 physicians practicing in North Dakota who graduated from a U.S. medical school.

As of 2021, half of the physicians in North Dakota received some or all of their medical training (medical school or residency or both) in-state. The patient to physician ratio is not equally distributed across the state. Micropolitan areas have about twice as many patients per physician as metropolitan areas, while rural areas have about five times as many. Without the effects of the HWI, current estimates indicate a shortage of some 260 to 360 physicians by 2025, the consequence of a heightened need for healthcare services as the Baby Boom generation ages and from retirements in the aging physician workforce (one-quarter of the physicians in North Dakota are 65 years of age or older).

Primary Care Workforce and Specialist Care Workforce: The state's primary care physicians include family medicine, general internal medicine, and general pediatrics. Compared with the rest of the country, North Dakota has a similar number of primary care physicians when normalized to the population size. Their density is significantly higher than either comparison group in metropolitan regions. Although primary care physicians in North Dakota are more likely to practice in rural areas compared with specialist physicians, they still are twice as likely to be found in urban regions rather than rural areas (*see Figure 6.1*). Residency training in North Dakota is an especially important conduit of primary care physicians, since nearly half (45%) of them have graduated from medical school at UND; more than half completed a residency within the state or did both. The impact of UND and in-state residency training is even more impressive for family medicine physicians, since more than three- quarters of them are in-state graduates.

North Dakota has relatively fewer specialists in certain specialties (including obstetrics/gynecology) than the Midwest or the rest of the United States (*see Figure 6.8*). North Dakota has about the same relative number of psychiatrists as other Midwest states and the United States, although two-thirds of them work in the eastern part of the state, leaving the western parts of North Dakota with a relative shortage.

Nursing Workforce: The state's nursing workforce was examined using new licensure data. The state has shown an increasing trend of Registered Nurses (RNs) and Advanced Practice Registered Nurses (APRNs) with a decline in Licensed Practical Nurses (LPNs) from 2018 to 2022 (*see Figure 7.1*). The representation of APRNs between 2018 and 2022 was relatively stable with an increase from 7% to 8%. The representation of LPNs decreased from 19% to 16%, and RNs increased from 74% to 76%. Despite the decline in the percent of LPNs, there has been an increase of more than 2,500 nurses licensed in the state of North Dakota between 2018 and 2022. The increase in nurses overall was due to the increase of more than 2,200 RNs between 2018 and 2022. The current 2022 distribution of licensed nurses in North Dakota is represented by a majority of RNs (76%), followed by LPNs (16%) and APRNs (8%). A majority of RNs and LPNs were trained in state, with the highest numbers working in an outpatient setting. A majority of nurse practitioners were trained in North Dakota with the highest percentage working in primary care. Most nurses in North Dakota – regardless of nursing role – work full-time; 12% are unemployed (*see Figure 7.2*). The majority of

full-time nurses are licensed as RNs or APRNs; however, the percent of RNs employed full-time declined from 74% in 2018 to 69% in 2022. In 2022 61% of LPNs were employed full-time and 19% of LPNs were not employed. Although a nursing presence is especially noteworthy in isolated rural regions of the state, the majority of nurses work in the urban areas (*see Figure 7.3*).

Behavioral Health Non-Physician Healthcare Workforce in North Dakota: Most behavioral health professionals and non-physician providers are found in urban areas. This includes psychiatrists, psychologists, counselors, licensed addiction counselors, social workers, occupational therapists, physical therapists, physician assistants, medical laboratory scientists, pharmacists, and dentists (*see Figures 8.5 and 8.6*). The largest behavioral health workforce occupation in North Dakota is social workers, with more than 2,000 licensed in the state. A majority of social workers are licensed bachelor's social workers (LBSW) with 66% of social work licenses, followed by licensed clinical social workers (LCSW) with 18%, and licensed master social workers with 16% of licenses. Of the three social work license types, LCSWs have specialized clinical knowledge and training in the areas of practice, and can also diagnose and treat mental, emotional, and behavioral disorders, conditions, and addictions. Of all behavioral health occupations in the state, the most common academic program offered at North Dakota institutions of higher education is social work. When comparing geographic distribution, approximately three-fourths of counselors and social workers are in urban areas. Despite this distribution in a majority in urban areas, the county level distribution of counselors and social workers shows representation of the workforce in a majority of counties. Addiction counselors are less likely to be in urban areas than their peers, with only 66% in urban areas. When examining those occupations with programs at the SMHS, the geographic distribution favors rural areas. Physical therapy professionals are split almost evenly between urban and rural with 51% in urban areas and 49% in rural areas. Medical laboratory scientists are represented in urban areas at 65% and isolated rural areas at 15%. Physician assistants and occupational therapist professionals are distributed with approximately 70% in urban areas and 30% in rural spaces.

Healthcare Organization and Infrastructure: Healthcare in North Dakota is delivered through more than 300 ambulatory care clinics, 52 hospitals, and 77 skilled-nursing facilities (*see Figure 9.2*). These facilities are supported by an array of emergency medical services (EMS) providers, trauma centers, 28 public health units, oral health providers, human service zones, and pharmacies. Generally, the further the facility is from a metropolitan area, the more its operation is threatened by financial and other pressures, including staff recruitment and retention challenges. Rural health organizations tend to be small in size but have a significant impact both on the health of individuals and the economic base of their communities. An example identified in the full report demonstrated the importance of collaboration between health systems, public health, and other entities to provide vaccinations for SARS-CoV-2. For example, the collaboration between the Alerus Center, Altru Hospital, City of Grand Forks, North

Dakota Department of Health, North Dakota National Guard, the University of North Dakota College of Nursing and Professional Disciplines, and the University of North Dakota Master of Public Health Program served the greater Grand Forks region to provide vaccinations for the public. This effort allowed the region to optimize the acquisition and delivery of the vaccine at one location that resulted in the delivery of over 37,000 vaccinations. This effort also focused on delivering vaccines to home-bound individuals who otherwise would not be able to travel to the vaccine delivery site.

Healthcare Policy: Nationally, as well as locally, the health delivery system is going through profound change. Improvements in population health and a realignment of provider payments to incorporate those improvements is a new and fundamental reality. The quality and safety of care 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 be considered when reforming or redesigning the health system. In addition, the quality of care provided to the population and the patient outcomes produced are equally important facets of reform.

The statewide problem of unmet mental and behavioral health needs, especially related to the recent pandemic, is highlighted in the current *Biennial Report*. One approach already implemented through the HWI is to bring the (often rural) patient to the provider through the use of telepsychiatry. The UND Department of Psychiatry and Behavioral Science has implemented training in telemedicine-delivered clinical services for all of its residents so that they will be able to utilize this effectively in clinical practice.

The quality of healthcare delivered in North Dakota is as good as or better than much of the United States, but there appears to have been a decline in several measures in the past few years, particularly in the delivery of certain acute-care services. North Dakota (along with other upper Midwest states) generally provides high-quality care at relatively lower cost than other states in the United States. North Dakota ranked 29th in state health system performance in the country in a recent assessment undertaken by the Commonwealth Fund (down from 22nd in 2017) (*see Table 10.1*).

The *Biennial Report* concludes with a number of recommendations. First is continuing strong endorsement of the Healthcare Workforce Initiative especially given the accumulated data that verify its effectiveness. One component of the HWI—the RuralMed medical school scholarship program—is cited in particular for its positive results in rural physician recruitment. One suggestion for consideration by the 68th Legislative Assembly is to authorize funding so that any approved merit pool for North Dakota University System salaries can apply as well to personnel funded through the HWI. The budget submitted by the UND SMHS for the 2023–2025 biennium and endorsed by both UND and the State Board of Higher Education has been structured to permit ongoing funding of the HWI and a continuation of the various vital healthcare

educational programs of the UND SMHS. The UND SMHS Advisory Council strongly supports the proposed funding.

A second major conclusion of the *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) are needed to address a variety of intertwined mental and behavioral health issues that are present throughout the state but are especially challenging in the more rural regions.

A final recommendation is for full implementation of the recently completed *Strategic Plan for Health* and its ambitious goal for North Dakota to become the healthiest state in the nation. The three important initial steps for beginning this quest will be to raise awareness of the health implications of policy and legislative decisions, expand statewide public health expertise and leadership capacity, and enhance cross-sector collaboration and integration of the numerous entities involved in the healthcare enterprise within (and outside) the state.

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 national, regional, and local systems that provide access to healthcare services. The healthcare provider arrangements and structures follow a variety of options from a single provider at a location to a multistate, managed-care organization. Reimbursement and payment methods rely on both private market options including individual and employer health insurance purchases, as well as public options. Healthcare delivery in the U.S. is an intricate system that can be difficult to navigate, understand, and improve.

Healthcare workforce is influenced by several contextual and environmental factors that shape the supply and demand for healthcare providers. These factors can include public policy, payor mix, demographic and economic factors, quality of care, healthcare outcomes, and national certification and oversight boards. These are all components that are within the scope of 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. healthcare system. Public payments also influence the educational framework for the training of health professionals at many levels with newer efforts attempting to gain interest in healthcare careers at younger ages.

Healthcare providers can rely on both public payment and private health insurance. The most common private health insurance is employer-sponsored insurance financing which has remained relatively stable over time.[1] The delivery of healthcare through predominantly private markets is affected by public payment structures such as Medicare and Medicaid. While Medicare is a federal initiative, Medicaid receives both federal- and state-based funding. Federal and state policymakers set the rules for Medicaid with regard to eligibility, covered services, and provider reimbursement. There is a balance between the federal government and individual states concerning Medicaid policy.

Medicare is a significant payer for hospitals, healthcare centers, clinics, and healthcare professionals. Medicaid constitutes a smaller level of funding for some providers but is still very important. In January 2014, North Dakota adopted the new Medicaid expansion. Medicaid now may increase coverage for those earning incomes up to 133% of the federal poverty level, which could make Medicaid 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 39%.[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 is a factor that affects healthcare workforce

issues. Public and private reimbursements 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 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.

> ***"Rural hospitals in North Dakota commonly have a Medicare inpatient base of about 39%."***

Healthcare systems such as hospitals and 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 healthcare needs, address operational concerns, and secure greater cooperation.

Overall, Critical Access Hospitals (CAHs) in North Dakota have formed collaborative relationships with other providers such as urban hospitals, rural hospitals, clinics, emergency medical services, public health units, and long-term care facilities. These collaborative relationships address common organizational and community needs to achieve greater efficiencies, standardize cost structures, share resources and skills, and improve organizational performance. Networks, partnerships, and collaborative efforts affect the healthcare workforce in that they can contribute to a stronger, more viable health system. They can be used to address recruitment and retention, and they can operate as educational and skill development platforms. While all CAHs work in collaborative arrangements with area tertiary hospitals, they also created the North Dakota CAH Quality Network in 2007. Through this network arrangement, staff training opportunities, process tools and protocols, patient outcome records for benchmarking data, and practice experience and best practices are shared within the network.

Payment incentives and penalties have been gradually introduced to influence patient decision-making and provider treatment decisions to improve quality and outcomes. Over time, these incentives will emphasize outcome-based payment over fee-for-service. A national focus developed in the early 2000s to address quality of care improvement and patient safety issues, following a study and report of shortcomings in the U.S. health delivery system. 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. Health information technology (HIT) infrastructure has been considered a core component to address quality of care concerns, improve health provider communication, and develop a higher level of patient awareness and control in matters concerning their own health.

Prospective Payment System (PPS) hospitals are hospitals that receive Medicare's flat-rate-per-case payment based on a payment schedule associated with a

set of diagnosis-related groups. In North Dakota, the largest prospective payment system hospitals located in Bismarck, Fargo, Grand Forks, and Minot receive Medicare payment incentives to measure and record 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. However, all CAHs collect and report quality-related data.

Educational institutions and their associated academic health centers respond to the needs of healthcare providers in the health delivery system. Academic centers are also subject to supply based on changes in demand.

> ***"In North Dakota, the PPS hospitals located in Bismarck, Fargo, Grand Forks, and Minot receive Medicare payment incentives to measure and record 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."***

Pandemic Impacts on the Population of North Dakota and Attendant Healthcare Needs

Subsequent chapters of this *Report* will address the direct data-related impacts of the SARS-CoV-2 (COVID-19) pandemic. A large majority of the data used in this document are public-use and subject to data delays ranging from one to three years from collection to release date. Due to this potential data distribution delay, some chapters may not directly address the pandemic due to a lack of clear, visible trends in the data. While this chapter serves to establish a base of attendant healthcare needs within the state, later chapters (especially chapter 4) will more fully address the pandemic within the context of the relevant data.

DEMOGRAPHICS

Population characteristics influence healthcare workforce as well as the overall healthcare delivery system. Demographic changes can influence policy discussions and decisions. Health policy at both national and state levels responds to changes in the socioeconomics that affect the ability of individuals and employers to obtain health insurance, which can influence health status. As demographics and socioeconomics change, the demands for certain types of health services are impacted. For example, a geographic area 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 source for providers will become more dependent upon public payers, particularly Medicare. The demand for health professionals may be modified by attracting professionals with interest and ability to serve a geriatric population, but it may be more difficult to attract professionals with an interest in a multigenerational population. Healthcare systems constantly keep up with

demand for more services, including more diversified services, than they 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 securing healthcare insurance.

Areas experiencing depopulation must contend with conditions that threaten the ability of the local health system to maintain existing services, where the overall demand may decline but for which there still is a need. In remote areas there are legitimate needs for access to primary and emergency care, public health functions, as well as reasonable access to acute and specialty services. 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. This results in rural areas simultaneously experiencing a loss of population coupled with a relatively larger older-adult population requiring an increase in services.

The overall population decline affects the local health system with corresponding service demand change (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. Population decline and the 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, concerns exist regarding the survivability of local health systems given these conditions.

Demographic factors, economic conditions, and public policy decisions have combined to create a complicated and challenging environment for maintaining access to essential healthcare services. Rural North Dakotans recognize the barriers and threats to community institutions and to 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.

“Population decline and the growing presence of an aged patient base places many rural health systems at financial risk 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.”

Metropolitan, Micropolitan, Rural, and Frontier Counties

North Dakota is comprised of a mixture of several densely populated larger cities, many smaller towns, and large areas with low population density. The distribution of North Dakota's population is another challenging issue for efficient healthcare delivery. Figure 1.1 shows the population per square mile for metropolitan, micropolitan, and rural counties in the state. Since its inception, the state has experienced low population density overall. North Dakota ranks 48th in population density when compared nationally, with 11.3 people per square mile. As a reference, the District of Columbia has approximately 10,090 people per square mile.[3]

Until recently, North Dakota experienced muted population growth. North Dakota is unique in the nation in experiencing negative population growth for four of the past 11 decennial censuses.[3-7] According to the 2020 Census, North Dakota has increased 15.8% from 2010 to 2020.[5] North Dakota had the fifth-fastest growth rate in the country over that period, primarily from the rapid growth in the energy sector. The national growth rate from 2010-2020, in comparison, was 13.7%.[6, 7] North Dakota's growth mainly occurred in four general locations: the western counties and the cities of Fargo, Dickinson, and Bismarck.

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 and their surrounding area (Fargo, Bismarck, and Grand Forks) are located in metropolitan areas.
- ***Micropolitan*** (or large rural) describes areas with a population core from 10,000 to 49,999. This includes Minot, Dickinson, Williston, and Jamestown.
- ***Rural*** constitutes areas with a population cluster of fewer than 10,000. Both micropolitan and rural areas are considered nonmetropolitan. Historically, more than 50% of North Dakota's population has been designated as rural.[3-7] Depending on the definition of rural, North Dakota is among the five states with the largest component of rural areas.[7]
- ***Frontier*** is defined as a county with a population density of six or fewer people per square mile. Thirty-six 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 11 people per square mile. The lowest density is found in Slope County (0.6 people per square mile), and the most densely populated is Cass County (99.4 people per square mile). The average population density of the United States, as a point of comparison, is 93.7 people per square mile.[5]

It should be noted that Metropolitan, Micropolitan, and Rural are a combined set of definitions from the Federal Office of Management and Budget, while Frontier is a designation that is based on separate federal criteria.[8]

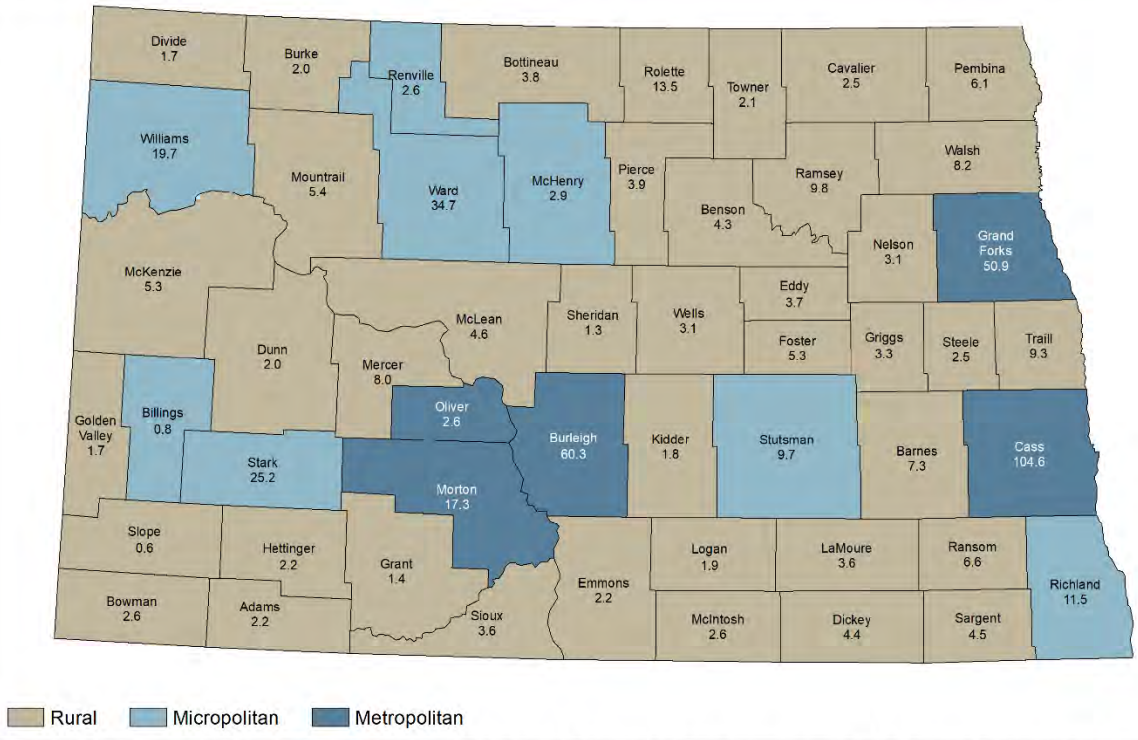

Figure 1.1. **Population densities (number of people per square mile) of metropolitan, micropolitan, and rural counties in North Dakota, 2020.[3,9]**

Age

Older populations use dramatically more healthcare resources than do younger populations. North Dakota's population is among the oldest in the nation. It is tied for fourth in the country in the percentage of its state population that is 85 years or older. This greatly influences the need for providers. For example, nationally in 2016, 15- to 24-year-olds on average generated 153 ambulatory office visits annually per 100 persons, while Americans age 75 or older made 546.8 annual visits per 100 persons (over 3.5 times as many).[9] If one assumes that a family physician provides 5,500 office visits a year, 1,000 15- to 24-year-olds would take up 35% of one physician's practice, while it would take 1.4 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. Figure 1.2 shows specific age ranges across North Dakota, as compared to the U.S. North Dakota has a smaller percentage of individuals between the ages of 45 and 64 and 65 to 84 than the U.S.

"Older populations use dramatically more healthcare resources than do younger populations. North Dakota's population is among the oldest in the nation. This greatly influences the need for providers."

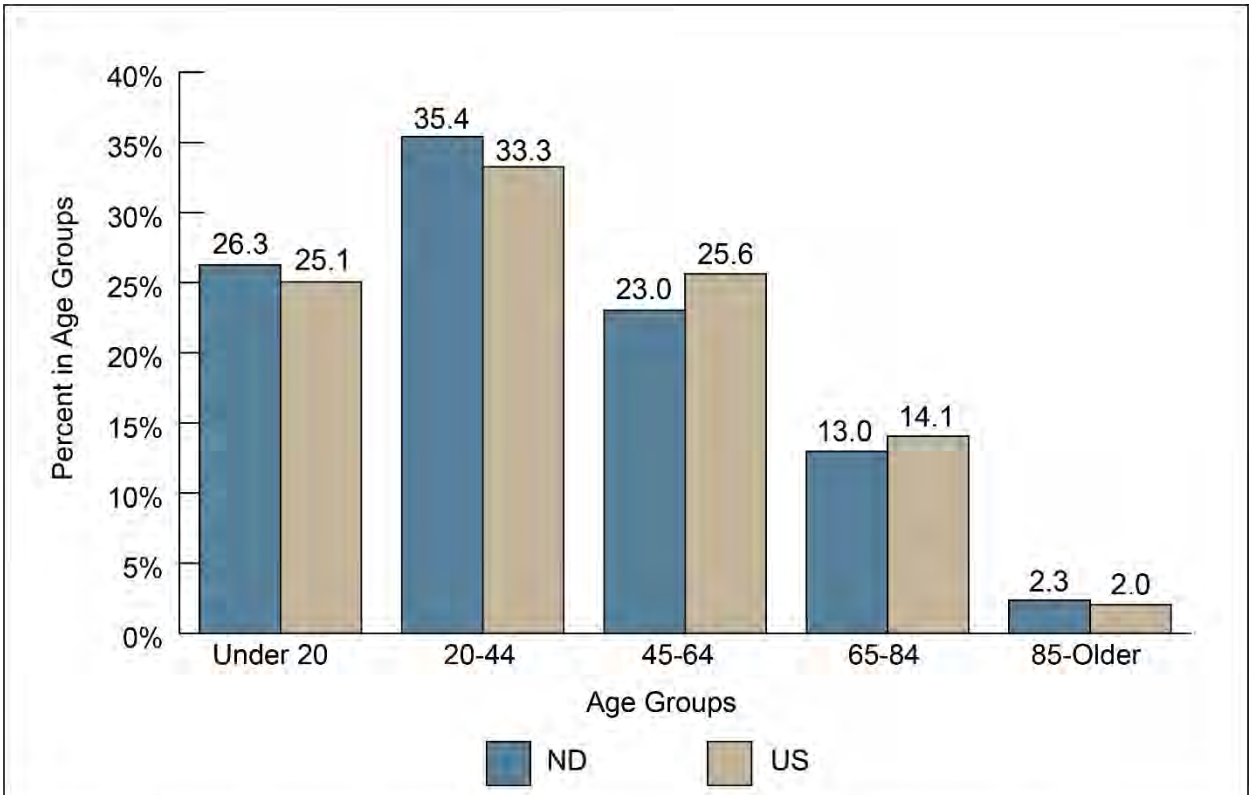

Figure 1.2. **Age of people in North Dakota compared with US in 2020.**[4]
There are more North Dakotans 85 and older compared with the US population. There are fewer North Dakotans between the ages of 45 to 64 and 65 to 84 relative to the US population.

As shown in Figure 1.3, rural North Dakotans are significantly older than their counterparts in micro- or metropolitan areas. 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 North Dakota farmers (Figure 1.4).[10] Since most rural counties have continued to see a decline in overall population, that decline is commonly associated with a loss of young individuals and families or difficulty in recruiting and retaining young individuals and young families. Older adults are less likely to leave an area where they have spent their entire lives. The effect is one where the overall population declines, and the average age of the area increases.

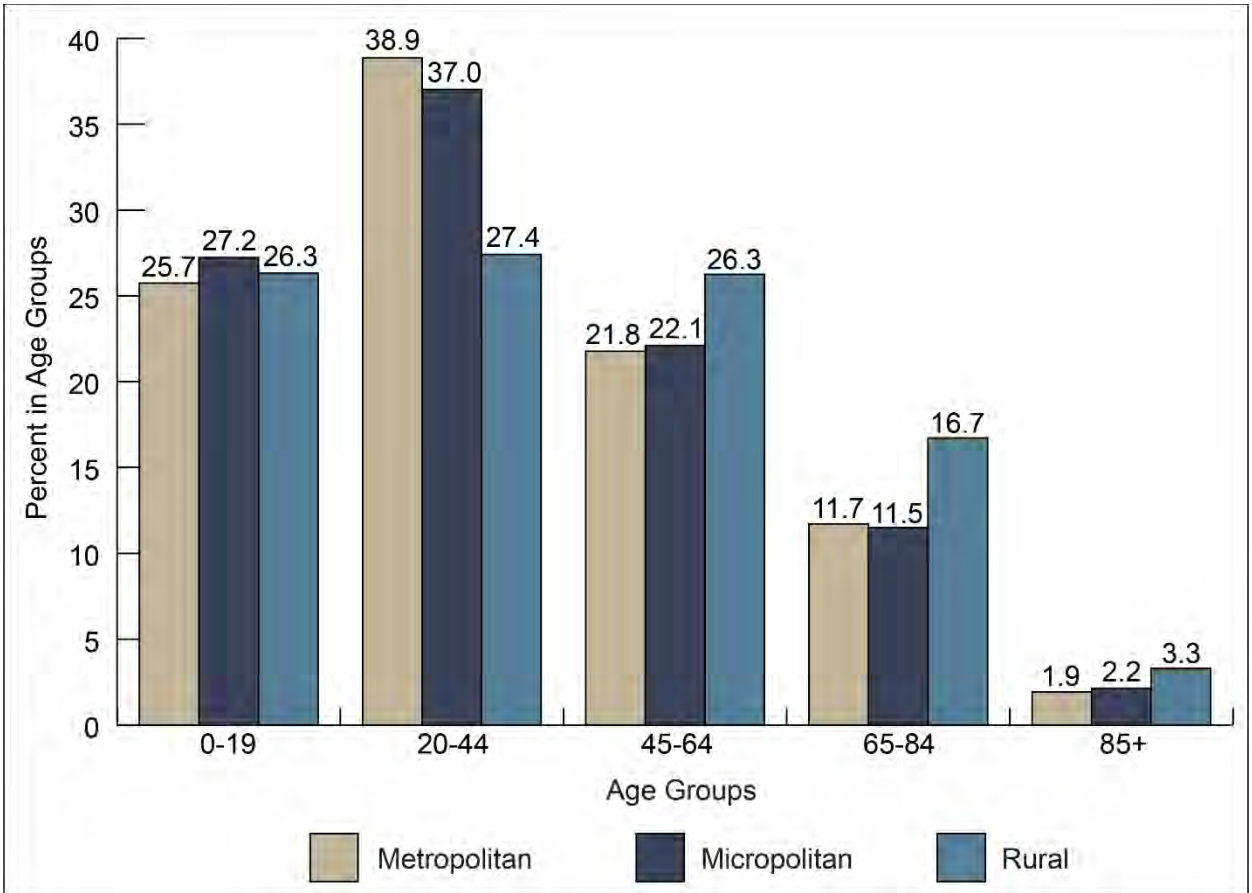

Figure 1.3. **Age of people in North Dakota by metropolitan, micropolitan, and rural counties, 2020.**[3]

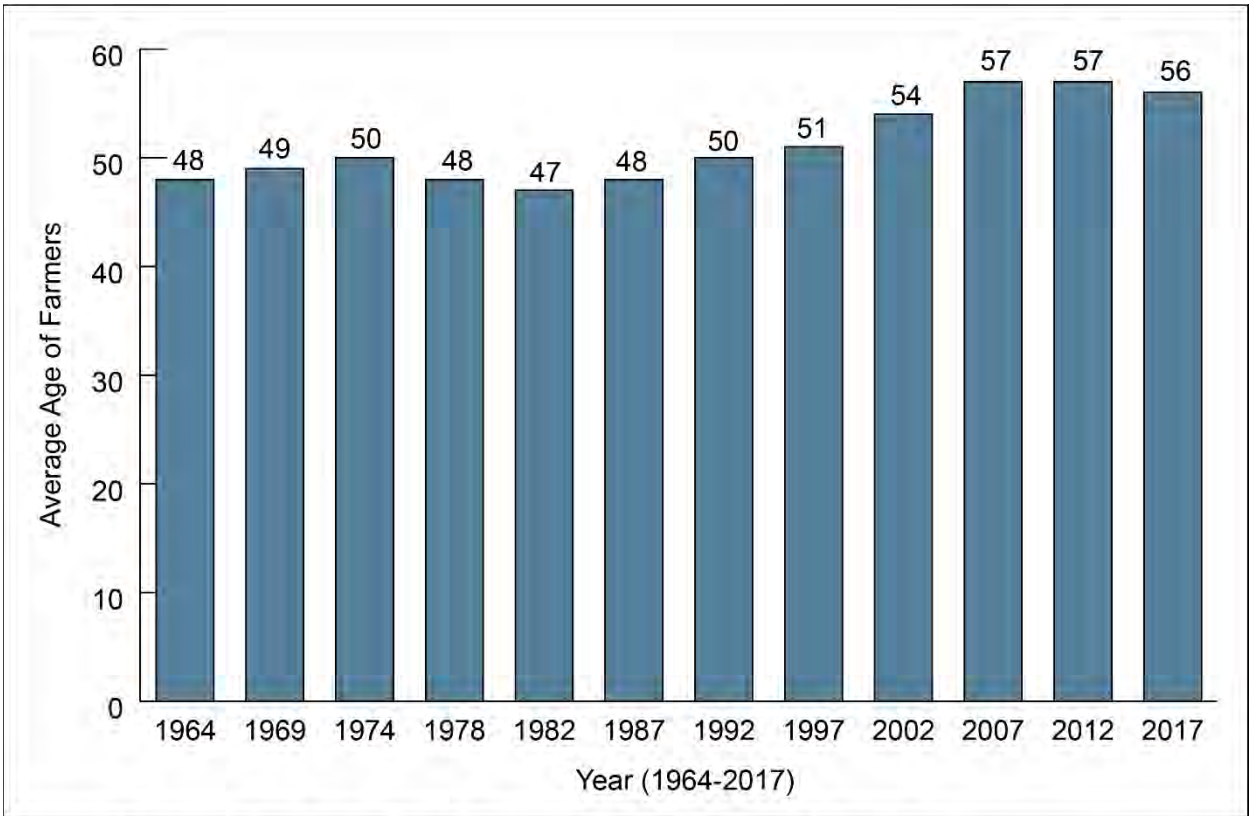

Figure 1.4. **Average age of North Dakota farmers from 1964 to 2017.**[11]
The increase in average age has been especially pronounced in North Dakota farmers, whose average age rose from 47.3 to 56.0 years from 1982 to 2017.

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, and access to adequate and quality food sources is limited. Poverty is associated with greater rates of illness and shorter life spans. People with incomes at 200% below the federal poverty level (or less) are more likely to have only fair or poor health status, and to have sought care through the emergency room as opposed to a clinic setting. Access to health services is affected by income level in other ways. Lower-income households have a lower rate of health insurance coverage and less frequent contact with a healthcare provider.[11]

Poverty rates vary based on age, race, household composition, and geography (Figure 1.5). Poverty has been varied in urban areas, but still remains lower than rural rates (9.6% compared with 11.2%).[8, 12] The highest poverty rates are in rural counties and counties with a higher proportion of American Indians.

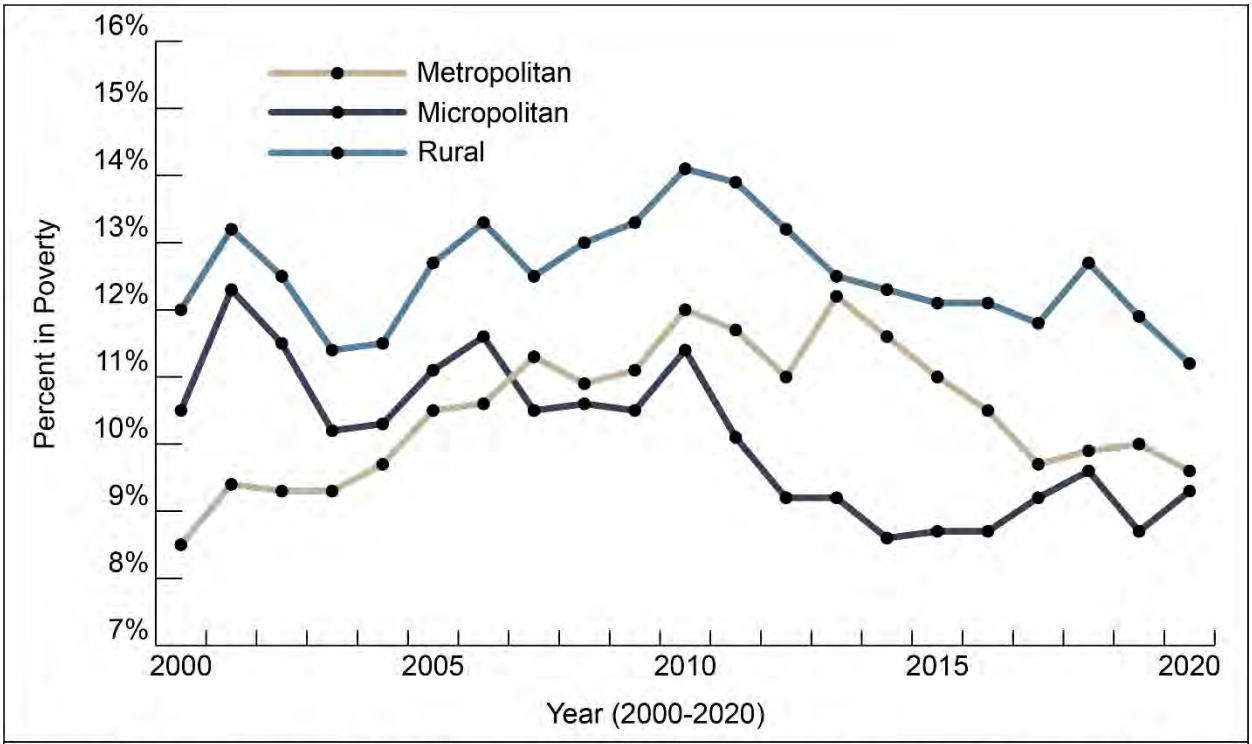

Figure 1.5. **Poverty in North Dakota by rural, micropolitan, and metropolitan areas.**[9,13] In 2020, the federal Office of Management and Budget (OMB) considered the poverty level for a family of two to be $17,240 and for a family of four it was $26,200. In 2020, 10.2% of North Dakota residents were in poverty (the US had 11.9% in poverty) and lived in all regions of North Dakota. Poverty rose from 8.5% to 9.6% in metropolitan areas since 2000, and in rural areas it remained roughly the same, from 12.0% to 11.2%. The poverty rate from 2000 to 2020 was higher in rural North Dakota than other areas.

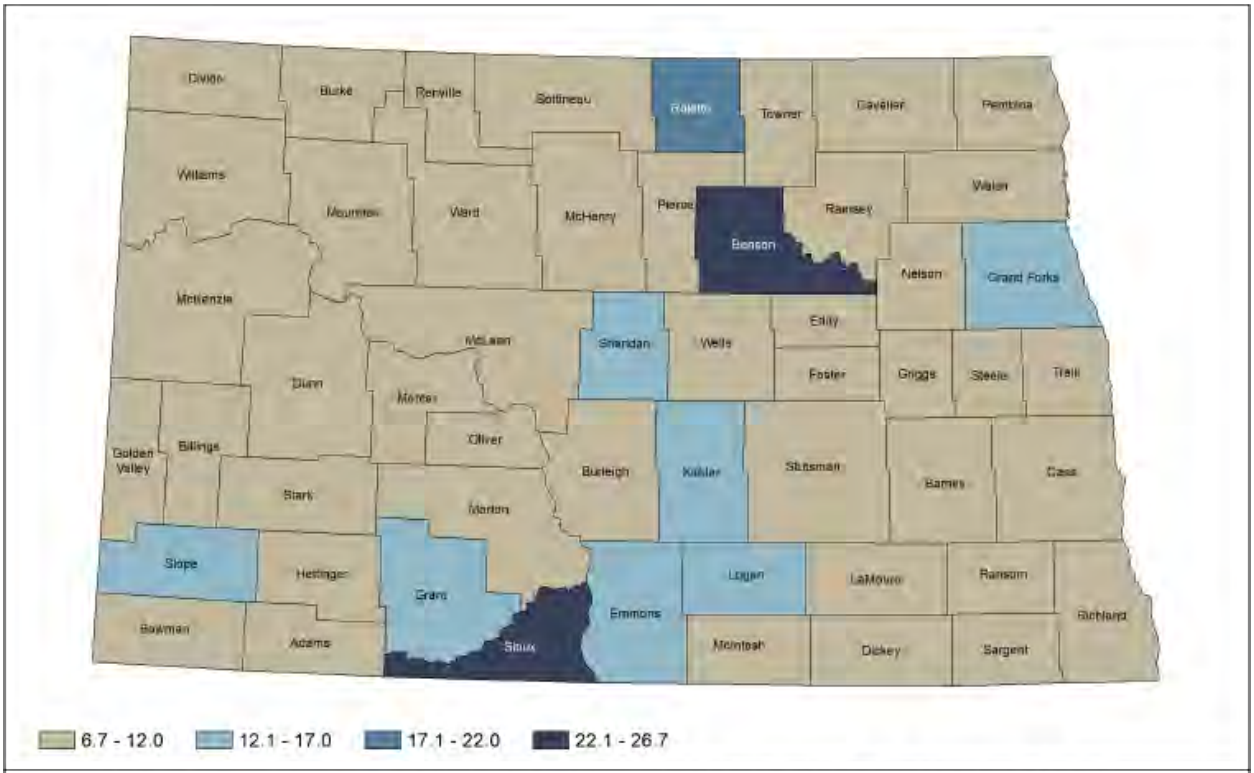

Figure 1.6. **Percentage of population in poverty in North Dakota, by county, 2018.**[16]
In 2018, five counties had more than 20% of their population in poverty. These five counties are designated as rural and 3 have significant American Indian populations. Eleven counties in North Dakota have poverty rates less than or equal to 10% compared to 25 counties within this poverty rate range in 2016.

"The highest poverty rates are in rural counties and counties with a higher proportion of American Indians."

DEMOGRAPHICS SUMMARY

Demographic characteristics contribute to rural health disparities and highlight the access-to-care and health status issues found in rural North Dakota. In general, those in the most rural areas of North Dakota are older, and poorer than those in metropolitan and micropolitan areas (Table 1.1). Each of these factors has been shown to influence the ability of a person to seek healthcare 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 culture, including rural culture, can serve as social determinants of health, which will be discussed in Chapter 2.

Table 1.1
Summary of demographics in North Dakota's population by metropolitan, micropolitan, and rural areas, 2020.[3,8,12]

	Metropolitan		Micropolitan		Rural	
	N	%	N	%	N	%
Total	**378,769**	**50**	**182,392**	**24**	**199,233**	**26**
Gender						
Male	191,873	51	95,484	52	101,927	51
Female	186,896	49	86,908	48	97,306	49
Age						
Under 20	97,508	26	49,652	27	52,429	26
20-44	147,189	39	67,512	37	54,619	27
45-64	82,459	22	40,329	22	52,291	26
65-84	44,337	12	20,974	12	33,311	17
85 and Older	7,276	2	3,925	2	6,583	3
In Poverty						
Yes	36,496	10	17,024	9	22,261	11
No	342,273	90	165,368	91	176,972	89

Nationally, rural residents tend to be poorer, older, and have less insurance coverage than those residing in non-rural regions. North Dakota data reflects the national data.

POPULATION

Historical Changes

North Dakota has been significantly influenced by its agricultural history and the role agriculture has played economically, socially, and culturally. Historically, North Dakota has benefited from federal statutes such as the Homestead Act, a rich productive land base, early immigration, the proliferation of railroad expansion to move out agricultural products (and move in settlers), and changes in agricultural technology. The state's population growth from 1910 to 1930 (Figure 1.7) was likely influenced by the continuing development and growth in agriculture. The full effect of the Depression in the 1930s and World War II precipitated a population decline in North Dakota. At one point in 1934, one-third to one-half of North Dakotans were "on relief" and receiving government assistance. During the 1930s, there was an out-migration of more than 120,000 people. Even during this period, there was a rural-urban dichotomy with population shifts where farm and small-town populations declined and larger, more urban areas of the state grew.[13]

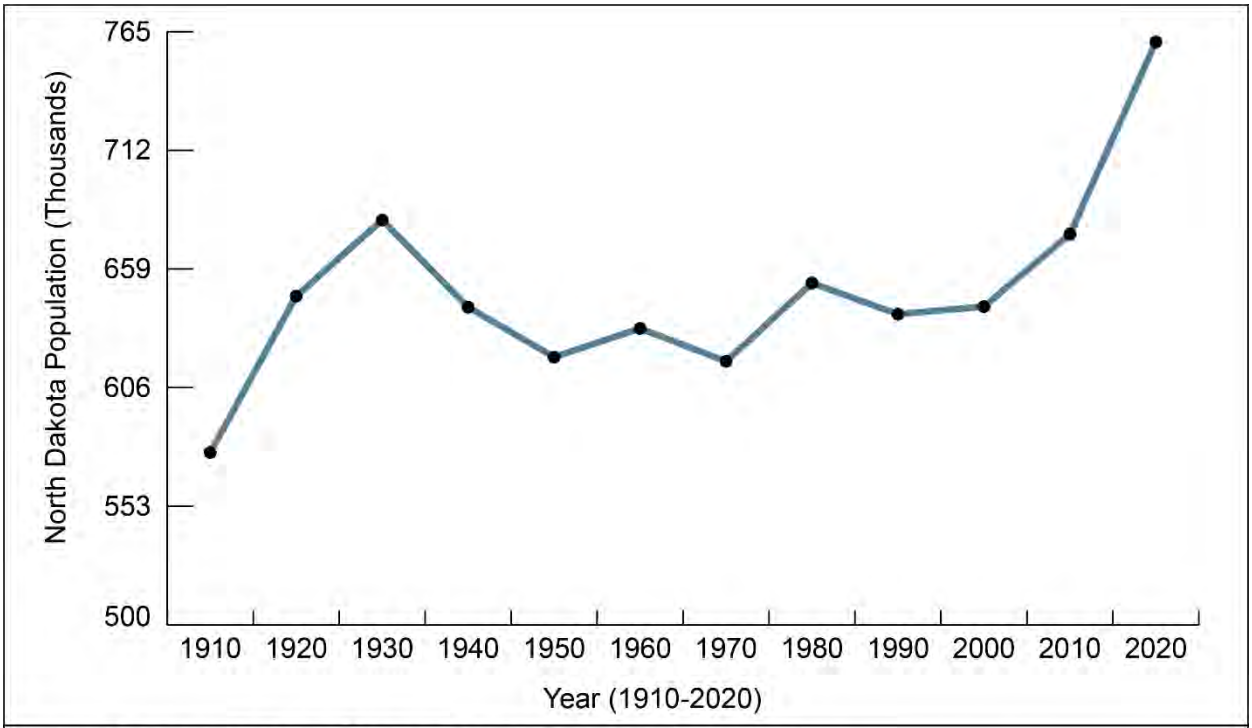

Figure 1.7. **Population of North Dakota from 1910 to 2020.**[14]
ND population increased from 577,056 in 1910 to 680,845 in 1930, decreased to 617,761 in 1970, and then increased to 674,518 in 2010. North Dakota's highest population was in 1930. In 2020, the U.S. Census Bureau estimated projected population was 760,394. North Dakota has gained more than 100,000 residents since 2000, when the population was 642,200.

"The ND counties with the most significant population increases from 2000 to 2019 were McKenzie, Williams, and Mountrail. 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."

From 1930 to 1950, the state's population declined from about 681,000 to 620,000, then increased to 632,000 in 1960, and dipped again to 618,000 in 1970. By 1980, the population increased to 653,000. The rapid increase in the late 1970s likely was a result of significant energy expansion (oil and coal) during that period and a trend toward urbanization. Following the 'oil bust' in the 1980s, the state's population once again declined and was accompanied by continuing rural depopulation. Since 2003, the population has rebounded.

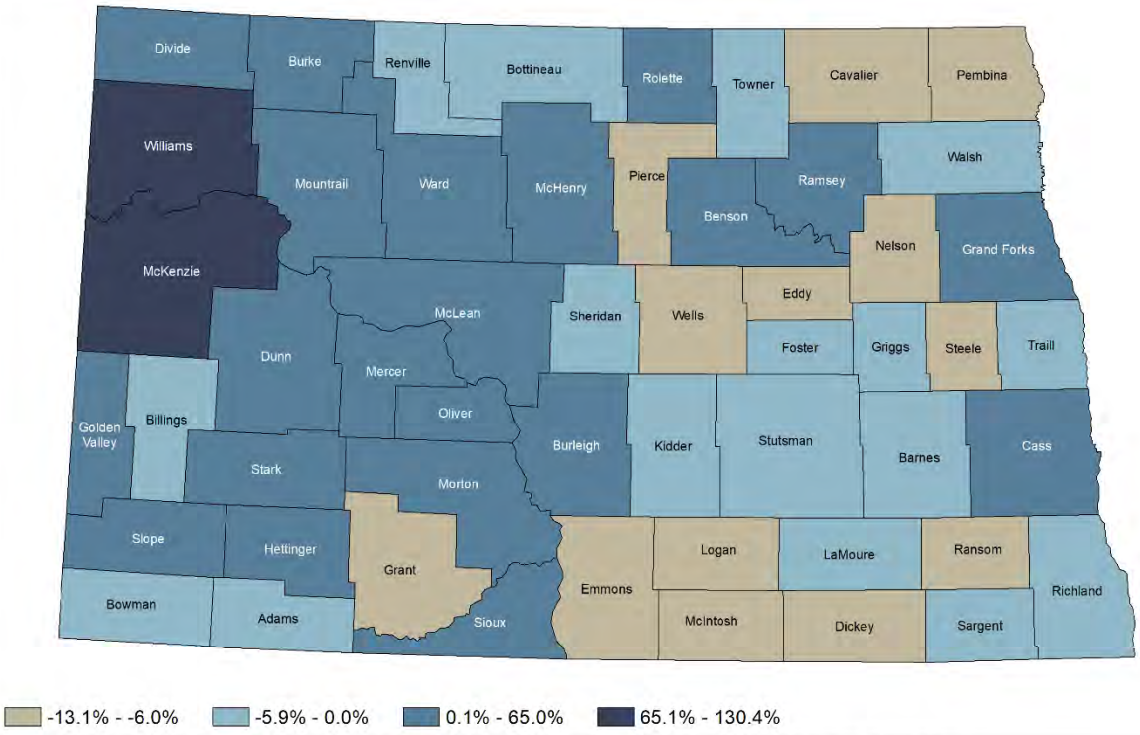

Figure 1.8. **Percentage change in county population from 2010 to 2020.**[3,7]
Four counties have increased their population by greater than 30% from 2010 to 2020. These four counties are McKenzie, Mountrail, Stark, and Williams. From 2010 to 2020, 30 counties have lost population.

Figure 1.8 shows the change in population by county from 2000 to 2019. The counties with the most significant population increases from 2000 to 2019 were McKenzie, Williams, and Mountrail. 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 healthcare industry accounted for eight of the 10 largest employers in the state in 2010, and these private businesses were headquartered in the three largest cities, demonstrating the growing importance of health as a business activity and underscoring the diversification of the state's economy, particularly when it is associated with the continuing urbanization of the state."***

The three most urban counties, Burleigh, Cass, and Grand Forks, home to the state's three largest cities have had consistent growth dating back to 1930. The two fastest-growing cities through births and migration over the past decade, West Fargo and Horace, demonstrate that urban expansion is not solely concentrated within the geographical boundaries of the major cities.[7,8,14] This is also an indicator that while the state may still rely economically on land-based economies (agriculture and energy),

there is a more diversified economic structure under development (health infrastructure, regional service and retail, government, manufacturing, and education). The healthcare industry accounted for four of the 10 largest employers in the state in 2020, and these private businesses were headquartered in the three largest cities.[15]

While the more urbanized areas continued to grow, the most rural and remote areas declined in population. About one-third of the rural counties had experienced average decennial population losses of 10% or greater since 1930. Sheridan County, in the central part of the state, has actually lost over half of its population since 1980.[4,8] The changing economic face of the state has spurred much of this change. In 1960, agriculture accounted for 17% of the state's gross domestic product (GDP), but declined to about 8% in 2021.[15]

> ***"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."***

In 2010, healthcare accounted for 8.6% of the state's economic activity and had shrunk slightly to 8% in 2021.[16] 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 and other economic conditions have helped to shift population to the more urban centers. For example, as agriculture has become a smaller economic driver for the state over time, the number of farers and farm employees has decreased.

Changes in Population by County and Age

Figure 1.9 shows the progression of population change for people age 65 and older at four census periods (1990, 2000, 2010, and 2020). There has been a continual increase in the proportion of older adults in the rural counties. In 2020, the nine counties with 27% or more of their population age 65 or older were all rural; in fact, they are some of the most remote counties because all are classified as frontier. North Dakota's median age has steadily increased over the past 50 years. The state's median age was 26.2 in 1960, 26.4 in 1970, 28.1 in 1980, 32.4 in 1990, 36.2 in 2000, 37 in 2010, and 35.2 in 2020.[9] Twenty-three counties had a median age of 45 and older, while Sheridan County had a median age of over 54 years.[7]

There has been a significant increase in the number of people aged 85 and older, and it is the state's second most rapidly growing sector. This group constitutes 2.3% of the state's population. North Dakota is tied for sixth in the country for states with the highest percentage of older adults; nationally, 2.3% of Americans are age 85 and older.[7]

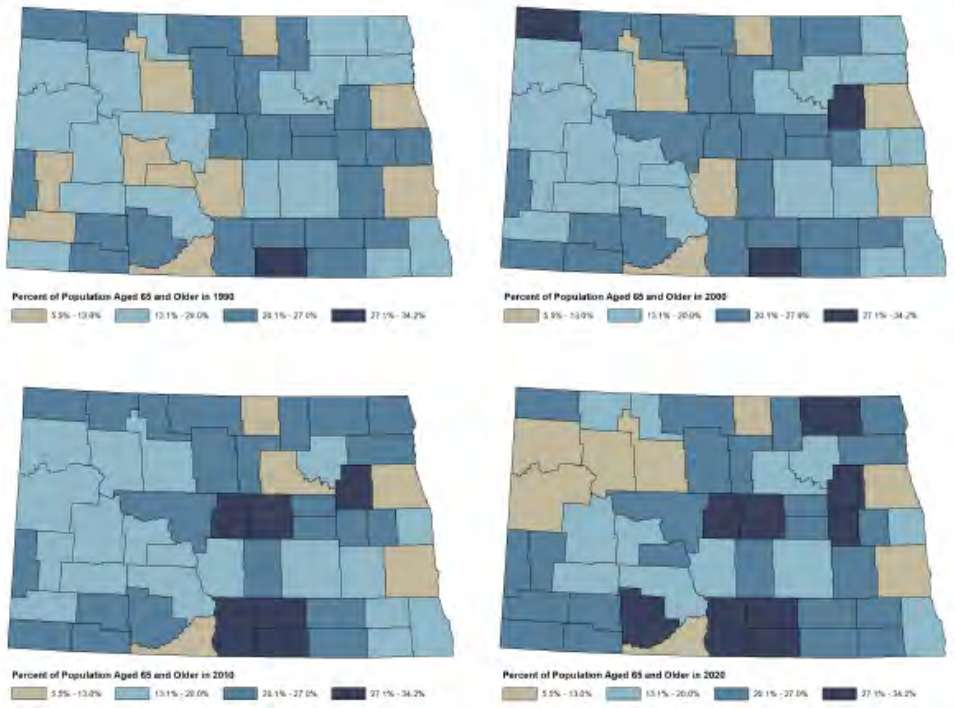

Figure 1.9. **Percent of population aged 65 and over in 1990, 2000, 2010, and 2020.**[4,6-8]

Change in Population by Metropolitan Status

Changes in the state's economy, and the number of people engaged in agriculture, account for some of the change in rural population. The number of North Dakota farms has declined by about 50,000 since the 1920s. Since that time, there has been a progressive urbanization of the state (Figure 1.10). One marked difference noted in recent years is an increase in the 45-64 year age cohort in metropolitan counties.

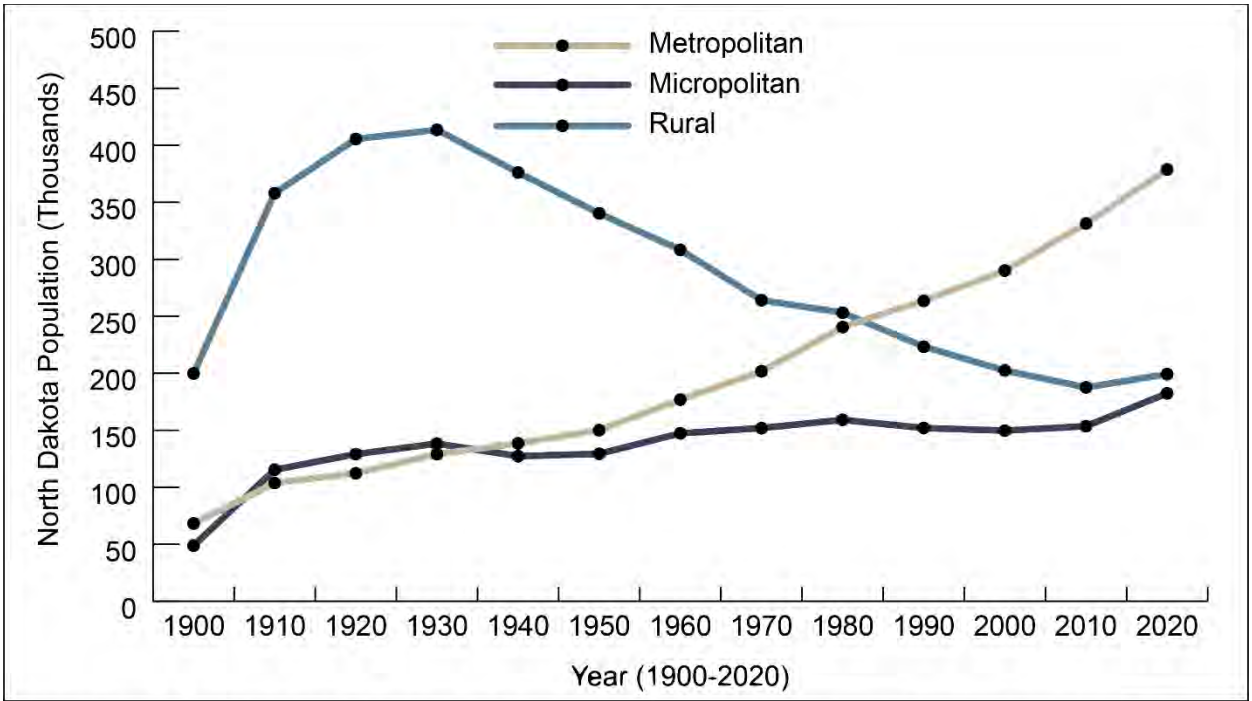

Figure 1.10. **Population in North Dakota from 1900 to 2020 by metropolitan, micropolitan, and rural counties.**[8,14]
Rural population decreased from 1930 to 2010, but has remained stable since then. Since 1990, metropolitan population has been higher than rural population. Population in rural North Dakota counties was up to three times as high as metropolitan or micropolitan populations into the 1930s. 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.

Change in Population by Births and Deaths

A large part of the increase in metropolitan population is the result of an increase in birth rate in metropolitan areas. The number of births in North Dakota has increased from 9,088 in 2010 to 10,040 in 2020.[16] The number of deaths also increased from 5,913 in 2010 to 7,934 in 2021.[16] Metropolitan areas have experienced the largest number of births. Although rural areas have the lowest number of births, there is a trending increase in the birth rate (Figure 1.11). One reason for the gradual increase in rural births, despite an aging population, is the higher fertility rate (number of births per 1,000 women) in rural areas compared with metropolitan areas. In 2020, there were 86 births per 1,000 females of childbearing age in rural areas, compared to 79 births in metropolitan areas.

Metropolitan areas had 592 more births than deaths on average from 2010 to 2020. Micropolitan areas had on average 90 more births than deaths. As a consequence of these two factors alone (apart from any migration effect), metropolitan population has increased more than micropolitan population has. Rural areas, in

contrast, had on average 6 more deaths than births; however, the higher fertility rate in rural areas helps account for the increasing birth rates in rural counties.

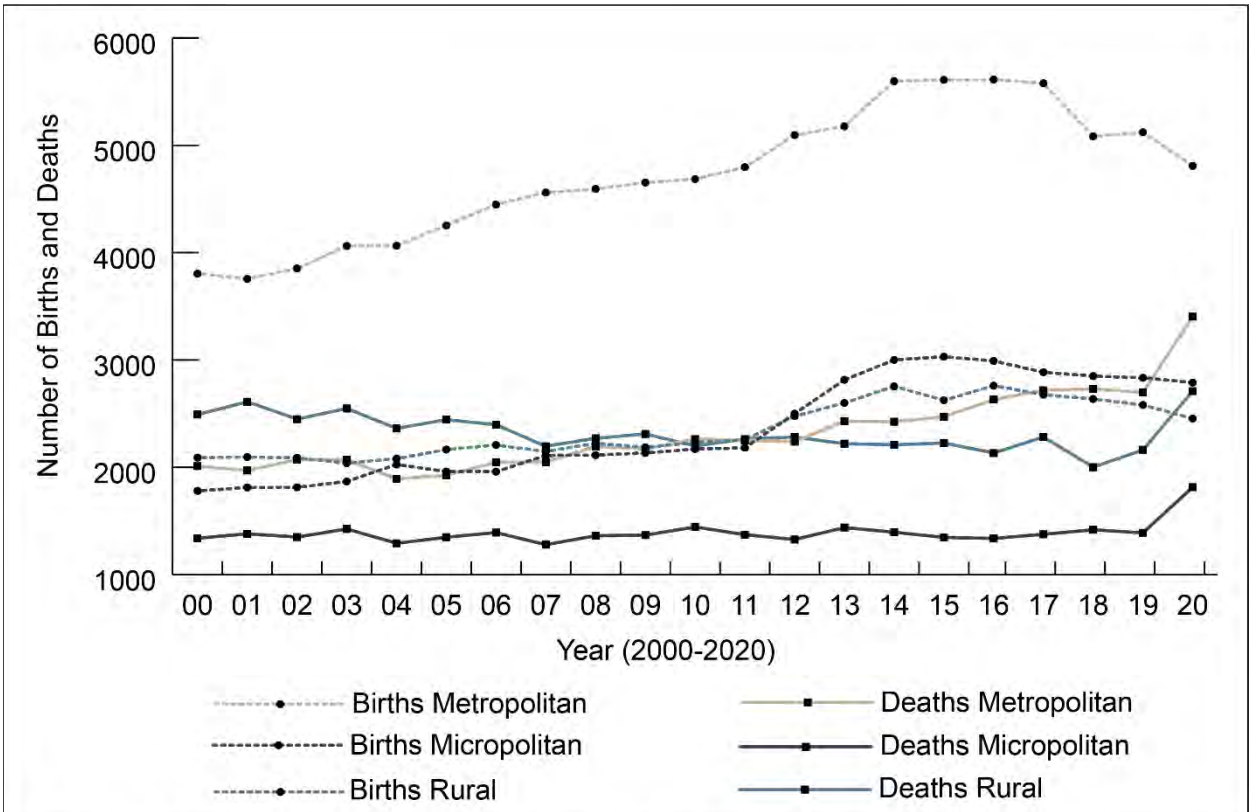

Figure 1.11. **Number of births and deaths in North Dakota from 2000 to 2020 by metropolitan, micropolitan, and rural counties.[8,16]**
Metropolitan births have been rapidly increasing. Rural and micropolitan births have been increasing slightly. Rural, metropolitan, and micropolitan deaths all increased in 2020.

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CHAPTER TWO: Social Determinants of Health in North Dakota

INTRODUCTION

Various external factors, referred to as social determinants of health (SDOH), can affect health status and explain why some Americans are generally healthier than others. SDOH consider the various circumstances in which people are born, live, learn, work, socialize, play, and age which affect a range of health outcomes.[1,2] Circumstances that may affect health outcomes of individuals include the current social structure, economic factors, and physical aspects of a person's environment. Environments include home, school, workplace, neighborhood, city, and other community settings where a person spends a significant amount of time. Resources that contribute to an enhanced quality of life for a given population are likely to have a significant influence on positive health outcomes of the population. Examples of quality of life enhancing resources include safe and affordable housing, access to education, public safety, availability of healthy foods, local health services, and environments free from life-threatening toxins.[2] Six factors are recognized as core social determinants of health. They are individuals' economic circumstances, their education, food access, the physical infrastructure of their environment, the social and community context in which they live, and their overall health and access to healthcare (Figure 2.1).[2] There is little consensus on how much impact each factor has on an individual, but each does have some degree of influence.

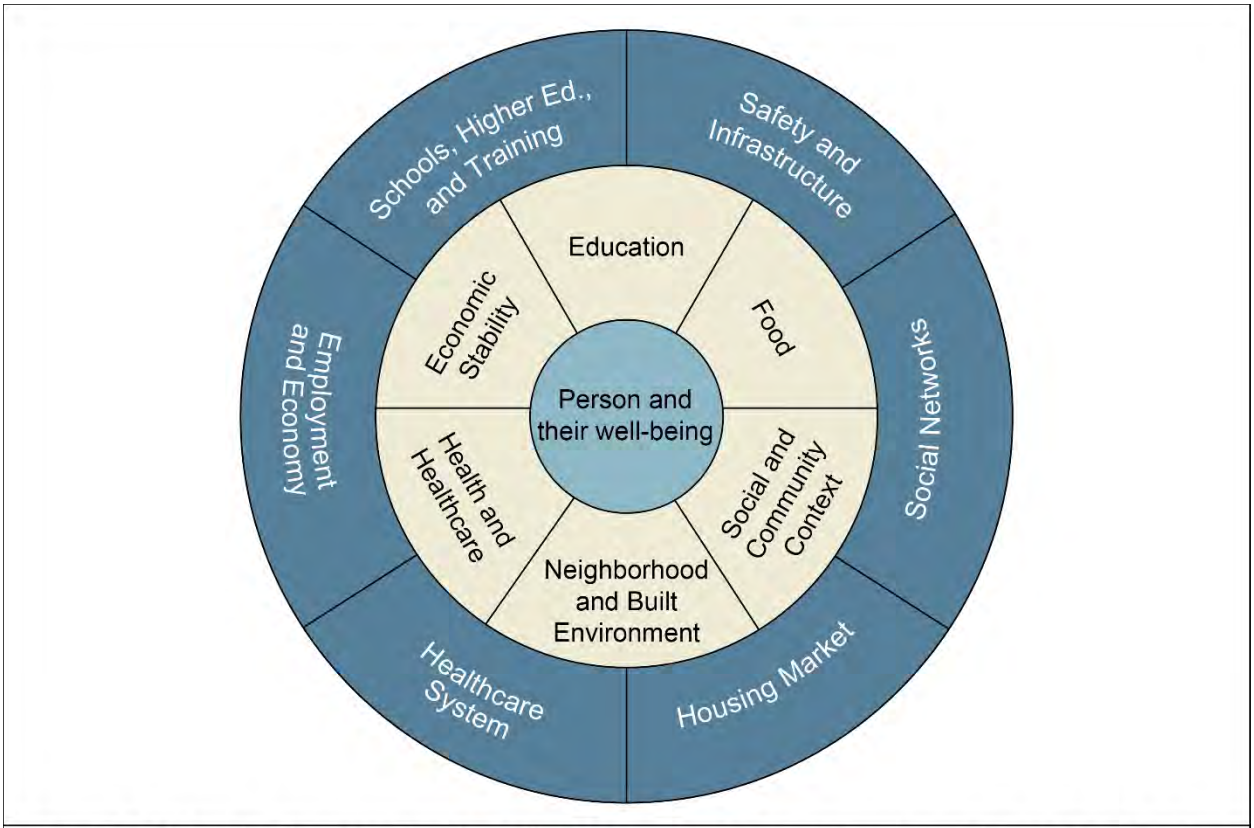

Figure 2.1. **Social determinants of health.**[3] The innermost circle represents the individual, the middle ring represents an individual's immediate environment, and the outermost ring represents other outside influences on an individual's immediate environment.

As discussed in Chapter 1, population characteristics influence healthcare delivery systems and should inform local health policy. When the demographics or socioeconomics of an area change, it is also possible that the healthcare delivery system will change. For example, when an area experiences the aging of its population one would more likely see increased demand for long-term care services, home care, transportation services, and alternative housing options. If an area were to experience depopulation, then it is likely those conditions would make it more difficult for the healthcare delivery system to maintain services in that area. The rurality of North Dakota is another factor that can influence healthcare delivery and local health policy. The majority of North Dakota counties are designated as rural and some healthcare services, such as specialty care services, may not be readily available in more rural areas of the state. All of these factors and more are a part of social determinants of health and can affect the health of North Dakota residents.

Pandemic Impacts on Social Determinants of Health

In the early months of 2020, a global pandemic was declared and the subsequent efforts to mitigate the spread of the disease had an effect on every aspect of the lives of individuals around the world. When examining data around SDOH in

North Dakota, one can see where changes in data coincided with the pandemic over the past two years. One example would be the sharp increase seen in the unemployment rate in early 2020. Another example would be the changes to how much various economic sectors contribute to the Gross Domestic Product (GDP) of North Dakota. The functioning of educational and economic systems has also changed. To avoid further spread of the disease in some areas, schools and offices moved to an online virtual format. This made access to reliable high-speed internet a key factor to academic success and necessary to have an effective environment from which to work from home. Another notable change during the past two years is how individuals accessed healthcare services. Non-emergent surgeries and procedures were delayed, there was a marked increase in patients needing in-patient hospital care due to pandemic related disease which created a shortage of hospital beds, providers were diverted from regular duties to treat patients with pandemic related disease, and there was increased provider stress and burnout. These factors can contribute to changes in how individuals access healthcare. Another SDOH that experienced changes would be access to recreational and fitness centers. Some fitness facilities closed or had reduced capacity and saw group classes canceled or moved to a virtual format. There were also fewer in-person social gatherings to avoid spread of pandemic related disease, and more people connected via video conferencing.

The following information in this chapter reviews the data related to each of these SDOH in North Dakota.

SOCIAL DETERMINANTS OF HEALTH

Economic Stability

Economic stability can encompass numerous factors, including the overall health of the economy for an area in which an individual lives, employment, poverty, and opportunities in various industries.

Employment

The unemployment rate is typically used as an indicator of an area's economic stability, and an individual's employment status is a key indicator of their personal economic stability. The Bureau of Labor Statistics reports unemployment rates on a monthly basis. In December of 2019, North Dakota had an unemployment rate of 2.4%.[4] A low rate such as this typically indicates a healthy economy for the state. However, the unemployment rate can change rapidly due to external factors that affect various industries. Some examples pertinent to North Dakota include changes in crop prices that may affect agricultural sales/exports, or if there is a decline in the oil market subsequently affecting prices. When there is prolonged economic stability, it is more likely that the unemployment rate will be lower, but the unemployment rate can increase based on outside economic influences. The state saw a sharp increase in the

unemployment rate during the spring of 2020. In the early months of 2020, North Dakota reported an unemployment rate of 2.0%, but this rate jumped to 9.1% in April 2020. However, this jump has been followed by a steady decline through 2020 and 2021 (Figure 2.2).[4] In 2020, about 11% of youths aged 16-24 in North Dakota were not enrolled in school and were not working, compared to 12.6% nationwide. These are referred to as disconnected youth.[5] The largest employers by industry in North Dakota include healthcare and social assistance, educational services, retail trade, and public administration.[6] Although these industries employ the largest number of people in North Dakota, other sectors of the economy contribute the most to North Dakota's overall Gross Domestic Product (GDP).

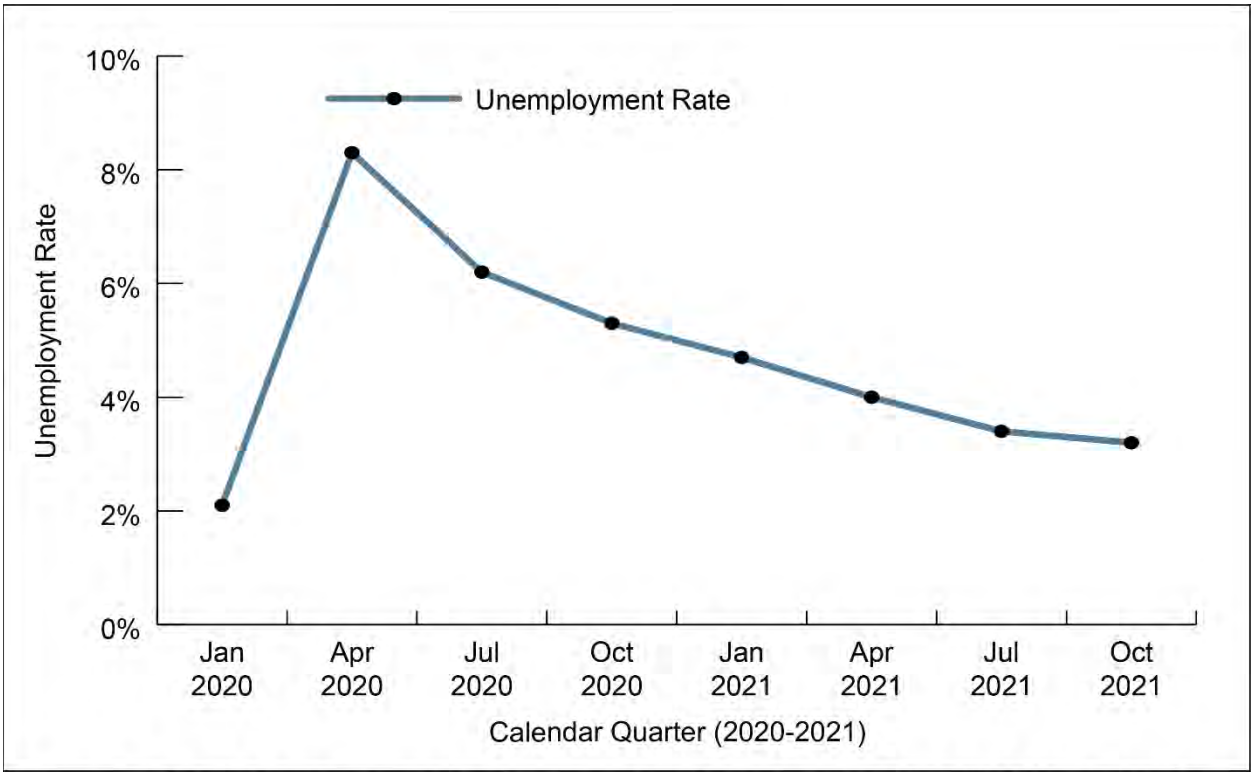

Figure 2.2. **North Dakota unemployment rate by calendar quarter 2020-2021.**[4] North Dakota had an increase in the unemployment rate in the spring of 2020 followed by a steady decline.

Economy

In 2021, the industry contributing the most to the GDP in North Dakota was mining, quarrying, and oil and gas extraction, which accounted for 15.3% of the GDP. The next largest industry was finance, insurance, real estate, rental and leasing contributing 14.4% to the state GDP, followed by government and government enterprises, which contributed 11.1% to the GDP. Education services, healthcare, and social assistance contributed 8.3% to the state GDP, and agriculture, forestry, fishing and hunting also contributed 8.3% to the state GDP. These five industry sectors accounted for over half of North Dakota's GDP in 2021 (Figure 2.3).[7] Another economic

measure to consider would be the Gini Index value, which is a summary value of income inequality. The Gini Index ranges from 0 to 1, with 0 indicating perfect income equality (everyone receives an equal amount) and 1 indicating perfect income inequality (one person or group receives all of the income).[8] North Dakota has a Gini Index value of 0.45 compared to the overall value in the U.S. of 0.48, indicating that there is more income equality in North Dakota than the country as a whole.[9]

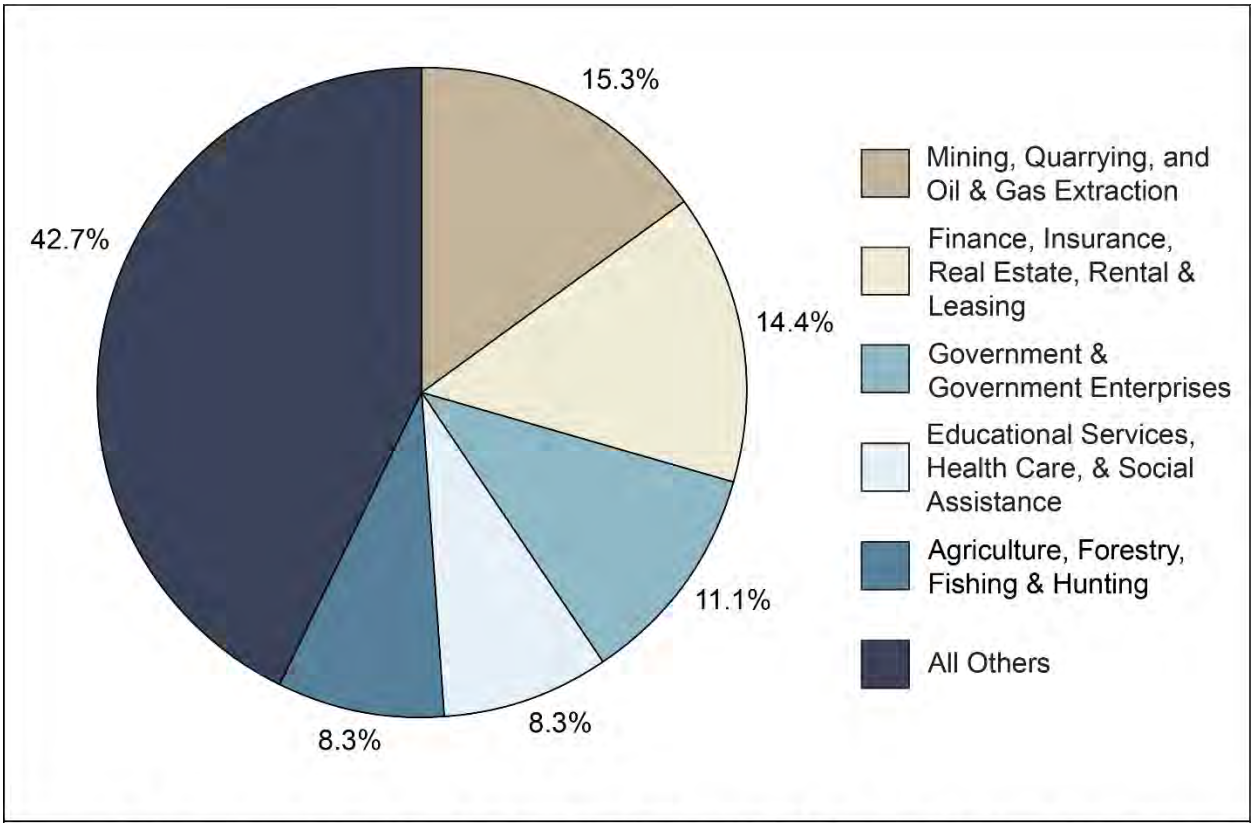

Figure 2.3. **Economic sector contributions to North Dakota GDP in 2021.**[7] The 'All Others' category includes: entertainment, recreation, accommodation, and food services; professional and business services; retail trade; transportation and warehousing; information; construction; manufacturing; wholesale trade.

Poverty

While employment and the health of the overall economy are important indicators, it is also important to consider an individual's income when examining their economic stability. In 2020, the median household income in North Dakota was $64,289.00 while the median income for the U.S. was about $67,340.00.[10] Poverty can have a significant impact on an individual's health as it can limit access to services and resources including healthy foods, good housing, and healthcare. The Federal Poverty Level (FPL) is often used as a measurement of economic hardship for individuals and families. In 2020, the FPL was $12,760 for individuals, $17,240 for a family of two, $21,720 for a family of three, and $26,200 for a family of four.[11] It is estimated that

10.2% of the total population of North Dakota is living in poverty while 10.9% of children under the age of 18 are living in poverty.[10]

Education

Education is an important facet of social determinants of health as obtaining an education can lead to increased job and economic opportunities. Some level of training or education is typically required for most jobs in today's market.

Public Education

Public schools are an important aspect of the education system in the U.S. and North Dakota, and a high school diploma is a standard requirement for most jobs and higher education opportunities. In North Dakota, the four year cohort high school graduation rate was 88.3% for the 2018-2019 school year, which exceeded the national number of 85.8% .[12] About 4.2% of North Dakotans age 25 or older went to high school for some amount of time but have no high school diploma, which is far lower than the national number of 6.6%.[13] There are certain programs available that support school readiness in young children and support children as they progress through school. One such program is the Head Start Program, which supports school readiness for children up to age 5 that come from low-income families. In 2022, there were 34 Head Start programs and 12 Early Head Start programs in North Dakota or about 16.6 head start programs per 10,000 children.[14] North Dakota has seen an increase in enrollment in public schools over the past decade. During the 2021-2022 school year, there were 113,858 K-12 students enrolled in North Dakota public schools. This is an 18.9% increase compared to enrollment in the 2011-2012 school year (Figure 2.4). During the 2021-2022 school year there were a total of 113,858 K-12 students enrolled in public schools and 8,463 K-12 students enrolled in non-public schools.[15]

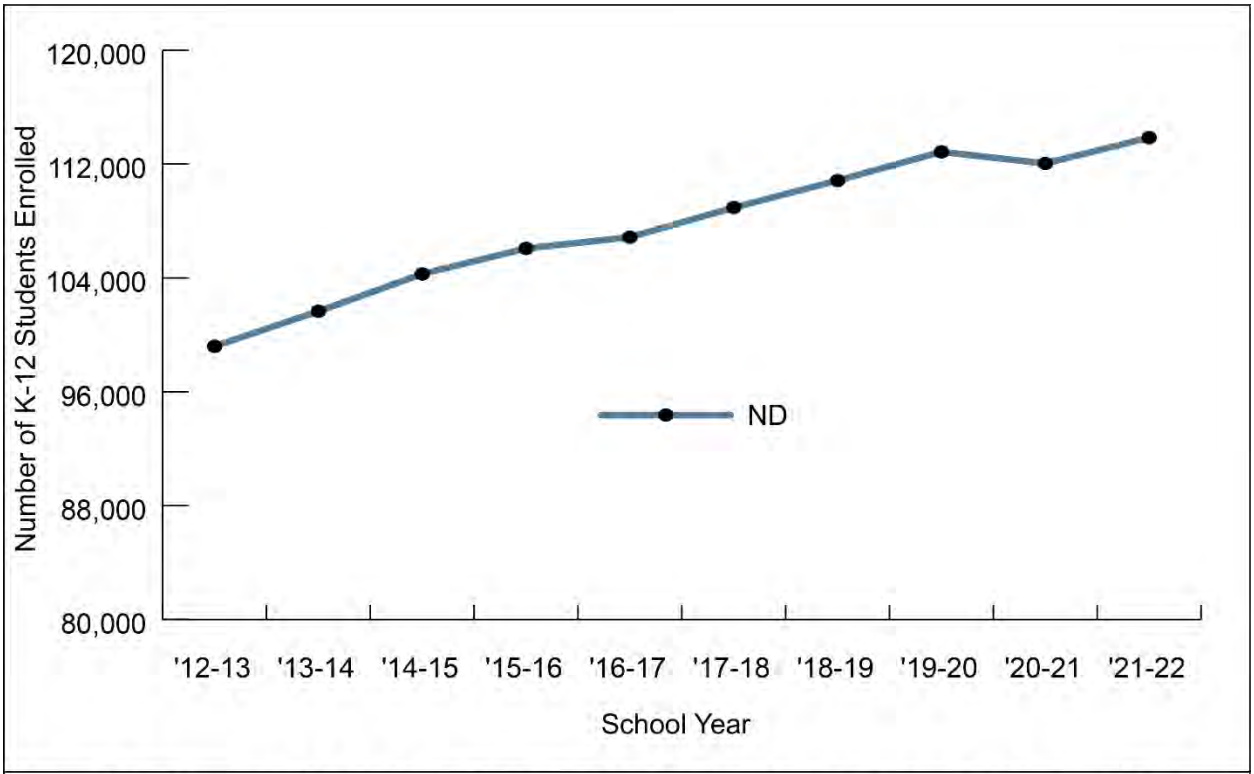

Figure 2.4. **Number of K-12 students enrolled in North Dakota public schools, by school year.**[15] North Dakota has had a mostly steady increase in public school enrollment between the 2011-2012 school year and the 2021-2022 school year, with a dip in enrollment during the 2020-2021 school year.

There are instances where schoolwork or classroom activity needs to be completed online at home or out of the traditional school environment making internet access very important. According to the Federal Communications Commission (FCC), 100% of the population of North Dakota has access to at least two internet providers that offer download/upload internet speeds of 25/3 Megabits per second (Mbps) but only 38.02% of the population has access to at least two internet providers offering download/upload internet speeds of 100/10 Mbps.[16] While broadband may be available, some individuals may experience barriers to using the service. For some, internet service may be too expensive, or the service might be unreliable. The FCC found that in 2019 about 14.5 million Americans lacked access to broadband speed internet with 17% of those lacking access living in rural areas of the United States and this was higher on Tribal lands at about 21%.[17] In another study, Microsoft found that it is likely that 162.8 million Americans do not use broadband speed internet. This indicates a difference between availability of a service and its use.[18]

Higher Education

Generally, obtaining a college degree provides more opportunities for employment. College degrees allow individuals to gain more specialized skills and

knowledge within their chosen field, as well as learn the most up to date techniques and information. In North Dakota, 30.7% of individuals aged 25 or older have obtained a bachelor's degree or higher.[13] North Dakota has a number of institutions of higher education that offer a variety of degrees and programs. There are five 2-year public colleges, four 4-year private colleges, five tribal colleges, four 4-year public colleges, and two research universities.[19] Overall, the North Dakota higher education system has a retention rate of 74% and graduation rate of 55%.[20] Community colleges can be a key component of the higher education system as they are a potentially affordable way for individuals to receive higher education or start their journey into higher education. In 2019, there were 23,424 students enrolled in community colleges across the state. Of those students, 13,661 were degree seeking, 1,718 were non-degree seeking, and 8,045 were taking non-credit courses.[20]

Food Access

Lack of access to fresh, healthy foods is associated with poor diets and higher levels of obesity, diabetes, and other negative health outcomes. Thus, access to healthy food and food security are important components of social determents of health.[21,22] Referring to an individual or household as food insecure means they do not have the resources to provide enough food to live a healthy and active life.[23]

Assistance Programs

Food insecurity in children is an area of concern as it may worsen the onset and persistence of adverse health conditions, such as cognitive developmental deficits, obesity, weakened immunity, and increased risk of serious illnesses. Programs that provide healthy, affordable food result in fewer negative health outcomes and chronic illnesses among the population, especially when targeted towards children in need.[24] One program available for students is the Free/Reduced Price Lunch program in schools. In North Dakota about 30.3% of students were eligible for a free/reduced lunch during the 2018-2019 school year.[25] Based on the school year 2018-2019 income eligibility requirements, children in families at or below 130% of the FPL were eligible for free lunches at school and children in families at or below 185% of the FPL were eligible for reduced price lunches at school. These income eligibility requirements are adjusted every school year.[26] Children of individuals that receive Supplemental Nutrition Assistance Program (SNAP) benefits that attend school automatically qualify for free school meals.[27] SNAP – the Supplemental Nutrition Assistance Program (formerly called food stamps) is a federal nutrition program helping individuals and families in need access healthy food. SNAP participation is associated with lower overall health care expenditures and Medicaid/Medicare costs for states. Early access to SNAP is also associated with improved birth outcomes and long-term health for children and adults.[28] Based on 2019 data, 6.4% of the population in North Dakota was receiving SNAP benefits.[29]

Food Environment

Access to healthy food does not depend only on one's income, but also the food environment in which a person lives. Ahern, Brown, and Dukas (2011) investigated the relationship between food availability and county-level health outcomes. In non-metro counties, more grocery stores and direct farm sales per capita were associated with lower mortality rates. Fewer fast-food restaurants and convenience stores per capita were associated with lower rates of diabetes.[30] Fast food establishments do not always offer healthy food options that grocery stores and other food markets may offer. In North Dakota, there are about 2.4 grocery stores per 10,000 persons in North Dakota, but some counties have no grocery stores at all.[32] The US Department of Agriculture (USDA) defines grocery stores as supermarkets and smaller grocery stores primarily selling food, such as canned and frozen food; fresh produce; and fresh and prepared meats, fish, and poultry. They do not include convenience stores with or without gasoline, or large general merchandise stores that also sell food.[31] According to the Food Access Research Atlas (2019), there are 107 census tracts in North Dakota where residents have low access to retail outlets selling healthy foods, with 346,369 residents living in those census tracts. For a census tract to be designated as low access, 500 people and/or 33% of the population in that census tract must be living more than 1 mile away from a grocery store in urban areas or more than 10 miles away from a grocery store in rural areas.[32] Another way to view the issue of food environments is by looking at food deserts. The U.S. Department of Agriculture (USDA) defines food deserts as geographical areas with limited access to a variety of healthy and affordable food. The USDA examines food desert at the census tract level and those census tracts that are considered low access and designated as low income are considered food deserts.[33] There are 17 census tracts in North Dakota that are considered food deserts, with 52,813 North Dakota residents living in these census tracts (Figure 2.5).[32]

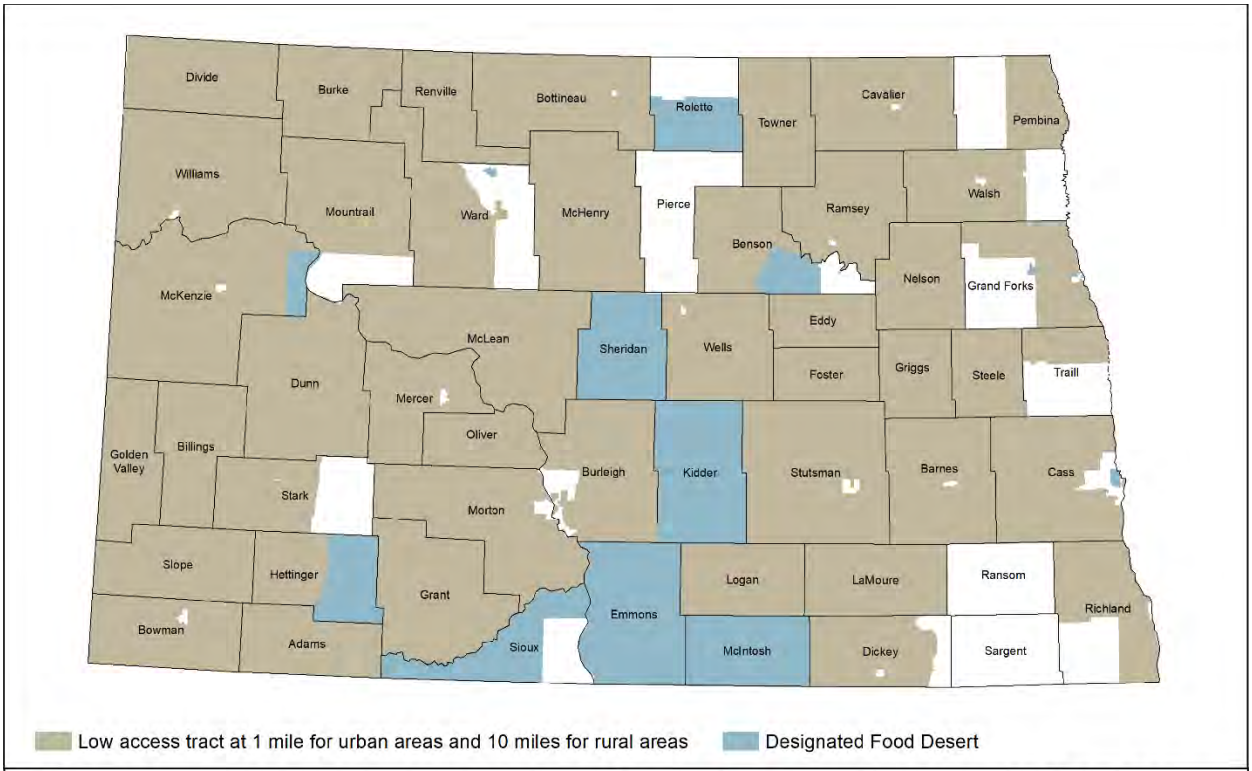

Figure 2.5. **Low food access and food desert designated census tracts in North Dakota, 2019.**[32] Low food access is defined as 500 people and/or 33% of the population of a census tract living more than one mile from a grocery store in urban areas and more than 10 miles from a grocery store in rural areas. Food deserts are census tracts designated as low access and low income.

Physical Infrastructure

The physical environment in which individuals live can also affect their overall health. Factors such as roads, air quality, and access to both outdoor and indoor recreation can vary significantly between communities. There are also significant environmental differences between rural and urban areas, which is particularly salient to North Dakota, as a majority of the state is designated rural.

Access to Recreation

Weather can be a hindrance to outdoor recreation activities. North Dakota typically experiences a variety of weather conditions throughout a given year. The state can experience extreme heat during the summer and extreme cold in the winter, as well as both floods and droughts. Depending on weather conditions, individuals may not be able to enjoy outdoor activities and may need to use indoor recreational facilities for physical activities. One study found that fewer recreational facilities per capita was a predictor of obesity in non-metro settings.[30] Based on the 2010 population, there are about 14.4 recreation/fitness facilities per 10,000 persons in North Dakota.[34] Some of these recreational facilities may require a paid membership for use and not every

community is able to support fitness gym or larger recreational facilities. Smaller communities in North Dakota have a variety of ways of providing for recreational opportunities in the community. They typically have postings about community recreation groups or classes (whether free or paid), or even open/extra hours at available recreational facilities such as high school gyms or a community pool. Announcements regarding recreational classes or events can often be found in the local newspaper, a town newsletter, town websites or social media pages, or on bulletin boards in community spaces such as at post offices, community centers, grocery stores, clinics, or city office buildings.

Social and Community Context

Access to community and social supports also influences an individual's overall health. Having access to supports, different community activities and social groups/clubs/organizations can play a role in physical, mental, and emotional well-being. Studies have shown that loneliness and social isolation are associated with an increase in all-cause mortality. Social isolation has also been linked to cardiovascular disease. Lack of social supports not only affects physical health but also has been shown to affect mental health, as social isolation is associated with poorer mental health outcomes.[35] The Mayo Clinic and the American Psychological Association consider social support an important tool in mitigating stress and offers tips on how to build social networks, including being proactive through volunteering or community classes, and taking advantage of technology by staying in touch through text, email, or social network websites.[36, 37]

Community Social Supports

Some communities work on building social networks for individuals living in their community. Often times these efforts take the form of community events such as citywide rummage sales, community potlucks, or art and entertainment fairs. Many cities have event calendars or event announcements on their city websites or social media pages. For example, Devils Lake, Dickinson, and Garrison all have community event listings on their city websites including listings for music events, camps for kids, boating events, and other activities. There are communities that also work towards encouraging individuals and families to move to their town or city and offer support to new residents. One example is Carrington's New Resident Guide. This guide not only provides information on utilities and City Hall, but also has information on local realtors, telecommunications providers, employment opportunities, and local news media.[38]

Community Health Workers

There are a number of different ways to maintain the health and social connectedness of a community. One model that has been used more widely in the past

decade is community health workers (CHWs). This model uses community members who work in conjunction with the local healthcare system and public health officials, providing support for individuals seeking healthcare. CHWs can help patients navigate the local healthcare system, connect people to healthcare and healthcare resources, provide culturally competent health education and information, serve as patient advocates, and provide numerous other services. A key benefit of the community health worker model is that these professionals provide services in a culturally competent manner. Typically, CHWs reside in the communities they serve and share the same language, similar socioeconomic status, ethnicity, and life experiences as patients.[39]

Health and Healthcare

This category of social determinants of health may be the most obvious factor contributing to an individual's overall health; but it is influenced by all the other social determinants. Access to healthcare and healthcare resources can be affected by where an individual lives, their socioeconomic status, their ability to navigate the health system, and other social determinants. Access to and availability of healthcare resources and healthcare providers is an important aspect to consider when looking at an individual's overall health.

Access and Availability

One way to examine access to and availability of healthcare services and providers is through Health Professional Shortage Area designations or HPSAs. These are designations defined by the Health Services and Resources Administration (HRSA) and indicate health care provider shortages for primary care providers, dental health providers, and mental health providers. These designations can be for a geographical area, a specific population within an area, or for a facility.[40] As of March 2022, about 85% of counties in North Dakota are fully or partially designated HPSAs for primary care, 38% of counties are fully or partially designated for dental health, and 87% of counties are fully or partially designated for mental health (Figure 2.6, Figure 2.7, Figure 2.8).[41] Individuals located in an HPSA may have increased travel time and distance to healthcare services and/or they may have to wait longer periods of time to access healthcare services.

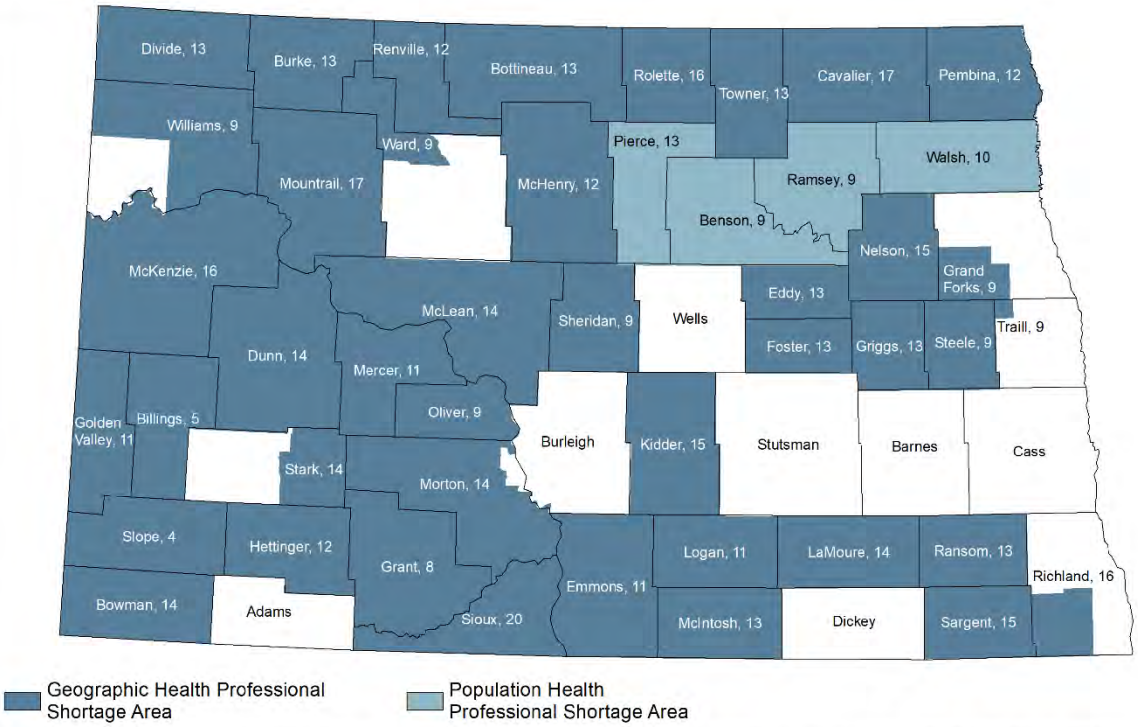

Figure 2.6. **Primary care health professional shortage areas (HPSAs) in North Dakota, 2022.**[41] The numbers associated with the counties are the HPSA scores for the respective county. A higher score indicates a greater shortage of primary care providers.

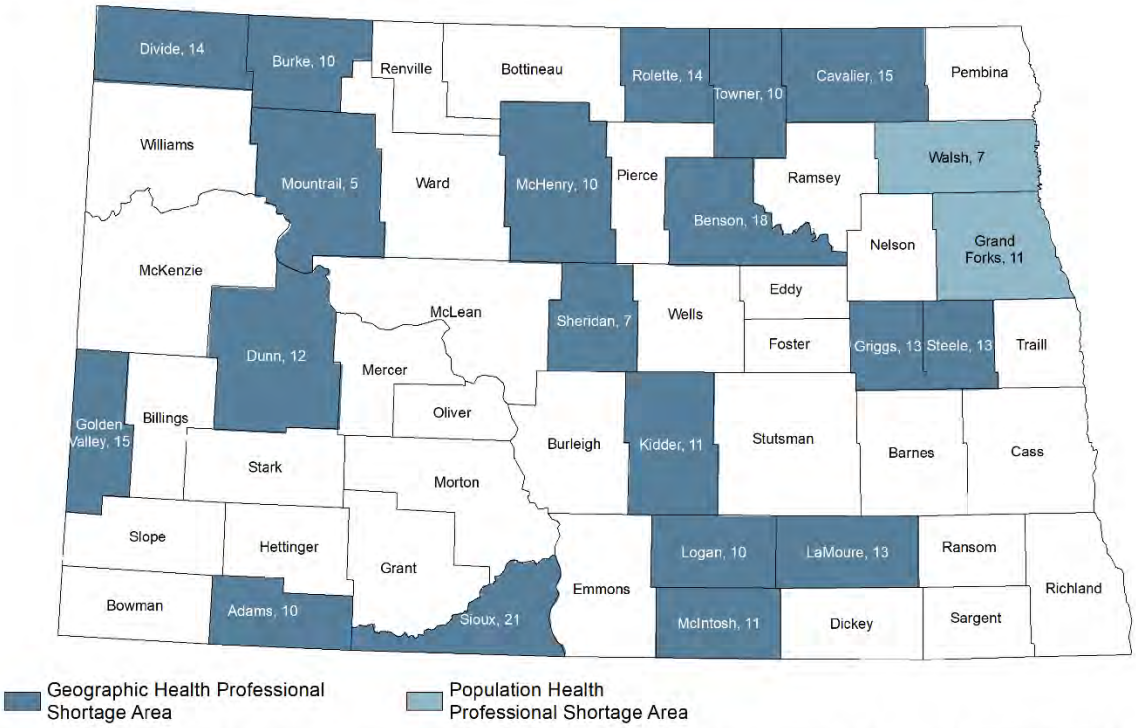

Figure 2.7. **Dental health professional shortage areas (HPSAs) in North Dakota, 2022.**[41] The numbers associated with the counties are the HPSA scores for the respective county. A higher score indicates a greater shortage of dental health providers.

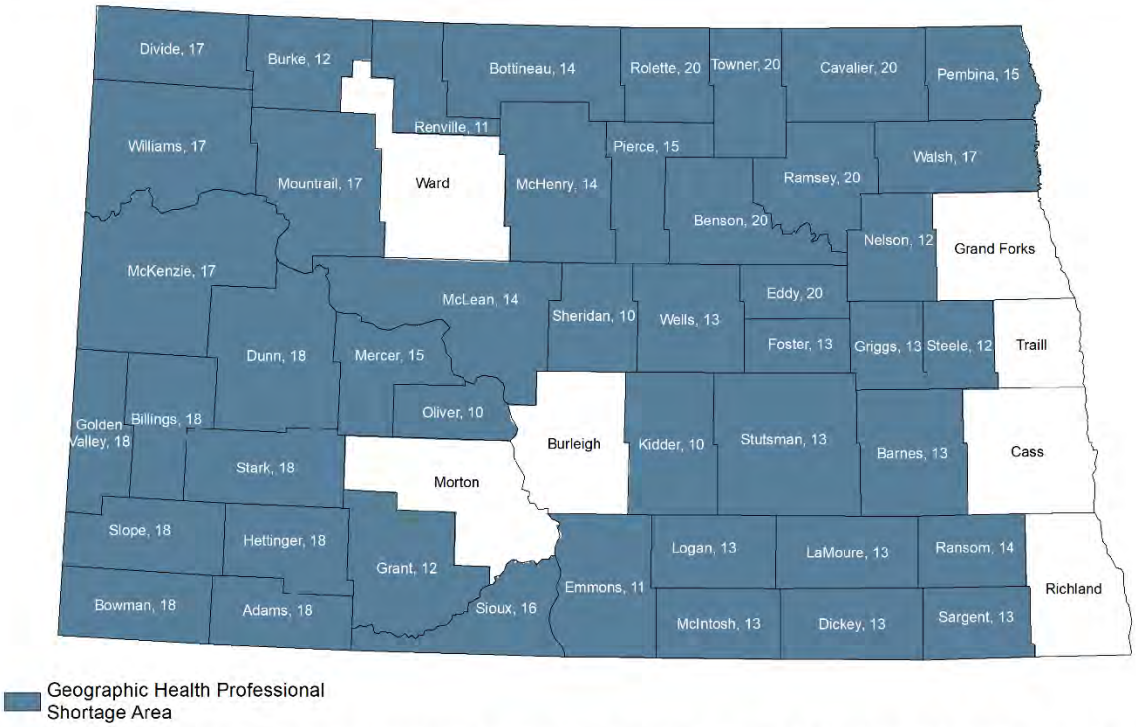

Figure 2.8. **Mental health professional shortage areas (HPSAs) in North Dakota, 2022.**[41] The majority of counties in North Dakota are designated as mental health professional shortage areas. The ones that are not designated contain or are adjacent to the cities of Grand Forks, Fargo, Bismarck, and Minot. The numbers associated with the counties are the HPSA scores for the respective county. A higher score indicates a greater shortage of mental health providers.

When a facility is designated as HPSA this indicates that the facility likely serves as a safety net facility and provides health services to underserved populations. As of September 2022, there are 42 healthcare facilities in North Dakota designated for primary care including 12 Indian Health Service, Tribal, and Urban Indian Health (ITU) facilities, 5 Federally Qualified Health Centers (FQHCs) and their satellite locations, 23 Rural Health Clinics (RHCs), and 2 correctional facilities (Figure 2.9). There are 48 facilities designated for mental health in North Dakota including 12 ITU facilities, 5 FQHCs and their satellite locations, 23 RHCs, 2 correctional facilities, the state mental health hospital, 4 human service centers that are not located in an already designated area, and one other facility not located in an already designated area (Figure 2.10). Finally, there are 43 healthcare facilities designated for dental health including 12 ITU facilities, 5 FQHCs and their satellite locations, 23 RHCs, 2 correctional facilities, and one other facility not located in an already designated area (Figure 2.11).[41] Federally Qualified Health Centers (FQHCs) are a key safety net facility for low-income and other underserved populations. In North Dakota, there are a total of 22 FQHCs or about 3.27 FQHCs for every 100,000 North Dakota residents.[42]

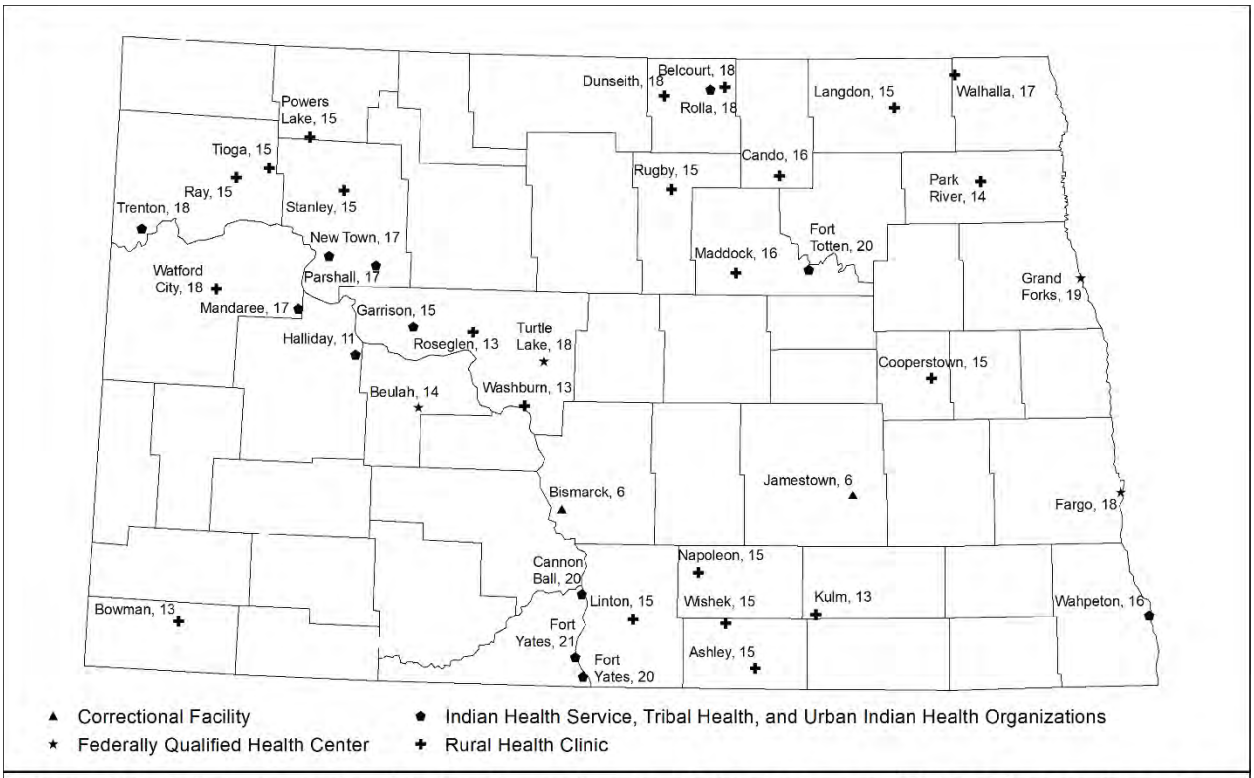

Figure 2.9. **Primary care facility health professional shortage area (HPSA) designations in North Dakota, 2022.**[41] The numbers associated with the facilities are the HPSA scores for the respective facility. A higher score indicates a greater shortage of primary care providers.

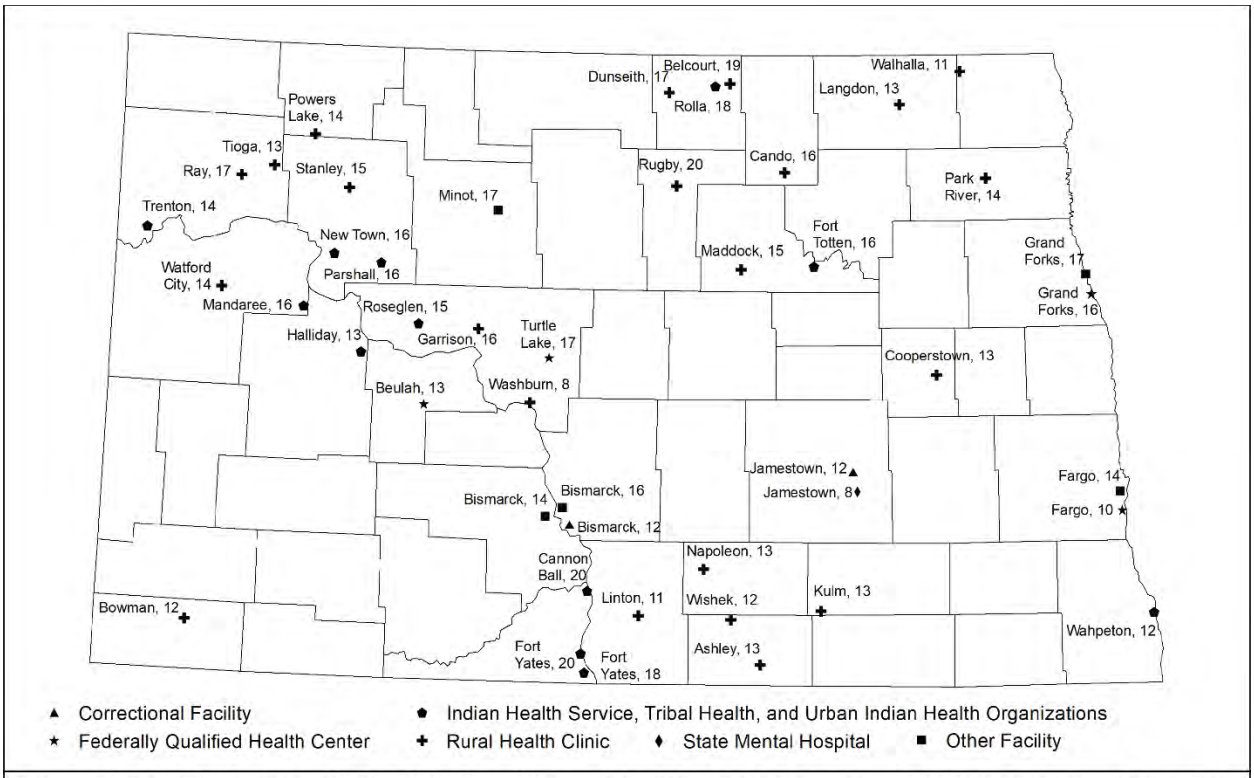

Figure 2.10. **Mental health facility health professional shortage area (HPSA) designations in North Dakota, 2022.**[41] The numbers associated with the facilities are the HPSA scores for the respective facility. A higher score indicates a greater shortage of mental health providers.

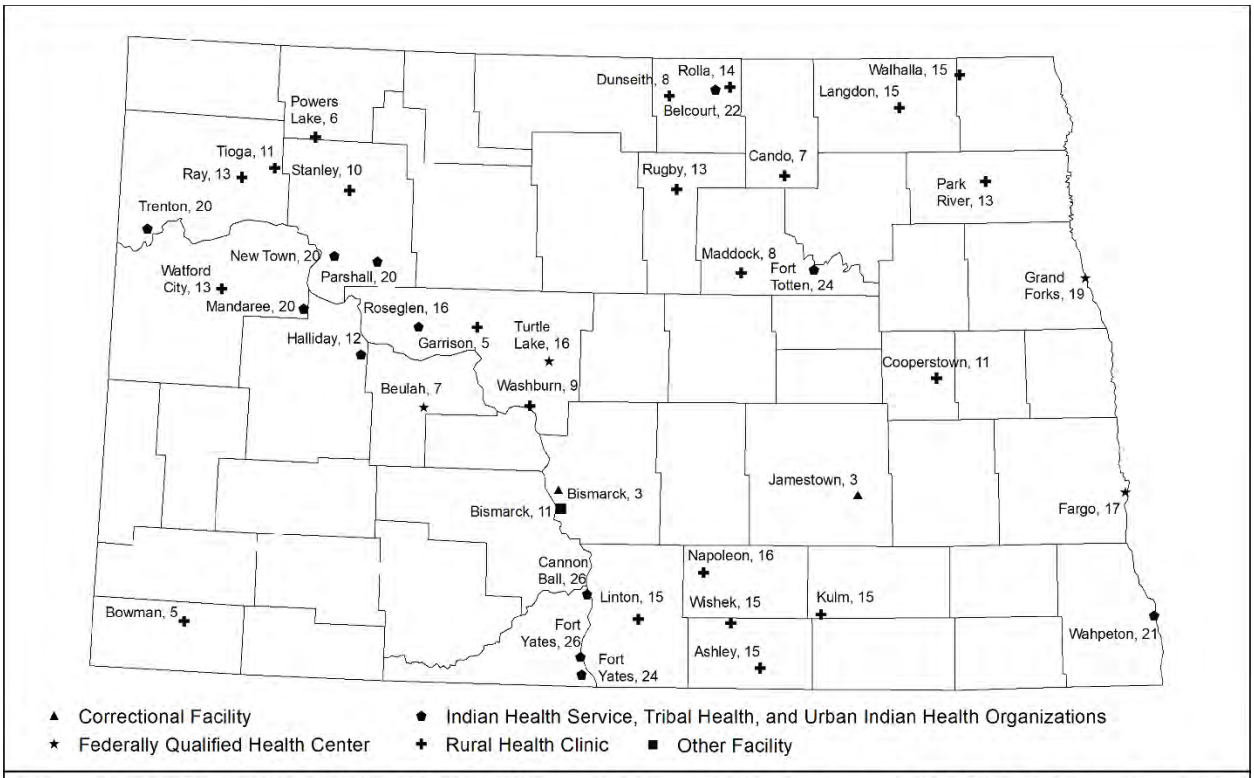

Figure 2.11. **Dental health facility health professional shortage area (HPSA) designations in North Dakota, 2022.**[41] The numbers associated with the facilities are the HPSA scores for the respective facility. A higher score indicates a greater shortage of dental health providers.

Another way to look at access to healthcare is to consider the types of providers available and how many there are to serve a given population. While a community may have a healthcare facility, that facility may not be fully staffed or may not be able to offer a complete range of healthcare services based on available providers. According to the Area Health Resource File there were 54.62 dentists per 100,000 persons in North Dakota and 93.82 primary care physicians per 100,000 persons in North Dakota in 2021. When compared to other states, the rate of dentists and the rate of primary care physicians in North Dakota are about average.[43]

Insurance Coverage

Availability of healthcare services is not the only factor to consider when examining an individual's access to healthcare services. Insurance coverage or lack of insurance coverage is also a factor. Some healthcare services can be costly or unexpected, such as being injured in a car accident. There are a number of ways for an individual to pay for healthcare services including out-of-pocket or through insurance. The majority of the population of North Dakota has some form of health insurance coverage, but in 2019, about 7.2% of the population was uninsured. In 2009, the percent of the population in North Dakota with no insurance was 11.5% so the number

of uninsured individuals in North Dakota has decreased between 2009 and 2019 (Figure 2.12).[44]

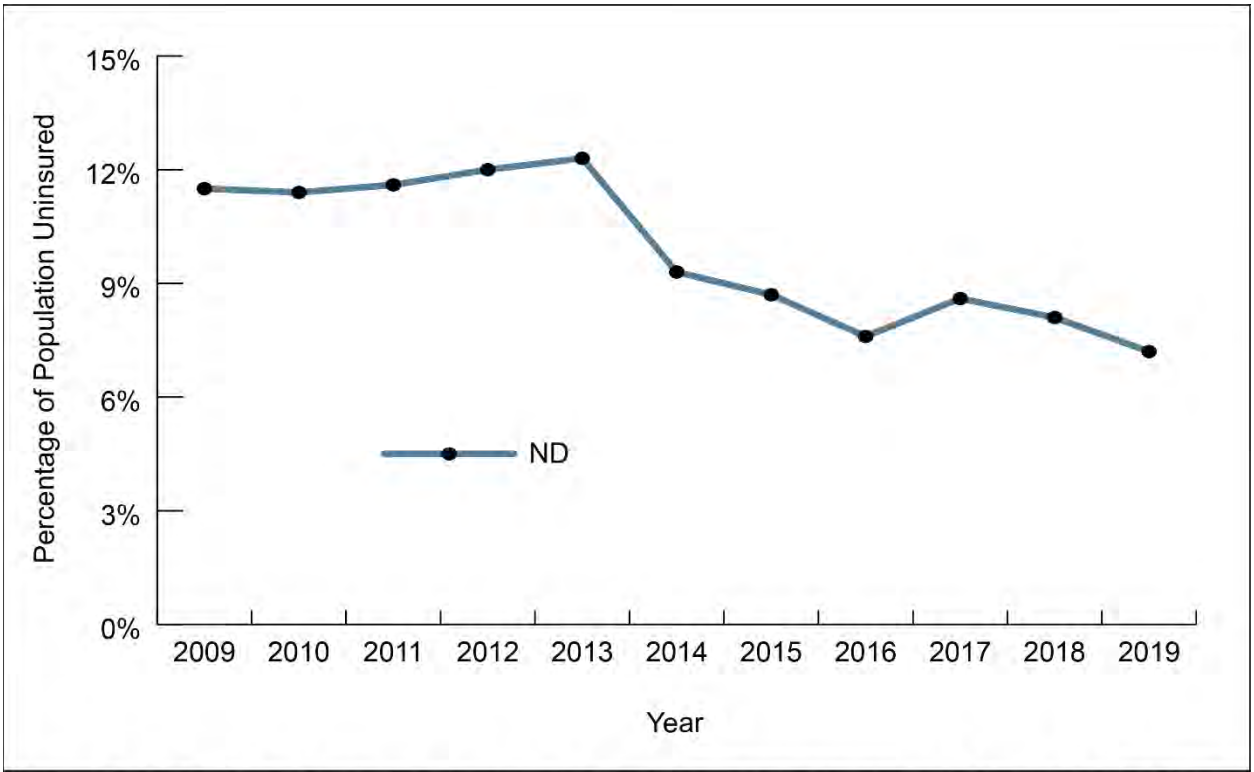

Figure 2.12. **Percent of population with no health insurance coverage in North Dakota from 2009-2019.**[44] Between 2013 and 2016 North Dakota had a notable drop in the uninsured rate, and since 2013 the uninsured rate has remained below 10%.

National Focus on Social Determinants of Health

The topic area of social determinants of health has become a major research area at the national level. In particular, the Centers for Disease Control and Prevention (CDC) has compiled a large amount of data, research, and resources on the topic. This information was compiled by the CDC in order to assist those interested in the topic with assessing SDOH for their community and improve community well-being. One of the resources available through the CDC is the National Environmental Public Health Tracking Network. This resource compiles environmental data and health data from city, state, and national sources while also providing context and analysis of the data in order to make it easier to understand and use. This network allows users to explore the data, review various topical dashboards, and provides information on state and local tracking programs. Another resource provided by the CDC is their database on chronic disease indicators. This database not only provides state level and some metropolitan level information on chronic diseases, but also provides information on risk factors for those chronic diseases. The risk factors for which data is provided are SDOH. Some of the risk factors contained in this database are health care coverage, data on the uninsured,

poverty, education, and risk behaviors. All of these are noted SDOH and can contribute to an individual's health status.

Finally, another significant resource is provided through a partnership between the CDC and the Agency for Toxic Substances and Disease Registry (ATSDR). The Social Vulnerability Index (SVI) looks at 15 census variables in order to help identify communities that may require support in the event of disasters. While this index was developed to assist local officials in preparation for or recovery from a potential disaster, a number of the variables used in the SVI are considered SDOH. Some of the variables include measures of socioeconomic status, housing, transportation, and how many in the population have a disability. Data used to create the index is provided on the resource webpage as well as an interactive map where individuals can view the geographical distribution of the index. The geographical distribution can be viewed at either a county or census tract level and the sub-themes that makeup the index can also be examined individually through geographic distribution.

The resources listed above are just a few of those available through the CDC that provide data on SDOH. There are numerous other national organizations that also focus research, data collection, data analysis, and policy development around addressing social determinants of health. Some of these groups include the National Alliance to Impact the Social Determinants of Health, the National Collaborative for Education to Address the Social Determinants of Health, the Agency for Healthcare Research and Quality, Centers for Medicare & Medicaid Services (CMS), and the Kaiser Family Foundation. There are also global entities with work focused around SDOH such as the World Health Organization (WHO). With so much focus on the topic of social determinants of health, there are a number of useful tools available for individuals and organizations to learn more on the topic and review available data about their local communities.

CONCLUSION

Together, all of these social determinants affect an individual's health. The kind of work they do, the type of education they receive, their living situation, their economic stability, access to food, social norms, social supports, and access to healthcare services all influence health. All these factors are linked and influence one another. For example, a lack of access to healthy food may lead to a poor diet, which could contribute to other health concerns. Certain health concerns may require more frequent medical intervention and could include increased cost or even increased travel time depending on where an individual lives. Disparity in one area of the social determinants of health could affect other areas of an individual's life. Some of the goals when addressing social determinants of health include increasing health equity and reducing disease prevalence.[45] Health equity refers to everyone having the opportunity to achieve their full health potential and not facing barriers to this possibility due to socially determined circumstances. Reducing disease prevalence includes making efforts

towards reducing obesity, cardiovascular disease, diabetes, cancer, and other conditions, all of which can be influenced by social determinants of health.[46]

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CHAPTER THREE: The Health of North Dakota

INTRODUCTION

Health disparities can be defined as significant differences between populations, including the incidence, prevalence, mortality, and burden of disease, as well as other adverse health effects.[1] Determinants of health disparities include individual behaviors or characteristics (smoking); biology and genetics (family history, gender, race, and high blood pressure); social environment (income, education, and discrimination); physical environment (distance to care, transportation, and weather); and the health system (access, availability, quality, and insurance).[2]

Health disparities have public policy implications. The federal government's "Healthy People" initiative has since 1979 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 2030, health disparity is one of four principal health measures that serve as progress indicators in meeting national goals. The others are general health status, health-related quality, and determinants of health.[3,4]

The condition of individual health is of concern to the individual, family, and insurers; 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.

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

> ***"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."***

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 other factors. Access is a core issue because it directly addresses the ability of people to maintain or improve their health status. First, in order to address any health concern, people need to be able to meet and talk with health and medical providers and have physical access to a clinic or hospital. Limitations on access can lead to unmet health needs and medical outcomes, and can add to healthcare costs. Numerous factors can restrict access to care, including an individual's ability to purchase health services (e.g., level of income, insurance coverage, employer-sponsored health insurance, and current health); the supply of health professionals and the types of providers and medical specialties available; financial viability of health organizations and health systems; and

the location of health facilities. In North Dakota, natural barriers such as distance, weather, road conditions, and ethnicity or race also are important. 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 concern within public policy discussions. For example, the Community Health Needs Assessments (CHNA) that are required of all nonprofit hospitals under the Affordable Care Act (ACA), 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 42 hospitals in North Dakota (2014–2016), providing strong evidence of concern. The number one health issue was behavioral health, followed by mental health, and health workforce.[6] In 2019, before the SARS-CoV-2 pandemic, healthcare costs in the United States were highest in comparison with other countries, accounting for about 16.8% of gross domestic product (GDP), which is a common and accepted measure of economic production and activity.[7] In comparison, healthcare in the next most expensive countries, Germany and Switzerland, accounted for approximately 11.7% and 11.3% of GDP. In looking at the average for the 34 countries of the Organization for Economic Cooperation and Development (OECD), the United States is 8 percentage points higher than the OECD average of only 8.8%. Healthcare spending in all OECD countries is expected to increase sharply due to the SARS-CoV-2 pandemic based on contracted GDP and increased spending to combat the pandemic. Regarding per-capita healthcare spending, in 2019, the United States spent almost $11,000 vs. Switzerland ($7,138) and Norway ($6,745). Per capita health spending in the United States is more than 2.5 times greater than the OECD average ($4,087).[8] At the same time, our high costs do not necessarily translate into the best health outcomes, because the United States ranked 46th in life expectancy (226 countries compared) and 174th in infant mortality (226 countries compared).[9,10] In comparison with 1970, when the United States had a life expectancy rate that was one year above the OECD average, in 2019 the United States had a life expectancy that was more than two years below the OECD countries.[8]

> ***"As a country, we spend a great deal of money that does not seem to contribute positively to key health outcomes."***

The United States consumes more health care services than other countries. For example, 25% of Americans take four or more prescription drugs regularly compared with a median of 17% for residents of OECD countries.[11] 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 patients' needs, improving patient safety, basing care on the science of best practices in order 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 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 (for example, 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 (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 entitled *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 this *Seventh Biennial Report* and will be discussed in more detail in Chapters 5-8. 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 ACA are dependent upon a well-prepared and adequate supply of healthcare professionals. 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 3.1 shows the percentage of adults in North Dakota who have the behavioral risk factors of smoking, drinking alcohol, binge drinking, drinking and driving, not wearing a seat belt, and not exercising at least moderately from 2015 to 2020. Changes over time can be seen in the rate of adults smoking, seatbelt use, and physical activity. All measures related to alcohol use showed an overall decreasing trend from 2015 to 2020 with some variance between years. Along with the decrease in percent of persons who drink alcohol or binge drink, the number of DUI arrests have decreased. This is evidenced by the number of DUI arrests that decreased by 13.5% from 2019 to 2020 (4,828 to 4,175), according to the North Dakota Attorney General's office.[17]

Behavioral Risk Trends

Table 3.1
Percent of adults reporting behaviors, 2020.[18]

	2015 (590,349)	2016 (591,299)	2017 (588,563)	2018 (580,621)	2019 (586,392)	2020 (584,823)
Smokes	17.9	18.9	NA	18.6	16.7	16.7
Drinks Alcohol	57.9	60.2	NA	57.6	59.6	56.2
Binge Drinks	22.6	23.3	NA	21.1	21.4	19.7
Drinks & Drives	NA	3.8	NA	2.7	NA	2.0
Doesn't Always Wear a Seatbelt	25.6	26.2	NA	27.5	NA	25.1
No Physical Activity/Exercise Other Than Job	24.6	22.1	25.6	22.2	27.4	24.6

Behavioral risk factors are an important aspect of any health discussion. They have components that operate at the most basic individual, social, and global public policy levels. According to the World Health Organization, the 10 leading behavioral causes of death worldwide (factors such as high blood pressure, tobacco use, high blood glucose, physical inactivity/overweight, alcohol use, high cholesterol) account for 33% of all deaths. 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 global disease burden risk factors.[20,21]

GENERAL HEALTH

Table 3.2 shows the percentage of adults in North Dakota who have general health issues of disability, overweight/obesity, fair/poor general health, one or more days in the past month with poor health, poor physical health, and poor mental health.

Table 3.2
Percent of adults reporting general health conditions, 2020.[18]

	2015 (590,349)	2016 (591,299)	2017 (588,563)	2018 (580,621)	2019 (586,392)	2020 (584,823)
Disabled	16.6	17.0	NA	NA	NA	NA
Overweight/Obese	61.5	62.8	NA	65.8	65.6	64.3
General Health is Fair or Poor	13.9	14.8	15.3	13.9	13.9	12.1
1+ Days Poor Health	19.4	19.0	21.0	20.7	18.6	17.2
1+ Days Poor Phys. Health	34.8	33.1	34.6	33.1	33.6	26.0
1+ Days Poor Mental Health	33.0	32.5	34.3	36.2	34.2	34.7

Comparison with National Benchmarks

Part of the explanation for the relative good health and health outcomes in North Dakota may relate in part to more healthful lifestyles. For eight of 10 general health measures, North Dakotans are relatively healthier than the country as a whole (e.g., fair/poor health, high cholesterol, high blood pressure, diabetes, cholesterol screen, influenza immunization, asthma, and sigmoidoscopy/colonoscopy). Recently, North Dakota was reported to have a higher number of people who are overweight and obese (64.3% versus 59.1%), and a higher pneumonia immunization rate than the U.S. overall (28.5% versus 26.5%). In the *Fifth Biennial Report*, it was reported that North Dakota scored slightly worse on overweight/obesity by having 62.8% of the population so classified versus a national rate of about 60%.

> ***"For eight of 10 general health measures, North Dakotans are relatively healthier than the country as a whole; however, North Dakota scores slightly worse on overweight/obesity."***

Thus, for both the state and the nation the obesity rate is increasing; however, the rate for the country as a whole is increasing at a faster rate. Obesity/overweight status is a health problem that contributes to many health conditions, including cancer, diabetes, and heart disease. The percentage of North Dakotans viewing themselves as

having only fair or poor health has decreased over the past two years: 13.9% in 2019 to 12.1% in 2020; the U.S. rate in 2020 (14.6%) was higher than the state rate.[22]

Health Promotion

Although generally less of a problem in North Dakota than nationally, obesity rates have been increasing over time. Heathy People 2030 has different, but consistent goals. The Centers for Disease Control and Prevention (CDC) uses Health-Related Quality of Life (HRQOL) process metrics to better determine the burden of preventable diseases, injuries, and disabilities. This involves both self-reported chronic diseases such as diabetes, arthritis, breast cancer, and hypertension; and risk factors such as body mass index, physical inactivity, and smoking status. According to the CDC, the measurement of HRQOL indicators can assist in establishing the relationship between the burden of preventable diseases, injuries, and disabilities with risk factors. The measurement also is part of the national process in achieving national health objectives such as those found in Healthy People 2030. A related set of measures are Healthy Days metrics, which assess an individual's perceived sense of well-being (self-rated health, number of recent days when physical health was not good, number of recent activity limitation days because of poor health). Although these are 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. 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 risk factors have showed varied trends from 2015 to 2020. 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.

Compared with national benchmarks, North Dakotans have a lower prevalence of various non-behavioral related health conditions than persons in other states, no doubt contributing to our better state of overall health. In 2019, North Dakotans had a lower prevalence of high cholesterol (22.6% compared with 27.9%), high blood pressure (29.8% compared with 32.5%), asthma (12.3% compared with 14.5%), and diabetes

(10.1% compared with 12.1%) than nationally. Table 3.3 shows the percentage of North Dakotans reporting various health conditions since 2015.

Table 3.3
Percent of adults reporting chronic health conditions, 2020.[18]

	2015 (590,349)	2016 (591,299)	2017 (588,563)	2018 (580,621)	2019 (586,392)	2020 (584,823)
High Cholesterol	34.8	NA	26.0	NA	22.6	NA
High Blood Pressure	30.3	NA	29.5	NA	29.8	NA
Arthritis	22.7	23.2	24.1	25.9	25.4	22.5
Asthma	12.7	12.8	12.9	13.0	12.3	11.8
Cardiovascular Disease	3.6	4.1	3.8	4.2	3.3	4.0
Diabetes	8.7	8.6	9.0	9.4	10.1	10.9

Chronic Disease

An important issue when examining the dynamics of health status is chronic disease. Chronic disease is commonly associated with aging, but people of all ages can experience it. Common chronic diseases include the following: cancer, heart disease, stroke, diabetes, chronic obstructive pulmonary disease (COPD), and arthritis. Significant health risk factors include smoking, lack of physical activity, and poor nutrition. Engaging in healthful behavior reduces the risk for illness. Chronic disease causes 7 in 10 deaths each year in the United States, and heart disease and cancer together account for about 48% of all deaths. About 117 million Americans (roughly half of all adults) live with at least one chronic condition. About one-fourth of the people with a chronic disease have experienced significant limitations in daily activities. More than 86% of the cost of healthcare in the United States is related to chronic disease.[23,24]

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.[25] 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 requires new health plans to cover preventive services for certain populations, including testing for high blood pressure and cholesterol.[26] Newer concepts such as patient-centered medical homes and health system delivery and payment channels such as accountable care organizations (ACOs), bundled payment models, and pay for performance will be used to facilitate better care coordination and disease management.

Chronic disease is a concern both nationally and statewide. Under the ACA, all nonprofit hospitals must conduct a community health needs assessment (CHNA) every

three years and develop an action or implementation plan. In the *Fourth Biennial Report*, discussion focused on the identification of obesity and physical inactivity and chronic disease management as high priorities at the community level. That covered the 2011–2013 period. At this time, a second round of assessments are being completed. Analysis of 41 rural communities found that obesity and physical inactivity were still identified as community health issues. The most prevalent issue was related to behavioral and mental health. Throughout the state, community coalitions have been initiated to develop solutions to address CHNA needs, such as obesity and physical inactivity and related issues. Some of these have been supported through funding from the Medicare Rural Hospital Flexibility Program or the Blue Cross Blue Shield of North Dakota Rural Health Grant Program. The focus of the Blue Cross Blue Shield of North Dakota grants is on physical activity and wellness.

Children's Health

Children's health (birth to 18 years) is critically important because what we experience growing up can affect our health, attitudes about health, and our ability to change or manage our behavior. There are family genetic traits that can either act as barriers or serve to steer our health in positive directions; however, our attitudes and behavior as we mature are significant factors as well. Our early experiences as we mature have been shown to affect healthful development cognitively, socially, emotionally, and physically. How a child behaves, learns, and adjusts in school and society is affected by health. How they interact with others and learn to interact relates to their health. How they move through life—education, work, having children—has a connection to their health status when they were in early and middle childhood. All of this can be referred to as "pre-disease pathways," which can manifest as medical conditions and adult health issues later.[3] Healthy People 2030 developed 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 13–15 years old with untreated dental decay in their permanent teeth.
- Reduce tobacco use by adolescents (students in grades 9 through 12).
- 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 3.4, adolescent females in North Dakota have a generally poorer behavioral risk profile than do adolescent males for drinking alcohol and being

overweight; however, adolescent males have greater issues with tobacco use, drinking and driving, not wearing a seat belt, and being obese.

Table 3.4
Percent of youth risk behaviors in North Dakota, 2021.[27]

	Total	Female	Male
Smokes	5.9	4.9	6.9
Drinks	23.7	24.5	22.9
Drinks & Drives	5.0	3.9	6.1
Doesn't Always Wear a Seat Belt When Driving	6.1	3.1	9.0
Doesn't Always Wear a Seat Belt as Passenger	49.6	45.0	53.7
Obese	16.3	13.7	18.7
Overweight	15.6	17.7	13.6

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. Approximately 16.9 million Americans with a history of cancer were alive in 2019.[28]

According to the American Cancer Society, about 30% of cancer deaths are caused by smoking cigarettes.[28] In other words, approximately 182,808 out of an estimated 609,360 cancer deaths were attributed to the use of tobacco in 2022. Overweight and obesity have been found to contribute from 14% to 20% of all cancer deaths. There is also evidence that being overweight increases the risk for cancer recurrence and decreases the likelihood of 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 time, from 49% between 1975 and 1977 to 68% between 2003 and 2009.[28,29] 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 progression of the disease. Thus, while the survival rate (people alive despite a diagnosis of cancer) has gone up substantially, the cancer mortality rate has fallen only a little.[24] The American Cancer Society estimated that there would be more than 1.9 million new cancer cases diagnosed in 2022 in the United States.[28]

Age is a primary risk factor for most cancers, with about 80% of all cancers diagnosed among individuals ages 55 or older. Men have a 40 out of 100 lifetime risk of developing cancer whereas for women the risk is 39 out of 100. Although 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.[28]

According to the American Cancer Society, the disparities in the cancer burden among racial and ethnic minorities are the result of obstacles to prevention, early detection, and high-quality treatment. In addition, poverty is a serious factor. African Americans are more likely than any other group in the United States to develop and die from cancer. Hispanics have the lowest incidence and mortality rates for lung cancer; however, for uterine or cervical cancers, they have the second highest incidence. The American Indian and Alaska Native populations have the highest kidney cancer incidence and mortality rates.[28] 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.[30]

As the second-leading cause of death in the country, cancer and cancer control command a place in U.S. health objectives. Healthy People 2030 presents 20 separate cancer targeted objectives. For example, one objective is to reduce the overall cancer death rate by 10% (from 179.3 deaths per 100,000 to 161.4 deaths per 100,000).[3]

> ***"Digestive system cancer, including colorectal, is the most commonly diagnosed cancer in North Dakota, followed by breast cancer. For reasons that are unexplained, North Dakota also has the highest incidence of colorectal cancer of any state."***

In North Dakota, females are slightly less likely to develop cancer than men (Table 3.5 and Figure 3.1). Digestive system cancer, including colorectal, is the most commonly diagnosed cancer in North Dakota (Table 3.6 and Figure 3.2), followed by male genital cancer and 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 incidence in North Dakota is somewhat lower than in the rest of the nation overall (Figure 3.3), although it is higher for prostate, lung, and colon cancer (Figure 3.4).

It is noteworthy that North Dakota leads the nation in the incidence of some cancers. For example, the incidence of chronic lymphocytic leukemia (CLL), a disease of the elderly, is more common in North Dakota than in any other state. This is a particularly unusual occurrence because most cases of CLL are diagnosed "incidentally" during routine medical exams performed for other reasons. The relative scarcity of health care professionals in North Dakota, discussed in subsequent chapters, would act

to underestimate the true burden of CLL, which often is not the cause of death (and thus would not appear in mortality statistics). One possible reason for the high rates of CLL in North Dakota is the high exposure to radon. Radon, a naturally occurring gas, is a by-product of uranium, which is common in soils in the upper Plains, and is a cause of several types of leukemia. Research at the University of North Dakota has shown that CLL rates by county, in many states (including North Dakota), is positively correlated with levels of radon measured in homes.[31]

> ***"North Dakota leads the nation in the incidence of some cancers. For example, the incidence of chronic lymphocytic leukemia (CLL), a disease of the elderly, is more common in North Dakota than in any other state."***

For reasons that are unexplained, North Dakota also has the highest incidence of colorectal cancer of any state and shows a three-fold variation in colorectal cancer rates among North Dakota counties. The cause of the majority of colorectal cancers is unknown. Because colorectal cancer is the third most common cancer in the U.S. in terms of incidence and mortality, a better understanding of colorectal cancer in North Dakota could improve the health of North Dakotans and of the U.S. overall.[32]

Table 3.5
Cancer rates per 100,000 people, 2019.[33]

Age	All North Dakota		Males		Females	
	Rate	Cases Per Year	Rate	Cases Per Year	Rate	Cases Per Year
0-4	-	-	-	-	-	-
5-9	21.5	11.0	-	-	-	-
10-14	-	-	-	-	-	-
15-19	-	-	-	-	-	-
20-24	-	-	-	-	-	-
25-29	53.1	32.0	-	-	-	-
30-34	99.1	54.0	-	-	-	-
35-39	147.2	75.0	-	-	-	-
40-44	227.2	95.0	-	-	-	-
45-49	332.9	129.0	-	-	-	-
50-54	509.4	201.0	-	-	-	-
55-59	816.3	384.0	-	-	-	-
60-64	1,204.1	562.0	-	-	-	-
65-69	1,583.1	611.0	-	-	-	-
70-74	1,962.1	554.0	-	-	-	-
75-79	2,262.9	443.0	-	-	-	-
80-84	2,161.6	318.0	-	-	-	-
85+	1,697.6	312.0	-	-	-	-
All ND	431.8	3,824.0	446.2	1,944.0	447.2	1,880.0

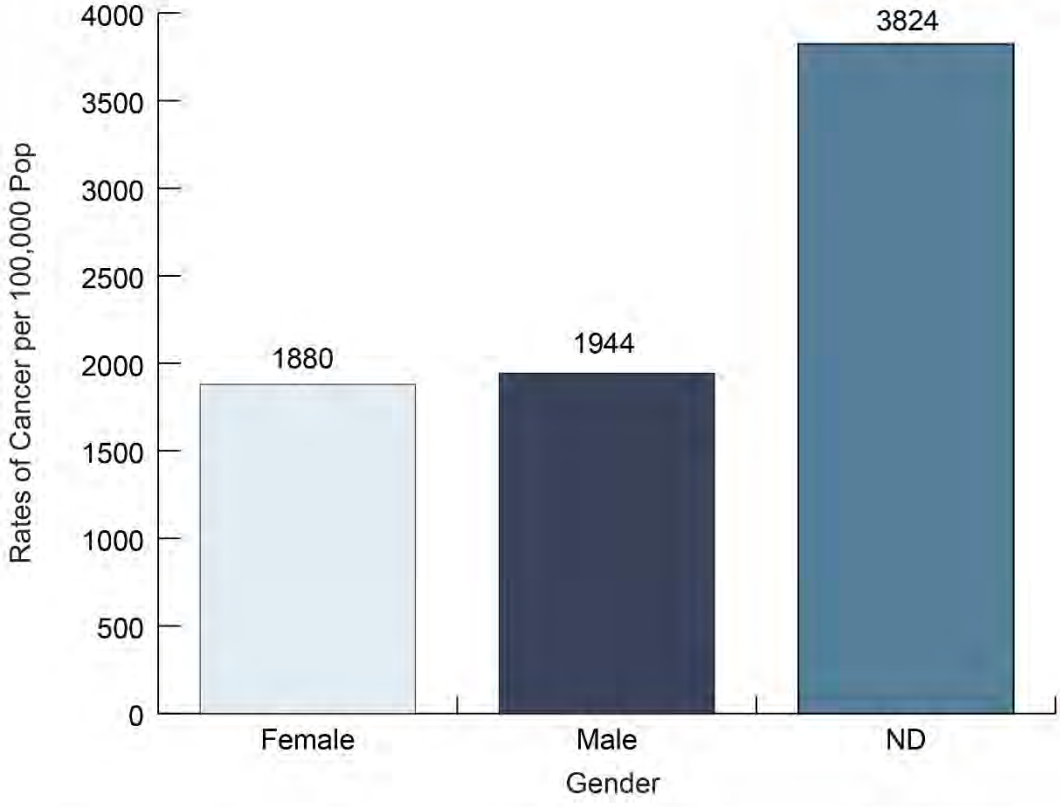

Figure 3.1. **Rates of cancer per 100,000 people in North Dakota and by gender, 2019.[33]**

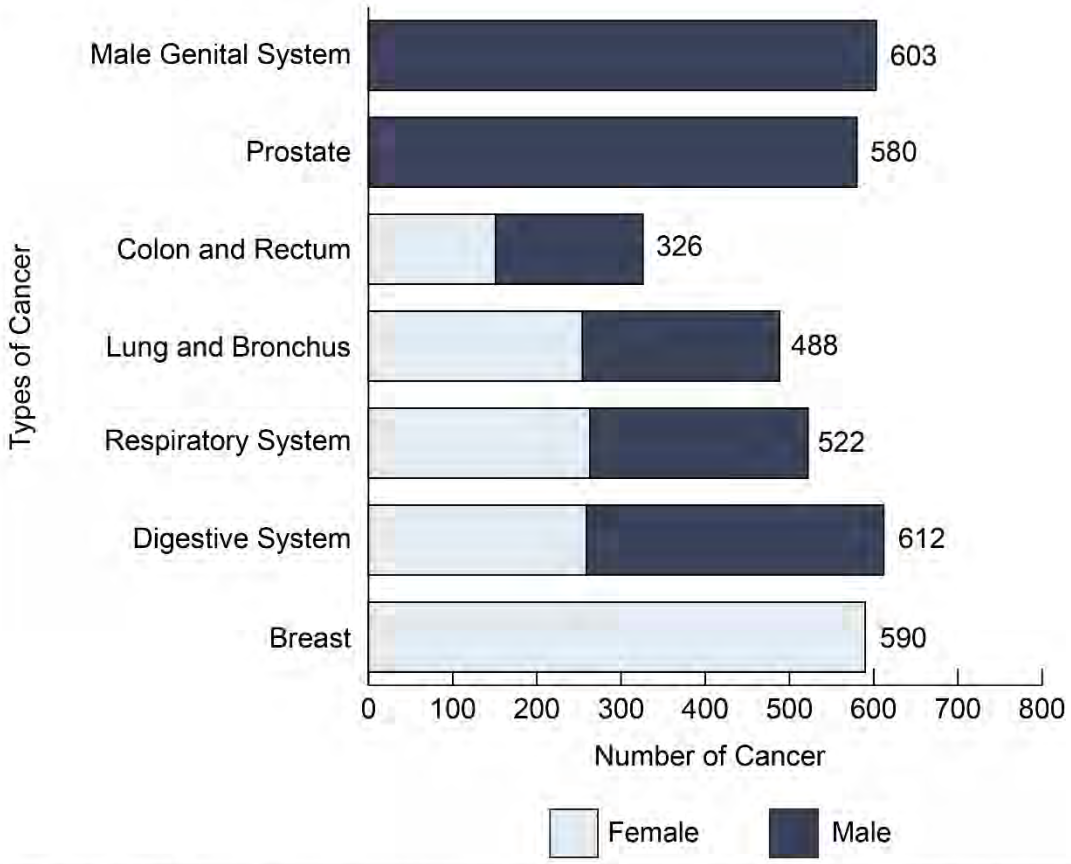

Figure 3.2. **Incidence of most common types of cancers in North Dakota, 2019.[33]**

Table 3.6
Most common cancer rates, 2019.[33]

Type	All North Dakota		Males		Females	
	Rate	Cases	Rate	Cases	Rate	Cases
Breast	70.5	599	NA	0	137.2	590
Digestive System	69.2	612	81.9	353	58.0	259
Male Genital System	63.8	603	130.4	603	NA	0
Prostate	60.5	580	124.2	580	NA	0
Respiratory System	56.6	522	59.1	259	55.0	263
Lung Bronchus	52.8	488	52.7	234	53.4	254
Colon Rectum	38.1	326	41.8	175	34.9	151

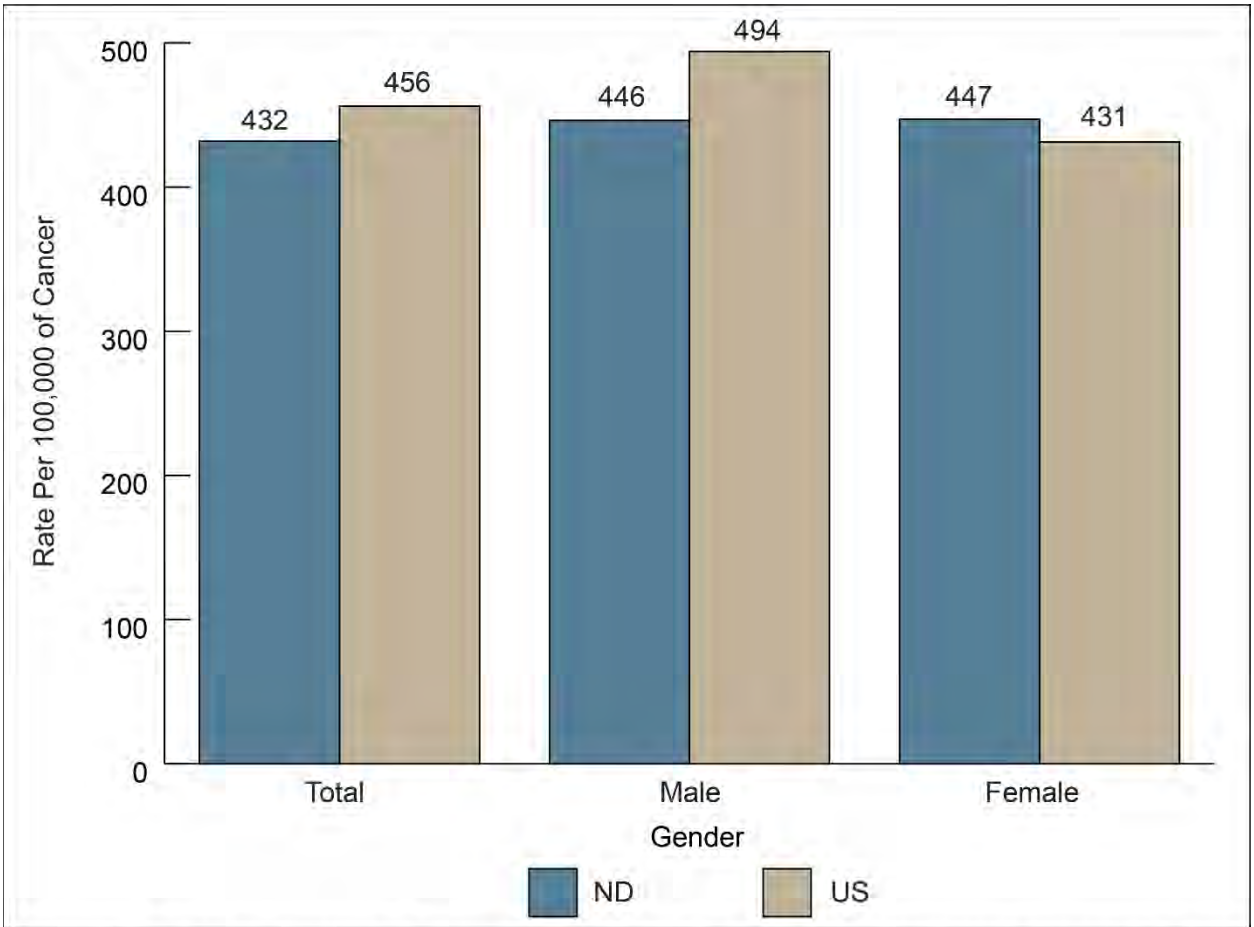

Figure 3.3. **Rates of cancer in North Dakota and the United States by gender, 2019.**[33,34,35]

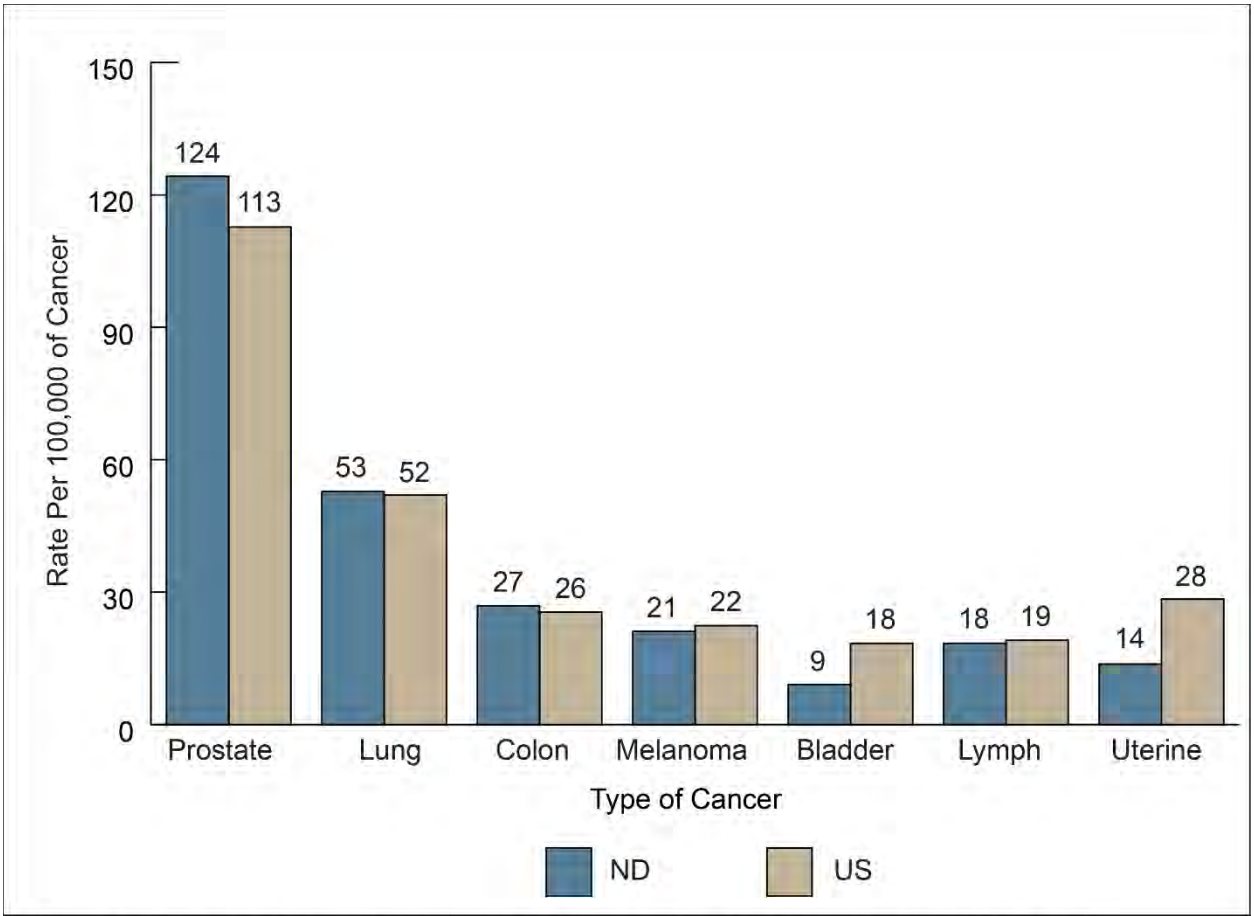

Figure 3.4. **Rates of cancer incidence in North Dakota by cancer type, 2019.**[31,33,34]

Screenings and Immunizations

Table 3.7 shows the percentage of adults in North Dakota who have had screenings for high cholesterol (past five years), prostate-specific antigen (PSA), home blood stool test (ever), sigmoidoscopy/colonoscopy (ever), mammogram (ever), pap smear (ever), flu vaccine (past year), or pneumonia vaccine (ever).

Table 3.7
Screening percentages, 2020.[18,22]

	2015 (590,349)	2016 (591,299)	2017 (588,563)	2018 (580,621)	2019 (586,392)	2020 (584,823)
Cholesterol	69.2	NA	77.7	NA	73.4	NA
PSA	NA	52.1	NA	NA	NA	10.1
Blood Stool	NA	29.3	NA	NA	NA	13.1
Sigmoid/Colonoscopy	NA	68.4	NA	NA	NA	31.9
Mammogram	NA	60.7	NA	59.2	NA	28.9
Pap	NA	89.6	NA	84.2	NA	41.1
Flu	43.6	41.9	NA	38.6	44.9	48.3
Pneumonia	31.5	32.5	32.3	NA	31.2	28.5

According to Healthy People 2030, people in the United States continue to develop diseases that are preventable. The increase in life expectancy (from about 49 years in 1900 to 78.8 years in 2012) is the result, in part, of 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 (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).[29]

Vaccines are among the most cost-effective clinical preventive services and are a core component of any preventive service package. Childhood immunization programs provide a particularly high return on investment. According to the CDC, for children born between 1994 and 2013, vaccination will prevent an estimated 322 million illnesses, 21 million hospitalizations, and 732,000 deaths during their lifetime.[36]

Health screenings are an important way to evaluate risk factors for disease (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 2030. 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 (breast, colorectal, and skin) at earlier stages that are then treatable; and regular check-ups for adults 65 and older can help to screen for age-related conditions such as eye disease and hearing loss.[3]

Mortality

Nationally, premature mortality is higher in rural areas than urban areas. In North Dakota, Figure 3.5 shows the expected number of deaths for each age group among metropolitan, micropolitan, and rural areas. The North Dakota data indicate that the state's mortality rates have exceeded the national rates from 2001 until 2017 (Figure 3.6). 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 one 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 36% higher than people in suburban areas. For the 25-to-64 age cohort, age-adjusted death rates in suburban areas was roughly 15% lower than urban counties and over 30% lower than rural counties. In the oldest age cohort, 65 and older, the rural rate exceeded the urban death rate by about 13%.[37,38]

U.S. mortality rates have trended lower since the 1960s for both urban and rural areas, although there is an upward trend since 2009. But since the early 1990s, mortality rates in urban and rural areas have diverged somewhat. From 1969 to about 2009, male rural mortality has declined at an average annual rate of 1.09%, which was significantly slower than the 1.40% decline noted for men in urban areas. Similar trends are seen among women in rural and urban areas, 0.68% and 0.98%, respectively.[39]

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.

"Despite the recent increase in the opioid problem, North Dakota has one of the lowest rate of drug deaths in the country."

Since 2016, there has been an increased awareness of the growing problem of opioid addiction and deaths.[40] Drug overdose is now the leading cause of accidental death in the United States with an estimated 46 people in the country dying from overdose of prescription opioids per day.[41] Drug overdose deaths now exceed motor vehicle crashes. Heroin-related mortality rates increased by roughly 19 percent from 2014 to 2015. In 2016, 475,000 people age 12 or older were current heroin users and 3.4 million people who were 12 or older were nonmedical users of prescription pain relievers.[42] Research has established that the rural opioid problem is disproportionally higher. Nevertheless, despite the recent increase in the opioid problem, North Dakota has one of the lowest rates of drug deaths in the country. Some research indicates that rural adolescents are more likely to abuse prescription pain-killers than urban adolescents.[43] Other research studies have found the misuse of nonmedical prescription opioids is concentrated in states with large rural areas.[44]

Motor vehicle crashes are a form of unintentional death and would likely be a contributing factor in geographical comparisons. Between the years 2013 and 2015, the United States age-adjusted suicide rate for rural counties (19.74 per 100,000 people)

was higher than both medium/small metropolitan counties (16.77) and large metropolitan counties (12.72).[44] Rural males have a 32% higher mortality rate from suicide than males nationally. The lower respiratory disease death rate also was higher in rural areas where the rate for rural males was 47% higher than for urban males.[35]

The rural maternal mortality rate is higher than in urban areas. Likely contributing factors are rural women have less adequate prenatal care, are more likely to be on public health insurance or have no insurance, and have less access to adequate primary care. The latter issue is related to the general lower supply of rural-based primary care combined with less direct access to obstetricians because of fewer obstetricians practicing in rural areas – due in part to malpractice and liability concerns.[38,45]

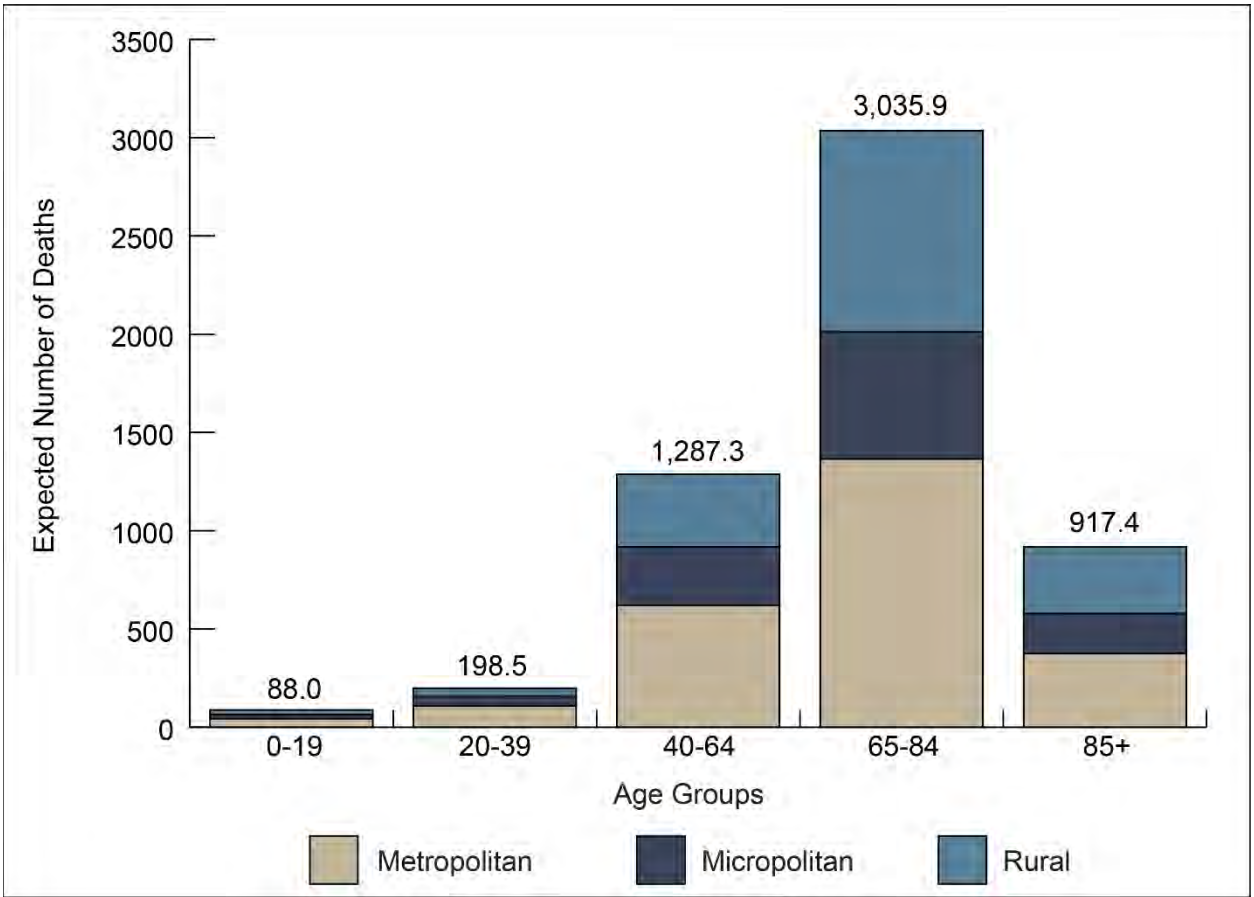

Figure 3.5. **Expected number of deaths in North Dakota per age group after adjusting for demographic factors specific to each region, 2020.[19,36]**

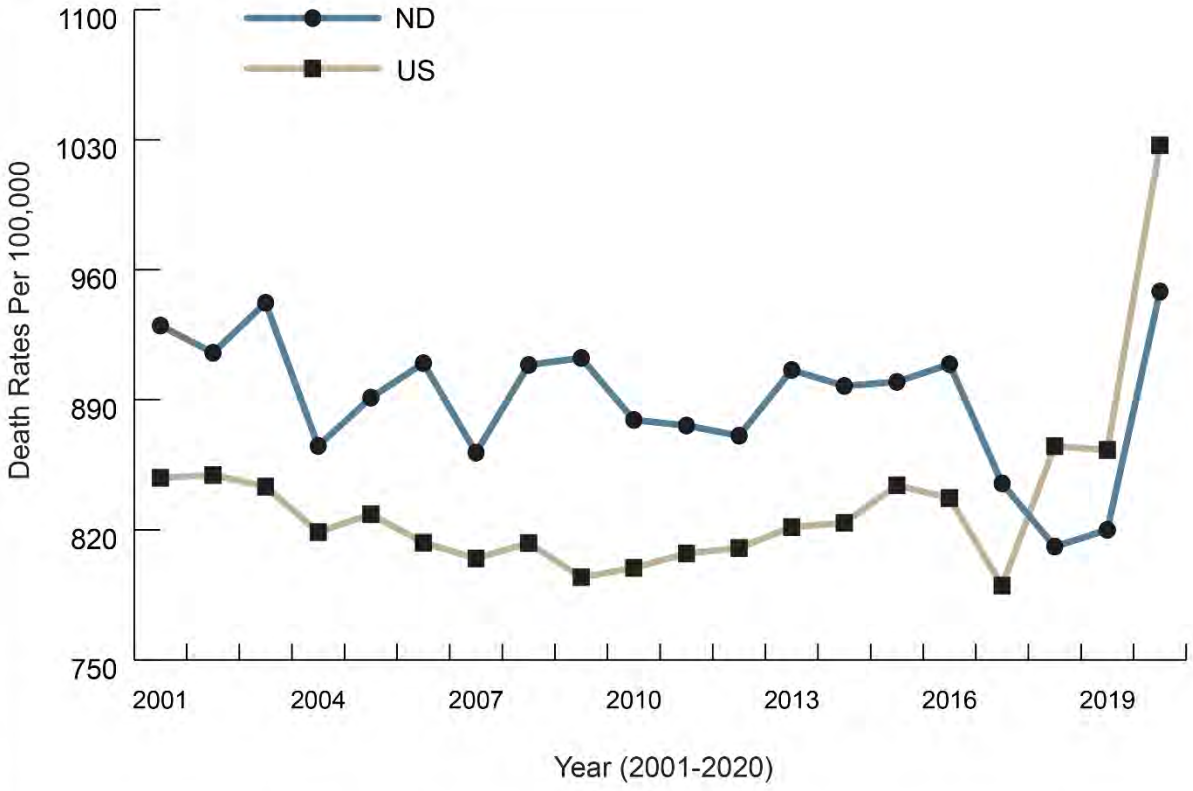

Figure 3.6. **Changes in North Dakota mortality rates from 2001 to 2020 compared with the United States, 2020.**[37,46]

Changes in Mortality

United States mortality rates were relatively stable from 2001 until 2016, while North Dakota rates over the same period were more variable (Figure 3.6). The U.S. rate dropped precipitously in 2017 and began to climb again in 2018. North Dakota's rate also dropped precipitously in 2017 and 2018 and began to climb again in 2019. The SARS-CoV-2 pandemic appeared in early 2020 and the mortality rates for both U.S. and North Dakota, increased substantially. The substantial increase in recent mortality rates likely reflects the direct impact of the pandemic along with the indirect effect of delayed care of other medical conditions. Figure 3.7 shows changes in mortality rates for metropolitan, micropolitan, and rural areas, as well as North Dakota overall.

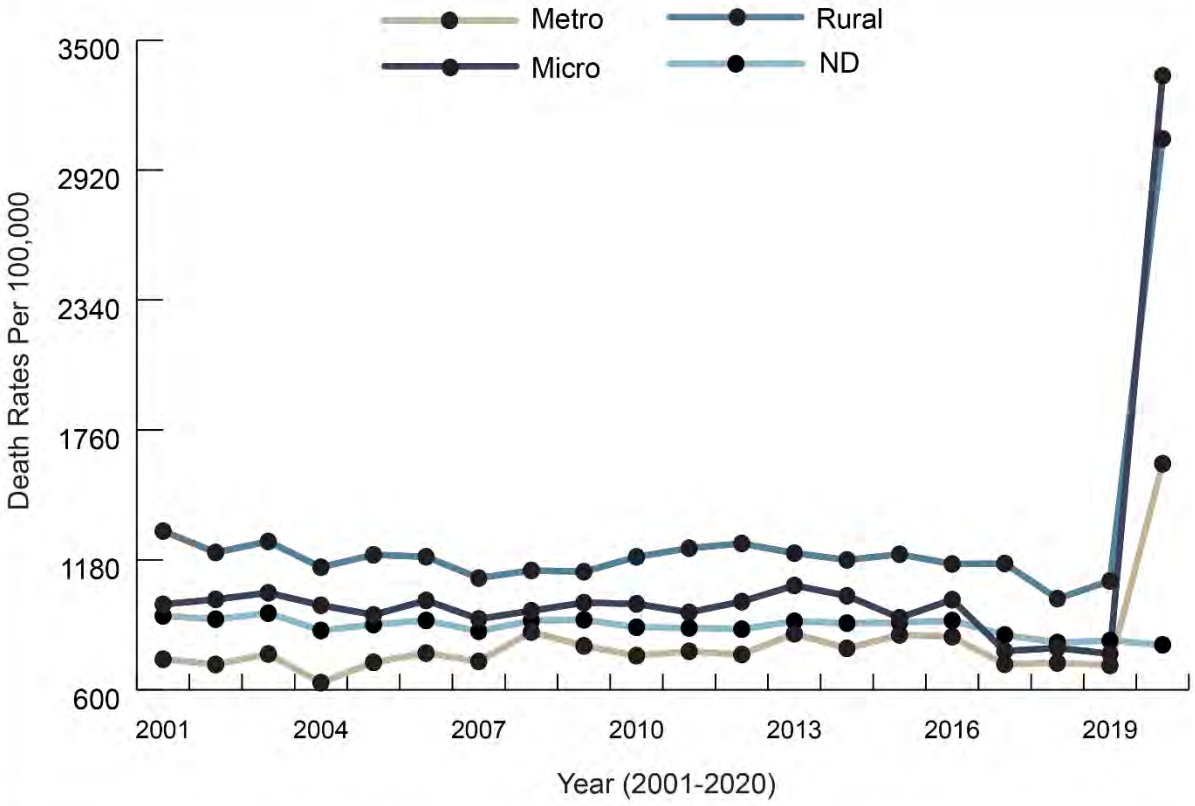

Figure 3.7. **Changes in North Dakota mortality rates from 2001 to 2020 for metropolitan, micropolitan, and rural areas, 2020.**[19,37,46]

Neurodegenerative Diseases

Neurodegenerative diseases are a range of illnesses that cause the death of nerve cells. These include Alzheimer's disease (AD), Parkinson's disease, motor neuron diseases (the most common of which is amyotrophic lateral sclerosis), as well as relatively rare genetic disorders such as Huntington's disease. Statistics for most of these diseases are generally less reliable than those for cancer, as cancer is a reportable disease (a disease for which statistics on incidence and mortality are mandated by federal law), whereas mortality data for other diseases must rely on death certificates and other passive means of reporting. However, it is important to note that one in 10 Americans suffers from AD. This is both an important medical and financial issue as dementia care is among the most expensive conditions for society to manage. Death certificate data indicate that North Dakota has the nation's highest death rate from AD.[47] This is likely due, at least in part, to the facts that AD is strongly age-dependent, and that ND has the second-highest proportion of seniors age 85 and older in the nation. For example, individuals 65 and older comprised greater than 14.0% of the population of the state in 2011 and this population is projected to increase by 50% by 2025. For reasons that are unknown, Midwestern and Plains states also have

significantly higher mortality rates of amyotrophic lateral sclerosis, a progressively paralyzing disorder that is usually fatal within 3-5 years of diagnosis.

> ***"Death certificate data indicate that North Dakota has the nation's highest death rate from Alzheimer's Disease."***

SARS-CoV-2

Sixty eight percent of the world's population has received at least one dose of the SARS-CoV-2 vaccination [as of October 7, 2022].[48,49] However, only 30% of people in low income countries have received at least one dose.[48,49] The United States surpasses the world's progress in terms of vaccination administration with over 264-million (80%) people having at least one dose and over 225-million people (69%) fully vaccinated.[48,49] Here in North Dakota 515,000 (68%) people of all ages have had at least one dose and over 435,000 (57%) are fully vaccinated.[48,49] North Dakota has administered at least one dose to 413,629 (58.5%) people aged 12 years and older and fully vaccinated 385,514 (62.8%) of those aged 12 and older.[50] Likewise, 218,375 (56.6%) North Dakotans aged 12 years and older have had at least one booster shot.[3] Children under the age of 12 years in North Dakota are much less likely to have had one shot (24.0%) or been fully vaccinated (21.0%).[50] Over 230,000 (60.8%) of North Dakotans aged 12 and older in metropolitan areas have had at least one dose and over 223,000 (58.9%) have been fully vaccinated.[50] More than 102,000 (51.6%) rural North Dakotans aged 12 and up have had at least one dose and more than 100,000 rural North Dakotans aged 12 and older have been fully vaccinated.[3] North Dakotans aged 12 and older living in micropolitan locations are least likely to have had one dose of the vaccine (44.1%) or be fully vaccinated (42.1%; see Figure 3.8).[50]

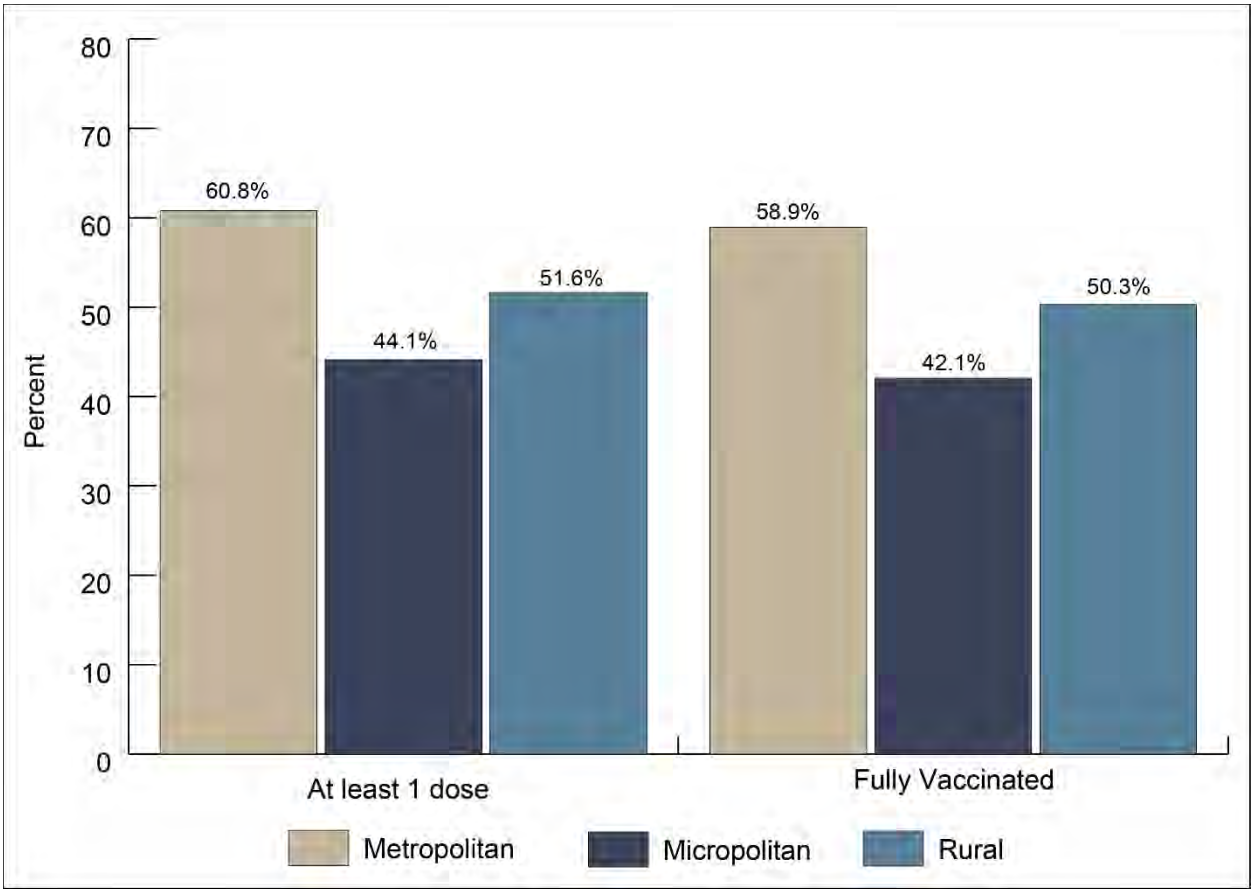

Figure 3.8. **North Dakota COVID-19 vaccinations for those 12 years old and older by location, 2022.[50]**

SUMMARY

There are a number of factors that influence the health status of individuals and communities that are tied to socioeconomics, geography, workforce supply, and health policy. These factors can contribute to behavioral risks, chronic conditions, preventive care, and mortality. In recent years North Dakota has improved in the behavioral risk areas of smoking, alcohol use, and seatbelt use; however, behavioral risks related to physical activity have not improved for North Dakota adults. The general health of North Dakotans has shown an increase in overweight/obese persons but a decrease in the areas of one or more poor health days. The percentage of adults reporting chronic health conditions has shown variance in recent years with fluctuating trends showing similarities between 2015 and 2020. Similar to adults, children's risk behaviors in recent years have shown increases in trends related to not wearing a seatbelt, but a decrease in smoking and alcohol use. North Dakota has a higher incidence rate of prostate, lung, and colon cancer when compared to the U.S. North Dakota has the highest rates of death from Alzheimer's disease, as well as plains states having significantly higher mortality rates of amyotrophic lateral sclerosis. Health screenings have also shown variances in some areas in recent years. Lastly, although mortality rates in North

Dakota have fluctuated, the rates between 2001 and 2018 were trending downward prior to the onset of the SARS-CoV-2 pandemic.

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CHAPTER FOUR: Pandemic Planning and Public Health

SARS-CoV-2 (COVID-19) UNITED STATES NATIONAL PANDEMIC TIMELINE

Early 2020

In December 2019 the World Health Organization (WHO) was informed of a pneumonia of unknown origin in Asia. Subsequent investigation led to a WHO announcement in January 2020 that the unknown illness was caused by the 2019 novel coronavirus (2019-nCoV).[1] Over the next month, the number of cases increased with the discovery of human-to-human transmission. This very quickly led to the identification, or naming, of the now identified SARS-CoV-2 virus. This virus spread very quickly, and mitigation strategies were developed and implemented by countries, states, and municipalities to address the geographic needs of any given area. The mitigation strategies impacted every area of life and spanned over two years.

The United States was not immune to SARS-CoV-2, and the first confirmed travel-related cases were identified in late January 2020, followed quickly by the first person-to-person spread cases.[1] Immediate travel advisories for those coming from mainland China were applied by the U.S. Centers for Disease Control and Prevention (CDC). Two-week quarantines for travelers returning to the U.S. were implemented in attempts to prevent the spread of the virus. In addition to this, the U.S. government began relocating any citizens in China back to the U.S. The U.S. Food and Drug Administration (FDA) began work with partners to develop medical countermeasures. On January 31, 2020, the Secretary of the Department of Health and Human Services declared the outbreak a public health emergency.[1] As of January 2020, North Dakota had no confirmed cases of SARS-CoV-2.[2,3]

In early February 2020, the FDA issued an emergency use approval (EUA) for the CDC-developed testing kit for SARS-CoV-2. This shipped the day after the EUA was granted and priority testing kits were deployed to the quarantined groups around the U.S. by CDC personnel. These kits were sent to a processing laboratory in New York and unfortunately the tests were deemed untrustworthy. Further CDC updates allowed a policy for additional laboratories to develop diagnostic tools for SARS-CoV-2 prior to EUA. While the U.S. was enacting prevention efforts, the situation around the world was becoming more and more concerning. A cruise ship was quarantined off the coast of Japan for 14 days, and Italy experienced a drastic increase in cases resulting in governmental measures that locked down the country. The WHO announced the official name ‘COVID-19’ as an abbreviation of Coronavirus Disease 2019. In the U.S., the CDC incident manager for SARS-CoV-2 response announced mitigation efforts including school closings, workplace shutdowns, and limiting or canceling of gatherings, including a statement that the result would be a ‘disruption to everyday life.’[4] The first confirmed death in the U.S. was recorded in Washington state.[3] As of February 2020, North Dakota had no confirmed cases of SARS-CoV-2.[2,3]

On March 1, 2020, the CDC created a hospital surveillance network called COVID-NET to track the number and rates of hospitalizations.[5] This was done by modifying existing networks in place for influenza and other conditions. Additionally, the

CDC launched a symptom checker to the public and states began developing guidelines for prioritizing care. States began implementing shutdowns with New York City providing the most noticeable shutdown by closing its public school system, which is the largest in the country with approximately 1.1 million students.[6] Vaccine and treatment trials began around the U.S., as well as social distancing measures as ways to attempt to curb the spread. Domestic travel advisories were released to further attempt to limit the spread of the virus. In a White House press briefing, it was announced that the U.S. should expect between 100,000 and 240,000 deaths. The WHO declared SARS-CoV-2 pandemic on March 11, 2020, after more than 100,000 cases in over 100 countries and 4,000 deaths. North Dakota had its first confirmed case of SARS-CoV-2 in March of 2020.[2,3]

In April 2020, the CDC released guidelines on mask wearing and released a surveillance report summarizing weekly data on hospitalizations, deaths, and testing. This was called 'COVIDView.'[7] At the request of doctors and civil rights groups, the CDC and U.S. government were urged to release data on race and ethnicity to assess the impact of the pandemic on subgroups of the overall population. Later that month it was found that in Chicago alone, there was a vast racial disparity in SARS-CoV-2 related deaths. By mid-April of 2020, the U.S. had over 18,000 deaths and more than 500,000 confirmed cases of SARS-CoV-2. Shortages of hospital beds and ventilators were becoming common occurrences, and most U.S. states were experiencing widespread cases of the virus. The CDC set aside funding from the Coronavirus Aid, Relief, and Economic Security Act (CARES) to expand capacity for testing, contact tracing, and containment of the virus.[8] The U.S. also launched Operation Warp Speed to produce a vaccine against the virus utilizing several manufacturers.[9,10] North Dakota continued to see a low number of cases per day (<100) as of April 2020.[2,3]

Mid 2020

The U.S., like the rest of the world, was seeing drastic changes in the rates of SARS-CoV-2 by May 2020. At the federal level, responses were focused on prevention, identification, and clinical interventions, as well as financial interventions to ease the loss of income due to mitigation strategies. There was a worldwide shortage of personal protective equipment (PPE) such as masks, gloves, and gowns, as well as a shortage of sufficient antimicrobial cleaning supplies. This presented a challenge to prevention efforts. A new, national level network to track the evolution of the SARS-CoV-2 virus was introduced in an attempt to get ahead of the pandemic. Several treatments were presented and implemented as potentially beneficial in combatting the virus. While treatment options were being pursued, the U.S. initiative to produce a vaccine was in full effect. In mid-May 2020 it was announced that the first doses of a vaccine would arrive in September 2020. At a national level, plans were being made to reduce restrictions and effectively reopen the country. By the end of May 2020, the U.S. death toll had passed 100,000. In North Dakota the number of cases per day was still low (<100) as of May 2020.

Several major milestones occurred in June 2020. The CDC released guidelines for SARS-CoV-2 for nursing homes, long-term care facilities, and high-density critical infrastructure workplaces. Shortly after this, the U.S. Department of Health and Human Services (HHS) announced that vaccines for older adults and those at an increased risk would be free when they became available. The CDC also expanded the list of people at highest risk. The U.S. reached the 2 million case milestone in June 2020. North Dakota continued its relatively low number of cases per day (<100).

In July 2020 the CDC urged citizens to wear cloth facemasks in an effort to combat the spread of SARS-CoV-2. This was shortly after the WHO released information that the virus could be spread via airborne transmission, likely from asymptomatic individuals. Several states in the U.S. saw marked increases in their number of cases. The single day confirmed case count in the U.S. on July 16, 2020, was 75,600. The U.S. saw its 3 millionth case in July 2020. In North Dakota, the number of cases varied slightly but remained relatively low (<150).

An August 2020 study found that 50% of all individuals living in rural areas did not have access to intensive care unit (ICU) beds.[11,12] This in combination with increased rates of viral infection, limited access to testing, and reduced access to healthcare could lead to significant adverse outcomes for SARS-CoV-2 for individuals in rural areas.[1] The U.S. and the world documented the first cases of reinfection, confirmed by health authorities. By the end of August 2020, SARS-CoV-2 had become the 3rd leading cause of death in the U.S. as deaths per day surpassed 1,000. The number of cases in the U.S. was over 5.4 million.[3] In North Dakota the number of cases per day surpassed 250.[2,3]

Late 2020

The companies manufacturing SARS-CoV-2 vaccines were in phase 3 clinical trials. This included Pfizer-BioNTech, Johnson & Johnson, and Moderna. This was promising as secondary challenges were being discovered in relation to the pandemic. Mortality outcomes for older individuals, those with disabilities, those who were immunosuppressed, and persons of color had been found to be disproportionately high. A large proportion of those in the U.S. had delayed routine or emergent medical care during the pandemic, with no clear idea of how this would impact the population moving forward. HHS announced that vaccines for SARS-CoV-2 would be free in the U.S.. The number of deaths worldwide passed 1 million, and the number of deaths in the U.S. passed 200,000. The number of cases per day in North Dakota topped 500, with less than 250 deaths by the end of September 2020.

The CDC updated prevention guidelines in October 2020 that addressed the likelihood of airborne spread and the need for at least a 6-foot personal distance and possibly more in enclosed areas. The number of cases per day in North Dakota continued to climb in October of 2020 to more than 1,000 by the end of the month. This was overshadowed by the number of deaths in North Dakota doubling to over 500 in October alone.

In the U.S., the number of new cases per day on November 4, 2020, was 100,000 cases confirmed in a span of 24 hours. This was followed shortly by a spike in cases mid-November likely due to Halloween gatherings. The end of November 2020 saw promising reports from vaccine manufacturers with clinical trial effectiveness of more than 95% for vaccines created by Pfizer-BioNTech and Moderna. In North Dakota the number of cases per day climbed to over 1,500 per day.

In December 2020, the FDA issued EUAs for both the Pfizer-BioNTech and Moderna vaccines. This was quickly followed by the first vaccines being distributed to front-line health care workers and older adults in long-term care facilities. On a worldwide level, a new SARS-CoV-2 variant was identified in India, and was named Delta.[13] In the U.S., the number of deaths had reached 300,000. In North Dakota the number of deaths had reached 1,000.[2, 3]

Early 2021

In early 2021, HHS announced additional funding to expand testing and vaccine efforts throughout the U.S. This was partially to address vaccine shortages. A new National Strategy for the COVID-19 Response was announced in the U.S.[14] This included 7 goals to create a comprehensive plan. By the end of January 2021, the U.S. had passed 400,000 deaths. By the end of February 2021, that number had surpassed 500,000. In North Dakota the number of deaths was over 1,400 by the end of February 2021.

In late March of 2021, a CDC study found that both the Pfizer-BioNTech and Moderna vaccines were effective at reducing the risk of infection by 90%.[15] By the end of April, the U.S. had administered over 200 million doses of the vaccine. Late April also saw findings that both the Pfizer-BioNTech and Moderna vaccines reduced the risk of hospitalization for SARS-CoV-2 for those age 65 and older by 94%. In North Dakota, the number of cases per day was continuing to gradually decline by the end of April 2021.

Mid 2021

The FDA expanded the EUA for age groups to include adolescents in May 2021, and fully approved the vaccines for all people age 18 and older. Later that month, the CDC announced vaccine efficacy of 94% overall, and in June found that the vaccines reduced the risk of infection by 91% as well as protected against severe illness and hospitalization. On a global scale, the Delta variant found in late 2020 had become dominant and was creating a third wave of infections in the U.S. This resulted in additional preventive guidelines introduced by the end of July 2021. While the rest of the U.S. was in an upward trend of infections, North Dakota had experienced a decline in cases through mid-July. That trend shifted by the end of July, starting a prolonged increase of cases in the state.

At a national level, approvals and guidelines were further solidified in August 2021. The FDA fully approved vaccines for those age 18 and older, and additional booster doses past the recommended 1 or 2 dose preliminary vaccines were recommended. These were urged to prevent severe disease, hospitalization, and deaths.

Late 2021

Additional funding for community health workers was released in September 2021. This was followed by additional federal funding for state, local, and territorial public health departments. Later in September, recommendations were released for vaccine boosters for additional populations. By October this was augmented to include boosters to additional manufacturer's primary doses, followed by November recommendations for pediatric vaccines (children ages 5-11), and December recommendations for boosters to adolescents as young as 16. By the end of 2021, the U.S. had surpassed 800,000 deaths. In North Dakota the number of deaths had surpassed 1,900.

Early 2022

The increase in new variants of the SARS-CoV-2 virus by early 2022 resulted in a reported new number of daily infections of nearly 1 million. The number of hospitalizations in the U.S. rose by almost 50%. By the middle of January 2022, the daily U.S. average number of infections had risen to over 800,000 per day. This was up from 119,000 the month prior. Unlike previous waves of infection across the U.S., North Dakota mirrored the national trend. By mid-January of 2022, there were more than 3,000 cases per day in the state. North Dakota surpassed 1,500 deaths in January 2022.

The initial spike in SARS-CoV-2 from early 2022 saw a decline in cases through the early part of 2022. The focus of efforts related to data and information releases was able to be shifted to outcomes of the pandemic. Studies highlighted disparities in outcomes for specific age groups, risk associated with specific conditions, and adverse behavioral health outcomes.[16,17,18,19] By the end of March 2022, the number of recorded deaths worldwide had topped 6 million, with over 957,000 in the U.S., and 2,000 in North Dakota.[2,3,20] In April 2022 the CDC released statistics that for the second year in a row, SARS-CoV-2 was the third leading cause of death in the U.S.[21]

Mid 2022

Studies released in May of 2022 reported that approximately 50% of SARS-CoV-2 deaths were felt to be vaccine preventable.[22] The WHO estimated that approximately 15 million direct or indirect deaths (excess mortality) from January 2020 through December 2021 were caused by SARS-CoV-2 on a global level.[23] South-East Asia,

Europe, and the Americas represented 84% of these deaths.[23] By the end of May 2022, the weekly average number of new SARS-CoV-2 infections was six times higher than in 2021. There were 119,725 new cases each week compared to 17,877 in 2021.[24] The number of recorded deaths in the U.S. topped 1 million people.[2] In North Dakota that number surpassed 2,200.[3]

In June of 2022, the Advisory Committee on Immunization Practices (ACIP) recommended both Moderna and Pfizer-BioNTech COVID-19 vaccines for everyone. The result of this recommendation was that everyone in the U.S. age six months and older was eligible for vaccination in the U.S.[25,26] In June 2022, the U.S. reported over 84 million infections and confirmed over 1 million deaths from SARS-CoV-2.[1]

STATE OF NORTH DAKOTA RESPONSE TO THE PANDEMIC

North Dakota began preparations for the eventual arrival of SARS-CoV-2 starting in January of 2020.[27] This was in conjunction with the CDC issuing the declaration of a public health emergency. The preparation involved many preparatory steps including evaluating the state's emergency response, cataloguing existing supplies, and establishing information chains at a state and national level.

While the virus did not reach North Dakota until March of 2020, the efforts to identify and track the illness were already in place and being implemented.[28,29] The U.S. State Department informed individual states with travelers from countries under advisories, which allowed for individuals to be contact traced by the health department. While the concept of contact tracing is not new in the field of infectious disease control, most people are largely unaware of its existence. Contact tracing is the identification and monitoring of individuals known to be exposed to a highly contagious and infectious disease, many of which are untreatable. Once identification is made, the individual is then screened for relevant contact with other persons. When appropriate, quarantine or isolation protocols are recommended, and ongoing symptom assessment and testing are conducted to identify if the individual is ill. Quarantine is the separation of contacts from others after exposure to a probable or confirmed case while isolation is the separation of people who are known to be infected from others who are not infected.[30]

Prior to North Dakota's first SARS-CoV-2 case, the state's Emergency Commission voted to accept federal funding to contain and mitigate the spread of the disease.[31] Statewide efforts were focused on preparation for SARS-CoV-2 prior to its widespread arrival in the state. The messaging at a statewide level focused largely on prevention and protection of those highest at risk. At that time, the individuals at highest risk were those aged 65 and older and those with multiple chronic conditions. While a significant number of senior citizens (age 65 and older) live in long-term care facilities, there are also a large number of seniors living in communities, with a disproportionately higher numbers in rural areas. The state released a memo to long-term care providers outlining recommendations for reducing the spread of infection in long-term care facilities.[32] One major challenge for seniors in rural areas is the lack of access to health

care facilities in their local communities, a challenge that would become more evident as the pandemic wore on.

North Dakota saw its first positive SARS-CoV-2 case in March of 2020 as well as its first death. Quickly after that, statewide guidance on limiting public gatherings was announced, as was a statewide state of emergency.[33,34] New guidance on K-12 education delivery was announced, and guidance to close K-12 schools on an as-needed basis was issued in an effort to slow the spread of the virus.[34] This was followed shortly after by an order to close all K-12 schools for one week.[35] This was the first of many orders, regulatory changes, and emergency declarations that allowed efforts to manage the pandemic to go on with relatively few barriers. Of the many changes that occurred, health care facilities cancelled elective surgeries to preserve PPE and prevent the potential spread of infection. Outpatient clinic visits were limited to those individuals with ongoing serious chronic diseases and behavioral health crises.[36] Other public services deemed non-essential were limited and many changed to an appointment-only schedule. At a state level, agencies were modifying how services were provided and regulations to determine how to reduce the delay or disruption of services for North Dakota citizens.[37] Additionally, telehealth services were expanded within the state to limit in-person contact and allow for services to be reimbursed.[37]

The state's partially shut down status resulted in potential financial implications for individuals, families, and businesses. Non-essential businesses were either closed or extremely limited in their hours, which resulted in reduced income for individuals and lost revenue for businesses. The Bank of North Dakota announced student loan relief options in March of 2020 to alleviate some financial strain on borrowers.[38] The state also extended workers compensation for first responders and health care workers who contracted SARS-CoV-2.[39] The state Medicaid program received a waiver to allow program changes due to the pandemic.[40] An emergency grant program was announced for childcare providers who cared for children of health, safety, and other front-line workers.[41] The state received a federal disaster declaration allowing for federal funding to assist in the state's response to the pandemic.[42] While the state extended business closures for an additional two weeks, the state also waived the waiting period for unemployment benefits.[43] Additional Supplemental Nutrition Assistance Program (SNAP) benefits were made available for some North Dakotans.

By mid-2020 North Dakota still had not seen a significant outbreak of SARS-CoV-2. Despite this, areas of concentrations of cases were beginning to emerge which allowed the state to identify and address those clusters. Ongoing efforts were being implemented to identify and prevent spread, and focus was placed on high-risk individuals and health care facilities.[44,45] The state expanded testing locations to establish surveillance testing to not only identify positive cases, but to allow for testing larger populations to establish a negative case population.[46] Multi-agency collaborations increased to allow for agencies to assist one another in pandemic response. One example of this was the Department of Transportation (DOT) transporting PPE to hospitals throughout the state.[47] In additional prevention efforts, the North Dakota Department of Emergency Services (NDDES) provided information on the Federal

Emergency Management Agency's (FEMA) Public Assistance (PA) Program. This was federal funding that was available after the federal disaster declaration. This funding allowed local government, tribes, and some non-profits to be reimbursed for eligible costs for emergency protective measures. Shortly after the PA program was announced, the Coronavirus Aid, Relief, and Economic Security (CARES) ACT funding was allowed to be used for unemployment claims.[48]

Late spring into summer of 2020 in North Dakota saw a gradual re-opening of services and businesses as well as making and implementing plans to resume pre-pandemic activity.[49,50,51] A large focus was placed on resuming 'business as usual' in North Dakota to mirror the rest of the country. The statewide guidelines were announced as the Smart Restart guidance which was a color-coded guidance system that assigned colors to an established rubric for relative risk.[52,53] While this restart was occurring, the state received funding through the Elementary and Secondary School Emergency Relief (ESSER) fund for school and community needs related to the pandemic. Public schools continued distance learning for the academic year to slow and prevent the spread of SARS-CoV-2.[54] During this time, schools continued to provide lunches for students who usually received free or reduced-price lunches. This was continued under a partnership between the Department of Public Instruction and the Department of Human Services. In addition to the previously approved funding, the state's Emergency Commission voted to approve the use of $500 million in federal funding for public health and safety, economic support for business, economic support for individuals, and digital services.[55] The Smart Restart Guidelines allowed relaxation of guidelines for visitations for individuals in long-term care, congregate living, and correctional settings.[56,57,58] A plan was developed for K-12 schools to reopen in the fall.[59] An additional $320 million in federal funding was approved for use by the Emergency Commission, this time to support the university system, testing sites, emergency childcare grants, and funding for food bank programs.[60]

While the state was working to mitigate the impact of the pandemic, the U.S. and other countries were working to develop vaccines to minimize the risk of infection or prevent it altogether. The North Dakota Department of Health completed and submitted a vaccination plan to the CDC in October 2020 and updated that plan in December of 2020.[61,62] The vaccines under development were first approved and made available in December 2020, and North Dakota administered its first dose on December 15, although the first doses for the general public were not available until March 2021.[63]

Ahead of this, a significant amount of planning was done in preparation for the vaccines. A myriad of logistical issues were addressed in managing the preparations. The vaccine delivery at the national level was strategized to deploy initially to one static location in many states, North Dakota included. That meant that all doses of the vaccine would go to Bismarck. North Dakota encompasses over 70,000 square miles with the population distributed throughout the state. This presented a transportation challenge as the states 6 tertiary and 36 Critical Access Hospitals were also located throughout the state. Preliminary plans were made to distribute the vaccines proportionally to the population. While this was the most equitable strategy, the vaccines were not shipped

as single dose containers but rather multiple doses per vial and multiple vials per secure packaging. That made breaking down doses to distribute them a challenge as the smallest unit was not truly one dose. An additional challenge presented was the necessity for ultra-cold freezers to maintain the integrity of some of the vaccines. Not all facilities throughout the state expecting to receive the vaccine had an ultra-cold freezer, and those that did may not have had space due to the necessity to store other items. The solution to these challenges was one that was able to reach the largest number of people in as efficient of a manner as possible. Collaborations between health systems and the public health infrastructure throughout the state developed large-scale vaccine clinics in the major cities that served to vaccinate the population. This presented challenges for individuals having to travel to these locations, but the result was large-scale vaccinations for the residents of the state.

While the state was preparing for receiving its first doses of the SARS-CoV-2 vaccine, it was also experiencing the first spike of positive cases. This spike began in late July 2020 and while a decline was seen in early September, the increase continued to rise until a peak was reached in November 2020.[64] The direct impact of a spike in cases during a period where no vaccines were available to prevent the virus resulted in a nearly catastrophic impact on the state's health infrastructure. In this time period, the state received 60 Air Force nurses to assist in servicing the surge of cases.[65] The Emergency Commission approved funding for hospital staffing, businesses, and workers.[66] At the peak of the first wave of SARS-CoV-2, the state had 527 hospitalizations.[64] This peak slowly declined starting in mid-November and reached a pre-peak level starting in January 2021.

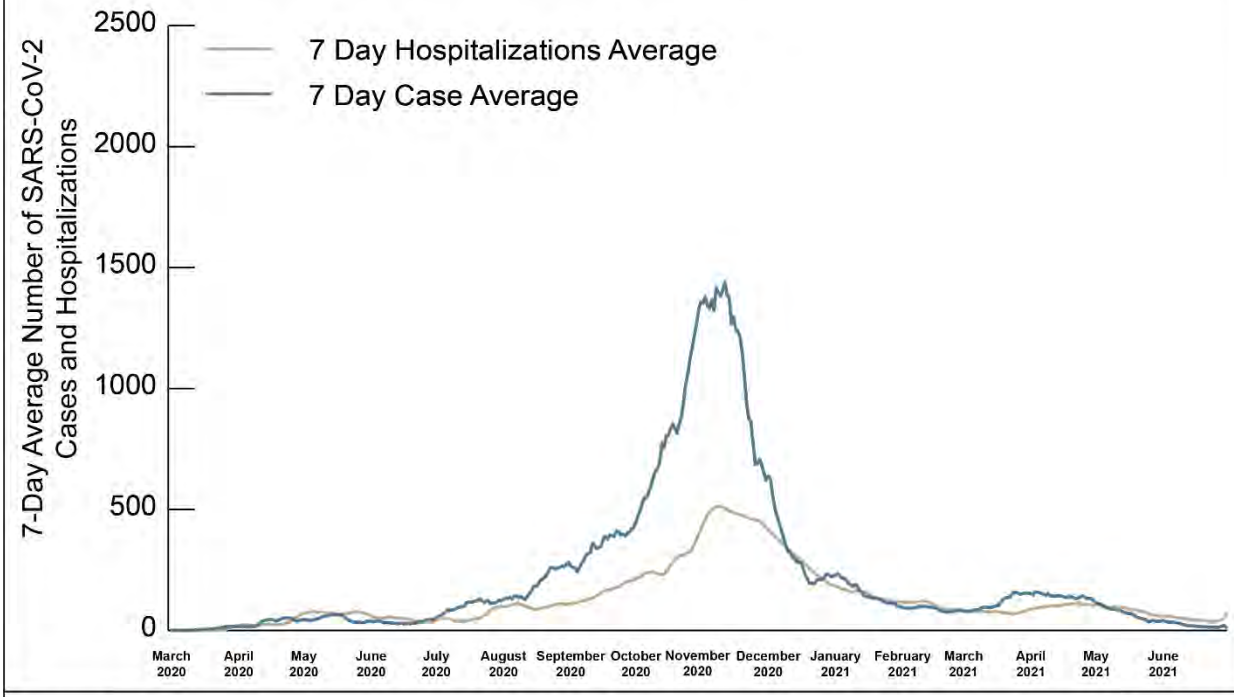

Figure 4.1. **Seven day average of SARS-CoV-2 cases and hospitalizations in North Dakota between March 1st, 2020 and June 30th, 2021.**[2]

As the state began vaccinating residents in March 2021, the number of active cases and hospitalizations in the first half of that year remained relatively stable.[64] The state again began lowering the risk levels and preparing for reopening by reducing mask restrictions and allowing visitors to correctional facilities. Additional assistance for transportation to vaccine locations was announced and individuals who were eligible for additional booster doses were encouraged to get them.

Despite the introduction and uptake of vaccinations in the state, by the latter half of 2021 the SARS-CoV-2 Delta variant had been discovered in North Dakota. The state experienced a second wave of infections that spiked higher in mid-fall than in 2020 but had a significantly higher crest in January 2022 with 15,584 cases.[64] This was identified as being predominantly confirmed cases of the new Omicron strain which was found to be resistant to the vaccine.[68] Unlike the peak in 2020 into 2021, this peak resulted in a prolonged period of hospitalizations with between 200-300 beds occupied each day between September 2021 and March 2022.[64]

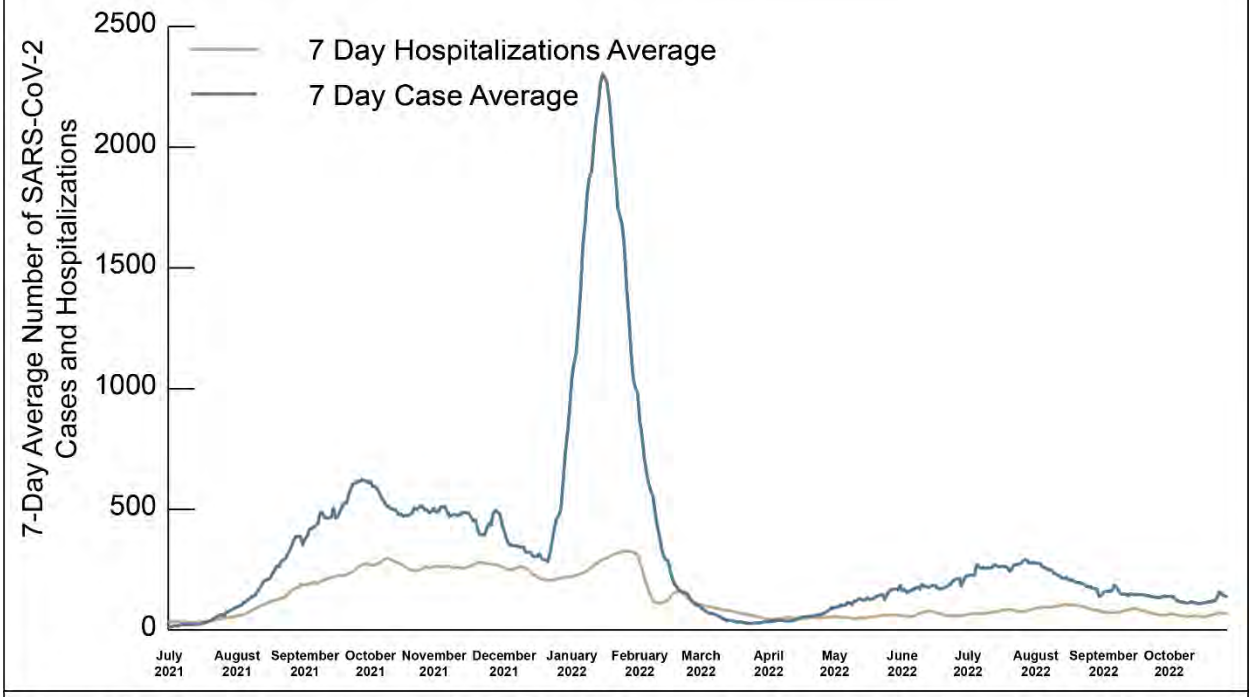

Figure 4.2. **Seven day average of SARS-CoV-2 cases and hospitalizations in North Dakota between July 1st, 2021 and October 27th, 2022.[2]**

Since the most recent peak in early 2022, the state has again experienced a reduction in the number of cases and hospitalizations and had focused on providing vaccinations and booster doses to those already vaccinated. In response to the Omicron strain, the state received booster doses augmented to include that strain.[69]

As of October 2022, the state has not seen any additional noteworthy fluctuations in the cases of SARS-CoV-2.

ACADEMIC PROGRAM RESPONSE TO THE PANDEMIC

North Dakota State University Smart Restart Task Force

In the spring of 2020, shortly after the SARS-CoV-2 pandemic exploded worldwide, the Chancellor (Dr. Mark Hagerott) of the North Dakota University System (NDUS) asked Dr. Joshua Wynne, Vice President of Health Affairs at the University of North Dakota and Dean of the UND SMHS, to chair a group of NDUS leaders to address pandemic-related issues on behalf of the university system. The group was called the NDUS Smart Restart Task Force, and it was formed to assist the NDUS campuses in their responses to the COVID-19 pandemic so that students, faculty, and staff could return to their institutions in a way that maximized safety and minimized the chance of further spread of the virus. At the same time, the goal was to facilitate the important educational, discovery/scholarly, and service missions of the NDUS and its constituent campuses.
The specific duties of the Task Force were:

- To make available to all campuses COVID-19 relevant documents that outlined federal guidance (especially the three-tiered approach), Centers for Disease Control and Prevention (CDC) guidelines, North Dakota Department of Health policies and guidelines, and the precepts contained in North Dakota's Smart Restart program to assist the campuses in the preparation of their campus-specific guidelines, policies, and procedures regarding the pandemic
- To collect and catalog the individual policies, procedures, and approaches that the NDUS campuses promulgated so that they are available in a central library
- To offer a forum, through the three working groups, for similar-sized NDUS institutions to have any desired discussions regarding issues of common interest
- To offer institutions the opportunity to collectively address purchasing and related issues for common requirements (e.g., testing, acquisition of personal protective equipment, contact-tracking database)
- To assist the NDUS and its constituent institutions of higher learning in developing approaches to optimize institutional success in the current and eventual post-COVID-19 era

The Task Force was composed of three working groups, one focusing on the large campuses, one on the medium-sized campuses, and one on the smaller campuses. In addition, the Task Force had representation from a faculty infectious disease expert (Dr. Paul Carson of NDSU), NDUS staff, and legal counsel, and solicited input and assistance from a member of the State Board of Higher Education (SBHE). The meetings were open to the presidents of all of the NDUS constituent campuses and other interested parties, including representatives from the North Dakota Department of Health, the executive branch, and others.

The Task Force met twice monthly starting in June, 2020, and continued to meet periodically over a two-year period until August 2022, at which time it suspended meeting indefinitely.

In an effort to provide the most robust pandemic related information, the academic programs from the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS), the UND College of Nursing and Professional Disciplines nursing programs (undergraduate and graduate), and the North Dakota State University School of Pharmacy were asked a series of questions related to their academic program's response to the pandemic. The following information is a summary of those responses.

University of North Dakota School of Medicine and Health Sciences

The university's and school's responses to the SARS-CoV-2 pandemic demonstrate strict adherence to existing safety, security, and emergency response protocols. Policies and procedures were adopted regarding face coverings; physical distancing; education and signage; student services; work environment; events; student and employee reporting procedures; testing; quarantine and isolation; and vaccination reflect the effort and dedication of the UND president's Executive Council, the UND pandemic team, and the UND SMHS Contingency Planning Group in collaboration and coordination with state and local agencies, as well as the Association of American Medical Colleges (AAMC) guidance and recommendations to ensure the security and safety of all faculty, staff, and students. University and School COVID-19 websites were continually updated with current information. During the 2020–21 academic year, UND held monthly town hall meetings for faculty and staff as well as students and parents to communicate information and answer questions. The dean's weekly *For Your Health* electronic publication and periodic "Java with Josh" town hall meetings also communicated important updates to UND SMHS constituents. The university's Coronavirus (COVID-19) Interim Policy, the UND Communicable Diseases Policy, and school-specific policies continue to guide the university and the school in responding to threats that the pandemic continues to pose to the security and safety of its faculty, staff, and students.[70]

During the SARS-CoV-2 pandemic, UND SMHS Information Resources reconfigured every classroom/conference room at all campus locations and added additional equipment and software licenses to enable students, faculty, and staff to access live lectures in classrooms using web-conferencing technologies (Zoom). The modifications also enabled classrooms to locally record live lectures originating at a distance using the school's lecture capture system, MediaSite. Lectures are automatically recorded and published to Leo, the school's learning management system. MediaSite is also integrated with IBM Watson's speech-to-text engine for rapid generation of closed captioning. All recorded lectures have accurate video and text search capabilities. During the pandemic, UND received federal funding to purchase laptops for qualified students, i.e., at no cost to them, to access on-line resources.

Federal funding dollars were also used to add new technologies (e.g., Butterfly IQ pocket ultrasound devices, new laptops for Bismarck CFM students and residents), as well as upgrade existing technologies (e.g., new cameras in the Simulation Center, new Aperio digital slide scanner, new virtual histology lab, upgrades to Media Site recorders).[70]

Academic Program Adaptations

Academic programs within the North Dakota University System transitioned to virtual learning. This impacted all campuses and programs but had additional impacts for students in health occupation programs. Programmatically, these curricula involve a large volume of either lab or clinical based education and training that presented unique challenges to both curriculum delivery for coursework as well as clinical placements for students. The following responses were provided by each program to address their specific programs.

The Medical Doctor (MD) program notified the Liaison Committee on Medical Education (LCME) of adjustments to the medical program curriculum delivery in response to the SARS-CoV-2 pandemic that resulted in removing students from the clinical setting and in precluding preclinical students from receiving most in-person teaching within the medical school building. These necessary adjustments resulted in preclinical students being provided lectures and course materials by online content delivery methods through campus learning management systems and video resources and conducted faculty-facilitated small-group patient-centered learning (PCL) sessions using Zoom. The School followed the Association of American Medical Colleges (AAMC) guidance on student clinical participation by suspending activities that involved patient contact and identified and implemented alternative ways for students to meet clerkship objectives. Other alternatives to instruction and assessment were put in place to ensure students met program outcomes, learning objectives, and required clinical experiences.[70]

Beginning in March 2020, adjustments were made to the delivery and timing of the Phase 1 curriculum because of the pandemic. All activities were delivered remotely (via Zoom with audio and video recordings available remotely and asynchronously) with two exceptions: gross anatomy laboratory dissection and clinical skills instruction, practice, and assessment. The only adjustment to the timing of Phase 1 activities was to divide gross anatomy laboratory dissection time into two sessions in order to minimize occupancy within the physical space of the gross anatomy laboratory. All assessment, including gross anatomy laboratory assessment, was conducted remotely with the exception of clinical skills. The only adjustment to assessment instruments because of the pandemic was that gross anatomy laboratory examinations were conducted using images rather than tagged cadaveric materials. The length and frequency of activities, the grading system, and availability of final grades in Phase 1 were not altered because of the pandemic.[70]

One example follows of how students with faculty support engaged in community service during the early phase of the SARS-CoV-2 pandemic. The onset of the SARS-CoV-2 pandemic initially limited the opportunities for students to participate in community service. When community needs brought on by the pandemic became apparent, many medical students looked for opportunities to be of service. Students and faculty created a UND SMHS Chapter of the National Student Response Network (NSRN). The school provided the faculty adviser for this chapter who helped to ensure student safety through adherence to safety protocols established by the school. Over 100 medical students participated in more than 10 service activities, including SARS-CoV-2 testing in Grand Forks, grocery shopping for residents in an assisted living facility in Detroit Lakes, Minnesota, connecting with isolated people in Bismarck, contact tracing for the North Dakota Department of Health (NDDOH), mask-making for UND SMHS faculty and staff, and participating in a video for the NDDOH encouraging vaccination.[70]

In the setting of COVID-19, the Clinical Skills Performance Review CSPR was modified to a virtual group experience for the Class of 2021 and cancelled for the Class of 2022. The traditional in-person format was reinstated in June 2022 for the Class of 2023.[70]

The Medical Laboratory Science (MLS) program made modifications mostly to do with moving courses or lab experiences to different places in the curriculum. Prior to March of 2020, the MLS program had a significant amount of infrastructure in place for online learning, and transitioning the program to virtual format was relatively easy to do with existing delivery mechanisms.[71]

In the fall of 2019, the Occupational Therapy program admitted the first cohort of students in the entry level occupational therapy doctorate degree (OTD) while completing the previous two cohorts of the Masters of Occupational Therapy (MOT) degree. The OTD curriculum was being taught for the first time and was designed to use innovative teaching strategies and concept exemplars that aimed to help the students learn the concepts of practice and apply them across the developmental and diagnostic categories rather than focusing on specific populations. This design was innovative, but it required faculty to rethink the educational process and ensure students were able to apply concepts in a variety of settings. Level I fieldwork experiences continued to be virtual using simulation software, video capture of clients with faculty oversite to follow instructions from the students to demonstrate assessment techniques and talk through clinical reasoning and intervention planning. Courses were moved online and students were encouraged to utilize anatomical software and practice skills on individuals with whom they were living. Students were able to participate in hands on supplemental instruction to facilitate skill mastery while check-offs were scheduled to test skills.[72]

The 2020 semester allowed for instruction to resume in a modified fashion. Classes were split into smaller groups and rooms were scheduled using technology to connect and provide instruction. Some classes continued online so as to free up space in the building for the hands-on laboratory classes. Faculty and students used personal

protective equipment, routinely sanitized the classroom, and instructional materials. Faculty and students adhered to the CDC guidelines regarding quarantine and isolation. Faculty were providing instruction in the classroom and via Zoom at the same time as they worked diligently to meet the educational needs of multiple learners.[72]

The restrictions continued into spring 2021, while anticipating vaccine availability. This was also challenging as vaccines were in short supply and both faculty and students were prioritized depending on patient contact.[72]

The Physical Therapy (PT) program, utilizing the same directive as all other academic programs, left campus for virtual learning on March 16, 2020. Many final clinical experiences for year 3 Doctor of Physical Therapy students were cancelled as local, regional, and national healthcare facilities responded to the mounting SARS-CoV-2 pandemic. The UND PT faculty quickly converted to online learning for spring semester and summer session. The faculty utilized laptop computers and a variety of UND software and educational products to deliver online content. The department delivered course content primarily through Zoom videoconferencing for lectures while laboratory activities were adjusted or postponed until in-person laboratory sessions could be held in fall 2020. The department also utilized Zoom videoconferencing to complete departmental meetings and student advising sessions. The Blackboard learning management system was integral to providing students with learning materials and recorded lectures. Faculty, staff, and students accessed numerous online, digital resources available through the UND SMHS Harley E. French library. The resources included AccessPhysiotherapy with subscriptions to both McGraw Hill and FA Davis publisher resources and textbooks. The department had used ExamSoft computer-based testing to provide secure and reliable examinations. The department added the features of ExamID and ExamMonitor that confirm the identity of the test taker and provide a virtually proctored environment for secure exam delivery at a distance.[73]

The Physician Assistant (PA) Program, under the directive of the Dean of the School of Medicine and Health Sciences, who also served as the Interim President, did not allow students to return to campus or their clinical rotation sites effective March 16, 2020, due to the coronavirus pandemic. These decisions were made in concert with the ND Department of Health, the ND University System, and the AAMC acting jointly with healthcare systems across the state/region. In response to this directive, modifications were made related to the PA curriculum and were implemented in order to continue meeting programmatic learning outcomes related to each cohort of students. The overall goal for all students was to continue effective content delivery without delaying progression through the curriculum.[74]

The Master of Public Health (MPH) Program, under the School's Department of Population Health, was well situated to respond quickly and decisively. Since its inception in 2012, the Program has offered the MPH degree to on-campus and distance learners. As a result, the Program had the foundational structure to respond in offering all courses and learning experiences in a remote nature. The pandemic brought even more clarity to the Program of the importance of delivering quality education to people already serving their communities, regardless of where they are located.[75]

The Sports Medicine program addressed both class and clinical education. Classes went online for the rest of the 2020 spring semester. There were no summer classes planned for summer 2020, and that time frame was not impacted for the program.[76]

Clinical or Fieldwork Adaptations

Because students in the Medical Doctor program were excluded from clinical rotation sites during part of Academic Year (AY) 2019–20 by the policies of the affiliated hospitals related to the SARS-CoV-2 pandemic and mindful that the potential existed for this to reoccur, the School aimed to ensure that all students completed the minimum required clerkship experiences in person as early in the academic year as possible in case the pandemic worsened and students were again removed from the clinical setting. The curriculum committees made the following scheduling adjustment: during AY 2020–21, a two-part clerkship strategy was utilized so that each student completed a portion of the clerkship in the first half of the year and then returned to complete the course in the second half of the year. Students returned to a traditional continuous clerkship format in AY 2021–22.[70]

Travel restrictions imposed because of the COVID-19 pandemic affected extramural elective opportunities for Phase 3 (third-year) students. For AY 2020-21, students were limited to an extramural elective only if a specialized letter of recommendation (e.g., Emergency Medicine) was required, the SMHS did not have a residency program that allowed a needed experience for residency application, or the SMHS did not offer a particular elective needed by a student for residency application. No international experiences were allowed. For AY 2021-22, students were limited to one in-person extramural elective and no international experiences, except for two extramural electives for students applying to Emergency Medicine residency programs in order for the student to obtain specialized letters of recommendation.[70]

Within the Occupational Therapy program, the MOT class of 2021 experienced more shifts in their educational experiences related to COVID-19 mitigation protocols. Level I and Level II fieldwork experiences were cancelled through the summer of 2020. Faculty restructured the Level I fieldwork week to include virtual fieldwork components. The department purchased simulation software that provided case studies to assess clinical reasoning and plan interventions for different age groups.[72]

Since level II fieldwork experiences were also postponed in the summer, the graduate year was re-sequenced so students completed their didactic courses during the summer and then the 12-week level II placements were scheduled for the fall. This shift tripled the load of faculty for the summer, but it also provided opportunities for the students to continue to make progress in their studies and graduate on time. The reaccreditation of the MOT curriculum was due during this time period but the department was able to petition cancelling this requirement due to it being the last cohort for the MOT program.[72]

Within the Physical Therapy department, the SARS-CoV-2 response resulted in first-year students (class of 2022) being unable to participate in clinical skills laboratory activities that are typically completed during the year one curriculum. This modification was a direct response to the pandemic as lecture-based courses and content was moved to summer session 2020. To assure that students received clinical skills educational information and practice, the department developed a clinical skills bootcamp for August 2020. This bootcamp included intensive, hands-on skills sessions that presented content that was delayed in spring 2020 and summer 2020 due to the distance learning requirement. Because of the limited opportunities to perform in-person laboratory skills activities, the program could not assure the students in the class of 2022 had achieved proficiency in the necessary clinical skills for clinical experiences. Therefore, clinical experiences scheduled for fall 2020 for the class of 2022 were delayed until fall 2021. The department moved lecture and laboratory courses into the fall 2020 semester instead of the clinical experience courses. These curriculum sequence changes allowed students in the class of 2022 to remain on schedule for a three-year curriculum and provided appropriate time with faculty for students to learn clinical skills prior to subsequent clinical experiences.[73]

For the Physician Assistant class of 2020, all 28 students completed their primary care clinical rotations. For the Specialty Clerkships, each student's progress through the clinical curriculum was evaluated in relation to program defined criteria for clinical experience expectations. Faculty conducted a thorough evaluation of patient demographics, clinical competencies, procedures, hours, care settings and completed assignments and evaluations. This analysis resulted in five students who had not yet started their surgical rotation (160 hours) and five additional students who had not completed the full hours requirement for general surgery (80-160 hour range). Further, there were three students who had not yet started their emergency medicine rotation (160 hours) and five additional students who had not completed the full hours required for emergency medicine (they were in the 80-160 hour range). Additionally, there were 16 students who had remaining specialty electives. Modifications of settings to accommodate students were put in place to ensure that all students had the opportunity for the required programmatic elements.[74]

In the Department of Population Health, the MPH Program, including staff and students, played a vital role in North Dakota's pandemic response. From April 2020 to June 2022, with funding provided by the North Dakota Department of Health, more than 180 case investigators worked 80,113 hours and 25,561 shifts and completed 36,579 investigations. The team, housed in the School of Medicine & Health Sciences, provided support to both the state and North Dakota University System. System leaders identified the work as one of the most successful and encouraging activities of the entire pandemic, including helping to keep NDUS institutions open.[75]

With support and guidance from the Program's accrediting body, the Council on Education for Public Health, all MPH students were successfully placed for their Applied Practice Experiences. Most, if not all, students completed their experiences using

remote technology. Nearly all experiences focused on and/or supported pandemic response in some way.[75]

The Department of Sports Medicine had to stop clinical education in the spring of 2020 but filled the void by meeting with students and utilizing Problem Based Learning (PBL) cases which the students worked through. The department's accreditation body modified its clinical education requirements temporarily because of the pandemic. There was a return to clinical education, which was done on the Campus of UND, in the fall of 2020.[76]

Academic Program Outcomes

A vast majority of SMHS students were able to graduate and enter the workforce on time. This included the Medical Doctor program, Medical Laboratory Science, Master of Public Health, Occupational Therapy, Physician Assistant Studies, Physical Therapy, and Sports Medicine programs. While some programs experienced slight delays, they were addressed, and students were able to catch back up to their peers.[70-76]

Ongoing Impacts

The Medical Doctor program reported that remote video/audio (Zoom) has been added to the list of available tools that could be utilized in the curriculum. The benefit of this is the ability to incorporate geographically-remote experts into the regular curriculum. As these experts would not have to travel to Grand Forks to provide, for example a lecture, there is minimal resource allocation and minimum impact on the experts' daily schedule thereby increasing their desire to be involved in educational experiences.[70]

The Medical Laboratory Science program has seen continued impacts. It has been challenging for some students to transition back to more traditional course delivery, and many are dealing with added mental health issues such as anxiety and depression.[71]

The Occupational Therapy program faculty and students have continued to adhere to the CDC guidelines for quarantining and isolation. If they are ill, they wear masks. Despite the shifts required in educational approaches and platforms, the SMHS entry level Occupational Therapy Doctorate program was fully accredited in December 2021.[72]

The Physical Therapy program fully returned to providing on-campus, face to face lecture and laboratory activities in May of 2021. It is important to note that the department faculty members initiated discussions about changing the curriculum prior to the SARS-CoV-2 pandemic. The faculty were in the process of developing a progressive curriculum that builds upon previous knowledge from semester to semester and year to year. The clinical experiences, which typically occurred in year 2, were going to be moved into year 3 of the DPT program to provide students with all didactic content prior to full time clinical experiences. Therefore, the SARS-CoV-2 pandemic

resulted in an accelerated shift toward a new curriculum that was approved to begin in August 2022.[73]

The Sports Medicine program does not have ongoing program impacts with COVID-19 other than at times faculty/students continue to isolate if testing positive.[76]

University of North Dakota College of Nursing and Professional Disciplines

Academic Program Adaptations

Undergraduate nursing converted the entire on campus program to online instruction during spring break of 2020. This included didactic, labs, and clinical instruction using virtual platforms.[77] The graduate nursing program was already online, However, it did have to move a face-to-face lab in the Nurse Anesthesia program to summer semester.[78]

Clinical or Fieldwork Adaptations

Undergraduate nursing students were not allowed in healthcare agencies for in person learning experiences for half of the 2020 spring semester. By fall 2020 instruction was in person at 75% with 25% virtual. Undergraduate nursing students did not return to full in person education until spring of 2021.[77] Graduate students were able to complete the minimum number of clinical hours, but some sites had to be changed.[78]

Academic Program Outcomes

Undergraduate nursing students were not delayed in their education and graduation was completed as scheduled.[77] All graduate nursing students were able to graduate on time.[78]

Ongoing Impacts

Ongoing changes for undergraduate nursing include various agency requirements regarding COVID-19 vaccines, testing, screening, etc. Additionally, students need fit testing of high-quality respiratory masks to be able to care for patients with active COVID-19 symptoms.[77] There have been no ongoing changes to the graduate program, but clinical sites remain reduced.[78]

North Dakota State University Pharmacy

Clinical or Fieldwork Adaptations

Many pharmacy students were not able to complete their introductory or advanced clinical experiences according to the usual schedule associated with the

curricular structure. Some students, especially those scheduled to complete clinical experiences in hospitals and health systems, had to delay those experiences from the summer of 2020 to the summer of 2021. Also, the duration of clinical experiential training during the final year had to be shortened for most of the graduating class of 2020. It was noted the rather significant reductions in the number of students that clinical sites were willing to take throughout 2020 and 2021 due to healthcare provider workload burden and clinical site patient care acuity levels. The experiential education team engaged in an enormous amount of problem-solving, creativity, and scheduling adjustment to continue to get student clinical hours completed. Less widespread disruptions to clinical training occurred periodically throughout 2020 and 2021 when sites and/or students had COVID-19 exposures or illness and had to isolate and/or quarantine.[79]

One positive impact was that many (nearly 100%) of the 2021 and 2022 graduating classes were able to serve the communities in which they completed clinical/fieldwork experiences through COVID-19 vaccination programs. Pharmacists and pharmacies were largely tasked with vaccine delivery when COVID-19 vaccines were approved. Many of the students received great clinical experience with vaccine program set up, delivery, and assessment in settings across the state and beyond.[79]

Academic Program Outcomes

Fortunately, the Pharmacy program was still able to meet the number of clinical hours required by the accrediting body and all students scheduled to graduate in 2020 and 2021 were able to do so on time. Students were generally able to enter the workforce on time, however there were delays for some due to limited testing time availability for national licensure exams, especially in the summer of 2020.[79]

Ongoing Impacts

When the pandemic began, a switch to remote instruction was necessary. In the fall of 2020, NDSU implemented a HyFlex instructional model, which allowed students and faculty the options of attending in person or remotely with live instruction happening in the classroom as well as via remote delivery simultaneously. Though all classes have returned to fully in person instruction, this HyFlex approach continues to be an option that the program has utilized periodically throughout the curriculum and in professional student advising, allowing for flexibility when needed and to ensure instructional continuity in the case of illness/absence of students and/or faculty.

The pandemic presented a great opportunity for the clinical training structure to be modified in sequencing of clinical experiences. Starting in the summer of 2020, there was an allowance for students just completing their first professional year (P1 year) to engage in clinical experiences in community pharmacy settings during the summer, when they previously had done so in hospital settings after the P1 year. This allowed for a switch of the focus of summer clinical experiences for both P1 and P2 students. The

Pharmacy program has retained this modification going forward and have formalized this adjustment in the curriculum.[79]

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CHAPTER FIVE: Physician Workforce in North Dakota

PHYSICIAN DISTRIBUTION IN NORTH DAKOTA

Distribution by Geography

Physician distribution in North Dakota varies significantly by geography, with a higher population-to-physician ratio in rural counties than in counties with larger cities (Figure 5.1). Nineteen of North Dakota's 53 counties, with a combined population of 49,239 (6.5% of North Dakota's population), have no practicing patient-care physicians.

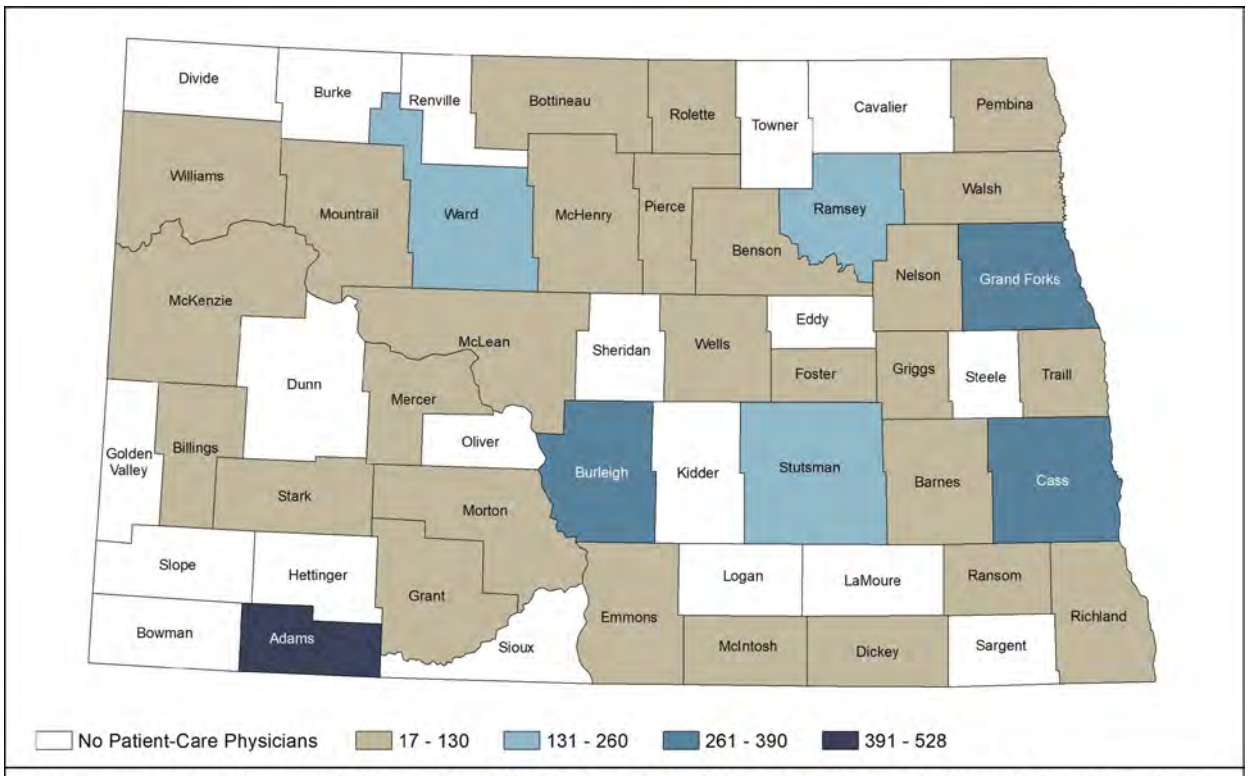

Figure 5.1. **County population per patient-care physician for all specialties in North Dakota, 2021.[1,2]**

Distribution of North Dakota Physicians Compared to the Upper Midwest and the Nation

When comparing the availability of physicians to provide healthcare services in North Dakota with regional and national benchmarks, it is important that the comparisons are of similar designations. There are a number of ways to select physicians for analyses, and analyses often are not clear about the criteria applied. The following are examples of the criteria that can be used for analysis: patient care, specialty, resident training status, age, Doctor of Medicine (MD)/Doctor of Osteopathy (DO) status, federal/nonfederal status, practice geography, gender, primary care status, patient-care status, practice type status, medical school of origin, and international medical school status.

"Prior to the full implementation of the Healthcare Workforce Initiative, North Dakota has the lowest number of residency slots per medical school student in the country, and there are significantly fewer residents on a proportional basis than any other state in the nation."

Differences in employment criteria can result in significant differences in physician counts and in workforce analysis results. Table 5.1 shows the allopathic physicians (MDs) in North Dakota and the United States for the years 1990, 1995, 2000, 2012, 2017, and 2019. This table includes all U.S. MD physicians except for those from U.S. territories. The table shows that across the years, North Dakota has trailed the United States in all physicians per 10,000 persons. However, the disparity between the number of North Dakota physicians per 10,000 persons and the number of U.S. physicians per 10,000 persons has generally remained consistent. Prior to the full implementation of the Healthcare Workforce Initiative, North Dakota has the lowest number of residency slots per medical school student in the country, and there are significantly fewer residents on a proportional basis than any other state in the nation.

Table 5.1
All medical doctors (MDs) per 10,000 persons in North Dakota and the United States by year. [1,3-5]

	ND	US	% ND of US
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
2017	23.9	28.1	85.1
2019	19.7	23.0	85.8

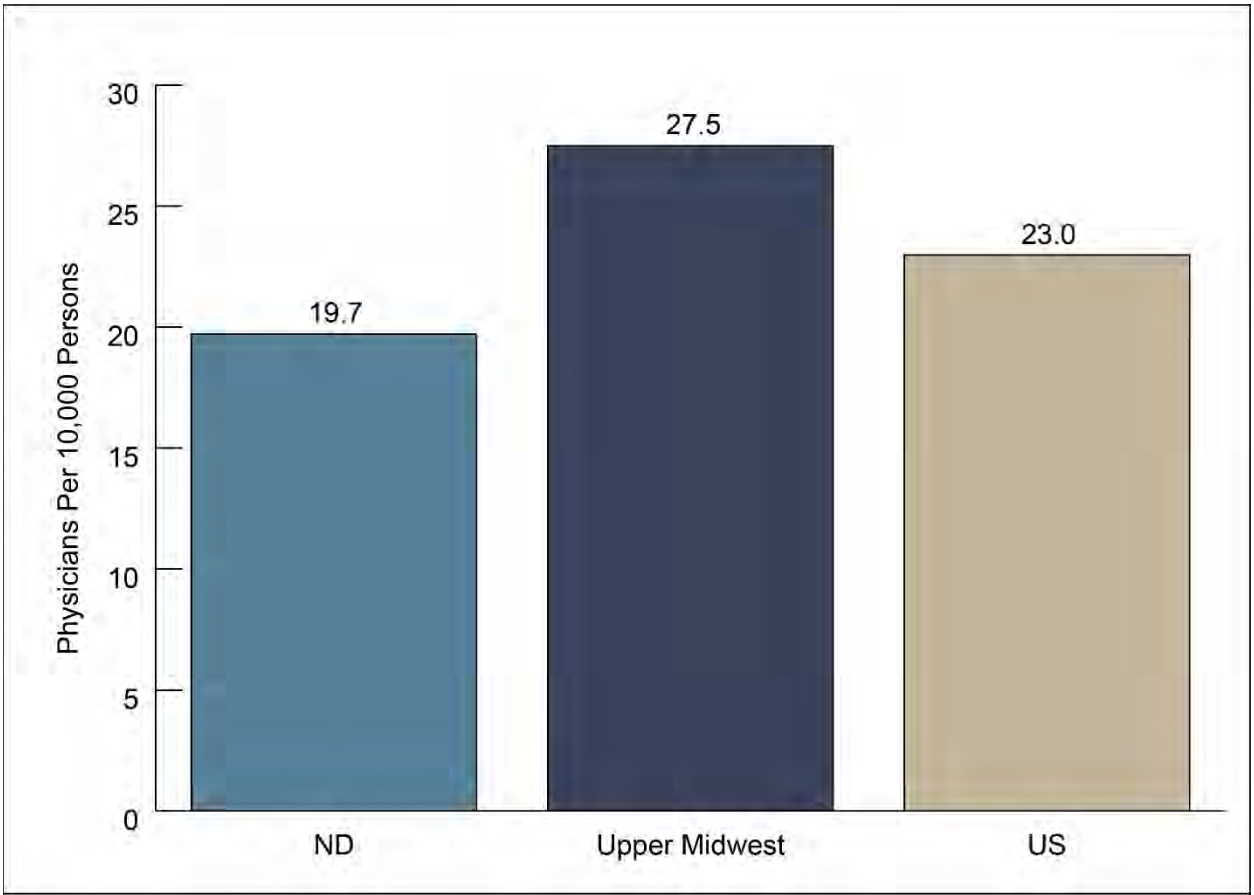

Figure 5.2. **Number of physicians per 10,000 persons for North Dakota, the Upper Midwest, and the United States (excludes resident physicians), 2019.[1,3]**

It often is challenging to reconcile differences between data from different sources. Thus, exact numbers, ratios, and text can vary somewhat from one place in the Seventh Report to another, though the differences are not significant. To minimize differences, data for this Report have been carefully garnered from the same source in an effort to be sure that the comparisons are as accurate as possible.

In 2021, North Dakota had 1,600 practicing patient-care physicians. Of those physicians, 51% graduated from the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) or from a UND residency program, or both.[2] The difference in 2019 physician-to-population ratios per 10,000 persons is illustrated in Figure 5.2. The ratio for North Dakota is 14.3% lower than for the United States as a whole and 28.4% lower than in the comparative Upper Midwest states (Iowa, Minnesota, Montana, Nebraska, South Dakota, Wisconsin, and Wyoming).

Distribution by Gender

North Dakota had fewer female physicians per 10,000 persons than the Midwest and United States during 2019 (Table 5.2). North Dakota had 29.4% fewer female

physicians than the United States and 20.8% fewer female physicians than the Upper Midwest. Although not as dramatic, the ratio of male physicians per 10,000 is also lower than both the Upper Midwest and the United States. The UND SMHS, like most medical schools in the country, currently graduates about equal numbers of men and women, so it is anticipated that the relative number of female physicians in North Dakota will increase over time.

Table 5.2
Gender of physicians per 10,000 persons in North Dakota with comparisons, 2019.[1,3,6]

	ND	Upper Midwest	US
Women	**8.4**	**10.6**	**11.9**
Metropolitan	12.9	12.8	13.0
Micropolitan	5.5	4.9	4.5
Rural	2.3	2.4	2.5
Men	**20.5**	**21.5**	**22.5**
Metropolitan	31.1	25.2	24.2
Micropolitan	14.0	13.6	13.1
Rural	6.1	7.1	7.2

The overall ratio of female physicians in North Dakota in metropolitan areas (per 10,000 persons) is similar to the ratios for the Upper Midwest and United States; the ratio of female physicians in North Dakota is slightly higher in micropolitan areas. The North Dakota male physicians per 10,000 persons ratio is higher in metropolitan counties than in the Upper Midwest and all U.S. counties. Regardless of gender, the ratio of physicians in rural areas is below that for the Upper Midwest and the nation.

> ***"The deficit of North Dakota physicians is in rural areas where we fall behind both the Upper Midwest and the nation in the number of physicians per 10,000 persons."***

Distribution by Geography

Figure 5.3 shows that North Dakota has a higher ratio of physicians (per 10,000) in metropolitan areas than either the Upper Midwest or the nation. By the same measure, the ratio of North Dakota physicians in micropolitan areas is higher than the Upper Midwest and the nation. The deficit of North Dakota physicians is in rural areas where we fall behind both the Upper Midwest and the nation in the number of physicians per 10,000 persons.

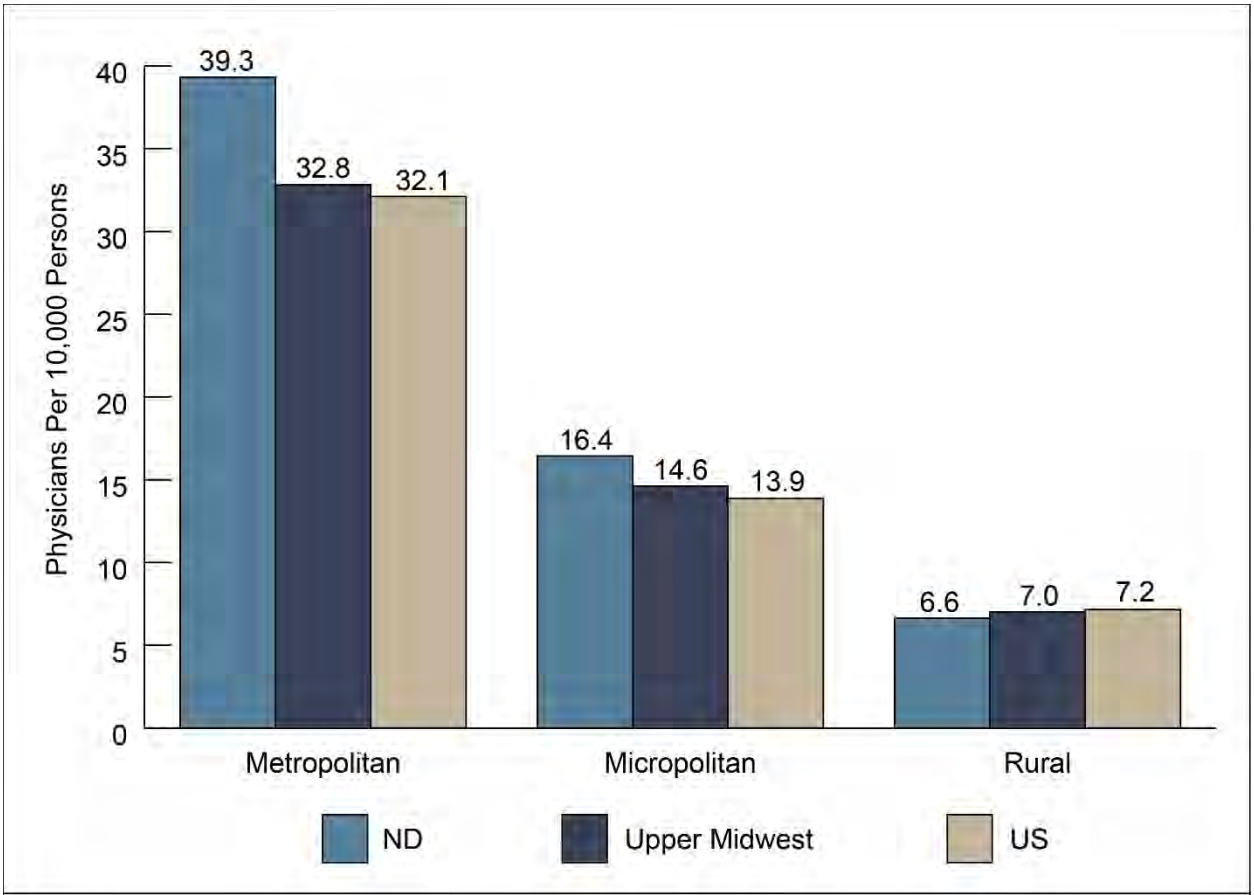

Figure 5.3. **Physicians per 10,000 persons for North Dakota with comparisons, 2019.**[1,3,6]

Table 5.3 shows the percentage of differences between the rate (per 10,000 persons) of office-based physicians in North Dakota, the Upper Midwest, and the United States in general. North Dakota has 17.4% fewer office-based physicians (per 10,000 persons) than the United States and 8.5% fewer office-based physicians than the Upper Midwest overall. Compared to Upper Midwest and U.S. rates, North Dakota has higher rates for metropolitan counties, approximately the same rates for micropolitan, and lower rates in rural counties.

Table 5.3
Physician primary practice per 10,000 persons in North Dakota with comparisons, 2019.[1,3,6]

	ND	Upper Midwest	% Difference	US	% Difference
Office	**15.7**	**17.1**	**-8.5**	**18.7**	**-17.4**
Metropolitan	23.9	20.4	15.8	20.2	16.8
Micropolitan	10.6	10.8	-1.9	10.2	3.8
Rural	4.7	5.3	-12.0	5.3	-12.0
Hospital	**7.3**	**7.2**	**1.4**	**6.9**	**5.6**
Metropolitan	11.6	8.6	29.7	7.6	41.7
Micropolitan	4.5	2.8	46.6	2.7	50.0
Rural	1.6	1.3	20.7	1.4	13.3

Negative numbers indicate that the ND rate is below that of the Midwest or US rate. Positive numbers indicate that the ND rate is above the Midwest or US rate.

Regarding hospital-based physicians, North Dakota metropolitan counties have more physicians per 10,000 persons than the Upper Midwest and United States by 29.7% and 41.7%, respectively. For micropolitan areas, North Dakota similarly has more by 46.6% and 50.0%, respectively. In rural counties, North Dakota has 20.7% more physicians than the Upper Midwest and 13.3% more physicians than the United States. The data indicates that North Dakota physicians in metropolitan and micropolitan counties are more likely to be in a hospital-based practice than the comparison groups. This likely is a reflection of North Dakota's emphasis on family medicine and primary care, which typically are clinic and office-based practices.

Distribution by Age

Table 5.4 shows the age of physicians distributed by geographic areas. Overall, North Dakota has fewer physicians in all age groups (per 10,000 persons) than does the Upper Midwest and U.S. comparison groups, except in the 35-44 age group where North Dakota has more physicians than both the Upper Midwest and the U.S. However, North Dakota has more physicians in metropolitan counties across all age categories except for the 75 and older group. North Dakota has fewer physicians in rural counties in all age categories than does the Upper Midwest and United States comparison groups except for the younger than 35 age group. Table 5.4 demonstrates the geographic maldistribution of physicians in North Dakota, the Upper Midwest, and the U.S., where the lowest number of physicians are in rural areas and the highest number of physicians are in metropolitan areas by a large factor. Figure 5.4 shows that the North Dakota physician age structure is similar to that of the Upper Midwest states and U.S. comparison groups, though North Dakota's physicians are a little less likely to be

75 and older. It is important to note that North Dakota has the highest percentage of physicians in the 35 to 44 age group, which would suggest that they will be in the physician workforce for a good number of years. Figure 5.5 shows that North Dakota physicians are slightly less likely to be female than the Upper Midwest and U.S. The state has a greater percentage of international medical graduate (IMG) physicians and physicians working in hospital-based practices.

> ***"There is a maldistribution of physicians in ND, the Upper Midwest, and the U.S., where the lowest number of physicians are in rural areas and the highest number of physicians are in metropolitan areas by a large factor."***

Table 5.4
Physician age groups per 10,000 persons with comparisons, 2019.[1,3,6]

	ND	Upper Midwest	US
<35	**3.8**	**4.8**	**4.9**
Metropolitan	6.1	5.6	5.4
Micropolitan	2.1	1.4	1.1
Rural	1.0	0.6	0.5
35-44	**7.3**	**6.8**	**6.9**
Metropolitan	12.3	8.2	7.6
Micropolitan	4.1	3.0	2.5
Rural	1.0	1.3	1.1
45-54	**4.9**	**6.0**	**6.4**
Metropolitan	7.7	7.4	7.0
Micropolitan	3.3	3.3	3.1
Rural	1.0	1.6	1.5
55-64	**5.5**	**6.2**	**6.4**
Metropolitan	8.1	7.3	6.8
Micropolitan	3.8	4.3	4.1
Rural	1.9	2.2	2.1
65-74	**4.5**	**4.8**	**5.3**
Metropolitan	6.2	5.4	5.6
Micropolitan	4.0	3.9	3.9
Rural	1.8	2.1	2.4
75+	**2.9**	**3.5**	**4.5**
Metropolitan	3.7	4.0	4.7
Micropolitan	2.3	2.6	2.9
Rural	1.8	1.7	2.0

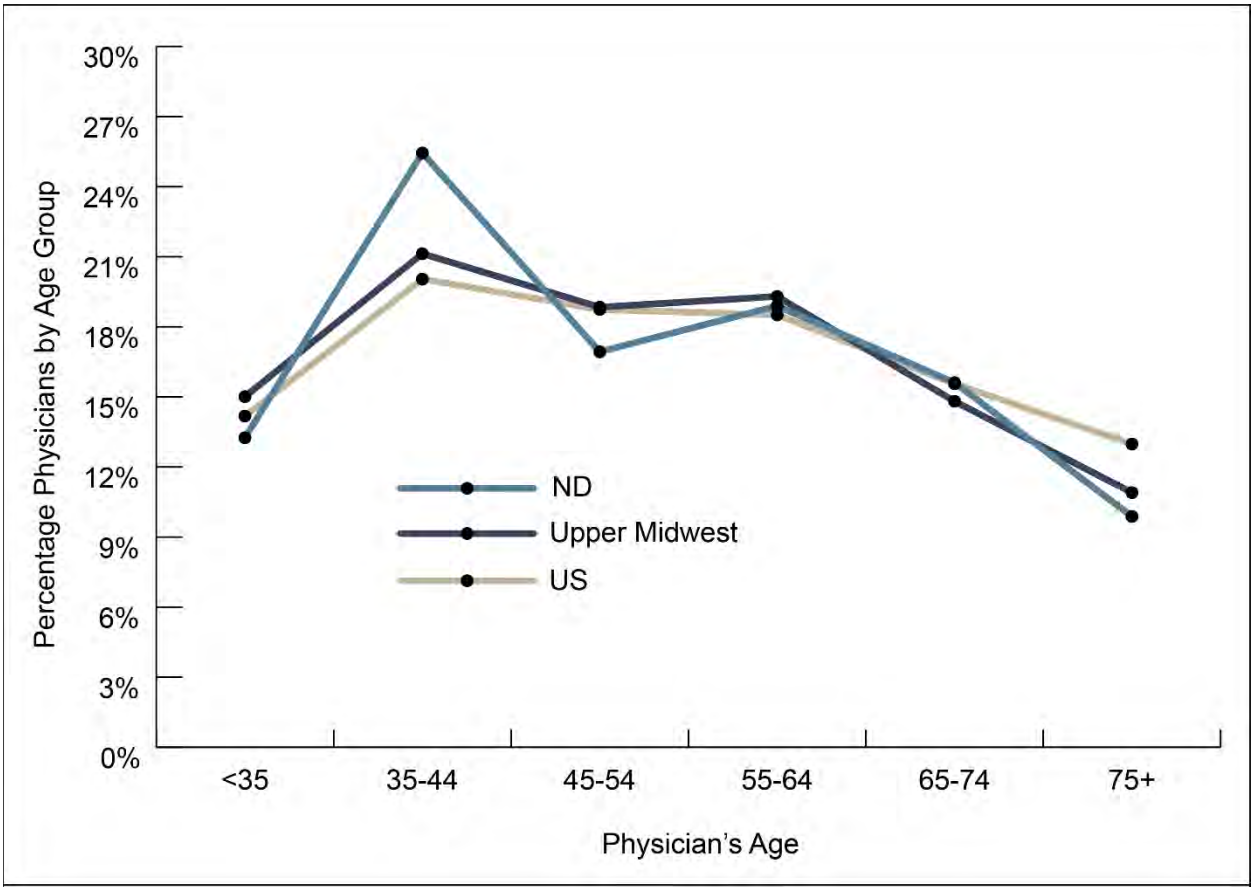

Figure 5.4. **Physician percent by age category with comparisons, 2019.[3]**

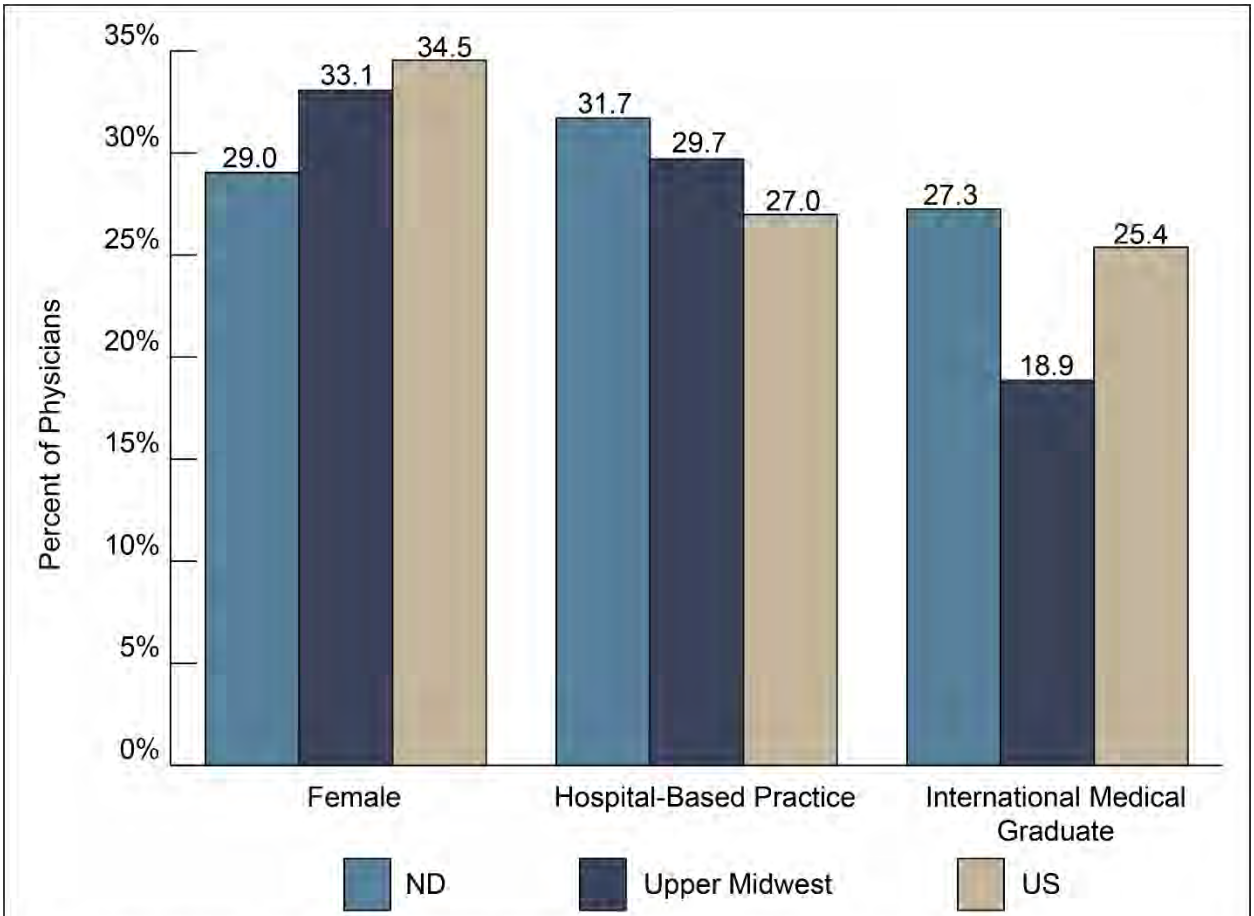

Figure 5.5. **Select physician characteristics with comparisons, 2019.[3]**

Distribution by Origin

Medical school graduates are dispersed widely across the nation with their location 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 greater the nationwide market is for its graduates. For example, the market for primary care physicians is more regional, while the market for neurosurgeons is more national and international.

Table 5.5
Percent of ND physicians who graduated from medical school in different states and where physicians who graduated medical school in ND currently practice, 2021.[2]

	Medical Schools that ND Direct Patient Care Physicians Graduated From		Where UND SMHS Graduates are Currently Practicing		Net ND Migration Balance
Region/State	**N**	**%**	**N**	**%**	
ND	603	38	522	30	--
MN	76	5	333	19	-257
WI	18	1	75	4	-57
IA	38	2	25	1	+13
MO	56	4	16	1	+40
CA	21	1	39	2	-18
SD	30	2	39	2	-9
MI	23	1	34	2	-11
TX	25	2	21	1	+4
NE	36	2	19	1	+17
IL	30	2	17	1	+13
Other	627	40	625	36	+2
Total	**1583**	**100**	**1765**	**100**	**-182**

"North Dakota is a net medical school graduate physician exporter. That is, more UND SMHS graduates practice in other states than other states' graduates are practicing in North Dakota."

Table 5.5 shows that of the 1,583 physicians currently practicing in North Dakota that were trained in the United States, 603 (38%) of them graduated from the UND SMHS. However, of the 1,765 MD graduates from the UND SMHS only 30% are currently practicing in North Dakota. Minnesota supplies the largest number out-of-state trained physicians to North Dakota (76 or 5%); however, North Dakota has exported 333 (19%) of its graduates to Minnesota. In 2021, the balance of migration into and out of North Dakota by physicians based on medical school state location varied widely with respect to where the physicians were practicing. This can be thought of as an interstate balance of trade in medical school training and practice destination (excluding IMG graduates).

North Dakota is a net medical school graduate physician exporter. That is, more North Dakota UND SMHS graduates practice in other states than other states' graduates are practicing in North Dakota. For the UND SMHS, 1,243 medical school graduates practice outside North Dakota versus 980 graduates of medical schools outside of North Dakota who practice in North Dakota. The resulting interstate "balance

of trade" between North Dakota and the rest of the nation is −182 to North Dakota's disadvantage. This number has decreased since 2013, when the balance was -370.

This out migration can be partly explained by the fact that UND graduates over the years who wanted to specialize in any specialty other than family medicine, internal medicine, psychiatry, general surgery, and transitional had to go out of state for their residencies because the residency program they chose does not exist within North Dakota (for example, cardiology). In 2021, of the 1,583 U.S. medical school graduates practicing in North Dakota (excluding graduates from Canada and other countries), 980 or 62% graduated from medical schools outside of North Dakota. Overall, North Dakota benefits from the influx of physicians who trained in other parts of the nation.

> ***"The out migration of physicians can be partly explained by the fact that UND graduates who want to specialize in any specialty other than family medicine, internal medicine, psychiatry, general surgery, and transitional have to go out of state for their residencies because the residency program they chose does not exist within North Dakota."***

In an effort to help reverse this trend, the UND SMHS partnered with area health providers to establish more residency and fellowship programs. New post-graduate programs include residencies in neurology and pediatrics and fellowship programs in geriatrics and hematology-oncology. This is important because the most important predictor of eventual practice location for physicians is where they obtain their residency training. Other predictors include location of medical school, where they grew up, and geographic origin of spouse when applicable. Many physicians, especially those in primary care, start practicing in the general vicinity of where they completed their post-medical school residency training. The beneficial effects of North Dakota residencies are readily apparent as 50% of physicians graduating from those residencies stay in North Dakota.[2]

Of the 2,416 physicians practicing direct patient care in North Dakota in 2021, 534 (22%) completed at least one residency within North Dakota while 1,882 (78%) did not. Of the 1,097 physicians who completed at least one residency in North Dakota, 63.5% (697) practice in other states and 36.5% (400) practice in North Dakota (Table 5.6).

Table 5.6
Percent of ND physicians who graduated from residencies in different states and where physicians who completed a residency in ND currently practice, 2021.[2]

	Where ND Practicing Physicians Completed Their Most Recent Residency		Where Physicians Who Completed At Least One Residency in ND Currently Practice		Migration into ND
Region/State	**N**	**%**	**N**	**%**	
ND	534	22	400	37	--
MN	288	12	189	17	+99
MI	173	7	13	1	+160
CA	66	3	57	5	+9
WI	119	5	38	4	+81
TX	77	3	34	3	+43
NY	151	6	10	1	+141
OH	78	3	10	1	+68
IA	83	3	15	1	+68
IL	86	4	14	1	+72
MO	75	3	13	1	+62
NE	64	3	11	1	+53
Other	622	26	293	27	+329
Total	**2416**	**100**	**1097**	**100**	**1319**

Among current practicing physicians in North Dakota, approximately 22.1% (534) completed their most recent residency in North Dakota. Other common state residencies were located in Minnesota (11.9%, 288), Michigan (7.2%, 173), New York (6.3%, 151), Wisconsin (4.9%, 119), Texas (3.2%, 77), Ohio (3.2%, 78), and California (2.7%, 66). In addition to the individual states listed, North Dakota physicians frequently completed their most recent residency in various other states across the U.S. (25.7%, 622).

> ***"Among current practicing physicians in North Dakota, approximately 22.1% completed their most recent residency in North Dakota."***

In contrast, the current practice locations of physicians who completed at least one residency in North Dakota also were examined. It was found that 36.5% (400) of physicians who currently practice in North Dakota completed at least one residency in the state as well. Approximately 17.2% (189) of ND residency graduates currently practice in Minnesota; 5.2% (57) practice in California; 3.1% (34) practice in Texas;

3.5% (38) practice in Wisconsin; and 1.2% (13) are currently working in Michigan. In addition to the specific states listed in Table 5.6, 26.7% (293) of those who completed a North Dakota residency now work in other states across the U.S.

North Dakota has a positive balance of physicians who completed their residency training in other states and who are now practicing in North Dakota. There are 1,882 physicians with no North Dakota residency training currently practicing in North Dakota and 697 North Dakota residency graduates practicing out of state. The net influx of residents trained outside of North Dakota and now working in North Dakota is 1,319. This makes North Dakota a large net importer of other states' residency graduates.

> ***"One of the most important predictors of whether physicians establish a clinical practice in North Dakota is if the physician attends the UND SMHS and completes at least one residency in-state."***

One of the most important predictors of whether physicians establish a clinical practice in North Dakota is if the physician attends the UND SMHS and completes at least one residency in-state. Table 5.7 shows that the majority of family medicine physicians practicing in North Dakota either graduated from UND SMHS and/or completed a residency in North Dakota. This same trend is also noted for other specialties.

Table 5.7
Percent of North Dakota specialty physicians who graduated from the UND SMHS and/or completed at least one residency in North Dakota as of 2021.[2]

Residency	Percent
Family Medicine	78
Internal Medicine	44
Obstetrics & Gynecology	69
Pediatrics	45
Psychiatry	48

Residency Training in North Dakota

The number of different specialties where a residency can be completed within North Dakota includes family medicine, internal medicine, neurology, pediatrics, psychiatry, orthopedic surgery, surgery (preliminary), surgery (categorical) and transitional.[7] 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. There also are fellowship (post-residency) programs available in geriatrics, hematology-

oncology, and sports medicine. Table 5.8 shows the current numbers of residents and fellows in the programs.

Table 5.8
Number of residents/fellows in ACGME-accredited North Dakota residencies/ fellowships and number who completed training in 2021-2022.[7]

Residency/Fellowship	Number in Training 2021 - 2022	Duration in Years	Completed Training in 2021 - 2022
Family Medicine	86	3 Years	28
Geriatrics Fellowship	2	1 Year	1
Internal Medicine	23	3 Years	8
Neurology	3	4 Years	NA
Orthopedic Surgery	12	5 Years	NA
Psychiatry	20	4 Years	5
Sports Medicine Fellowship	2	1 Year	2
Surgery (Preliminary)	4	1 or 2 Years	4
Surgery (Categorical)	25	5 Years	5
Transitional Year	5	1 Year	5

"In addition to providing funding for many of these additional residency/fellowship slots through the Healthcare Workforce Initiative (HWI), the North Dakota Legislature provided support to permit expansion of graduate healthcare provider class sizes, with the addition of 16 medical students per year (total 64) and 30 health sciences students per year (total of 90)."

New positions have been awarded since 2012 to UND's Center for Family Medicine in Bismarck (rural family medicine, in conjunction with West River Health System in Hettinger); UND's Center for Family Medicine in Minot (rural family medicine in conjunction with Mercy Medical Center in Williston); UND Department of Surgery (rural general surgery); UND Department of Psychiatry and Behavioral Science (rural psychiatry); Catholic Health Initiatives-St. Alexius Medical Center (hospitalist and geriatrics); Sanford Health in Fargo (family medicine); and Sanford Health in Bismarck (geriatrics fellowship).

In addition to providing funding for many of these additional residency/fellowship slots through the Healthcare Workforce Initiative (HWI), the North Dakota Legislature provided support to permit expansion of graduate healthcare provider class sizes, with the addition of 16 medical students per year (total 64) and 30 health sciences students per year (total of 90).

Physician Specialty and Rural Location

North Dakota's patient-care physicians practice in many different specialties. Of the direct patient care physicians practicing in North Dakota in 2021, the most prevalent physician specialties included family medicine at 363 (23.0%); general internal medicine at 157 (9.9%); general surgery at 112 (7.1%); radiology at 88 (5.6%); internal medicine specialties at 87 (5.5%); anesthesiology at 83 (5.3%); psychiatry at 82 (5.2%); and emergency medicine at 79 (5.0%). These specialties account for more than half of the practicing physicians (66.5%) in the state. None of the remaining specialties account for more than 5% of North Dakota's practicing physicians.[2]

The geographic distribution of physicians is discussed in Chapter 6 in the context of primary care physicians. The more specialized areas of practice are centralized in the state's larger cities where the populations are sufficient enough to support them and they have the necessary threshold populations whose reimbursements make their practices viable.

International Medical Graduates

International medical graduates (IMGs) play a crucial role in the U.S. healthcare system.[8] They are defined as medical school graduates from any country outside of the United States and Canada. Currently, IMGs account for approximately 25% of the practicing physician workforce in the United States and that percentage is expected to grow in the future.[9] They are expected to fill needed positions in family medicine, internal medicine, surgery and pediatrics that are not being filled by U.S. medical graduates (USMGs). Forty-one percent of practicing IMGs are in primary care disciplines, with internal medicine having the highest number of IMGs.[1] In addition, they are more likely to practice in rural areas or in areas that serve socioeconomically disadvantaged populations.

IMGs make up about one-fourth of the North Dakota physician workforce, which was similar to the 2019 rate in the United States. In 2019, 24.7% of all physicians practicing in North Dakota were IMGs, compared to 16.6% for the upper Midwest and 22.0% for the U.S. IMGs are a critically important component of the professional workforce in North Dakota and throughout the country.

All three geographic areas of North Dakota have relatively more IMG physicians per 10,000 persons than does the Upper Midwest and United States (Table 5.9). The distribution of IMG physicians in North Dakota is similar to the distribution of U.S.

medical school graduates (USMGs), in that the highest density is in the metropolitan areas and lowest density is in rural areas.

> ***"International medical graduates are more likely to practice in rural areas or in areas that serve socioeconomically disadvantaged populations."***

The demographic characteristics of IMGs compared to USMGs in North Dakota are similar. In 2021, the gender breakdown for IMGs compared to USMGs is 69% male compared to 67%, respectively. The average age of IMGs is 49.2 compared to 52.1 for USMGs. When examining physician specialty, IMGs are slightly more primary care-oriented than USMGs with 41.8% and 36.5%, respectively. IMG surgeons represent less than half the rate of USMGs with 3.5% and 8.2%, respectively. IMGs are in internal medicine at twice the rate of USMGs with 17.3% and 7.6%, respectively.

Of the 376 IMGs in North Dakota, 157 practice in primary care with 65 (17.3%) practicing in general internal medicine. Of those 65 general internal medicine IMGs, 25 (38.5%) completed a general internal medicine residency in the state of North Dakota. Comparatively, of the 58 internal medicine specialty IMGs, 9 (15.5%) completed a residency in North Dakota while the rest were trained out-of-state.

Table 5.9
Rate of IMGs and USMGs per 10,000 persons with comparisons, 2019.[1,3,6]

	ND	Upper Midwest	US
IMG	**6.3**	**4.6**	**6.5**
Metropolitan	9.6	5.5	7.1
Micropolitan	4.7	2.7	2.6
Rural	1.3	0.9	1.2
USMG	**16.2**	**19.5**	**18.9**
Metropolitan	25.3	23.2	20.5
Micropolitan	9.7	10.8	10.1
Rural	4.8	5.7	5.4

The largest numbers of IMGs practicing in North Dakota come from India, Pakistan, and Dominica (West Indies) (Table 5.10). There was a high percentage of IMGs practicing in North Dakota in 2021 from India (5.5% of North Dakota's practicing physicians).

Table 5.10

Country of origin of IMG physicians practicing in North Dakota, 2021.[2]

Region	Country	Total Number	Per Country
Southern Asia		**126**	
	India		87
	Pakistan		27
	Nepal		5
	Bangladesh		4
	Iran		3
Caribbean		**55**	
	Dominica (West Indies)		22
	Grenada (West Indies)		12
	Netherlands Antilles		12
	Antigua and Barbuda		4
	Dominican Republic		2
	Jamaica		1
	Aruba		1
	Barbados		1
Southeastern Asia		**32**	
	Philippines		20
	Thailand		7
	Indonesia		2
	Malaysia		1
	Myanmar		1
	Vietnam		1
Western Asia		**34**	
	Syria		10
	Jordan		10
	Lebanon		6
	Israel		4
	Turkey		3
	United Arab Emirates		1
Western Africa		**16**	
	Nigeria		12
	Ghana		4
South America		**6**	
	Brazil		3
	Peru		2
	Argentina		1
Eastern Europe		**26**	
	Poland		11
	Romania		10
	Hungary		3
	Bulgaria		1
	Czechoslovakia		1
Central America		**6**	
	Mexico		6
Eastern Asia		**8**	
	China		5
	Taiwan		2
	Japan		1

"If not for the HWI, the combination of the aging of the state's population and increasing healthcare needs would have resulted in the demand for physicians outpacing the supply even more than it has."

Projection of Physicians in North Dakota

If not for the HWI, the combination of the aging of the state's population and increasing healthcare needs would have resulted in the demand for physicians outpacing the supply even more than it has. All other things being equal, if the population of North Dakota does not expand at an increased rate but at the slower historical rate, the rate of physicians per 10,000 persons will remain stable through 2045. The standard projection of population growth shows a relatively steady supply of physicians relative to the population, but only if the HWI measures continue to be implemented in full. Full and continuing implementation of the HWI will help ensure that adequate healthcare delivery teams will be available throughout the state.

One important variable in projecting the future supply of physicians in North Dakota is when they decide to retire. Recent projections by IHS, Inc., in conjunction with the Association of American Medical Colleges, have shown a nearly 10% predicted difference in eventual workforce levels that occur if retirement is accelerated or delayed by as little as two years.[13] Because physician burnout and job dissatisfaction appear to be increasing (at least in part because of the burden of dealing with the electronic health record),[14] the frequency of early retirement may increase. The estimated average age of physician retirement at present is 67 years, but it is uncertain that this will continue to be the case in the future. For example, over one-third of surveyed physicians have indicated that they plan to accelerate their retirement plans because of frustration with the healthcare system, but there is little evidence so far that they actually are doing so.[13] Nevertheless, it is possible that one-third (or even more) of all currently active physicians might retire within the next decade.[13] If this were to occur, it clearly would exacerbate the existing physician shortage and distribution problem.

SARS-CoV-2 PANDEMIC IMPACTS ON PHYSICIAN WORKFORCE

National Impacts

When examining data related to physician workforce, it is important to consider potential impacts of the SARS-CoV-2 pandemic. Since the beginning of the pandemic, there have been observed declines in physicians' work hours and the percentage of physicians working full time.[15] Nationally, the percentage of physicians working full time decreased from 84.2% to 80.7% during the pandemic.[16] A loss of revenue and reduced earnings for physicians in the United States has also been linked to the pandemic. Moreover, there was an increase in the number of physicians who were laid off during the pandemic.

The onset of the SARS-CoV-2 pandemic introduced additional stressors into a physician workforce that already faces burnout. Generally, burnout refers to job-related stress that occurs in healthcare practice.[17] It is often characterized by emotional exhaustion, depersonalization, and a feeling of low personal accomplishment as a result of chronic stress from working in the medical field. Nearly 75% of emergency medicine physicians reported experiencing burnout since the beginning of the pandemic.[18] Numerous factors such as an increase in workload, emotional strain and anxiety, and being isolated from friends and family contributed to this burnout.

The use of telehealth became especially prevalent during the pandemic as a way to reduce the risk of infection while still providing medical care.[19] The number of primary care physicians utilizing telehealth increased from 5.3% before the pandemic to 46.2% during the pandemic.[20] This substantial change in healthcare delivery may have lasting effects, as around 70% of primary care physicians intended to continue using telehealth to some degree after the pandemic.

SUMMARY

The supply of physicians in North Dakota lags behind the nation, especially in rural counties (6.6 physicians per 10,000 persons compared with 7.0 in other Upper Midwest states and 7.2 for the United States). Aging is a problem because more than half of North Dakota's physicians (51.4%) are 45 to 74 years old. Though a large proportion of North Dakota's physicians were IMGs and Canadian physicians (23.8%) in 2021, the state lacks large numbers of physicians from other states.

As the physician population in the state continues to age, a large number will be retiring and will need to be replaced. As the North Dakota population also ages, there will be an increased need for physician care.

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

Thus, now is not the time for a business-as-usual approach in the face of all the specifics addressed in this chapter. These influences are likely to lead to fewer physicians within North Dakota to serve its growing population and the significant growing number of older adult citizens. North Dakota is vulnerable to various trends and

circumstances over which it has little control. In the face of all this, it is critical that North Dakota continues to control its own fate by appropriately continuing to invest in and support the HWI to train healthcare professionals, including physicians, who will practice within North Dakota. Finally, it is important to continue to provide opportunities for young adult North Dakotans to enter pathway programs that eventuate in their training as physicians.

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CHAPTER SIX: Primary Care and Specialty Physician Workforce in North Dakota

PRIMARY CARE PHYSICIANS

Primary care physicians are an essential foundational component of the North Dakota healthcare delivery system, and access to them by all of North Dakota's population is an important goal. Primary care physicians are defined as physicians in the specialties of family medicine, general internal medicine, and general pediatrics. Specialist physicians can provide some primary care services but focus on specific medical areas. The specialist physicians addressed in this chapter are psychiatrists, general surgeons, general pediatricians, and obstetrics/gynecology.

> ***"Primary care physicians are an essential foundational component of the North Dakota healthcare delivery system, and access to them by all of North Dakota's population is an important goal."***

PRIMARY CARE PHYSICIAN DISTRIBUTION IN NORTH DAKOTA

Distribution by Geography

The North Dakota population per primary care physician is shown in Figure 6.1. There are no primary care physicians in 16 counties, which have a combined population of 42,275.[1,3] Counties with greater than 2,500 people per physician also may have primary-care-physician shortages. Even in counties with the lowest rates of population-per-primary-care-physician may see primary care physician shortages because of travel distances to alternative care and high needs for care.

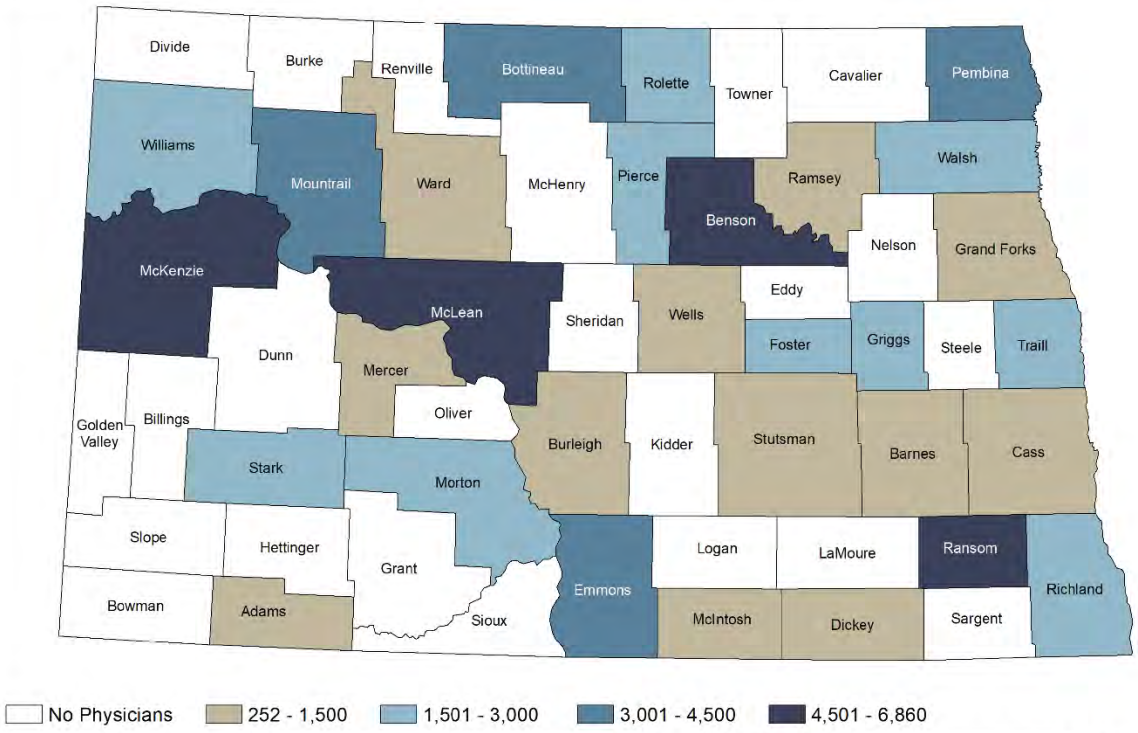

Figure 6.1. **Population per primary care physician in North Dakota, by county, 2021.[1,2]**

DISTRIBUTION OF NORTH DAKOTA PRIMARY CARE PHYSICIANS COMPARED TO THE UPPER MIDWEST AND THE NATION

Distribution by Geography

The ratio of primary care physicians (including residents who are medical graduates undergoing a period of advanced training in their medical specialty before practice as a physician) in North Dakota per 10,000 population is similar to the United States but slightly lower than for the Upper Midwest (Figure 6.2).

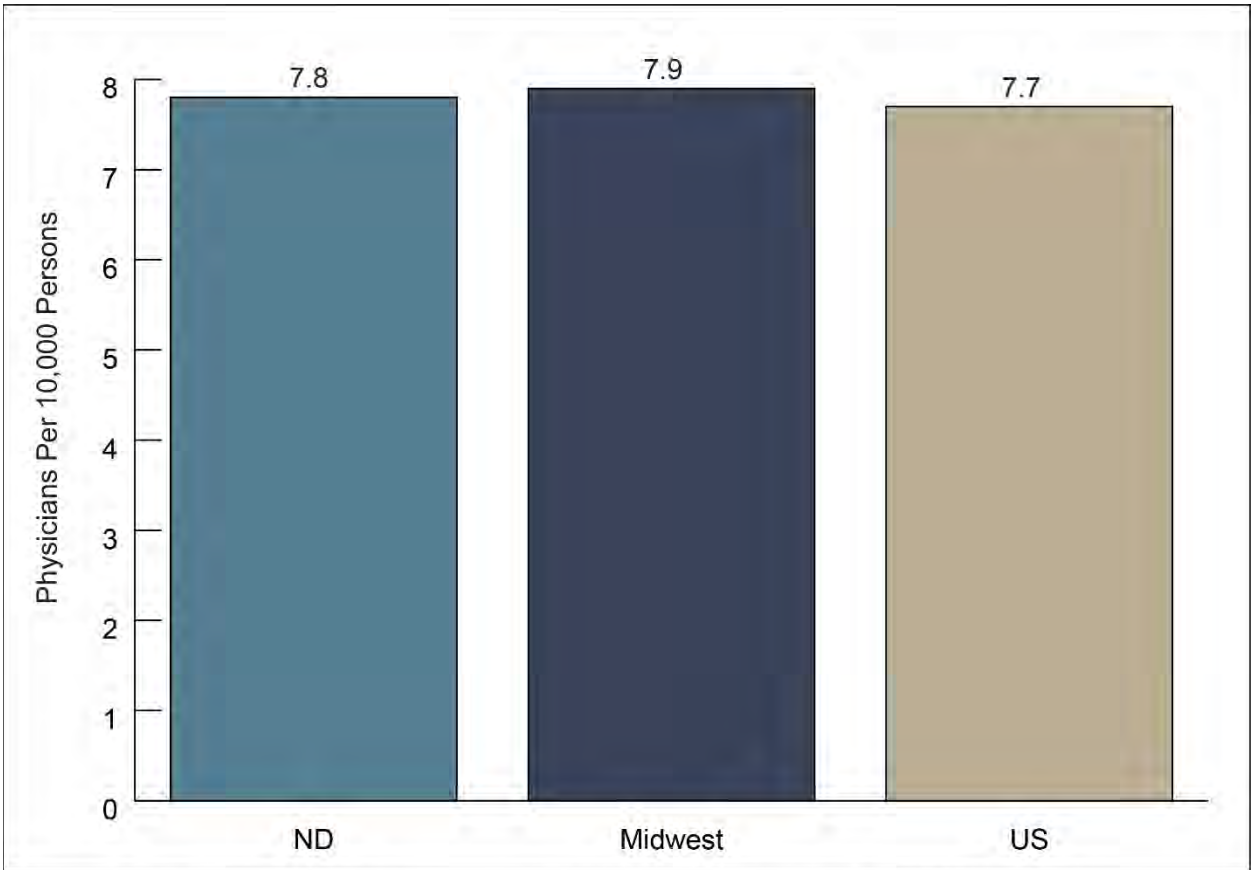

Figure 6.2. **Primary care physicians per 10,000 persons in North Dakota, the Upper Midwest, and the United States, 2020.**[3,5]

Figure 6.3 shows that across North Dakota, the Upper Midwest, and the United States, the practicing-primary-care-physician-to-10,000-population ratios are lower for rural counties. For metropolitan counties, North Dakota's rate per 10,000 population is higher than for the Upper Midwest and for the United States. Regarding rural counties, North Dakota trails the Upper Midwest (4.4 versus 5.2) and is equal to the United States (4.4 versus 4.4) in the number of physicians per 10,000 population.

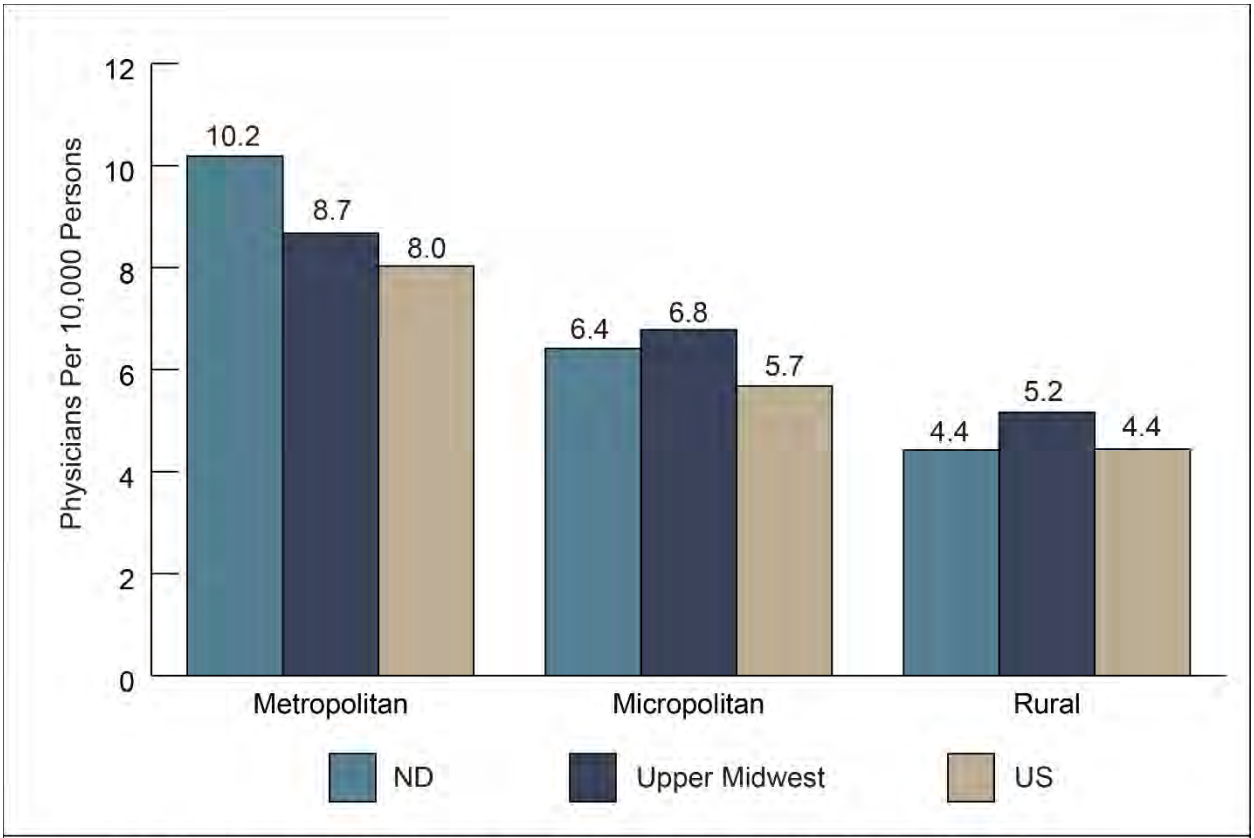

Figure 6.3. **Primary care physicians per 10,000 persons in North Dakota, with comparisons, 2020.**[2,3,5]

Of the 674 primary care physicians practicing in North Dakota in 2020, 60.7% (409) were family physicians, 27.3% (184) were general internal medicine, and 12.0% (81) were general pediatricians.[4]

Distribution by Selected Characteristics

Table 6.1 shows the percentage of primary care physicians broken down by gender, hospital-based practice, and international medical graduate (IMG) status. Of the 598 primary-care direct patient care physicians practicing in North Dakota, 66.9% are located in metropolitan counties, 19.7% in micropolitan counties, and 13.4% in rural counties. Rural counties have a higher percentage of physicians who are female than metropolitan or micropolitan counties (43.8% rural versus 34.7% micropolitan, and 42.0% metropolitan). The percentage of hospital-based physicians in metropolitan areas is 18.2% versus 21.2% in rural counties. Thus, rural based primary care physicians are more likely to practice in conjunction with a hospital rather than other settings. As shown in Table 6.1, the percentage of North Dakota physicians who are IMGs varies substantially by location status (16.2% up to 30.5%). In North Dakota, 26.3% of all primary-care, patient-care physicians are IMGs.

"Rural based primary care physicians are less likely to practice in conjunction with a hospital rather than other settings."

Table 6.1
Percent of primary care physicians in North Dakota who are female, have hospital-based practices, and are International Medical Graduates, 2020.[1,3]

	N	Area (%)	Female (%)	Hospital-Based (%)	IMG (%)
Metropolitan	400	66.9	42.0	18.2	27.0
Micropolitan	118	19.7	34.7	16.1	30.5
Rural	80	13.4	43.8	21.2	16.2
Total	**598**		**40.8**	**18.2**	**26.3**

Distribution by Age

A comparison of the age structure of North Dakota's primary care physicians compared with those of the Upper Midwest states (Iowa, Minnesota, Montana, Nebraska, South Dakota, Wisconsin, and Wyoming) and the United States is depicted in Figure 6.4. North Dakota's primary care physicians are less likely to be in the under 35 age group and more likely to be in the 35 to 44 age group with respect to the comparison regions. In the 45 and older group, North Dakota shows the same trends as in the other comparison regions.

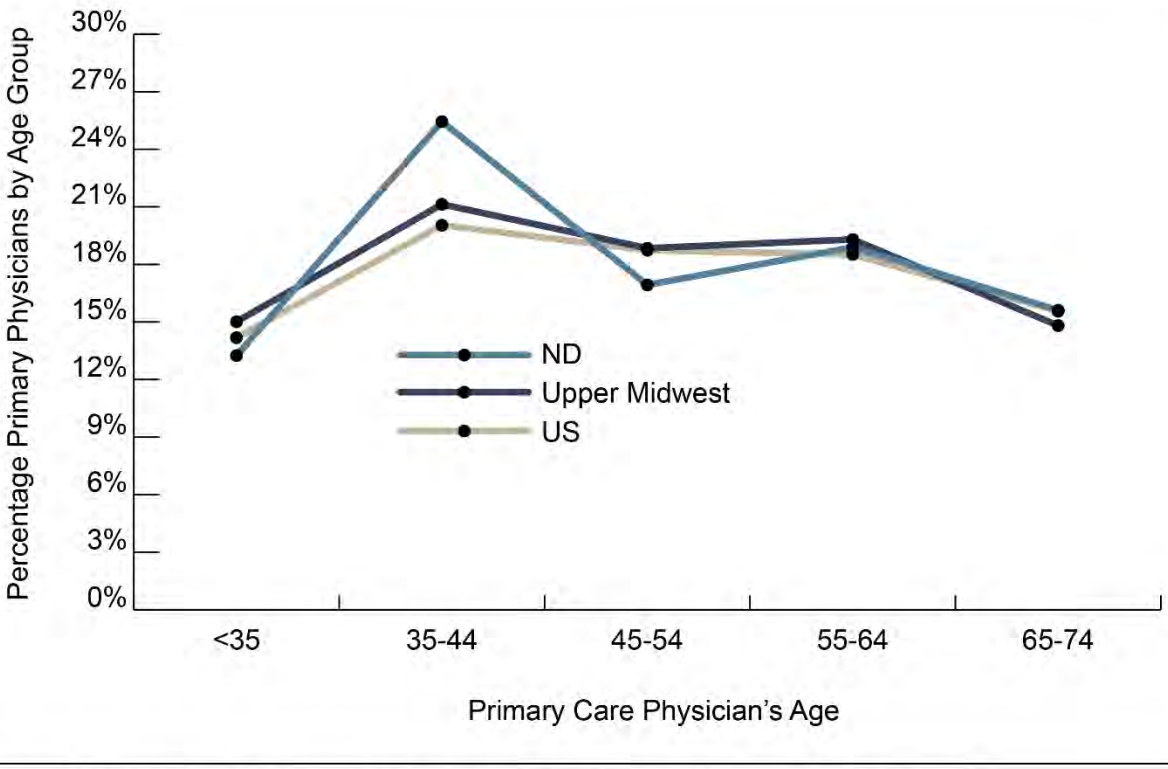

Figure 6.4. **Percent of primary care physicians by age for North Dakota, with comparisons, 2020.[5]**

The age distribution of North Dakota primary care physicians is shown by metropolitan status in Table 6.2. The percentage of primary care physicians for micropolitan counties is higher for the 65–74 age category than for the rural and metropolitan county categories (21.0% versus 15.4% and 14.6%, respectively). The micropolitan and metropolitan county categories are similar in their age structures. Rural counties have gained primary care physicians over the past few years (2019: 188 vs. 2017: 86). Furthermore, those gains are not specific to recent graduates but are spread across the age categories. The implication of this finding is micropolitan counties appear to have the most difficulty attracting recent graduates. The vast majority of primary care physicians, regardless of county population densities, are between the ages of 35 and 64.

Table 6.2
Percent of primary care physicians in North Dakota by age and area, 2019.[2,4]

	N	<35	35-44	45-54	55-64	65-74	>74
Metropolitan	362	11.9	32.9	19.3	20.7	14.6	0.6
Micropolitan	76	7.9	27.6	15.8	26.3	21.0	1.3
Rural	188	12.2	27.7	20.7	21.8	15.4	2.1
Total	**626**	**11.5**	**30.7**	**19.3**	**21.7**	**15.7**	**1.1**

Table 6.3 shows that North Dakota has comparatively more primary care physicians in the 35–44 age category, and fewer in the other age categories when compared to the upper Midwest and the U.S. The rates of primary care physicians are generally higher for metropolitan and micropolitan areas than for rural areas in North Dakota, the Upper Midwest, and the United States than for rural.

Table 6.3

Age and area of primary care physicians per 10,000 persons in North Dakota with comparisions, 2020.[2,3,5]

	ND	Upper Midwest	US
<35	**3.8**	**4.8**	**4.9**
Metropolitan	6.1	5.6	5.4
Micropolitan	2.1	1.4	1.1
Rural	1.0	0.6	0.5
35 - 44	**7.3**	**6.8**	**6.9**
Metropolitan	12.3	8.2	7.6
Micropolitan	4.1	3.0	2.5
Rural	1.0	1.3	1.1
45 - 54	**4.9**	**6.0**	**6.4**
Metropolitan	7.7	7.4	7.0
Micropolitan	3.3	3.3	3.1
Rural	1.0	1.6	1.5
55 - 64	**5.5**	**6.2**	**6.4**
Metropolitan	8.1	7.3	6.8
Micropolitan	3.8	4.3	4.1
Rural	1.9	2.2	2.1
65 - 74	**4.5**	**4.8**	**5.3**
Metropolitan	6.2	5.4	5.6
Micropolitan	4.0	3.9	3.9
Rural	1.9	2.1	2.4
75+	**2.9**	**3.5**	**4.5**
Metropolitan	3.7	4.0	4.7
Micropolitan	2.3	2.6	2.9
Rural	1.8	1.7	2.0

Table 6.4 shows that North Dakota has a lower percentage of its primary care physicians practicing in office-based practice than in the Upper Midwest or the United States. North Dakota has a slightly higher percentage of its primary care physicians practicing in hospital-based practice than in the two geographic comparison groups. The ratios for all three groups are lower as the counties become more rural.

Table 6.4
Practice base and area of primary care physicians per 10,000 persons in North Dakota with comparisons, 2020. [2,3,5]

	ND	Upper Midwest	US
Office	**15.7**	**17.1**	**18.7**
Metropolitan	23.9	20.4	20.2
Micropolitan	10.6	10.8	10.2
Rural	4.7	5.3	5.3
Hospital	**7.3**	**7.2**	**6.9**
Metropolitan	11.6	8.6	7.6
Micropolitan	4.5	2.8	2.7
Rural	1.6	1.3	1.4

Distribution by Origin

Nearly 5 out of 10 (46.8%) primary care physicians in North Dakota graduated from the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) (Figure 6.5). Figure 6.6 shows that over half (52.5%) of North Dakota's primary care physicians obtained their residency training from a residency program based in North Dakota. More than 70% of North Dakota primary care physicians completed their residency training in North Dakota and other upper Midwestern states.

> ***"Nearly 5 out of 10 (46.8%) primary care physicians in North Dakota graduated from the University of North Dakota School of Medicine and Health Sciences."***

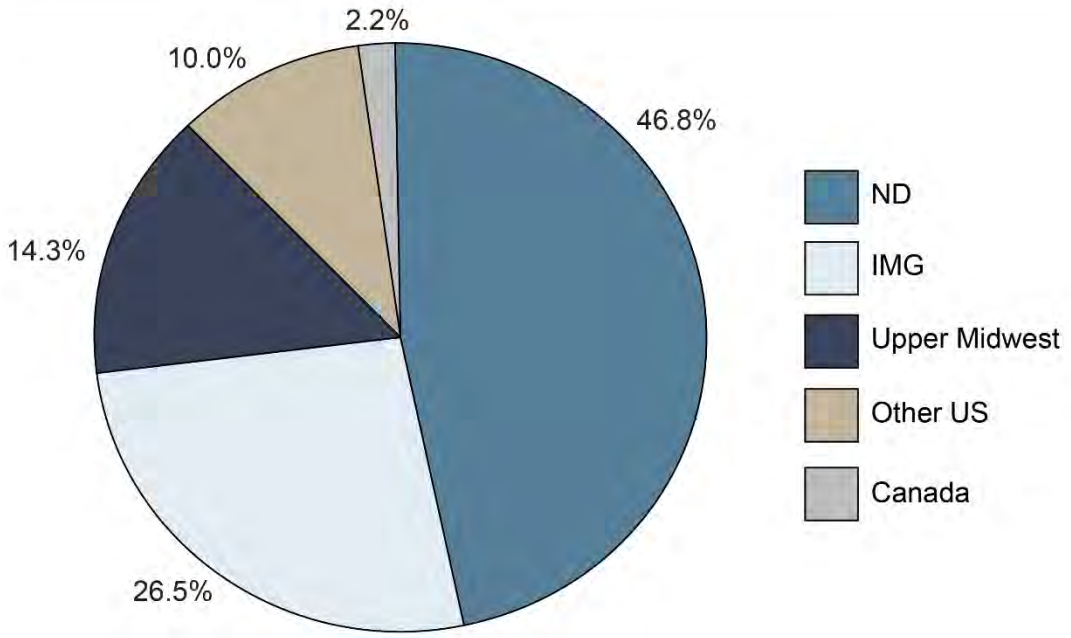

Figure 6.5. **Locations where North Dakota primary care physicians graduated from medical school, 2021.**[1]

North Dakota's primary care physicians graduated from medical schools from all over the United States and the world. UND SMHS graduates account for 46.8% of practicing primary care physicians in North Dakota. International Medical Graduates (IMGs) account for 26.5% and Canadian medical school graduates account for 2.2% of North Dakota's practicing primary care physicians. The rest of the Upper Midwest states account for 14.3% while the rest of the United States accounts for 10.0% of North Dakota's primary care physicians.

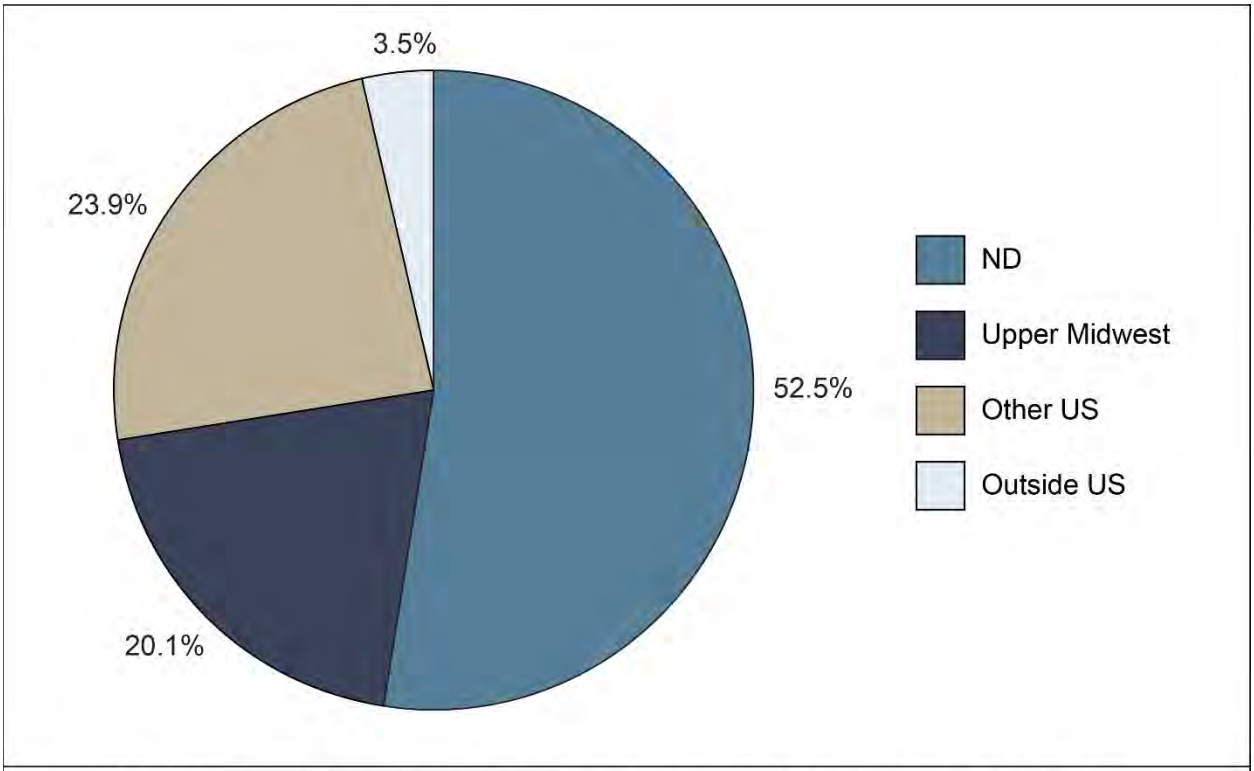

Figure 6.6. **Locations where North Dakota primary care physicians completed their residency, 2021.**[1]
Over half (52.5%) of North Dakota's currently practicing primary care physicians completed their residency training in North Dakota. Primary care physicians who graduated from residency programs outside of North Dakota came from other United States (23.9%), the Midwest (20.1%), and Canada and other foreign (3.5%).

Table 6.5
Percent of ND primary care physicians who graduated from medical school in different states and where primary care physicians who graduated medical school in ND currently practice, 2021.[1]

	Medical Schools that ND Primary Care Physicians Graduated From		Where Primary Care UND SMHS Graduates are Currently Practicing		Net ND Migration Balance
Region/State	**N**	**%**	**N**	**%**	
ND	277	66	277	41	--
MN	25	6	138	20	-113
WI	6	1	27	4	-21
SD	11	3	21	3	-10
IA	18	4	8	1	+10
MT	0	0	30	4	-30
CA	4	1	20	3	-16
MO	15	4	4	1	+11
NE	11	3	8	1	+3
MI	6	1	7	1	-1
AZ	2	<1	18	3	-16
Other	46	11	120	18	-74
Total	**421**	**100**	**678**	**100**	**-257**

Table 6.5 shows the states from which North Dakota's primary care physicians graduated from medical school on the left side, and where past graduates of UND SMHS now practice on the right side. This analysis permits a comparison of physician migration patterns.

The balance of migration into and out of North Dakota by primary care physicians based on medical school state location varied widely with respect to where the physicians were practicing. Specifically, 401 of the 678 graduates of the UND SMHS are primary care physicians practicing outside of North Dakota. However, 144 graduates of medical schools outside of North Dakota are practicing primary care within North Dakota. That means that North Dakota has a net loss of 257 SMHS graduates to other parts of the United States. The largest number of SMHS graduates is to Minnesota.

An important predictor of eventual practice location is where physicians obtain their residency training. Many physicians start practicing in the general vicinity of where they completed their post-medical school residency training. Table 6.6, using 2021 data, shows the states where North Dakota's practicing physicians completed their residency training on the left side, and where graduates of North Dakota's residency programs now practice on the right side. Of the 577 practicing North Dakota primary care

physicians, 302 (52.3%) completed their residency within North Dakota while 275 (47.7%) did not. Therefore, North Dakota is a net importer of other states' residency graduates.

> ***"An important predictor of eventual practice location is where physicians obtain their residency training. Many physicians start practicing in the general vicinity of where they completed their post-medical school residency training."***

At the same time, North Dakota exports the majority of its residency graduates. Of the 719 total North Dakota-trained residency graduates who are practicing, 405 (57.3%) practice in other states and 314 (43.7%) practice in North Dakota. Of North Dakota's total primary care physicians in 2021, over 50% completed residency training in North Dakota.

Table 6.6

Residency locations for ND primary care physicians and current practice state for physicians who completed a ND residency, 2021.[1]

	Where ND Practicing Physicians Completed Their Most Recent Residency		Where Physicians Who Completed At Least One Residency in ND Currently Practice		Migration into ND
Region/State	**N**	**%**	**N**	**%**	
ND	302	52	314	44	-12
MN	46	8	118	16	-72
WI	29	5	23	3	+6
SD	6	1	16	2	-10
IA	13	1	4	1	+9
MT	0	0	19	3	-19
CA	5	1	33	5	-28
MO	11	2	5	1	+6
NE	14	2	5	1	+9
MI	22	4	3	<1	+19
AZ	7	1	13	2	-6
Other	122	21	166	23	-44
Total	**577**	**100**	**719**	**100**	**-142**

SPECIALTY CARE PHYSICIANS

Distribution by Geography

As can be seen in Figure 6.7, most of North Dakota's practicing specialists are located in Fargo, Bismarck, Grand Forks, and Minot. Given the specialist geographic distribution and the generally low numbers of specialists per population, a significant portion of North Dakota's population is a long distance with long travel times from their nearest specialist physician. Note that in this analysis, general pediatrics is considered a specialty and not part of primary care.

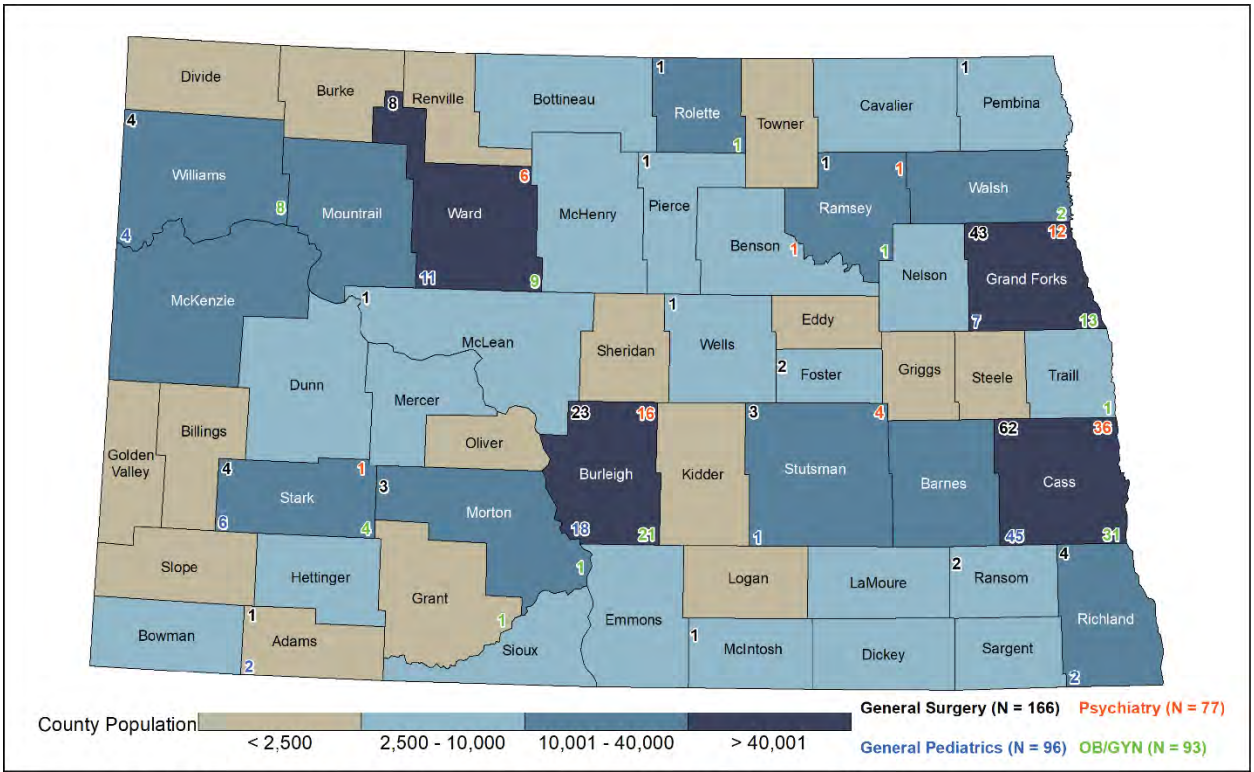

Figure 6.7. **Location of specialty physicians in North Dakota, 2021.**[1]

Distribution by Selected Characteristics

Within North Dakota, rural counties have an extremely low number of specialty physicians (Table 6.7). Furthermore, none of the specialty physicians in rural counties are female. Overall, the majority of obstetrics and gynecologist (OB-GYN) specialists in North Dakota are female (61.6%). In contrast, only about 11% of the general surgeons in North Dakota are female and about 56% of general pediatricians are female. Micropolitan counties have lower percentages of female specialists as do metropolitan counties for general surgery and psychiatry (i.e., less than 50% female). Micropolitan and metropolitan counties have higher percentages of female specialists for pediatrics

and OB-GYN (i.e., greater than 50% female). For all four specialties, the number of rural county specialists are so few that meaningful comparisons with metropolitan and micropolitan areas are not prudent. Across the state the vast majority of specialty physicians are office-based rather than hospital-based and are domestically trained, rather than international medical graduates (IMGs).

Table 6.7
Percent of specialist physicians in North Dakota who are female, have hospital-based practices, and are International Medical Graduates, 2021.[1,2]

	N	Female (%)	Hospital-Based (%)	IMG (%)
General Surgery	**112**	**10.7**	**36.6**	**11.6**
Metropolitan	88	12.5	36.4	9.1
Micropolitan	18	5.5	33.3	11.1
Rural	6	0.0	50.0	50.0
Psychiatry	**63**	**41.3**	**22.2**	**31.8**
Metropolitan	52	43.2	23.1	32.7
Micropolitan	9	33.3	22.2	33.3
Rural	2	0.0	0.0	0.0
Gen Peds	**78**	**56.4**	**18.0**	**16.7**
Metropolitan	56	57.1	19.6	12.5
Micropolitan	20	50.0	10.0	30.0
Rural	2	100.0	50.0	0.0
OB-GYN	**73**	**61.6**	**19.2**	**5.5**
Metropolitan	55	65.5	23.6	1.8
Micropolitan	17	52.9	5.9	17.7
Rural	1	0.0	0.0	0.0

Perhaps not surprisingly, the majority of specialty physicians are located in metropolitan areas, are male and office-based. While IMGs account for roughly a

quarter of North Dakota's practicing physicians, they account for substantially lower percentages of general surgeons (11.6%), general pediatricians (16.7%), and OB-GYNs (5.5%) but account for more psychiatrists (31.8%).

The percentage of specific specialty physicians by age and the three geographic categories is shown in Table 6.8. General surgeons (29.5%) and OB-GYNs (43.8%) are more likely to be in the 35-44 age category whereas general pediatrics (29.5%) are more likely to be in the 45-54 age category and psychiatrists (21.8%) are more likely found in the 55-64 age category.

Table 6.8
***Percent of specialists in North Dakota by age and area, 2020.*[2,5]**

	N	<35	35-44	45-54	55-64	65-74	75+
General Surgery	**112**	**0.0**	**29.5**	**26.8**	**28.6**	**15.2**	**0.0**
Metropolitan	88	0.0	30.7	28.4	28.4	12.5	0.0
Micropolitan	18	0.0	33.3	16.7	22.2	27.8	0.0
Rural	6	0.0	0.0	33.3	50.0	16.7	0.0
Psychiatry	**63**	**9.5**	**22.2**	**17.5**	**31.8**	**19.1**	**0.0**
Metropolitan	52	11.5	25.0	17.3	28.9	17.3	0.0
Micropolitan	9	0.0	11.1	22.2	33.3	33.3	0.0
Rural	2	0.0	0.0	0.0	100.0	0.0	0.0
Gen Peds	**78**	**3.9**	**28.2**	**29.5**	**18.0**	**20.5**	**0.0**
Metropolitan	56	1.8	35.7	32.1	10.7	19.6	0.0
Micropolitan	20	10.0	5.0	25.0	40.0	20.0	0.0
Rural	2	0.0	50.0	0.0	0.0	50.0	0.0
OB-GYN	**73**	**6.9**	**43.8**	**15.1**	**19.2**	**15.1**	**0.0**
Metropolitan	55	7.3	45.5	14.6	21.8	10.9	0.0
Micropolitan	17	5.9	41.2	17.7	11.8	23.5	0.0
Rural	1	0.0	0.0	0.0	0.0	100.0	0.0

North Dakota's specialists per-10,000-population ratios for general pediatricians and OB-GYNs are lower than for the Upper Midwest and U.S. ratios (Figure 6.8). The North Dakota ratio for general surgeons is higher than the Upper Midwest and the United States, and its ratio for psychiatrists is lower than for the nation but higher than the Upper Midwest.

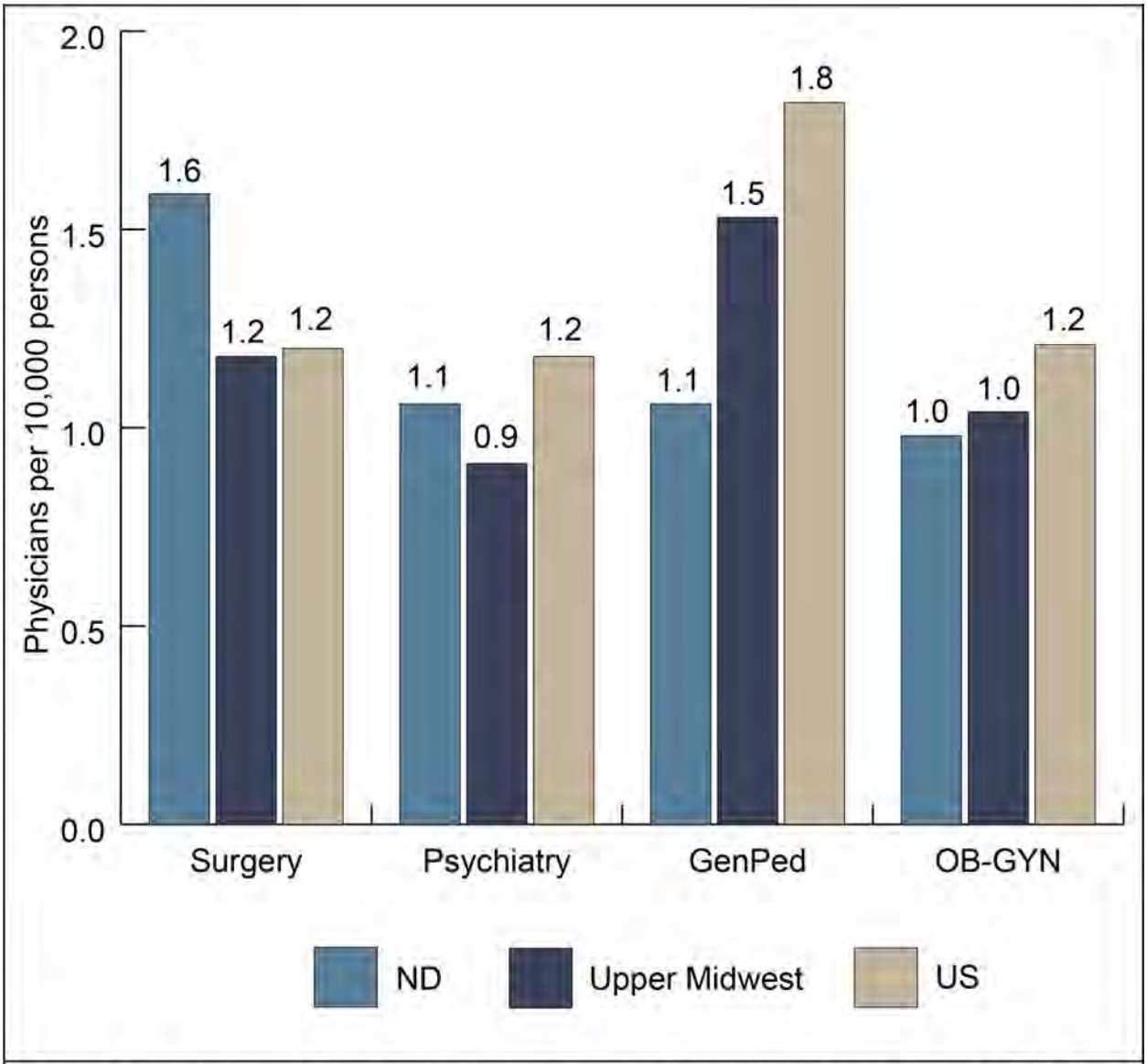

***Figure 6.8*. Surgeons, psychiatrists, general pediatricians, and OB-GYNs per 10,000 persons in North Dakota with comparisons, 2020.[3,5]**

Table 6.9
Specialty physicians per 10,000 persons in North Dakota by area with comparisions, 2020.[2,5]

	ND	Upper Midwest	US
Surgery	**1.6**	**1.2**	**1.2**
Metropolitan	2.5	1.3	1.3
Micropolitan	0.9	0.9	0.8
Rural	0.5	0.4	0.4
Psychiatry	**1.1**	**0.9**	**1.2**
Metropolitan	1.8	1.1	1.3
Micropolitan	0.6	0.4	0.4
Rural	0.2	0.2	0.2
Gen Peds	**1.1**	**1.5**	**1.8**
Metropolitan	1.6	1.9	2.0
Micropolitan	1.0	0.9	0.8
Rural	0.1	0.2	0.3
OB-GYN	**1.0**	**1.0**	**1.2**
Metropolitan	1.4	1.3	1.3
Micropolitan	1.0	0.7	0.7
Rural	0.1	0.2	0.3

The specialists per-10,000-population ratios by rural or urban status for 2020 are shown in Table 6.9. Across North Dakota and for each specialty, the rural counties have lower ratios than the micropolitan and metropolitan counties.

> ***"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 any primary care physicians."***

SARS-CoV-2 PANDEMIC IMPACTS

The pandemic led to a decline of physicians' work hours resulting in fewer full-time physicians. A result of this was reduced earnings for physicians. One commentator noted that "Physicians in small private practices around the country have reported steep

declines in revenues, drops so significant that some of them and their supporters have turned to GoFundMe—the platform best-known for helping patients pay their medical bills—to raise funds to help pay their overhead."[8] The absence of patients during the pandemic was so severe that the American Academy of Pediatrics launched a #CallYourPediatrician campaign in 2020 as a reminder to parents that going to the pediatrician is important and safe, even during a pandemic.[9] According to one study, oral surgery and gastroenterology had the biggest drops in utilization during the pandemic with declines of roughly 80% and 70% respecitively.[10] Cardiology and dermatology specialties also had major dips of 62% in utilization in 2020.[10]

In the early days of the pandemic, the Centers for Medicare and Medicaid Services expanded coverage of and access to telehealth services to minimize Medicare beneficiaries' need to seek care at a physician's office or a hospital. About 14% to 15% of all patient visits now are via telemedicine, and telemedicine has helped make up for some of the decline in office visits, but far from all of it. As many as 40% of patient visits could be handled via telemedicine, according to one gynecologist.[8] However, many practices are reluctant to commit the necessary resources because it is not clear whether they will continue to be reimbursed for telemedicine visits after the pandemic ends.[8]

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 any primary care physicians. Primary care physicians in North Dakota are more likely to be male, located in metropolitan counties, and trained domestically (in the upper Midwest or North Dakota specifically) for medical school and residency. Primary care physicians in North Dakota generally are early in their career, most commonly between the ages of 35 and 44 years old. In 2020, there were 674 direct-patient-care primary care physicians in North Dakota (409 family medicine, 184 general internal medicine, and 81 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 of all primary care physicians in North Dakota graduated from the UND SMHS or completed a residency in North Dakota or both.

Of North Dakota's total primary care physicians in 2020, 30% completed residency training in North Dakota. Of North Dakota's total primary care physicians (including IMGs), 52% received their medical degree from the UND SMHS. Considering both North Dakota residency graduates and UND SMHS medical school graduates, 68.3% of North Dakota practicing primary care physicians received at least some of their training in North Dakota.

In 2020, there were 112 general surgeons, 81 psychiatrists, 81 pediatricians, and 75 OB-GYNS in North Dakota. As with other physicians in North Dakota, these specialists are generally more likely to be older, male, office-based and domestically

trained when compared with other Midwest states and the United States. North Dakota has lower ratios of general pediatricians and OB-GYNs per 10,000 population than the comparison groups, and higher ratios of psychiatrists and general surgeons than other Midwestern states.

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CHAPTER SEVEN: Nursing Workforce in North Dakota

INTRODUCTION

The nursing workforce chapter for the *Seventh Biennial Report* has been a successful collaboration between the University of North Dakota (UND) College of Nursing and Professional Disciplines, the UND School of Medicine and Health Sciences (SMHS) as well as the SMHS Advisory Board and the North Dakota Center for Rural Health. There has been and will continue to be increased blurring of lines between health professions regarding roles and responsibilities. For an accurate account of the healthcare workforce and the potential health outcomes associated, the overlapping roles need to be taken into consideration. North Dakota is a unique state in that the rural nature of our healthcare systems provides more opportunity for progressive innovation regarding healthcare workforce roles.

To demonstrate the roles of nursing as clearly as possible in this biennium, multiple data sources have been utilized. Licensure data from the North Dakota Board of Nursing (NDBON), dated January of 2022, provides an account of all nurses licensed in North Dakota (ND) as of that date.[1] ND nurses renew licensure every other year by December 31. These licensure data encompass licensed practical nurses (LPN), registered nurses (RN), and Advanced Practice Nurses (APRN) in the state. These data provide basic demographic information such as age, location of employment, and specialty information. This information was supplemented with data from the NDBON's annual education report[2] from the academic year of 2020-2021, which provides information on ND nursing school numbers of applicants and graduates, among other information. In addition, trend analyses from 2018-2022 based on licensure data are included in this *Report*.

AGGREGATE NURSING RESULTS

Data were extracted from the NDBON licensure dataset as of January 2022. The NDBON conducts open licensure renewal from October through December yearly, with most nursing types renewing every other year. These data are obtained via electronic submission by the individual applicant or renewing nurse and aggregated by the NDBON for reporting purposes. All available demographic information was used as well as certification type, practice type, and educational program attended. Zip codes were used for determination of Rural-Urban Commuting Area (RUCA) codes. These are a widely applied national geographic taxonomy based on city/town population (Census Bureau designation as an urban place/cluster) and on work commuting patterns. This taxonomy classifies locations into one of four categories: urban, large rural, small rural, and isolated rural. Urban areas are defined as those with a core city population of 50,000 or greater. Large rural areas have a population between 10,000 and 49,999; small areas are between 2,500 and 9,999; and isolated small rural areas have populations smaller than 2,500.[3]

Limitations with the licensure data include the self-reporting of information. Individuals did not always enter their educational information appropriately. Employer

setting and employer practice area may have been misinterpreted by the individual as there are no clear definitions given in the NDBON renewal data entry website. Setting is defined as outpatient clinic versus inpatient facility, for example. Practice area is the specialty area in which the licensee might work such as family practice or cardiology. Zip codes were converted to RUCA codes, as this was not available directly from the data.

The information reported in this section combines all roles and license types of nursing within the state. North Dakota has 20,409, licensed nurses[1]. Since 2017, there has been a gradual increase in total number of nurses. Those nurses included LPN, RN, and the four APRN roles: Nurse Practitioner (NP), Certified Registered Nurse Anesthetist (CRNA), Certified Nurse Midwife (CNM), and Clinical Nurse Specialist (CNS). There was a slight increase in percentages of RNs and NPs; however, there was a slight decrease in the percentage of LPNs. Overall, the percentages of CRNA, CNM, and CNS licensed nurses remained relatively stable over time. Trends in percentages for all licensure types are delineated in Figure 7.1. The roles are all reported separately in later sections of this document.

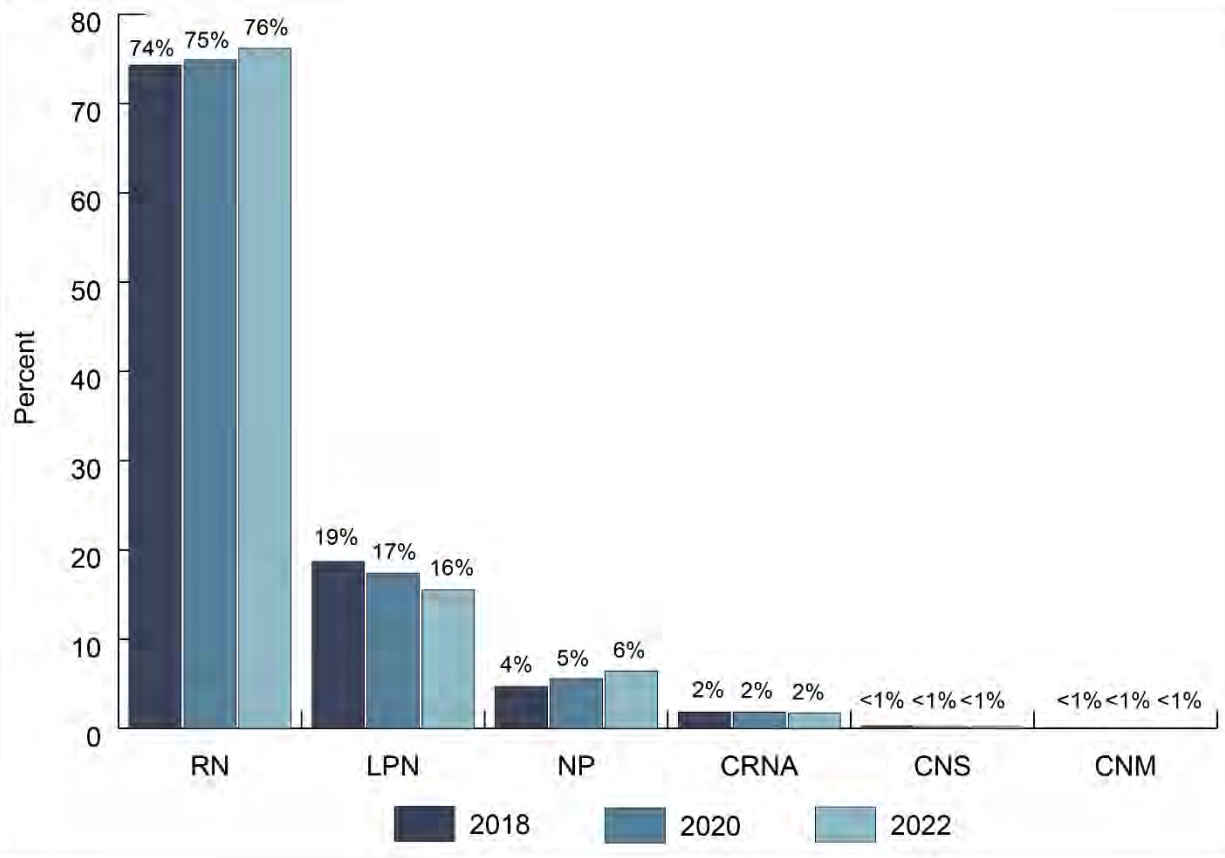

***Figure 7.1*. Percent of licensed nurses in North Dakota by type and year, 2022.[1]**

Most (69%) of the nursing workforce in ND is employed full-time. Approximately 14% of nurses are employed part-time, about 12% are unemployed, 4% are per diem, and 1% are retired (Figure 7.2).[1] Per diem nurses are defined as nurses who are on the payroll but who may not be regularly scheduled; are working flextime; or in an on-call status. The percent of nurses working full-time has decreased by 5% since 2018 while part-time employment has increased 1.5%. Nurses licensed in ND who report being unemployed has risen by almost 4% during the same time period.

"Most (69%) of the nursing workforce in ND is employed full-time."

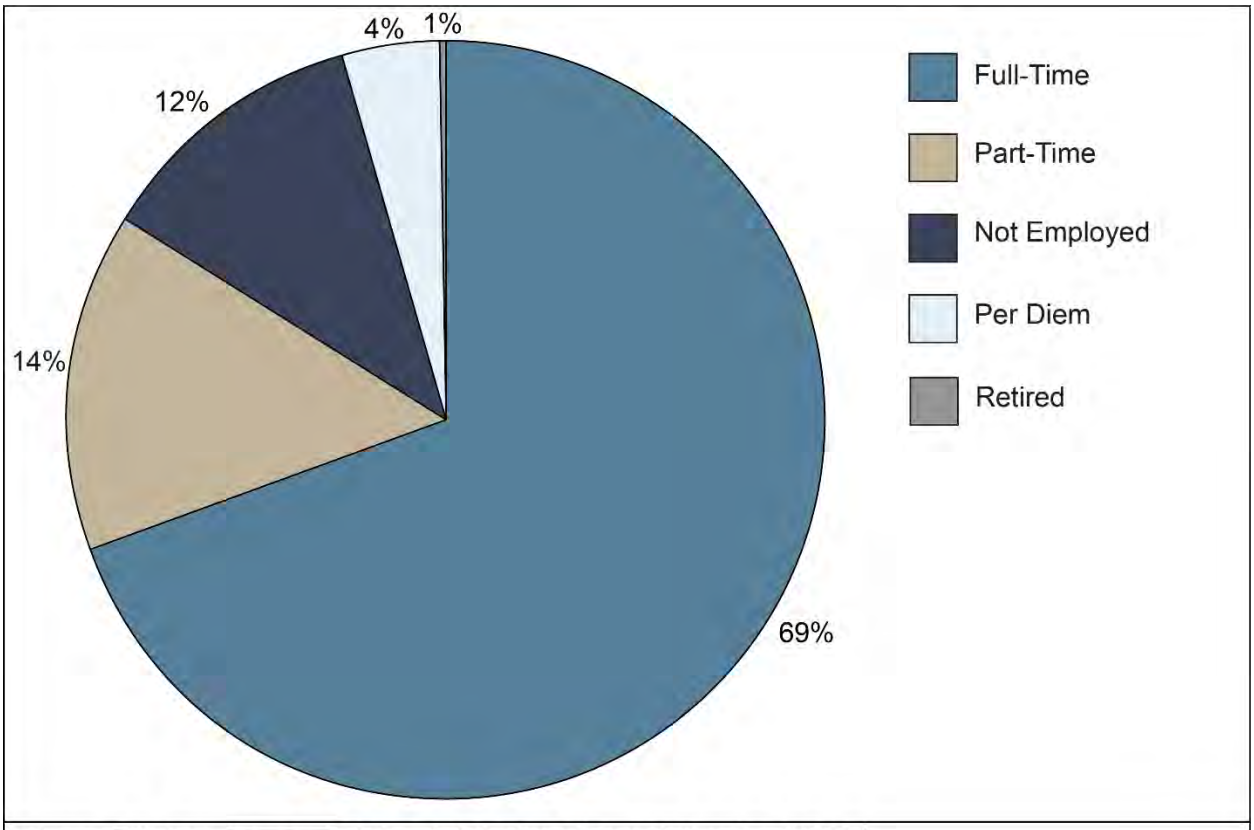

Figure 7.2. **Employment status totals for all nursing roles, 2021.**[1]

Despite the fact that North Dakota is a very rural state with only four areas encompassing six counties in the urban classification, approximately two-thirds of nurses licensed in North Dakota are employed in an area classified as urban. The remaining third are in rural areas. More nurses are employed in isolated or large rural areas than in areas with a small rural designation (Figure 7.3). By comparison, the distribution of the general population of ND is 51.3% urban, 13.8% large rural, 19.8% small rural and 15.1% isolated rural, indicating a relative maldistribution of nurses across the state.[1, 4]

"Approximately two-thirds of nurses licensed in North Dakota are employed in an area classified as urban. The remaining third are in rural areas."

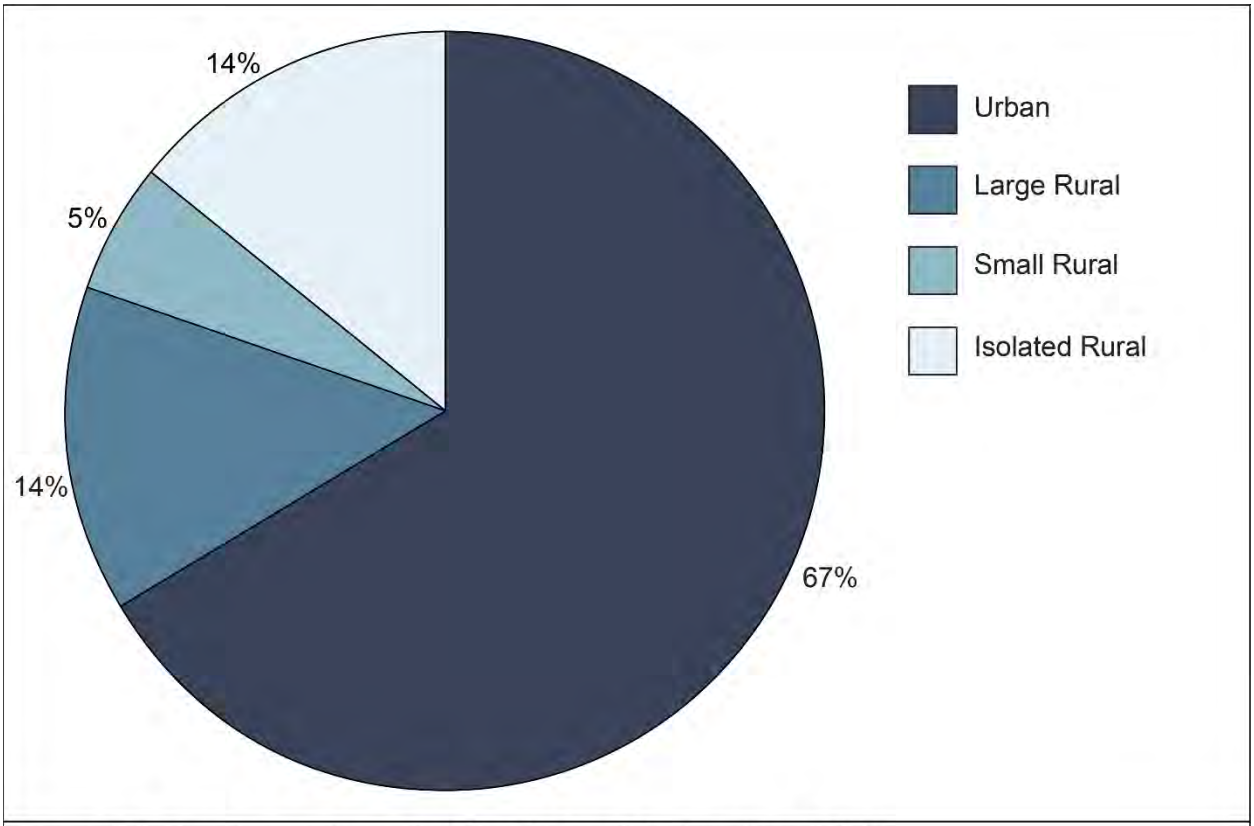

Figure 7.3. **Nursing employer location by rural designation, 2021.**[1]

Overall, North Dakota nursing programs have educated 53% of nurses currently licensed in the state. Minnesota nursing programs are a distant second with 25%. Thus, a significant majority (81%) of ND nurses are educated regionally (defined as ND, MN, or SD) (Figure 7.4). Since 2018 there has been an almost 8% decrease in the number of ND licensed nurses having been trained in the state and a 2% decrease in regional training. There is a trend of ND licensed nurses obtaining their training in Minnesota (9% increase since 2018) and from foreign schools (35% increase since 2018). It is unknown whether the nurses obtaining training in other states or areas are originally from ND and return after training or move to ND after their training.[1]

With increasing demand for nurses, the trends in where education is obtained is concerning. ND is only training half of the nurses needed for the state. It is a consistent observation that persons who move to other locations to obtain their education are significantly less likely to return to their hometowns to work. Though overall enrollments have been steadily increasing across the state, faculty numbers and experience continue to decline.

The trend since 2015 in ND has been a loss of nursing faculty age 51+ by about 1.7% per year. For faculty under age 50, the average trend is a 1.7% increase.[2] So, while faculty age is roughly static, experience and total FTE of faculty is not. While faculty prepared with a Master's degree or below have increased by 2.7% since 2015, those with Doctorate degrees have decreased by 3.6%.[2] Despite this loss of experience and overall decreasing numbers of faculty, student enrollments continue to climb. Faculty FTEs have increased by 14 across the state since 2015 while total enrollment in programs has gone up by 524 students.[2]

Increasing enrollment in state nursing programs obviously is beneficial; as the baby-boomers age, there will continue to be an increase in need for nurses in all roles. The major concern with these numbers is the attendant workload imposed on nursing faculty if trends such as those demonstrated continue.

"Overall, North Dakota nursing programs have educated 53% of nurses currently licensed in the state."

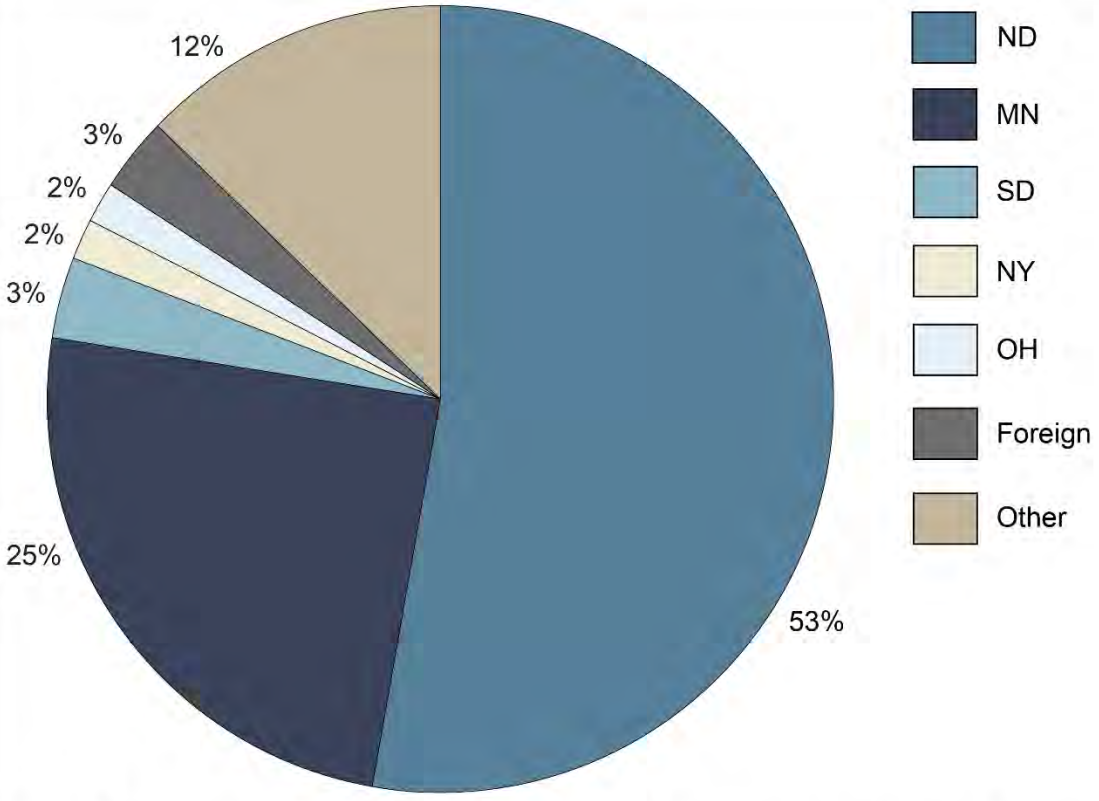

Figure 7.4. **Nurses licensed in ND and their state of educational preparation (Other = states with n < 250), 2021.[1]**

NORTH DAKOTA'S LICENSED NURSING WORKFORCE BY ROLE

This section presents an overall view of North Dakota's nursing workforce: LPN, RN, NP, CRNA, CNM, CNS, and CNAs. Data are presented, summarized, and analyzed from the North Dakota Board of Nursing Licensure Data, and the 2020-2021 North Dakota Board of Nursing Education Annual Report.[1, 2]

Licensed Practical Nurses (Licensed Vocational Nurses)

Licensed Practical Nurses or Licensed Vocational Nurses (LPNs/LVNs) work at North Dakota's various healthcare facilities, such as hospitals, clinics, assisted living and nursing facilities, including long term care and nursing homes. LPNs are important members of the interprofessional health care team and have certain roles and responsibilities while providing patient care. North Dakota's Standards of Practice Law states: "each LPN is responsible and accountable to practice according to the standards of practice prescribed by the board and the profession." It is not the setting or the position title that determines a nursing practice role, but rather the application of nursing knowledge.[5] The LPN practices nursing dependently under the direction of the registered nurse, advanced practice registered nurse, or licensed practitioner through the application of the nursing process and the execution of diagnostic or therapeutic regimens prescribed by licensed practitioners.[5] The administration and management of nursing by the licensed practical nurse includes assigning and delegating nursing interventions.[5] Unlicensed assistive persons complement the licensed nurse in the performance of nursing interventions but may not substitute for the licensed nurse.[5] The licensed practical nurse practices within the legal boundaries for practical nursing through the scope of practice authorized in the Nurse Practices Act and rules governing nursing.[5] Due to a more limited scope of practice, LPNs can work in fewer areas of clinical practice than RNs. However, an adequate supply of LPNs is critical to providing care in certain settings such as clinics, ambulatory care centers, nursing facilities, and rural facilities that coincide with the LPN's scope of practice.

As of December 2021, there were a total of 3,141 LPNs in North Dakota.[1] The number of North Dakota LPNs has decreased from 3,206 reported in the 2021 *Biennial Report*. In order to practice as an LPN, an individual must graduate from a practical nursing education program, pass the National Council Licensure Examination for Practical Nursing (NCLEX-PN) exam, and apply for licensure in the state. Most practical nursing graduates have earned either a certificate or an associate degree. The state's LPNs have obtained their initial education in several states. However, most of North Dakota's LPNs achieved their initial practical nursing education from North Dakota (50%) or Minnesota (42%) (Figure 7.5).[1] There are fewer LPNs than Registered Nurses (RNs) in the state since many LPNs continue their education to become RNs. Each year there are more students graduating from nursing education programs that are eligible to take the RN exam rather than the LPN exam. Increased salary, career advancement, and the desire to work in more areas of practice are reasons why an LPN may choose

to become an RN. LPNs are an important member of the healthcare team, especially in rural areas and at nursing homes. More measures and policies should be implemented to retain more LPNs from other states such as Minnesota. Furthermore, incentives are needed that encourage nurses to maintain LPN licensure rather than advancing to other licensure levels when the main driver for doing so is economic.

> "***LPNs are an important member of the healthcare team, especially in rural areas and at nursing homes."***

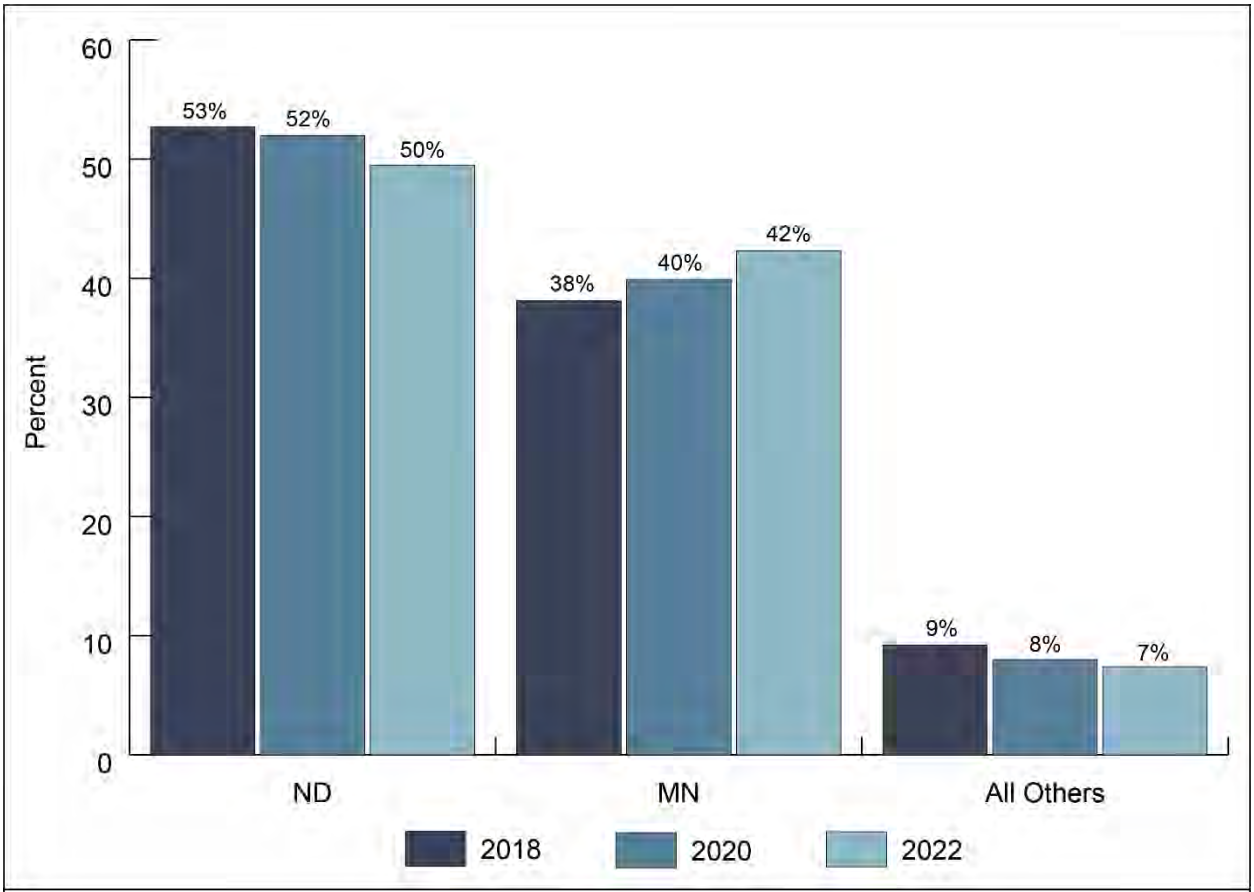

Figure 7.5. **LPNs' education state and year, 2022.[2]**

North Dakota's Practical Nurse Education Programs

North Dakota currently has seven NDBON-approved practical nurse education programs.[6] One of these programs is located at a tribal college (i.e., Sitting Bull College). Four of the state colleges collaborate and are part of the Dakota Nursing Program (Bismarck State College, Dakota College at Bottineau, Lake Region State College in Devils Lake, Williston State College). In addition, the Dakota Nursing Program has several distance sites located throughout the state. The remaining two programs are located at Dickinson State University and North Dakota State College of

Science. Graduates earn either an associate degree or certificate in practical nursing specific to the program.[6] Graduates from all programs can apply to take the NCLEX-PN examination to become LPNs. Table 7.1 provides information on total enrollment, admissions, and graduates for these programs over the past five years.[2] Most of these programs are in rural areas with the goal of increasing access to individuals for obtaining their practical nursing education. Overall, the programs have attempted to increase enrollment and admissions to assist in decreasing the nursing shortage in their rural community and the state (Table 7.1). There was a transient decrease in the number of graduates between 2018 and 2020, likely due to the closing of the practical nursing programs at Fort Berthold Community College in fiscal year 2014-2015, Turtle Mountain Community College in fiscal year 2016-2017, and United Tribes Technical College in fiscal year 2018-2019.[2] In addition, for 2019 – 2021, the SARS-CoV-2 pandemic influenced total enrollment numbers. However, over the last few years, the state's number of practical nursing graduates is on the rise.

The state's practical nursing programs are limited in the ability to increase enrollment numbers due to limited funding and resources, and a shortage of faculty. Efforts to alleviate the rural and urban nursing shortage should include more support for the state's practical nursing programs. Improved incentives for faculty recruitment and retention are needed. Increased funding for expanding resources such as buildings, simulation centers, and other resources also is needed. High school students and community members should be encouraged to pursue a practical nursing education and remain in their community and the state after graduation to practice as an LPN. The state's nursing education programs could consider giving priority to the state's residents for admission to their programs (as is done by the University of North Dakota School of Medicine and Health Sciences for medical program applicants), thereby increasing enrollment numbers in these programs to meet the current demand. Providing incentives for graduates to practice as LPNs in the state could also have a positive impact on the state's LPN vacancies.

Table 7.1
North Dakota's practical nurse program 5 year trends, 2020.[6]

Practical Nursing Program Trends	FY 2016 - 2017	FY 2017 - 2018	FY 2018 - 2019	FY 2019 - 2020	FY 2020 - 2021
Program Admissions	275	300	305	295	312
Total Enrollment	379	419	417	396	393
Graduate Certificate Program Graduates	92	132	138	128	155
Associate Degree Program Graduates	55	93	61	76	70
Total Graduates	147	225	199	204	225

Information provided is from the 2018-2019, 2019-2020, & 2020-2021 NDBON Nursing Education Annual Reports

LPN Employment Practice Areas and Settings

North Dakota's LPNs currently practice in a variety of settings (Figure 7.6). Practice areas are a part of the healthcare facility or employment setting and a facility can have several practice areas. Interestingly, the largest number of LPNs (1,268) identified the area "other" as their main practice area. The area of geriatrics was identified as the second most common area of practice (678 LPNs).[1] The third most common area is family medicine (409 LPNs). Many LPNs practice in geriatrics since many are employed at nursing facilities. In addition, a large number of LPNs are at family practice clinic settings. It is difficult to determine what practice areas make up the "other" areas.

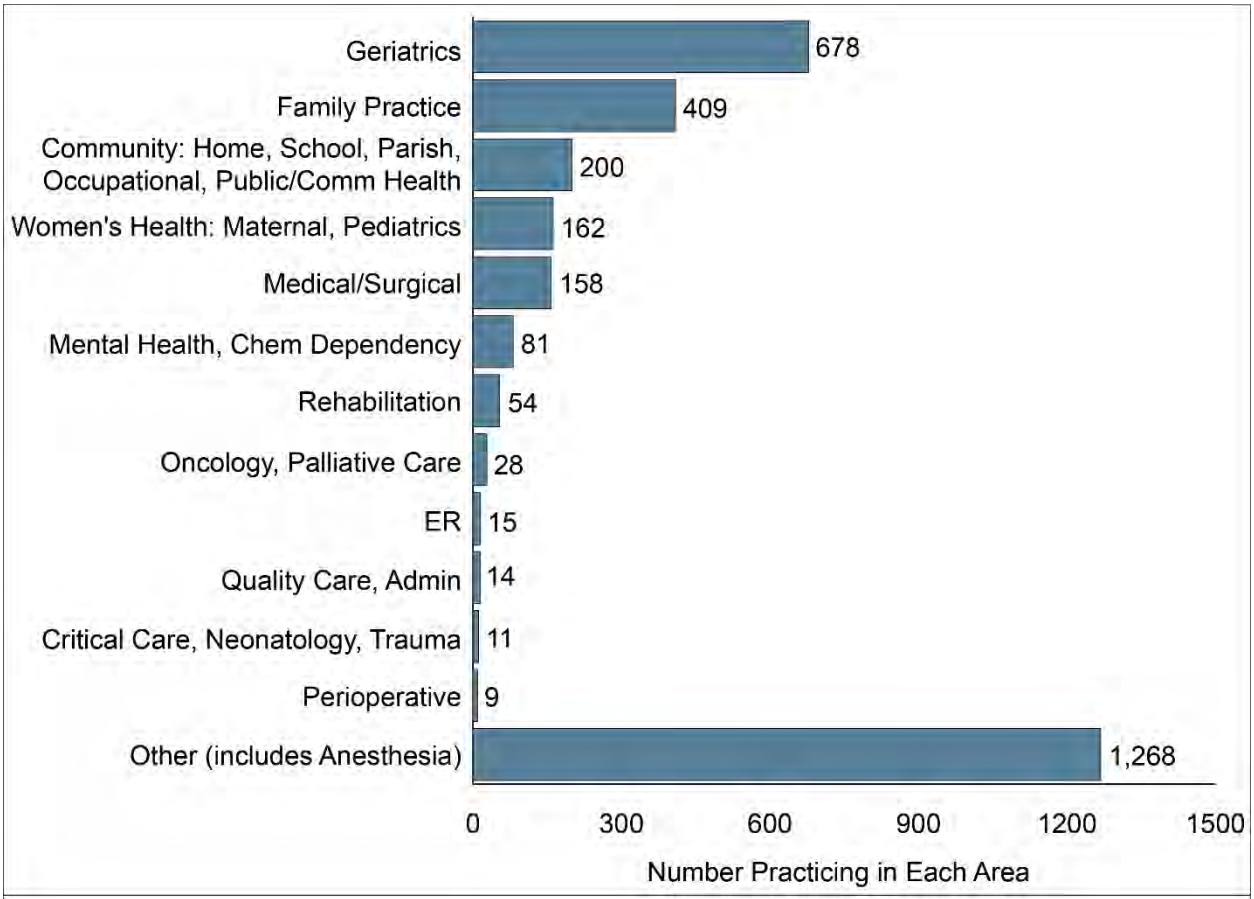

Figure 7.6. **LPN's current practice area, 2021.[1]**

Figure 7.7 illustrates the employment setting for North Dakota's LPNs. Employment setting is related to the specific type of healthcare facility. The majority of LPNs practice at inpatient facilities – nursing homes and hospitals (1,040) with nursing homes being the highest employer at 745 LPNs with the remaining 295 LPNs employed at hospitals. Outpatient facilities were second to inpatient facilities at 937 LPNs,

followed by community settings at 182.[1] These trends are similar to the data from previous years.

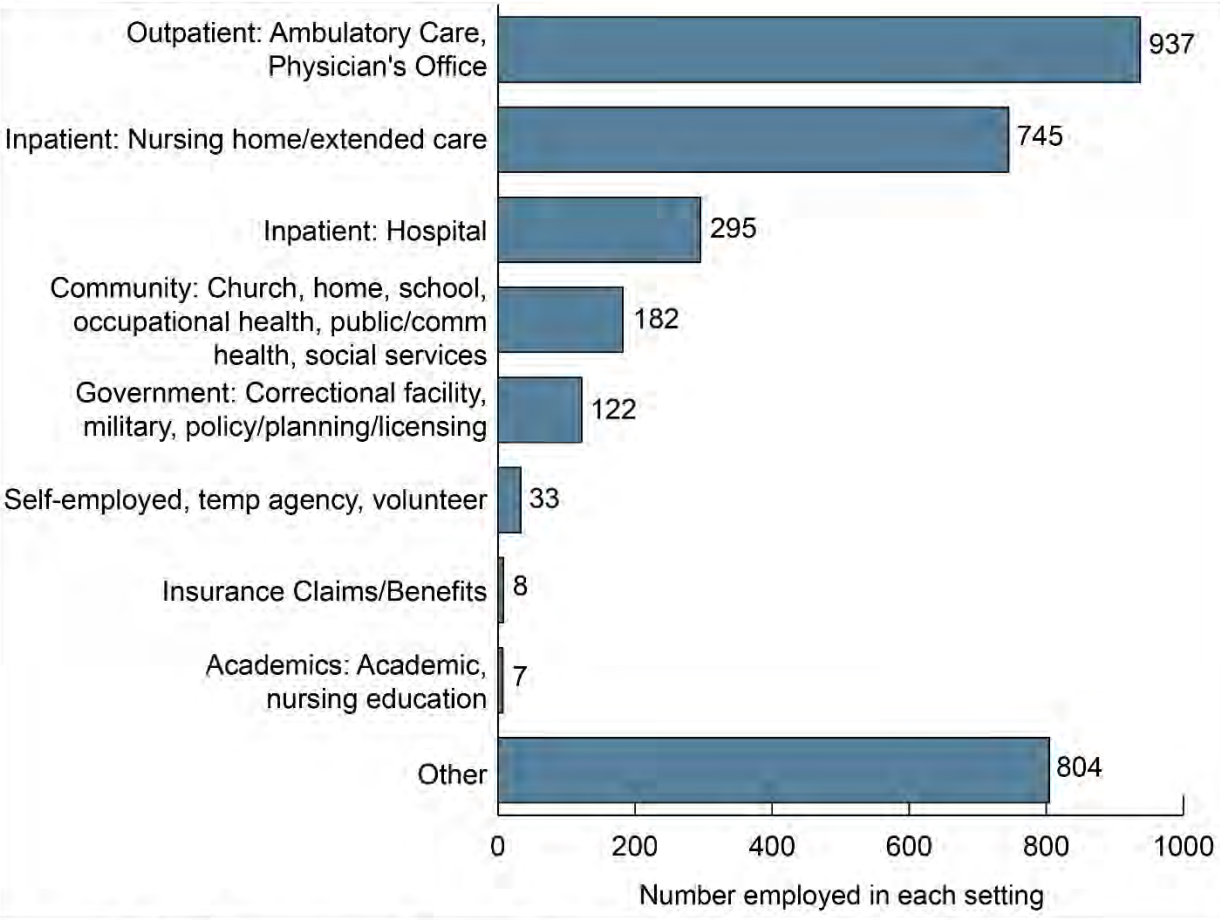

Figure 7.7. **LPNs' employment settings, 2021.[1]**

The state's LPNs vary in employment status as either full-time, part-time, not employed, retired, or per diem (Figure 7.8). Most indicated that they are working full-time (60.6%) or part-time (14.7%) in their current practice. However, 19.3% LPNs are not employed, adding further to the nursing shortage. Retired LPNs include 1% of nurses who are not working, but still maintain their license.[1] Further studies will explore the reasons why LPNs choose not to be employed and/or maintain a license as a retired LPN. Factors such as the SARS-CoV-2 pandemic could have a negative impact on the supply of LPNs either working full-time or part-time. Some may have chosen to retire or quit the profession altogether. Reemployment of these licensed LPNs could help decrease the state's LPN vacancies.

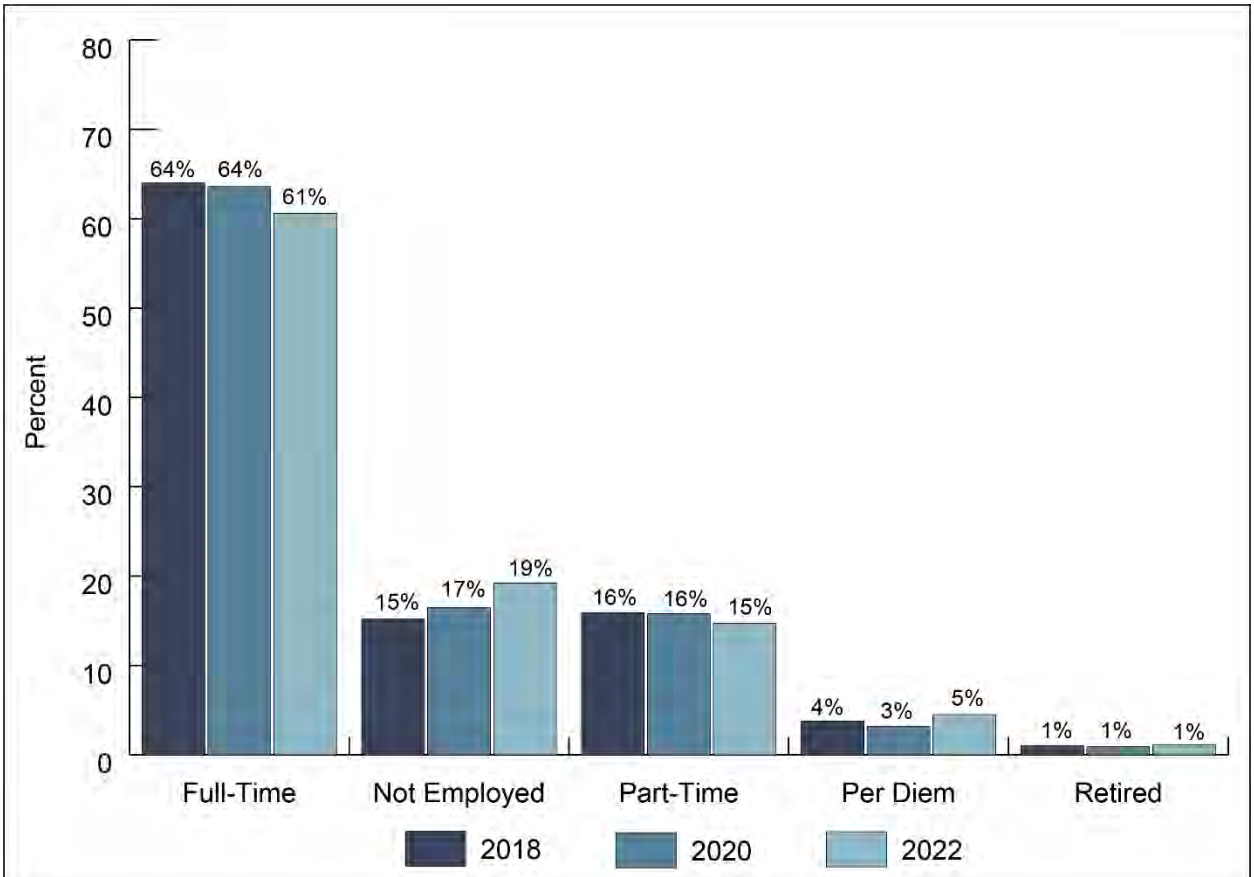

Figure 7.8. **LPNs' employment status and year, 2022.[1]**

LPNs identified the city in which they are employed. Based on this information, the LPNs were assigned a rural-urban commuting area (RUCA) code classification to identify which category (urban, large rural, small rural, or isolated rural) they are employed in practice.[3] Most LPNs (58%) are working at a facility that is considered urban based on the assigned RUCA code and 42% of the LPNs are employed in a rural area (Figure 7.9).[1] These percentages remain consistent from previous biennial reports.

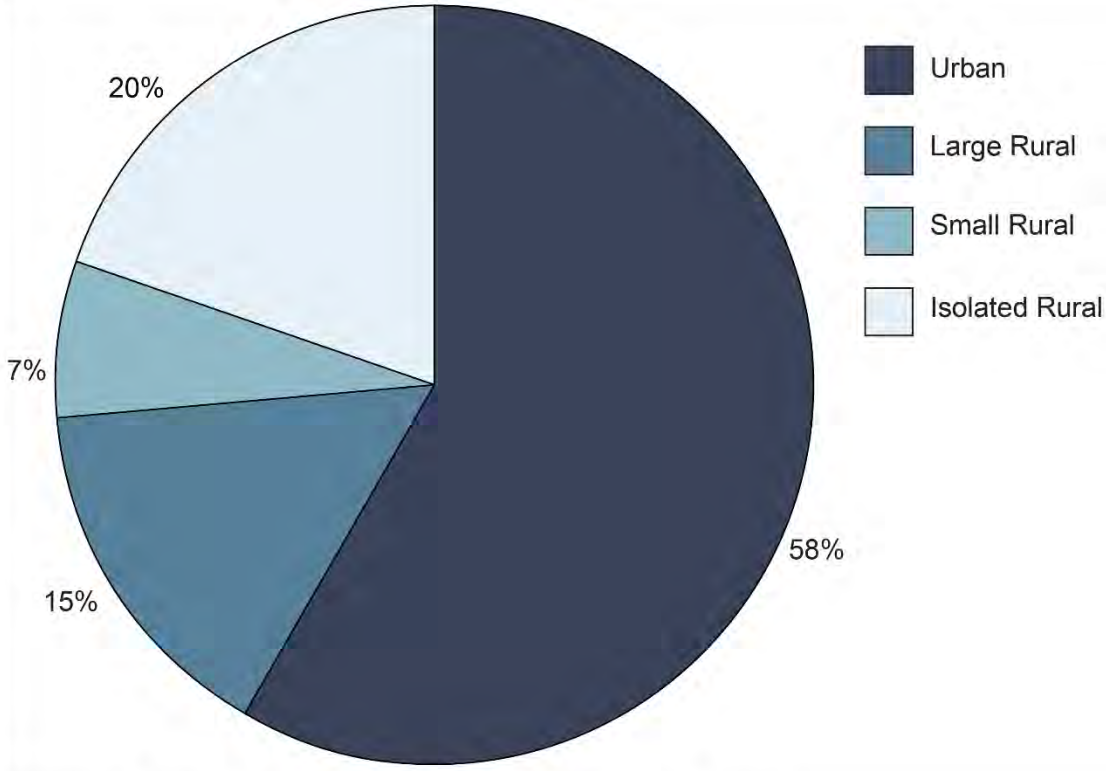

Figure 7.9. **LPNs' employment based on RUCA code, 2021.[1]**

LPNs can apply for licensure in more than one state so that they can concurrently practice in several states. The LPN may choose to have more than one license because they live on a state border, work under contract, or maintain a residence in more than one state. As of December 2021, the majority of the state's LPNs (97.8%) are licensed exclusively in North Dakota (Table 7.2), an increase from 94.4% reported in the previous biennial report.[1] LPNs that maintain multiple licenses could be contract nurses working at various rural and urban healthcare facilities. Rural and urban facilities often hire contract LPNs to help fill vacant positions.

Table 7.2
Number of states in which LPNs are licensed, 2021.[1]

Number of States Licensed	Frequency	Percent
1	3,084	97.8
2	58	1.8
3	5	0.2
4	4	0.1
5 or more	4	0.1

Other LPN Demographics

Although there are relatively more of North Dakota's LPNs in the 25-29 age group relative to other age groups, the average age of the state's LPNs is 44 years old (Figure 7.10). The state's LPNs are aging, with 20.5% of LPNs reporting their age at 60 years and older.[1] It appears some LPNs are working during their "retirement" years, but their retirement could be further contributing to the state's nursing shortage. Further studies are needed to explore reasons LPNs continue to work when they are eligible for retirement and find ways to meet the workforce needs of the older LPN so that they can maintain employment as long as possible and assist with filling vacant positions.

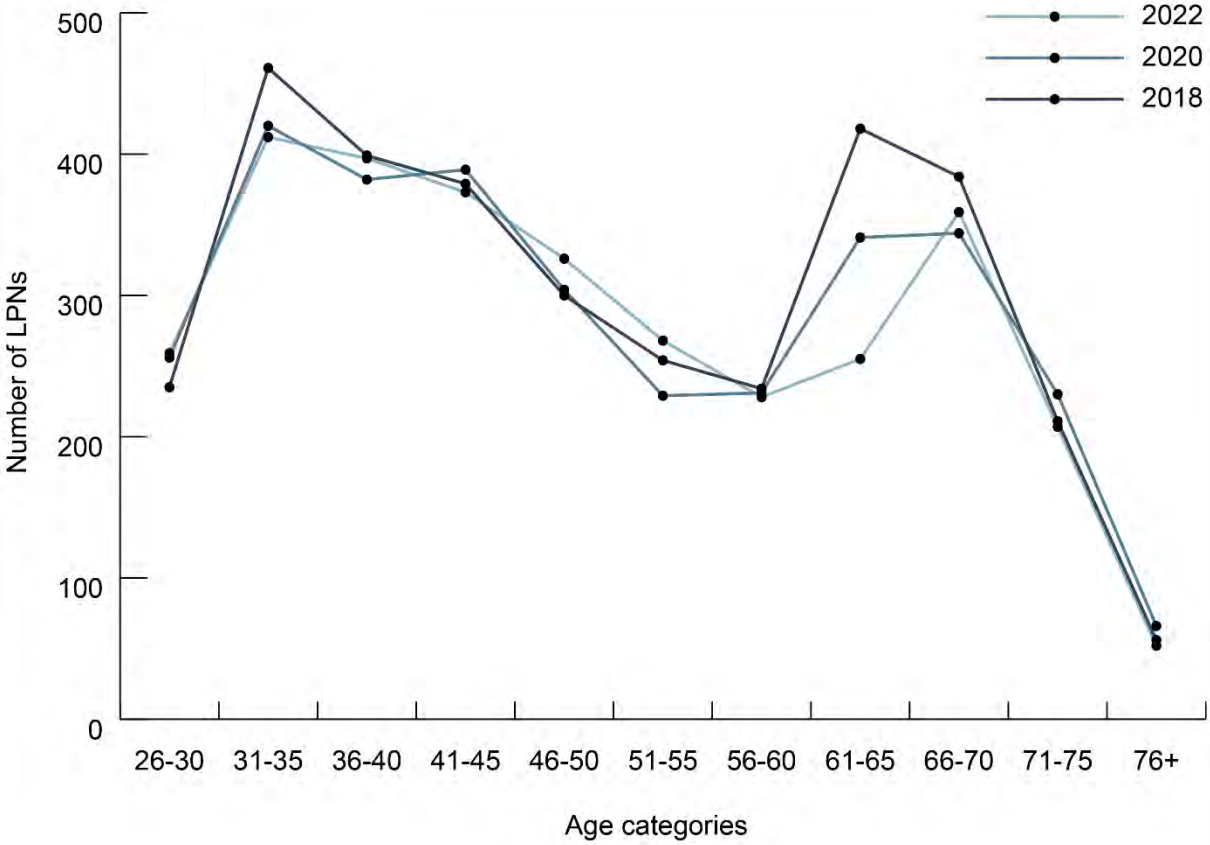

***Figure 7.10*. Number of LPNs in each age category by year, 2022.[1]**

Registered Nurses

Registered Nurses (RNs) work at North Dakota's various healthcare facilities, such as hospitals, clinics, assisted living and nursing (long term care, nursing homes) facilities. RNs are important members of the interprofessional health care team and have certain roles and responsibilities when providing patient care. North Dakota's Standards of Practice Law states: "each RN is responsible and accountable to practice

according to the standards of practice prescribed by the board and the profession."[7] It is not the setting or the position title that determines a nursing practice role, but rather the application of nursing knowledge.[7] Through the application of the nursing process, the RN practices nursing independently and interdependently.[7] RNs also practice nursing dependently through the execution of diagnostic or therapeutic regimens prescribed by licensed practitioners.[7] The administration and management of nursing by RNs includes assigning and delegating nursing interventions that may be performed by others.[7] The RN practices within the legal boundaries for nursing through the scope of practice authorized in the Nurse Practice Act and rules governing nursing.[7]

As of December 2021, there were a total of 15,473 licensed RNs in North Dakota.[1] This is an increase from 13,768 RNs reported in the 2021 *Biennial Report.* To practice as an RN, an individual must graduate from an approved nursing education program, pass the National Council Licensing Examination for Registered Nurses (NCLEX-RN) exam, and apply for licensure in the state. Several initial registered nursing education degree options exist. Most nursing graduates eligible to take the NCLEX-RN exam have initially earned either a diploma, associate degree, or a bachelor's degree prior to licensure. Some RNs, after receiving an associate degree, will continue their education and earn a bachelor's degree. After becoming licensed as an RN, they can pursue additional education necessary for their area of practice such as earning a master's degree and doctorate degrees (PhD – Doctor of Philosophy, DNP – Doctor of Nursing Practice). North Dakota's RNs have obtained their initial nursing education in many states. The majority of the state's RNs earned their degrees in North Dakota (53%), which continues to decrease since 2018. RNs who earned their degrees in Minnesota (22%) has slightly increased since 2018. In addition, there was a slight increase in numbers of RNs initially educated in a South Dakota (4%), foreign countries (4%), and other states (17%)[1] (Figure 7.11).

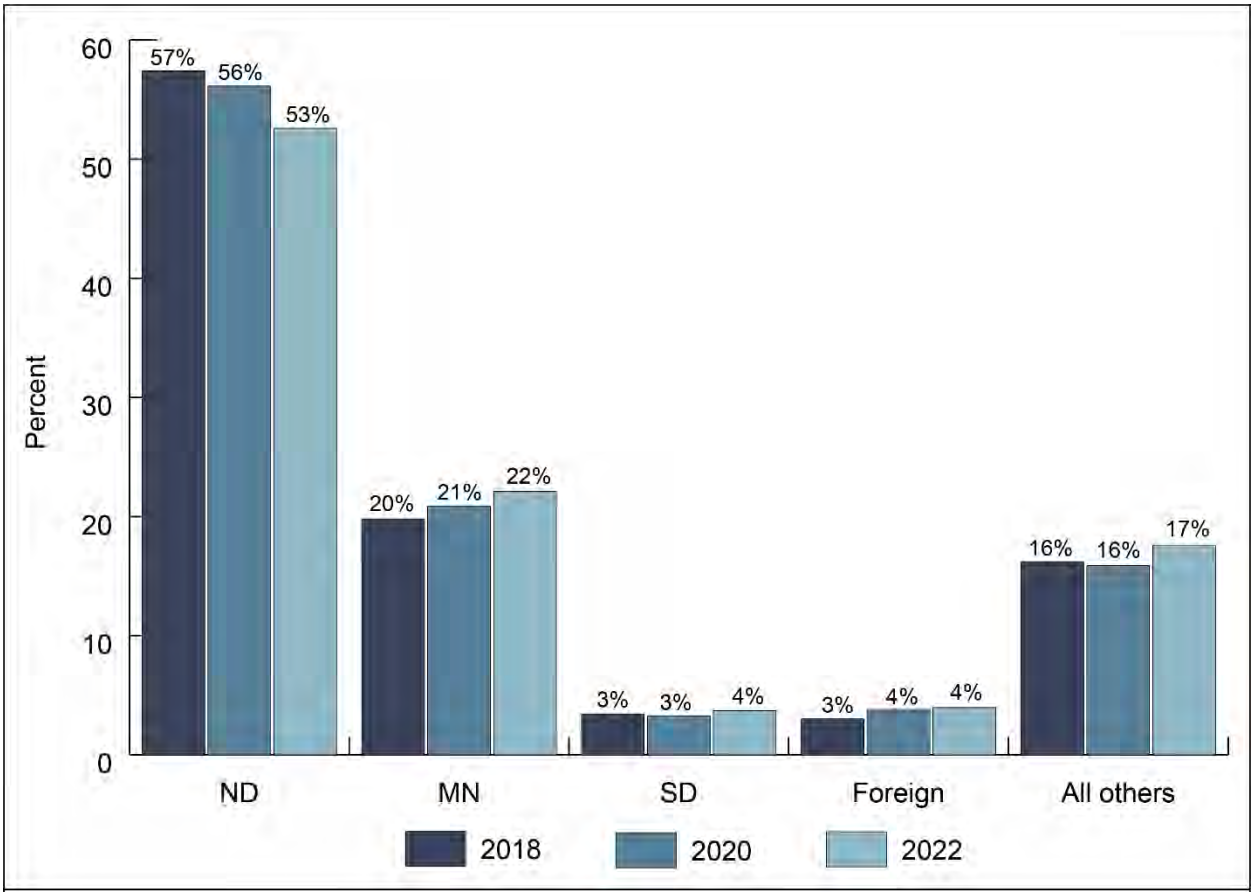

***Figure 7.11*. RNs' education state and year, 2022.[2]**

North Dakota's Registered Nurse Education Programs

North Dakota currently has 13 NDBON-approved registered nurse education programs.[8] All graduates are eligible to take the RN NCLEX exam required for initial RN licensure. Four of the state colleges collaborate and are part of the Dakota Nursing Program (Bismarck State College, Dakota College at Bottineau, Lake Region State College, and Williston State College) in which students graduate with an Associate Degree. In addition, the Dakota Nursing Program has distant sites located throughout the state in mostly rural areas associated with each of the four colleges. The North Dakota State College of Science also offers an Associate Degree. Other state universities offer a Bachelor of Science (BSN) (Baccalaureate) degree and include Dickinson State University, Minot State University, North Dakota State University (NDSU), NDSU Nursing at Sanford Health, and the University of North Dakota. There are three private universities/colleges that offer a Bachelor of Science (Baccalaureate) degree: University of Jamestown, University of Mary, and Rasmussen University.[8] Table 7.3 provides information on total enrollment, admissions, and graduates for these programs over the past five years. Fort Berthold Community College closed its Associate Degree nursing program in the fiscal year 2014- 2015.

"Efforts to alleviate the rural and urban nursing shortage should include support for the state's registered nursing programs."

The Baccalaureate graduate data (Table 7.3) includes some RNs already practicing who earned a previous diploma or Associate Degree prior to their initial RN licensure. While total enrollment overall has varied in the Baccalaureate and Associate Degree programs the past five years, the total number of graduates has steadily increased. Both types of programs have varied in number of admissions; however, it may take a few years to see the impact on the total number of graduates. In addition, it is known that the SARS-CoV-2 pandemic had a negative impact on the state's nursing programs' overall enrollment numbers. Total graduates for these programs increased in 2020-2021 despite the pandemic effects.[2] Note that the Baccalaureate programs vary on when they officially admit their students to the nursing programs. Mayville State University also offers an RN – BSN program where RNs enrolled in the program are practicing RNs and enroll in an online program to obtain a Baccalaureate degree. Data for Mayville State University's nursing RN – BSN program students are not included in the *NDBON Nursing Education Annual report* since they do not undergo approval through the NDBON and instead obtain Commission on Collegiate Nursing Education (CCNE) accreditation.

Like the state's practical nursing programs, the registered nurse programs are limited in the number of students they can enroll due to limited resources, funding, and a shortage of faculty. Efforts to alleviate the rural and urban nursing shortage should include more support and monetary funding for the state's registered nursing programs. Improved incentives for faculty recruitment and retention are needed. Increased funding for expanding resources such as buildings, simulation centers, and other resources also are needed. In addition, high school students and community members should be encouraged to pursue a registered nursing education and remain in their communities and the state after graduation to practice as an RN. The state's nursing education programs could consider giving priority to the state's residents for admission to their programs. More incentives must be implemented to keep the RNs practicing in the state after graduation. In FY 2020-2021, 751 total registered nursing students graduated from North Dakota's nursing programs (Table 7.3).[2] Some of these graduates are already licensed as RNs, but some are not. These graduates should have a positive impact on the RN vacancies if they remained practicing in the state.

Table 7.3
North Dakota's registered nurse program 5 year trends, 2020.[8]

Registered Nurse Program Trends	FY 2016 - 2017	FY 2017 - 2018	FY 2018 - 2019	FY 2019 - 2020	FY 2020 - 2021
Associate Degree Program Admissions	122	161	157	176	207
Baccalaureate Degree Program Admissions	639	612	706	671	643
Total Enrollment	1584	1514	1830	1797	1758
Associate Degree Program Graduates	103	119	151	143	188
Baccalaureate (BSN) Program Graduates	488*	553*	570*	563*	563*
Total Graduates	591	672	721	706	751

Information provided is from the 2018-2019, 2019-2020, & 2020-2021 NDBON Nursing Education Annual Reports
**Note total includes Basic BSN, LPN to BSN, Diploma to BSN, and ADN to BSN.*

RN Employment Practice Areas and Settings

North Dakota's RNs have identified several areas in which they currently practice (Figure 7.12). Healthcare facilities and settings can contain several practice areas. The largest number of RNs (4,994) identified the area of "other" as their main practice area. It is difficult to determine exactly what "other" would indicate; however, one could conclude that "other" would be any of the areas not classified below in Figure 7.27. Medical/Surgical was the second most common area (1,755).[1] Medical/Surgical practice areas can be found mainly in hospitals and outpatient surgery centers. These trends are consistent when compared to previous biennial reports.

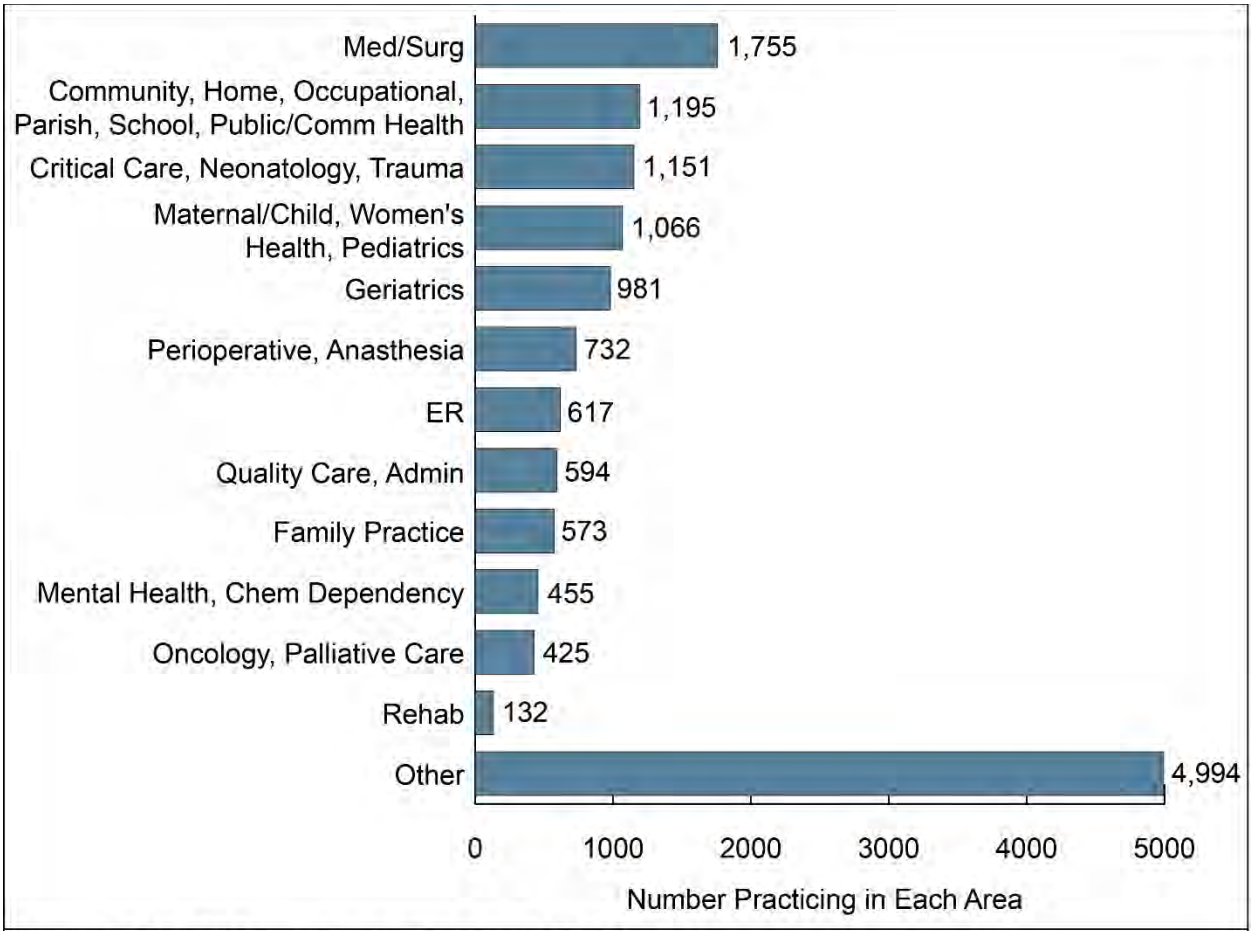

Figure 7.12. **RNs' current practice area, 2021.**[1]

Figure 7.13 illustrates the employment setting for North Dakota's RNs. Employment setting is related more to the actual type of healthcare facility. Like LPNs, the largest employer for the state's RNs is the inpatient facilities (hospitals and nursing homes) at 7,571.[1] However, unlike the LPN workforce, most RNs identified that they work in hospitals (6,473) with nursing homes (1,098) included in the rest of the inpatient facility total.[1] One reason that more RNs are employed in hospitals versus nursing homes is that the overall patient acuity is higher in hospitals. The RN legal scope of practice/license allows them to care for higher acuity patients compared to LPNs. Of interest is that outpatient settings (ambulatory care, clinics) were identified by RNs (2,142) as the second most common employment setting.[1] These findings are expected because of the increased utilization of clinics and outpatient settings for patient care. Furthermore, the findings reflect the increase in the number of licensed RNs since the last Biennial Report.

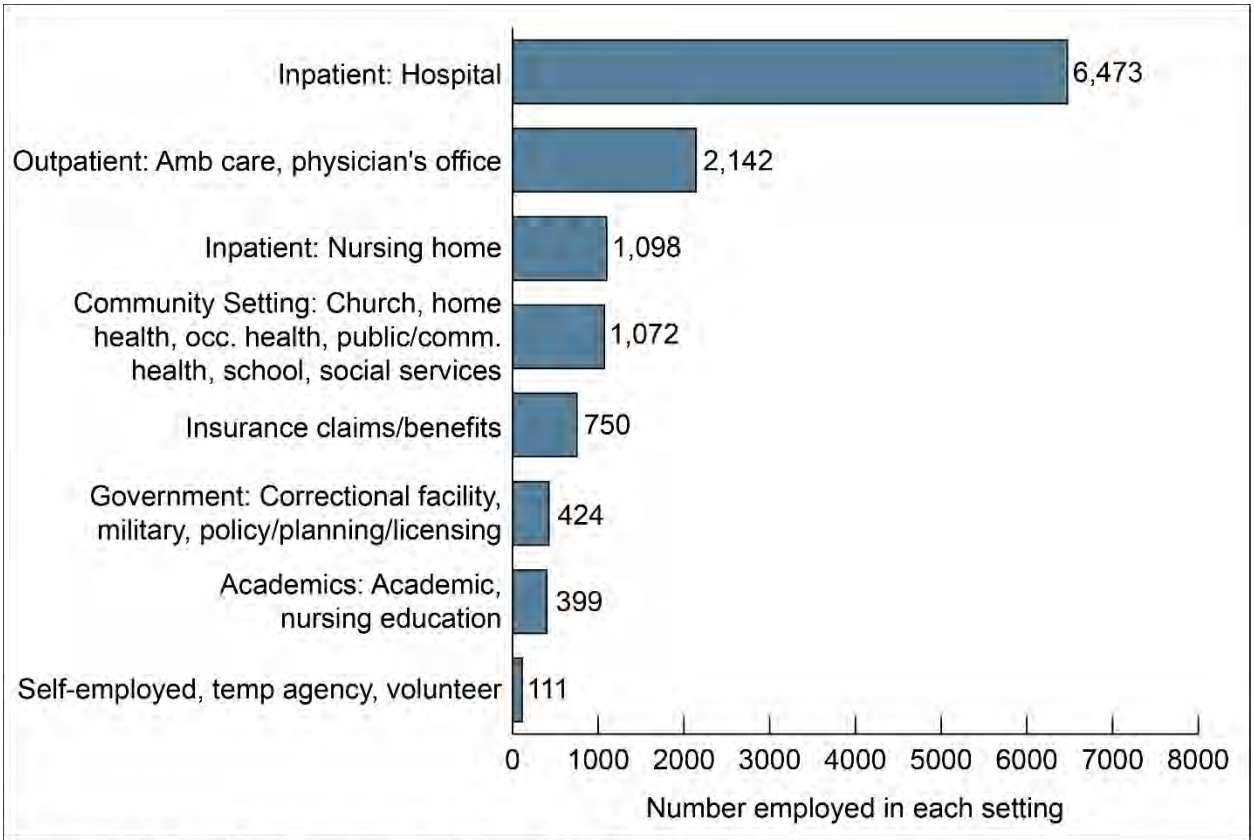

Figure 7.13. **RNs' employment settings, 2021.**[1]

The state's RNs vary in employment status as either full-time, part-time, not employed, retired, or per diem (Figure 7.14). In 2022, most indicated that they are working full-time (69%) in their current practice. Note that there has been a gradual decline in the percentage of RNs working full-time while there has been a slight increase in the percentages of RNs not employed or working part-time. Percentages of those working per diem or retired are relatively unchanged.[1] These trends in RNs workforce employment status further exacerbate the nursing shortage. Further studies should explore reasons why the RNs choose to not be employed, work part-time or per diem, or maintain a license as a retired RN.

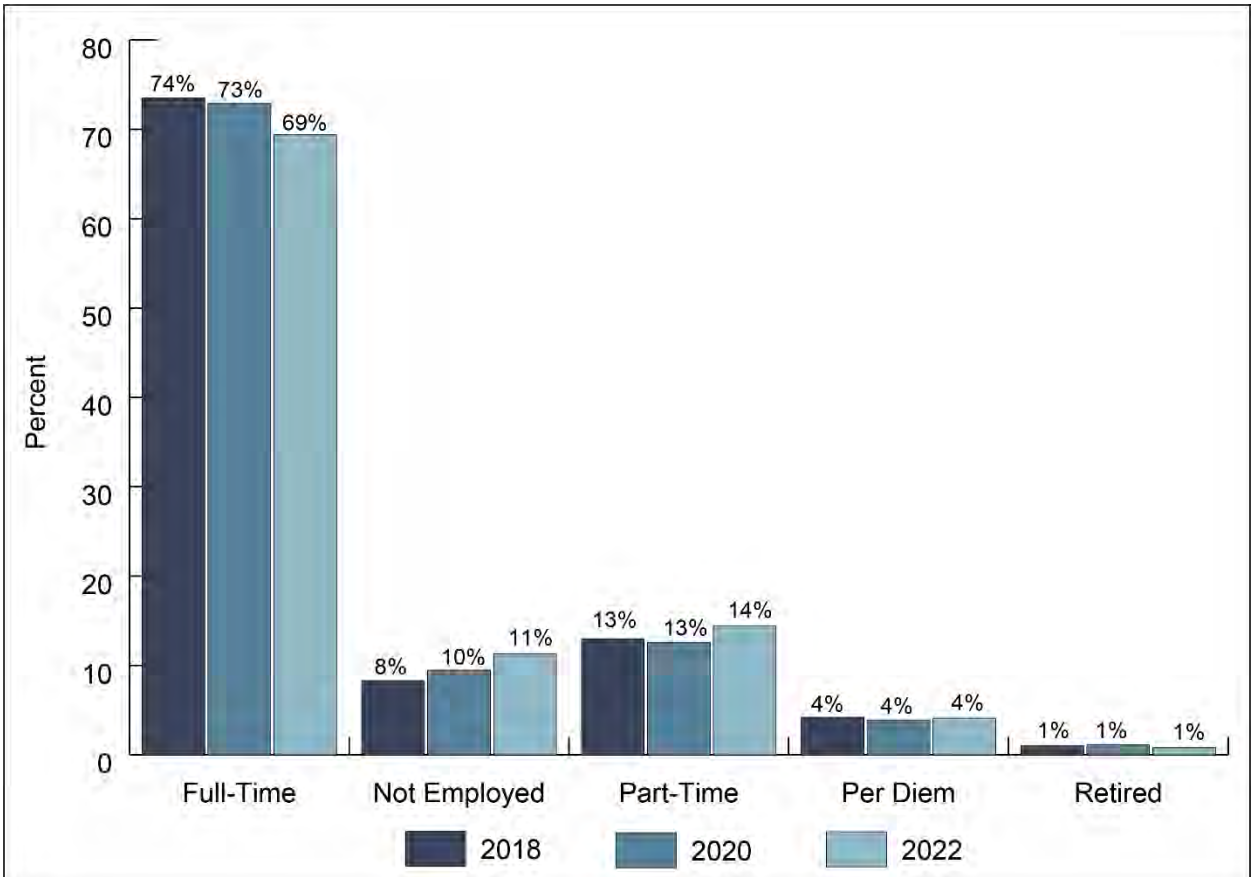

Figure 7.14. **RNs' employment status and year, 2022.[1]**

RNs identified the city in which they are employed. Based on this information, the RNs were assigned RUCA codes classification to identify which category they are employed in practice. Most RNs (68%) are working at a facility that is considered urban based on the assigned RUCA code. The remainder work in one of the rural areas (32%) (Figure 7.15).[1]

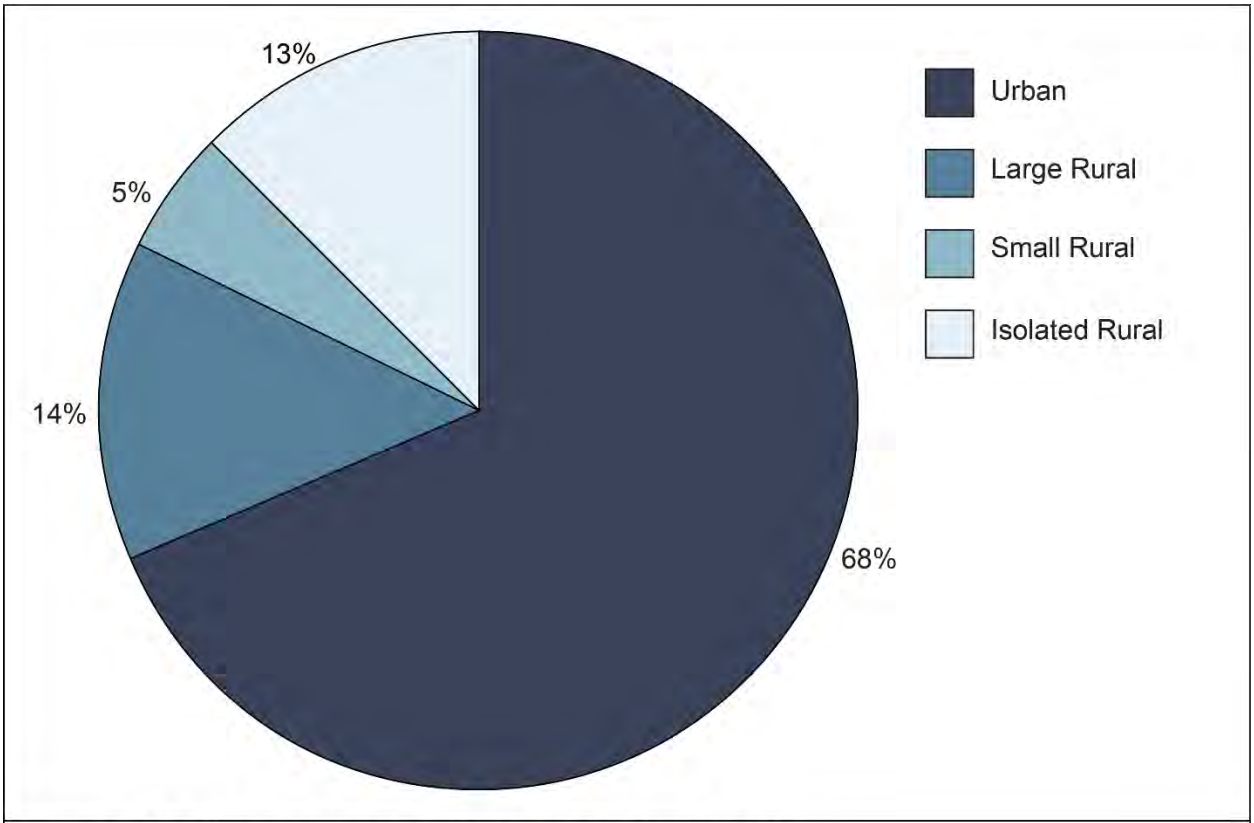

Figure 7.15. **RNs' employment based on RUCA code, 2021.[1]**

RNs can apply for licensure in more than one state so that they can concurrently practice in several states. The RN may choose to have more than one license because he or she lives on a state border, works under contract, or maintains a residence in more than one state. As of December 2019, most of the state's RNs (89.3%) are licensed exclusively to practice in ND (Table 7.4). 707 RNs are licensed to practice in two states, decreased from 1,074 nurses reported in the last Biennial Report, which may represent nurses located on ND's borders. Note that 4.5% RNs maintain a license in five or more states.[1] RNs that maintain multiple licenses could be contract nurses hired and working at various rural and urban ND healthcare facilities. There is a movement toward RN licensure compact agreements. This would require RNs to be licensed in their home state but could practice in any state included in the compact agreement. Currently, there are thirty-four states signed into the compact agreement. This trend could eventually contribute to less RNs with multiple state licenses and may provide a better picture of the RN's "home state." North Dakota is one of the current compact members.[9]

Table 7.4
Number of states in which RNs are licensed, 2021.[1]

Number of States Licensed	Frequency	Percent
1	13,890	89.3
2	707	4.6
3	159	1.0
4	106	0.7
5 or more	693	4.5

Other RN Demographics

Most of ND's RNs are in the age range of 30 - 34 years (15.6%) (Figure 7.16). The average age of the state's RNs is 43.3 years old. The state's RNs are aging with 16.6% of RNs reporting their age at 60 years and older.[1] It appears RNs are working in their "retirement" years, but could retire soon, further contributing to the state's nursing shortage. Further studies are needed to explore the reasons RNs continue to work when their eligible for retirement and ways to entice the older RN to maintain employment as long as possible to help fill vacant nursing positions.

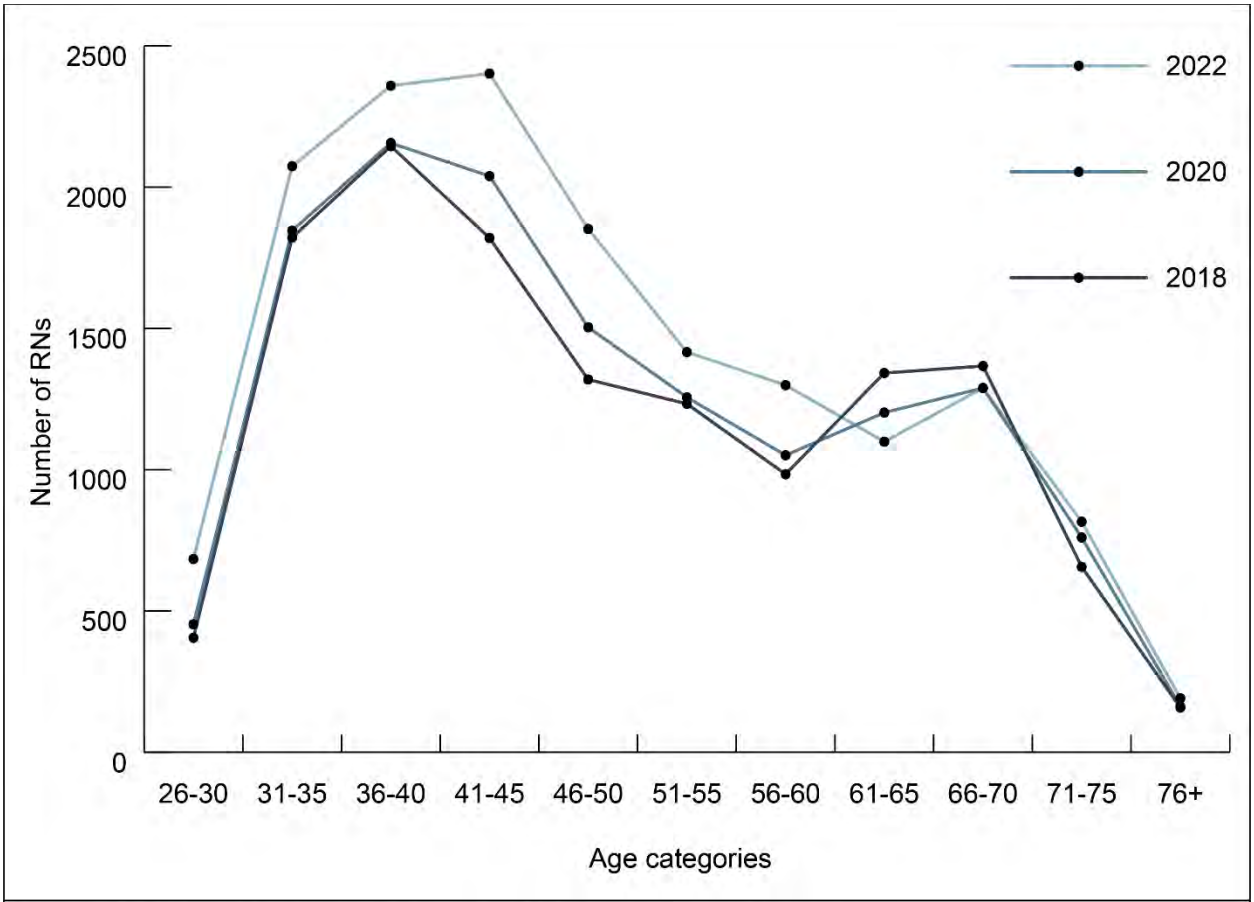

***Figure 7.16*. Number of RNs in each age category by year, 2022.[1]**

Nurse Practitioners

Nurse Practitioners (NP) have been recognized as providing care to patients in the United States since 1965. Currently, NPs must have the following: a bachelor's degree in nursing, pass state RN licensing exams, have a minimum of one-year experience as an RN, and then complete either a Master or Doctor of Nursing Practice degree. Upon completion of this degree, the RN must pass a national certification exam to be licensed and practice as an NP. According to the American Association of Nurse Practitioners, "NPs assess patients, order and interpret diagnostic tests, make diagnoses, and initiate and manage treatment plans, including prescribing medications." NPs can work in primary care, specialty care, inpatient, outpatient, and many other practice areas.[10] NPs can work independently in many states, including North Dakota, and are a significant addition to many interprofessional healthcare teams.

There are currently 355,000 NPs licensed in the U.S.[10] Approximately 36,000 new NPs complete their graduate degrees per year. 89% of NPs are certified in a primary care area, 81% accept Medicare patients, and 79% accept Medicaid patients.[10] NPs hold prescriptive authority, including controlled substances in all 50

states and Washington, D.C.[10] NPs provide increased access to primary care, especially with rural and underserved populations.[11]

There are currently 1,303 NPs licensed in ND, an increase of 278 since the Sixth Biennial Report[1]. North Dakota has three schools with accredited NP programs, two with Family Nurse Practitioner (FNP) and one with Adult-Geriatric Primary Care Nurse Practitioner (AGPCNP)^ and Psychiatric Mental Health Nurse Practitioner (PMHNP) programs in addition to an FNP program (see Table 7.5).[2] Of the currently licensed NPs in ND, 60% were educated within the state, an 8% decline since 2018.[1] 83% of NPs licensed in ND were educated regionally – including ND, SD, MN, MT, NE, WY, and IA, a 4% decline since 2018. Only 8 NPs were listed as educated outside the U.S. (see Figure 7.17).

^The AGPCNP program at UND stopped accepting applications in 2020.

Table 7.5
NP graduates from ND programs, 2021.[2]

University	Degree	Program	2018	2019	2020	2021
North Dakota State University	Doctor of Nursing Practice	Family Nurse Practitioner	16	15	13	15
University of Mary	Doctor of Nursing Practice	Family Nurse Practitioner	22	23	20	17
University of North Dakota	Master of Science	Family Nurse Practitioner	34	35	36	0*
		Adult-Geriatric Primary Care Nurse Practitioner	11	17	8	0*
		Psychiatric & Mental Health Nurse Practitioner	14	19	24	14
Total			97	109	101	46

*Curriculum was changed from FT/PT option to only PT = 1 yr with no grads.

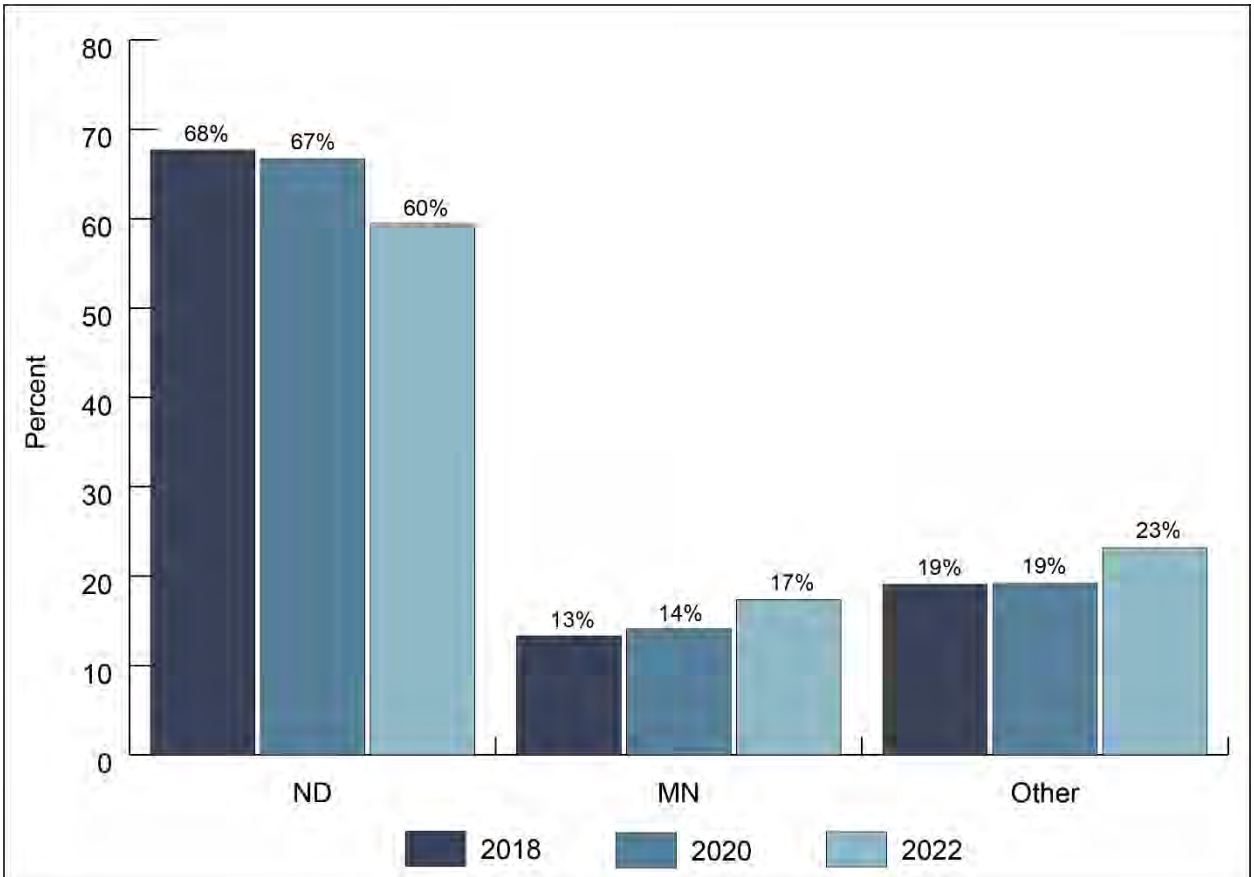

Figure 7.17. **NPs' education state and year, 2022.[1]**

Evidence has shown that RNs who are established in a rural area and return to school to become NPs tend to go back to their home areas to practice after graduation.[12] Limitations on enrollments to NP educational programs are a nationwide problem. This is primarily due to lack of qualified faculty and availability of clinical preceptors. In ND currently 35% of nursing faculty are over age 50, with 15% over age 60.[2] Retirements in the next ten years will compound an already existing faculty shortage. The shortage already is impacting future nursing workforce with over 40% of current licensees obtaining NP training out of state; this constitutes an 8% decline in ND grads since 2018. This also reflects the lack of capacity and loss of revenue for current in-state programs. The lack of availability of preceptors and the unwillingness of healthcare facilities to accept more students will limit the number of NP graduates.

Healthcare facilities across the nation constantly are overwhelmed with healthcare students needing preceptors and clinical hours. This has led to the necessity of forming internal processes or departments for management of student scheduling within many healthcare systems and academic programs. In turn, this creates a bottleneck for enrollment and progression of NP students through their curriculum. This occurs in ND as well, primarily in our larger urban centers. Academic programs not associated with a medical system are reliant upon the good will and voluntary efforts of

providers and their institutions to allocate time for student experiences as NP programs do not have funding to pay preceptors. In some areas of the U.S., the healthcare facilities require payment; this can fall to the NP program or the student and can be prohibitively expensive.[13] Some states have started providing monies or incentives to preceptors and healthcare facilities. Ultimately, the NP programs are limited in how many students can be placed in certain areas of the state at any given time due to these parameters set by healthcare facilities.

The NP role was originally developed to increase the numbers of primary care providers. Several non-primary care population areas of certification for NPs have evolved over the past 50 years so registered nurses could be trained to work with a particular population, such as Acute Pediatrics and Psychiatric/Mental Health. Additionally, many primary care NP designations such as Family Nurse Practitioner or Adult and Geriatric Primary Care Nurse Practitioner may also lend themselves to practice outside of a primary care area. This occasionally depends on job availability within the NP's home area. Many primary care NPs are either choosing or are involuntarily taking positions outside of primary care due to lack of NP primary care positions. This trend is seen most frequently in urban areas, both in North Dakota and in the U.S.[14]

Some 43% of NPs licensed in ND are working in primary care areas such as family practice, geriatrics, maternal/child, pediatrics, or women's health.[1] While numbers of NPs working in primary care have increased, the percentage has decreased 4% since 2018, reflective of additional NPs working in mental health, acute care, and other non-primary care areas.[1] Data are as such that not all acute care certifications are separated from primary care, being only separated by population versus acuity. Without separating acute and primary care, the certifications typically associated with primary care constitute about 92% of all ND licensed NPs. Interestingly, though 92% of NPs in ND may be certified in a primary care population, less than half of those report working in a primary care practice area. Again, this may be due to data collection not capturing all acute care certifications, but this would result in, at most, 9% less primary care certified NPs. Larger, urban healthcare systems across the state tend to employ primary care certified NPs in specialty areas more frequently than in primary care areas, so this may be contributing. NPs in acute specialty care comprise 16% of ND licensed NPs, 8% work in behavioral health, and 5% in a public health practice (see Figure 7.18)[1]. Additionally, 46% of NPs practice in an outpatient setting, 28% inpatient or long-term care, and the remainder in a community, government, academic setting, or other (see Figure 7.19).[1]

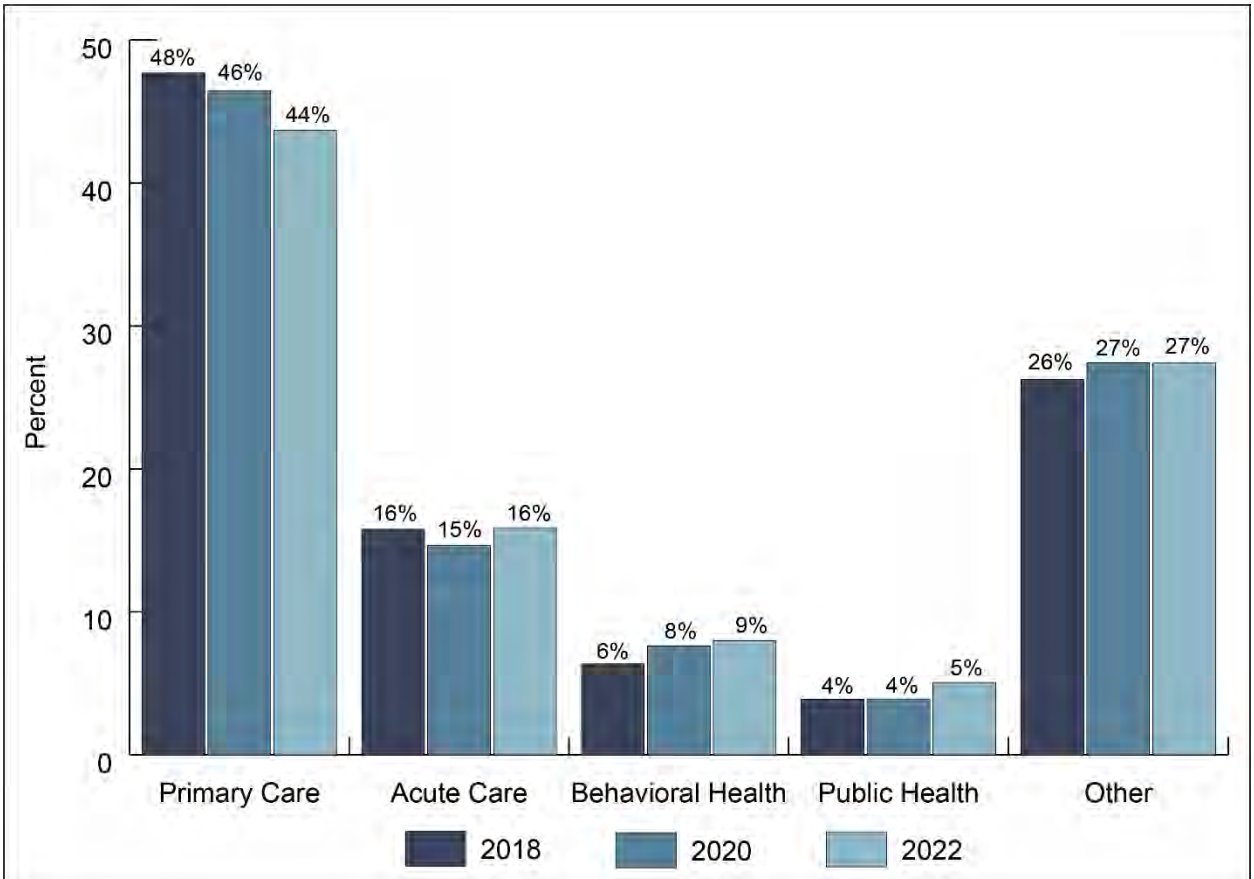

Figure 7.18. **NPs' practice area and year, 2022.[2]**

*Primary care = Family Practice, Geriatrics, Maternal/Child, Women's Health, Pediatrics; Behavioral Health = Chemical Dependency, Mental Health; Acute Care = Critical Care, Emergency, Med/Surg, Perioperative, Trauma, Palliative Care, Oncology, Neonatology; Public Health = Community, Home Health, Occupational Health, School, Rehab, Public/Community Health, Administration, Quality Assurance.

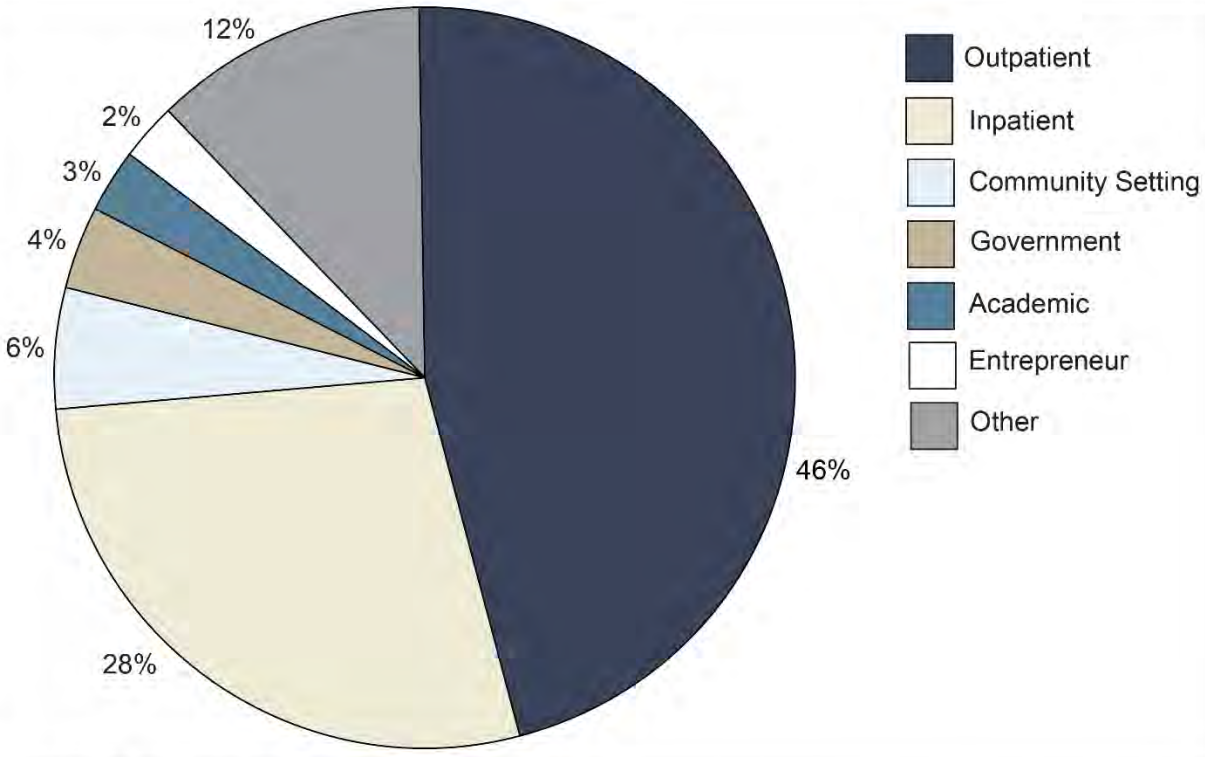

Figure 7.19. **NPs' employment settings, 2021.**[1]

Outpatient: Ambulatory Care, Physicians Office; Inpatient: Hospital, Nursing Home/Extended Care; Community Setting: Home, School, Occupational, Public/Comm Health; Government: Corrections, Military, Policy/Planning/Regulatory/Licensing Agency; Academics: Nursing Education; Entrepreneur: Self Employed, Temporary Agency; Other: Insurance Claims/Benefits.

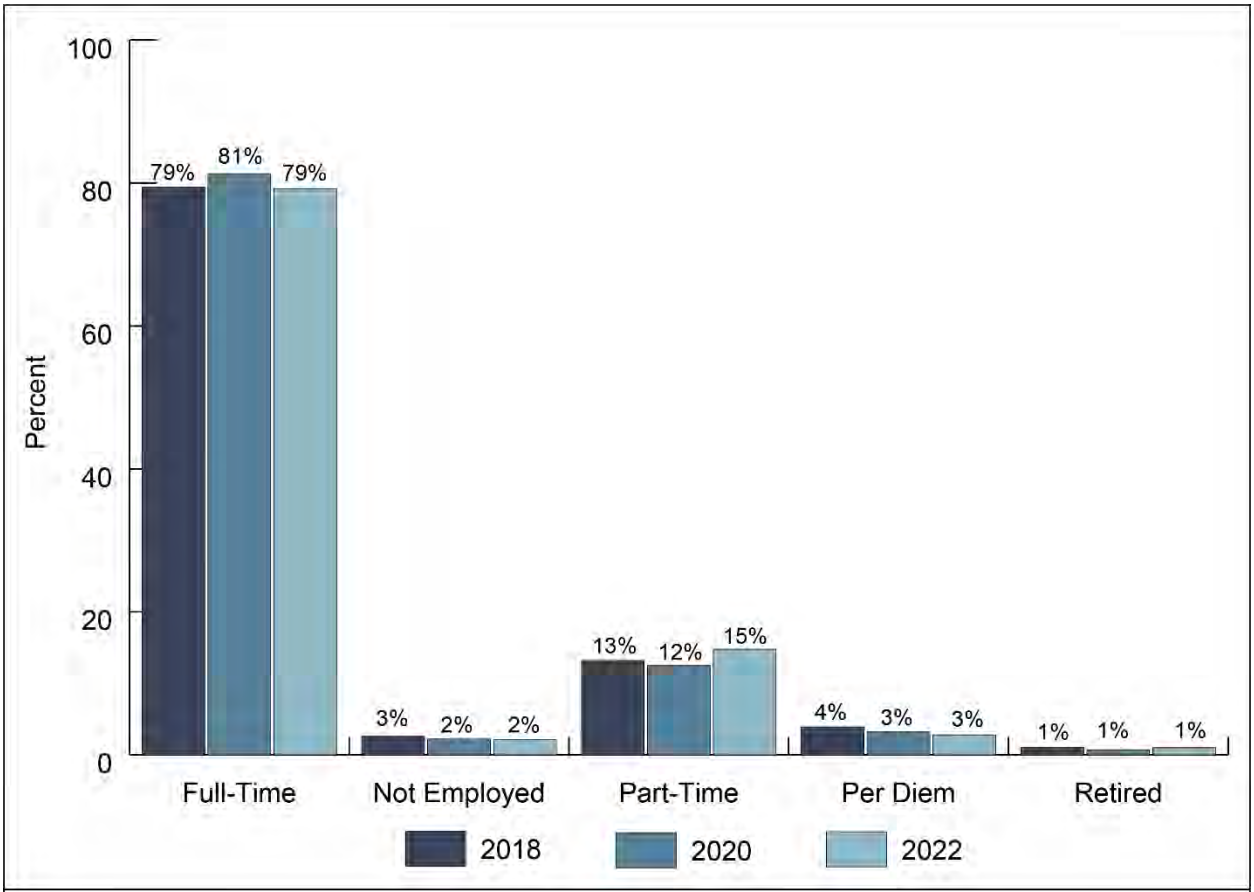

Figure 7.20. **NPs' employment status and year, 2022.[2]**

NPs in ND are primarily (79%) employed full-time, 18.5% are part-time or per diem (flex time), and 2.5% are unemployed or retired (see Figure 7.20).[1] There is a decrease in full-time NPs with an increase in part-time and unemployed/retired since 2020; however, current numbers are aligned with data from 2018. This slight dip could have been attributed to the recent pandemic. With the dataset parameters as they are, the NPs can only allot for their primary position. The part-time and per diem NPs could likely have multiple positions potentially equivalent to full-time status yet not have the ability to specify it on the current survey instrument. Retired and unemployed NPs were included here as they are still maintaining their license and certification.
Many times, these NPs may still contribute through short-term assignments, volunteer status, or other means of providing care.

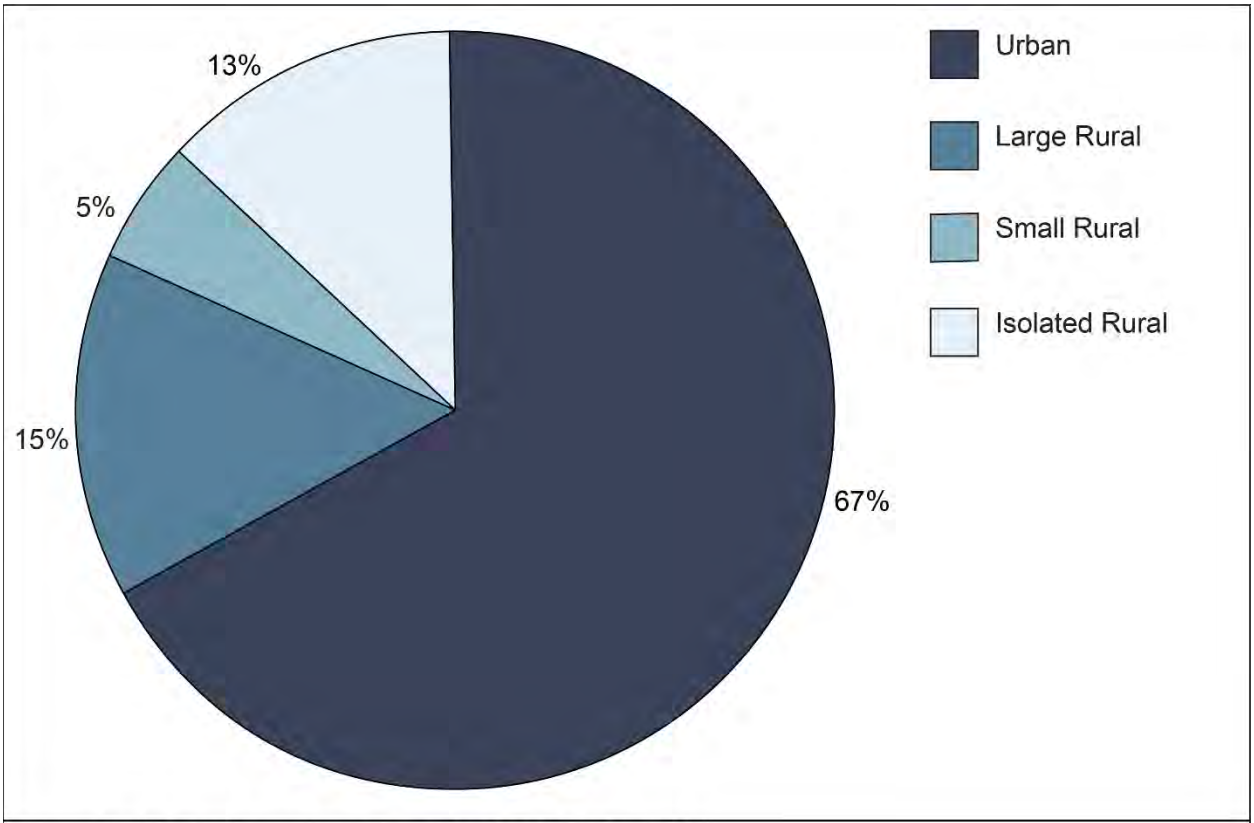

Figure 7.21. **NPs' employer location by RUCA, 2021.[1]**

North Dakota NPs are largely urban (67%) as most large healthcare facilities are in the four urban hubs of ND (see Figure 7.21).[1] There was a slight shift in percentage of NPs in the rural/urban areas of ND. Isolated rural representation has continued to decrease since 2018 from 16% to 12.6%, with small and large rural both increasing by less than 1%.[1] This could be as much related to fluctuations in rural/urban designations as to numbers of NPs. Nationwide there are 6.38 NPs per 10,000 population in rural areas and 7.2 NPs per 10,000 population in urban areas.[15] North Dakota's NPs have made more progress in serving the needs of the state as compared to nationwide numbers with 42% more NPs in rural areas and 114% more NPs in urban areas as compared to the nation. ND has 9.07 NPs per 10,000 population in rural areas and 15.4 per 10,000 population in urban areas.[16] With ND being an extremely rural state, even NPs practicing in urban areas are rural serving as well. A study completed in 2017 showed 83% of NPs practice in urban areas, 9.5% in large rural, 4.3% in small rural, and 2.9% in isolated rural.[17] North Dakota NPs are leading the nation in their service to our rural communities with approximately double the percentages of NPs in rural locations.

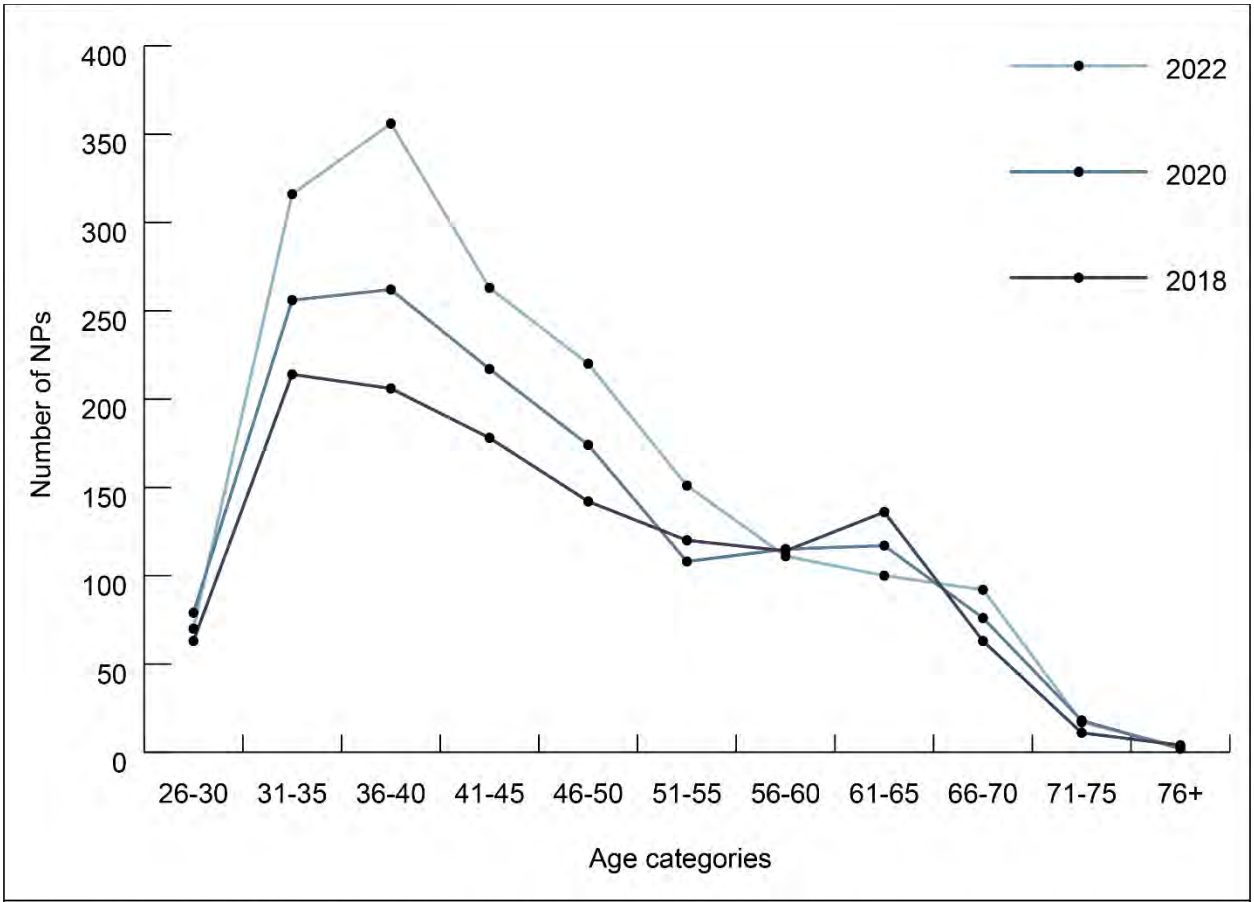

***Figure* 7.22. Number of NPs in each age category by year, 2022.[1]**

The average age of the ND NP is 44 years, a decrease of 0.5 from the last Report (see Figure 7.22).[1] This is just slightly above the aggregate of 43.9 years. As with other nursing roles, NPs have a higher percentage of licensed providers in the younger age groups with 55% between the ages of 31 and 45. The lower numbers of less than 30-year-old NPs could be due to the fact that in addition to the BSN at least one year of experience is required for most NP educational programs. Typically, the youngest any NP could be, if following a traditional path and moving quickly through the process, would be 25 years old.

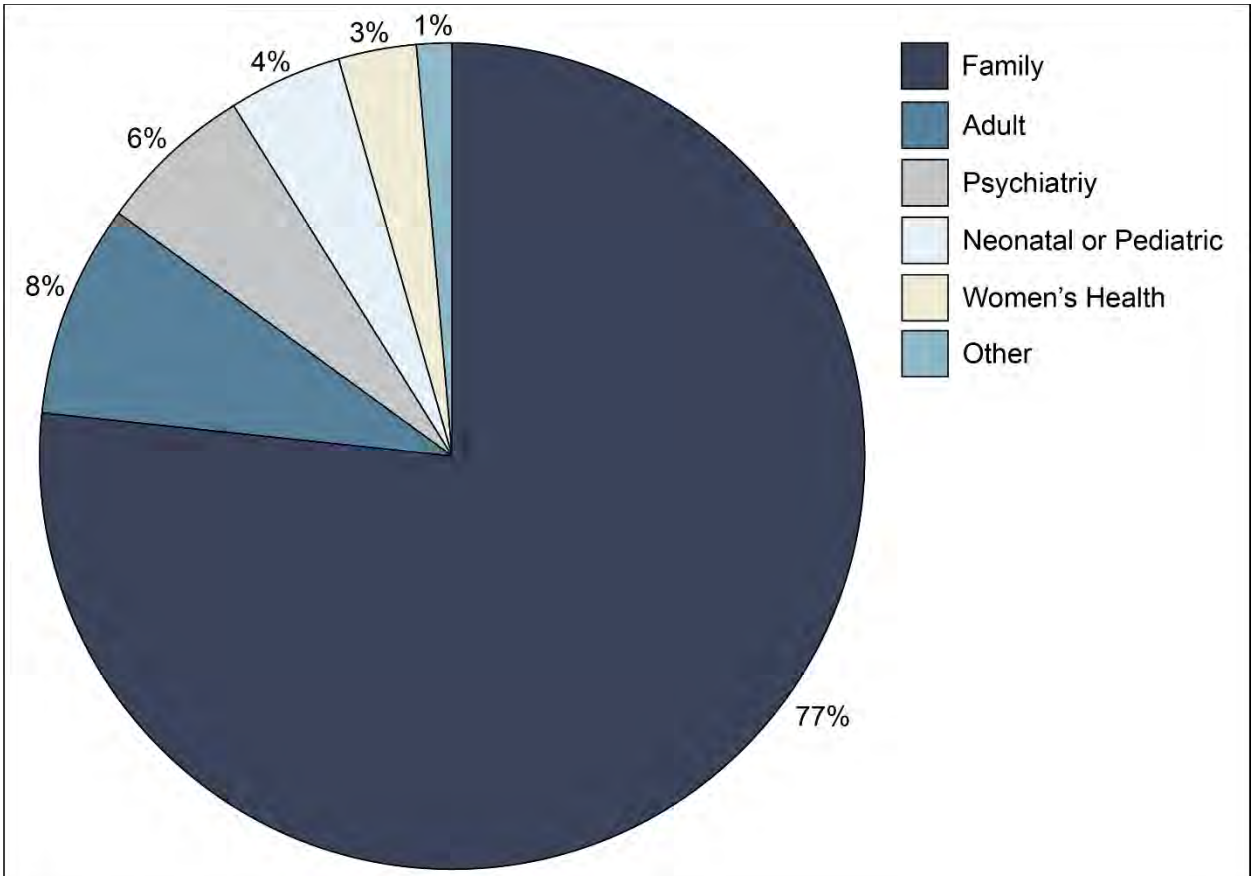

Figure 7.23. **NPs' certification types, 2021.**[1]

Most ND NPs are certified as Family Nurse Practitioners (77%) (see Figure 7.23).[1] The heavy reliance on family NPs in ND is likely due to the ability to care for patients across the lifespan, and it is more cost effective to employ one provider who can care for all ages than multiple limited scope providers. However, adult-geriatric certification is becoming more of a necessity as are the psychiatric-mental health NPs. The numbers of each certification type are relatively stable with just a 1% decrease in family and neonatal, and 1% increase in psych-mental health certified NPs.[1] Adult and geriatric NPs tend to care for patients with more chronic issues and residents in long-term care facilities. PMHNPs can work with patients having behavioral health issues both inpatient and outpatient, and typically children through elderly. While Family NPs can certainly care for all ages with chronic and acute illnesses as well as prevention, the adult-geriatric and psychiatric/behavioral health NPs are needed for the high-acuity patients and to consult with our primary care providers in ways to best treat these types of patients.

Certified Registered Nurse Anesthetists (CRNAs)

CRNAs are advanced practice registered nurses who administer anesthetics to patients undergoing procedures needing anesthesia and/or pain management. These services include pre-anesthesia evaluation, administering the anesthetic, monitoring and interpreting the patient's vital signs, and managing the patient throughout the procedure.[18] CRNAs practice in multiple settings including hospitals, ambulatory surgical centers, and outpatient offices.[18] CRNAs oftentimes are the sole anesthesia providers in rural settings. North Dakota currently has 337 licensed CRNAs with 73% of them educated at the University of North Dakota in the state's sole anesthesia education program. Overall, 88% of CRNAs were educated within the region including ND, SD, and MN (see Figure 7.24).[1]

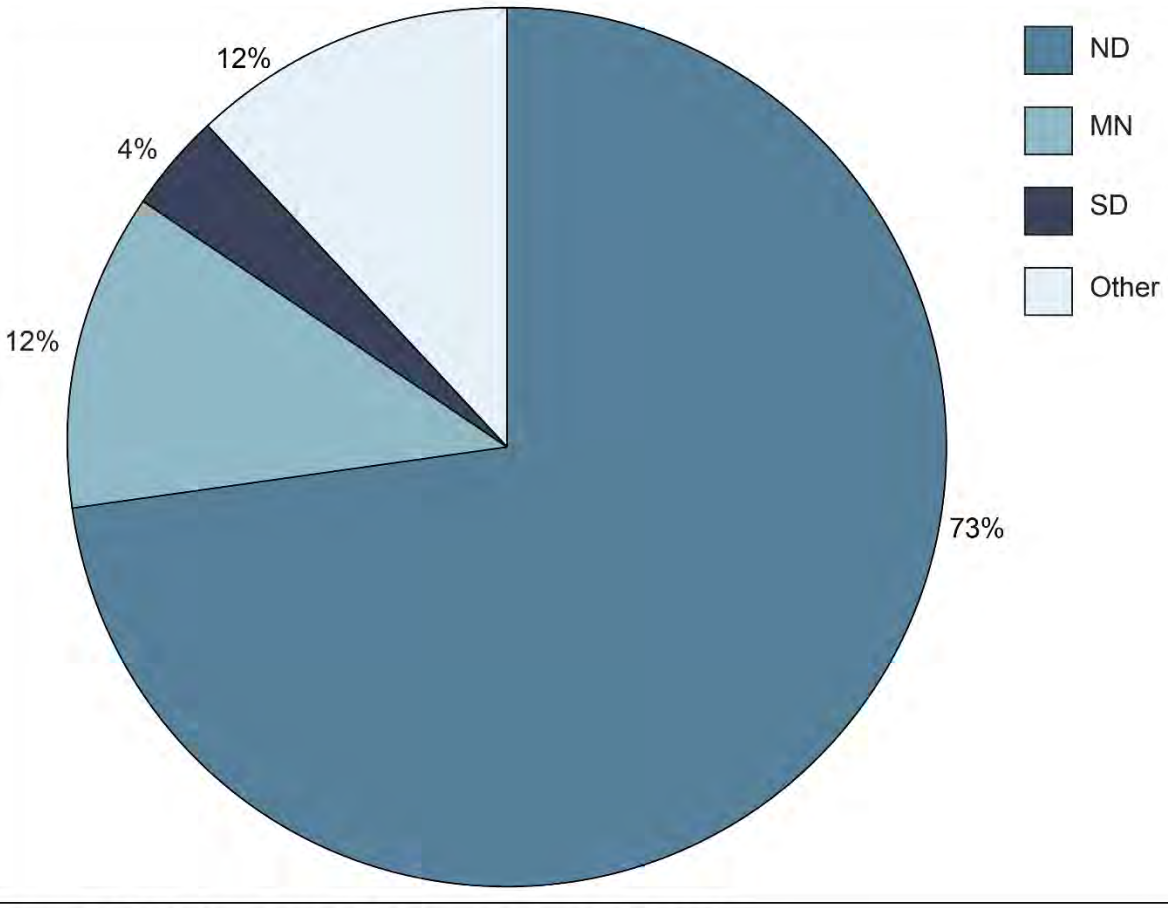

Figure 7.24. **States where CRNAs were educated, 2021.[1]**

The University of North Dakota has the state's sole CRNA educational program. This program transitioned to the Doctor of Nursing Practice (DNP) degree, with the first cohort of DNP prepared CRNAs graduating in 2021. The program typically graduates 13-15 new CRNAs yearly, as reflected in the most recent NDBON education reports.[2] The UND CRNA program has been increasing capacity over the past two

years, so an increase in graduates by the next biennium should be noted. 94% of CRNAs licensed in ND are currently working in anesthesia; the remainder reported working in critical care, community, or other practice area.[1] 85% of the CRNAs licensed in ND work in a hospital setting, 5% are in ambulatory care, 3.3% are self-employed, and the remainder are in an educational setting or “other”. Most CRNAs are employed full-time (83%), 12% are employed part-time or per diem, and 4.7% were unemployed at the time of licensure renewal (see Figure 7.25).[1]

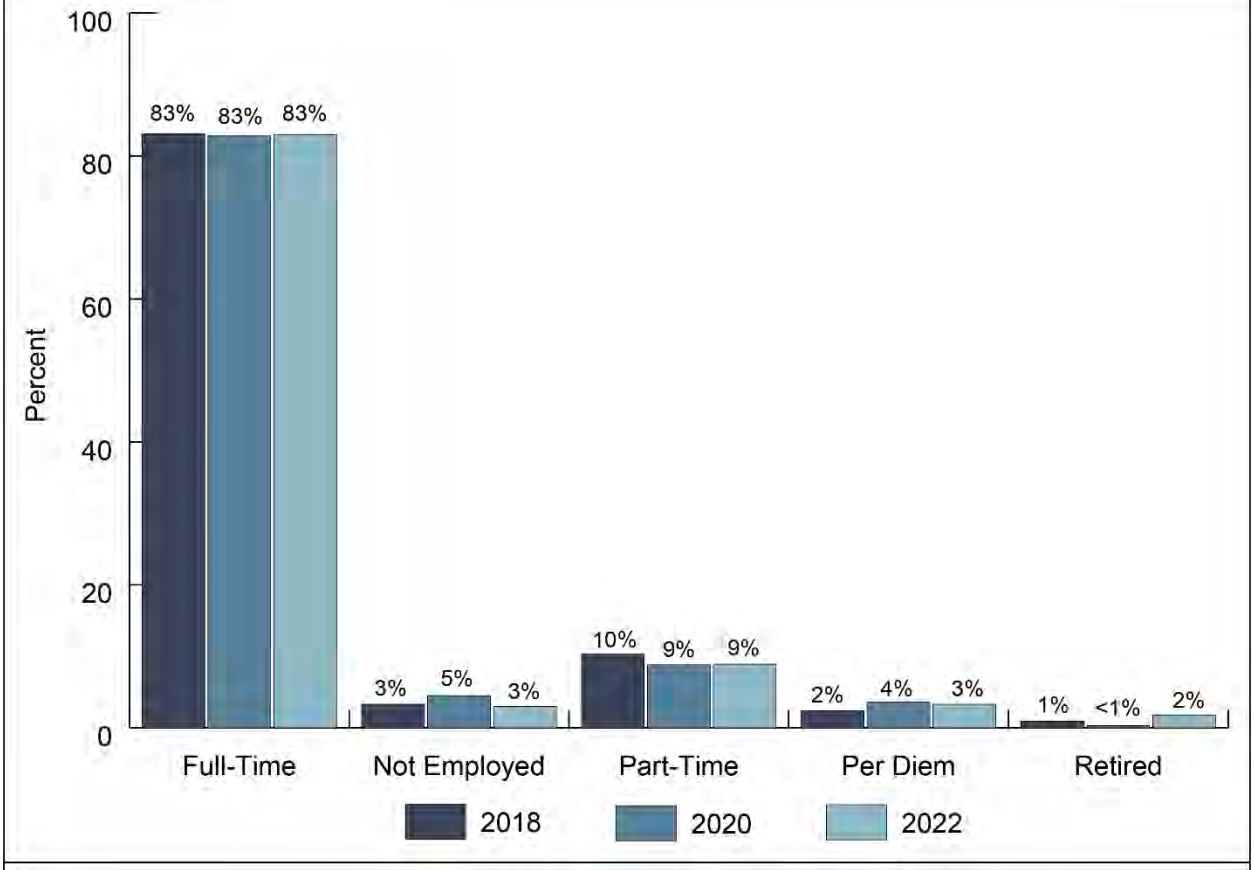

Figure 7.25. **CRNAs’ employment status and year, 2022.[2]**

Most CRNAs are hospital-based with the majority located in an area designated as urban (78%) (see Figure 7.26).[1] However, CRNAs typically are the sole anesthesia provider in rural locations throughout the U.S. 18.6% of CRNAs nationwide practice in rural counties whereas only 8.4% of anesthesiologists do so.[19] As compared to the nation, a higher percentage (22%) of the CRNA workforce are in rural locations of ND, making access to anesthesia services a possibility at some rural facilities.

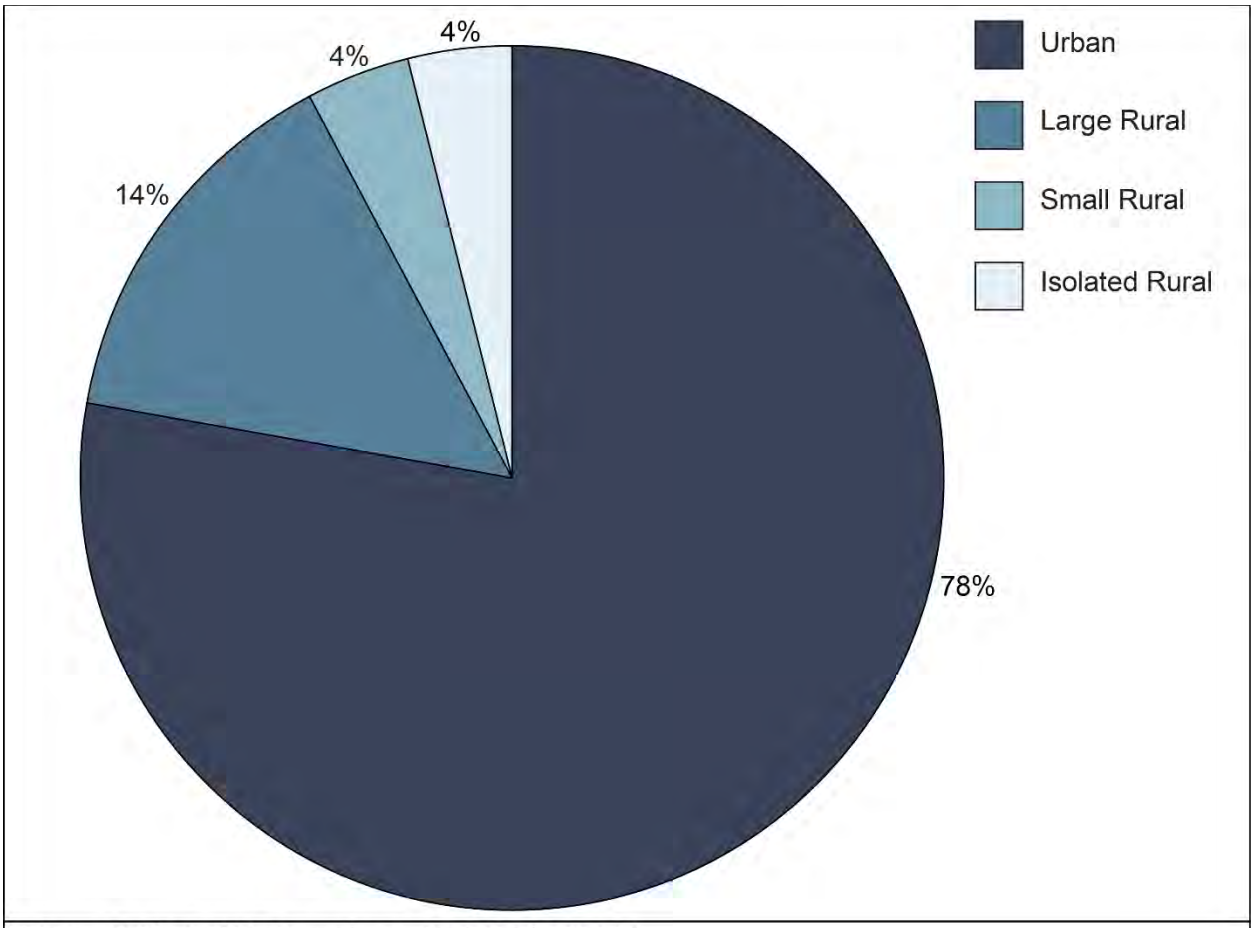

Figure 7.26. **CRNAs' employer by RUCA, 2021.**[1]

As with other APRN types, RNs need experience and additional education prior to being eligible to practice as a CRNA. This is likely the reason that there are no CRNAs under the age of 28 in ND. The average CRNA age is 47 currently (see Figure 7.27).[1] There is slightly less variability in the age ranges of the CRNA as compared to the overall RN workforce. This may be due to the higher percentage of male nurses who move into the CRNA ranks and continue employment throughout their careers versus women who tend to stop working or go to part-time status for parts of their careers due to childbirth and child rearing. Regardless, 30% of the current CRNA workforce is over age 55, likely indicating that one-third of the workforce may be retiring in the next 10 years.

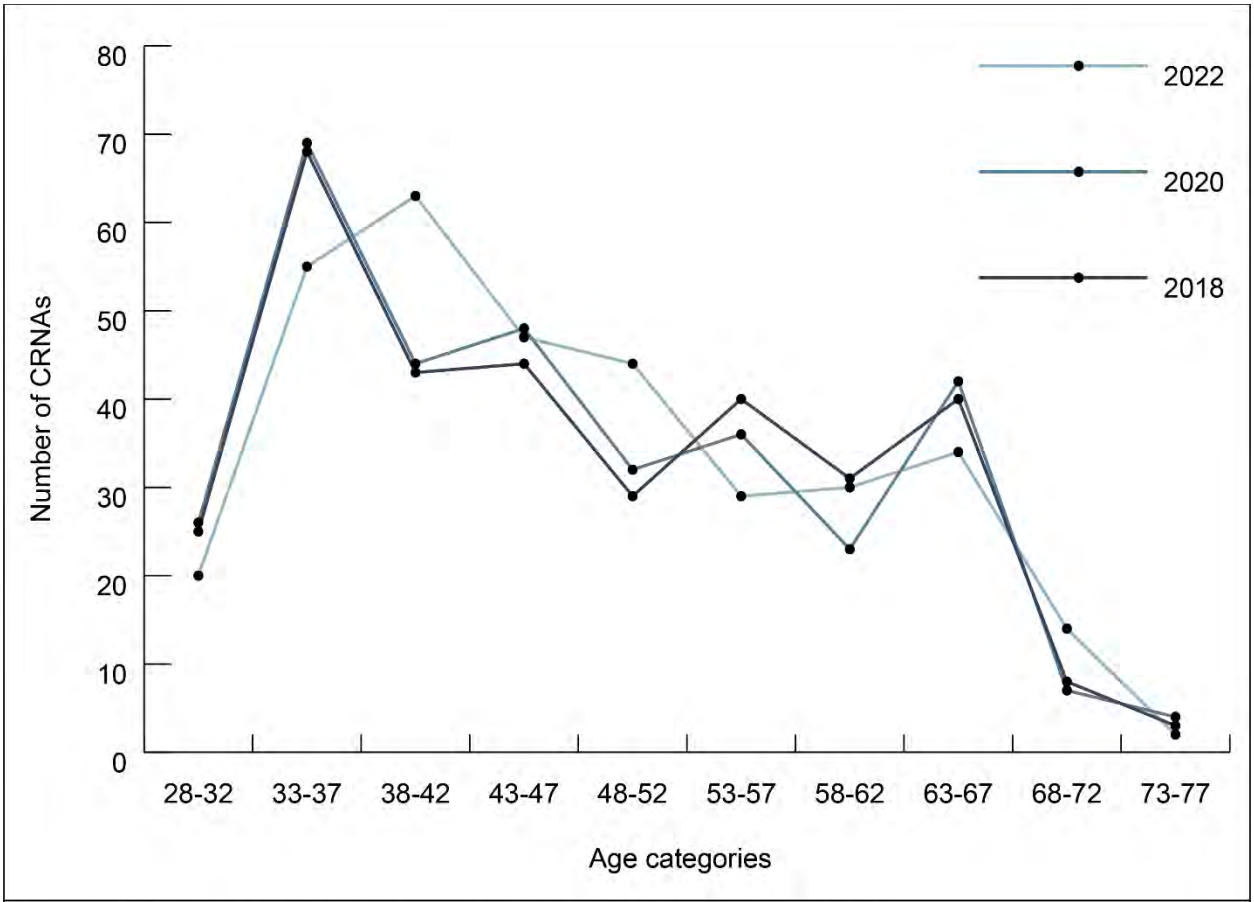

***Figure 7.27*. Number of CRNAs in each age category by year, 2022.[1]**

Certified Nurse Midwives (CNMs)

CNMs are licensed, independent health care providers with prescriptive authority in all 50 states and they are designated as primary care providers under federal law.[20] As with all APRN types, CNMs are RNs with additional didactic and clinical education and a national certification. CNMs attend births, provide reproductive care, and primary care for the childbearing woman. CNMs attend births in hospital settings, stand-alone birthing centers, and in the home setting.[20] There currently only are 25 CNMs licensed in ND (17% decrease since last report); 8 are employed in an ambulatory setting or physician's office, 12 are hospital-based, and the remaining 5 are employed in nursing education, community health, or a government setting.[1] All the CNMs are currently employed; 72% are full-time and 28% part-time or per diem. These percentages reflect an 8% shift between full-time and part-time employment since 2020.[1] It is important to note that though CNMs are qualified and licensed to attend labor and deliveries, it is estimated that less than half of the state's CNMs are in positions that include this privilege. Fourteen of 25 CNMs list ND as the state where they received their education. Overall, 60% were educated in the region, including ND, SD, and MN for some part of their nursing training. There currently are no CNM

educational programs available in ND or SD. 28% of the CNMs are employed in an area designated as rural. The average age of CNMs licensed in ND is 45, a decrease of three years from the last Report, likely a result of five retirements.[1]

While obstetricians and some family practice physicians also provide perinatal care and assist with deliveries, it would be advantageous to the women of this state to have more CNMs available. CNMs provide holistic care during pregnancy and the labor/delivery process. They are known for less invasive techniques and innovative methods of pain management during labor and delivery and are more likely to practice in rural areas and with underserved populations.[20] There currently are 40 obstetricians in ND, all in the major urban centers[21] (Data as of 2019; 2022 data was gathered, but ND did not release OB/GYN data to the Bureau of Labor Statistics). The infant mortality rate in ND is 34% higher than the national average.[22] As the numbers of family practice physicians providing obstetric services in rural areas continues to dwindle, women will be faced with increasing difficulties such as driving an hour or more to see a provider during their pregnancy or even the need to re-locate during the later stages of pregnancy to be nearer a delivering facility. If ND wants to sustain a younger population in rural areas and decrease the overall infant mortality rate, pregnancy and delivery care is a definite need.

Certified Nurse Specialists (CNS)

CNSs are APRNs who are certified in a specific population. This could be a population such as adult/geriatric, pediatric, or neonatal. CNSs work in a variety of settings and specialties such as palliative care, inpatient pediatrics, and psychiatry. CNSs work in three spheres of influence, clinical expertise, nursing practice, and system innovation. They can provide direct patient care, teach nurses and staff, act as a consultant for nurses/staff/other providers, lead evidence-based projects, and assist other providers with direct patient care. CNSs can prescribe either independently or collaboratively in 45 states.[23] North Dakota has 33 licensed CNSs, a 27% decrease since the last biennial report.[1] Over 60% of the CNSs in ND are employed in a mental health practice setting. Roughly half of the CNSs in ND work in a hospital or ambulatory care setting, with the remainder in an academic, government facility, or “other” category. 58% of CNSs are employed full-time, 30% part-time, and the remainder are unemployed or retired. Full-time employment of CNSs has decreased by 13% while part-time employment has decreased by 6% since the last report.[1] This is likely due to an overall loss in numbers for the role. CNSs are largely employed in urban areas of the state (64%), this is roughly reflective of the aggregate. There are 27 of the 33 CNSs educated in ND. There is no longer a CNS educational program in ND, the UND adult-geriatric CNS program having closed within the past 6 years. CNSs can be certified in multiple areas. In ND, 60% of the licensed CNSs are certified as psychiatric, providing much needed behavioral health care at many human service centers and inpatient facilities. It is important to note that the Psychiatric CNS role is no longer an available option. The shift has been to Psychiatric & Mental Health (PMH) Nurse Practitioners.

Although, currently, only 6% of NDs NPs are certified in PMH.[1] The remaining CNSs in ND are certified as adult or geriatric providers. Most of these providers work in hospital settings and/or long-term care. The average age of CNSs in ND is 59, holding steady since the last report. The CNS role is also under-utilized in ND. The CNS provider could support care for the aging population, more critical inpatient populations, and advanced nursing at the bedside.

ND NURSES COMPARED WITH NATIONWIDE STATISTICS

North Dakota is one of the top six states for the ratio of nurses per 100,000 working-age population at 1450-1820.[24] North Dakota currently has between 441 and 603 LPNs per 100,000 working-age population.[24] Nationwide numbers are difficult to obtain, the most recent being reported during the 2008-2010 timeframe. During this time there were 921 RNs per 100,000 and 225 LPNs per 100,000 in the U.S. This data does not consider FTEs (e.g., includes RNs licensed but not working or working part-time). In addition, differences between the needs of rural and urban areas of the states are not considered.

APRNs are typically looked at separately from RNs and LPNs and differentiated by the type of APRN when assessing workforce. The Bureau of Labor Statistics (BLS) identifies that North Dakota is among the states with the lowest total number of employed CRNAs, however, there is no comparison for population ratios. There are over 42,000 CRNAs spread throughout the U.S., with heavier distributions in the southeast and urban areas.[21] Unfortunately, there are only 6,530 CNMs employed throughout the U.S. This data is not entirely accurate, however, as there are none listed as employed in ND. Again, unequal distribution is seen with heaviest employment of CNMs on the coasts.[21] CNSs are not currently measured by the BLS, so there is not a current means of comparison.

The data on NPs from the BLS is not complete when compared to other sources. There has been more updated data collection from the American Association of Nurse Practitioners, as used here for comparison purposes. As of 2022, there are 355,000 NPs licensed in the U.S. with a mean age of 49.[10] Family NPs make up 69.7% of the overall NP population. There are 88.9% of NPs certified in an area of primary care and 70.2% of all NPs practice in a primary care area.[10] There continues to be a maldistribution of NPs in the U.S. Although NPs practice in rural areas in greater numbers as compared to other provider types, the Southeastern U.S. and the West coast have higher overall numbers of NPs.[14] States with full practice authority also tend to have higher numbers of NPs in rural areas.[14] In ND there are 1,303 NPs with an average age of 44, a smaller number but significantly younger group than nationwide. North Dakota remains above the national average in NPs certified in primary care with 92% compared to 88.9%. However, ND also shows less NPs employed in primary care practice at 43%, compared to 69% nationwide. Again, this may be partially attributed to data collection processes or to the larger health systems using more NPs in specialty areas versus primary care.

SARS-CoV-2's Impact on Frontline Health Care Workers

The SARS-CoV-2 health crisis had an unprecedented impact on hospital staff and frontline health care workers within North Dakota, such as nursing staff. An article published in the *Journal of Rural Health* highlights the tangible impact faced by North Dakota hospital workers during this period. In this study, 771 hospital staff in North Dakota were asked about the mental health impact of working with COVID-19 patients.[25] Frontline health care workers who had direct interaction with COVID-19 patients were significantly more likely to report symptoms of anxiety, depression, burnout, and stress. Several factors may have contributed to a decrease in mental wellbeing, including, but not limited to, exposure to infection, less-than-optimal staffing levels, social shunning, quarantine standards, pharmaceutical interventions, and unclear and inconsistent guidance regarding personal protection measures. These results highlight the importance of promoting mental wellness among frontline health care workers.

SUMMARY

Overall numbers in the nursing field demonstrate an increase in ND over the past three biennium. Enrollment in ND nursing programs also has increased. Practice settings and the distribution of nurses across rural and urban areas have been stable. However, there are a few trends of concern that should be addressed and monitored. Trends in employment type, age of nurses, place of education, faculty to student ratios, primary care practice, and CNM practice warrant a closer look.

There is a substantial trend since 2018 of decreasing numbers of nurses working full-time. Unemployment among nurses has increased 4% while part-time work has increased 1.5%. While some of this shift may be due to the recent pandemic, this could not be determined with the current descriptive data. The age of the nursing workforce also could be an area of further study as 23% of the overall nursing workforce in ND is over age 55. Perhaps the most concerning findings are that 28% of LPNs and 29% of CRNAs are over the age of 55 years.

Increasing enrollment trends in ND nursing programs is encouraging. However, the rising rate of students has not seen a corresponding rise in numbers of faculty with increases of 534 and 14 FTE respectively. Also of interest is the decreasing percentage of faculty with terminal degrees. This could be attributed to retirements, but the loss of faculty experience and lack of replacement of faculty with the same level of education is worrisome. There has also been a shift of licensed nurses in ND obtaining education in other states over the past three years. An 8% decrease in ND trained nurses has been demonstrated with most of that percentage now being attributed to MN schools. It is unknown whether this shift is due to ND students leaving the state for school and subsequently returning to ND, or due to nurses from other states moving into ND after school.

Primary care continues to struggle with insufficient numbers in the workforce across the U.S. A 4% decrease in NPs working in primary care has been seen since 2018, despite 92% of ND NPs having primary care certification. A shift away from isolated rural areas for practice also has been noted during this time. Conclusions as to the causes of these changes cannot be drawn but increased use of primary care NPs in specialty areas of large urban healthcare facilities, lack of reimbursement parity and subsequent salary parallels in smaller rural settings likely are contributing.

A final and important area to be addressed is CNM practice in ND. Fewer family practice physicians are providing delivery services across the state and the most recent data gathered lists only 40 practicing obstetricians. Current CNM numbers continue to decline as well, with only 25 licensed in ND and even fewer currently are practicing in their full capacity. Infant mortality is rising across the state, and while no conclusive correlations can be drawn from the current study, a lack of prenatal and delivery services across the state could be a contributing factor. A few issues could be contributing to the low numbers of CNMs in ND. The lack of a CNM educational program in ND and the dearth of facility use and recruitment of CNMs both are significant concerns.

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CHAPTER EIGHT: Behavioral Health and Non-Physician Healthcare Workforce

INTRODUCTION

This chapter addresses specific health occupations that are related to currently funded activities in the state as well as those health professionals trained within the state who are not addressed in other chapters. A majority of the data used here was obtained through the professional licensure boards in North Dakota.

DEFINING BEHAVIORAL HEALTH WORKFORCE

There are a variety of ways to define behavioral health workforce. The definition should include the providers who treat individuals with behavioral health disorders and should examine their education, scope of practice, and level of independence in the treatment environment. In North Dakota, a simple method for defining the behavioral health workforce is to utilize the tiered classification system established in 2017 by the North Dakota Legislature. This classification system for mental health professionals was based on a thorough review of education and statutory guidelines along with scope of practice, to ensure that professionals are being fully utilized within their scope of practice.[1] Behavioral health educational programs available in North Dakota, including those that meet licensure requirements, are listed in Table 8.1 and Table 8.2 below.

The Tiered System

Determining which professions are included in the behavioral health workforce is challenging due to varying education requirements, scopes of practice, and levels of responsibility. A broad definition of behavioral health workforce includes providers of substance abuse and mental health services, as well as those providing services in supportive roles. Established in 2017 by the North Dakota Legislature, the tiered classification system is a simple way of defining the behavioral health workforce. This system classifies the various professions based on the required level of education and scope of practice. There are four tiers within this system.[1]

Tier 1

Professionals in Tier 1 are those with the greatest responsibility, scope of practice, education/training, and ability to practice autonomously. This tier is further broken down into two subsections. Tier 1a are the professionals with expertise in behavioral health (i.e., psychiatrists and psychologists) and Tier 1b are the professionals without expertise in behavioral health but who may interact and work with aspects of the behavioral health field (i.e., physicians, physician assistants, advanced practice registered nurses).[1]

Tier 2

Professionals in Tier 2 are those that are able to work as independent clinicians. This tier is also further broken down into two subsections. Tier 2a are the professionals with comprehensive training in the diagnosis and treatment of a broad array of behavioral health conditions (i.e., licensed clinical social workers, licensed professional clinical counselors, licensed marriage and family therapists). Tier 2b are the professionals with an area of expertise that is limited to a specific population (i.e., licensed addiction counselors, registered nurses).[1]

Tier 3

Tier 3 has the largest variety of professionals with many different practice descriptions. This includes licensed associate professional counselors, licensed professional counselors, licensed master social workers, licensed baccalaureate social worker, licensed associate marriage and family therapists, occupational therapists, licensed practical nurses, licensed and registered behavior analysts, school psychologists, vocational rehabilitation counselors, and human resource counselors.[1]

Tier 4

Professionals in Tier 4 have the narrowest scope of practice and must work under the supervision of other behavioral health professionals (i.e., behavior technicians, assistant behavior analysts, mental health technicians, case aids).[1]

Non-Tiered

There are professions who are not currently in the tiered system that provide behavioral health services in North Dakota such as peer support specialists.[1]

Table 8.1
Behavioral health degree programs at North Dakota academic institutions, 2022.[1]

Degree Program	North Dakota Academic Institutions
Doctor of Medicine (MD)	UND (ACCME, ACGME, & LCME accredited)
PhD Clinical Psychology	UND (APA accredited)
PhD Counseling Psychology	UND (APA accredited)
Doctor of Occupational Therapy	UND (ACOTE accredited) Uni. of Mary (ACOTE accredited)
MA/MS Counseling	UND (APA accredited), Uni. of Mary, & Uni. of Jamestown (not accredited) NDSU (CACREP accredited)
MS Social Work	UND (CSEW accredited)
Behavior Analysis	UND (track within MS in Special Ed. degree)
MA/MS School Psychology	Minot State University (NASP accredited)
Psychiatric-Mental Health Nurse Practitioner	UND (ANCC, NACNS, NONPF accredited)
Addiction Studies	UND, Uni. of Mary, & Uni. of Jamestown (track within degree programs) Minot State University (NASAC accredited)
BS Social Work	UND, Uni. of Mary, & Minot State University (CSWE accredited) Sitting Bull College (candidacy status by CSWE) NDSU (dual degree with Minot State)
Social Work Associate	NDSCS, Cankdeska Cikana Community College, & Nueta Hidatsa Sahnish College
Human Services Associate	Bismarck State College, Dakota College at Bottineau, Nueta Hidatsa Sahnish College, United Tribes Technical College, & Sitting Bull College

Table 8.2
North Dakota academic institutions with behavioral health degree programs, 2022.[1]

North Dakota Academic Institution	Degree Programs
University of North Dakota (UND)	Medical school & psychiatry residency program *Doctorate*: OT, clinical and counseling psy. *Masters*: counseling, psychiatric NP, social work, special ed. w/ behavior analysis *Bachelors*: psychology, social work
North Dakota State University (NDSU)	*Masters*: clinical mental health counseling, school counseling *Bachelors*: human development, psychology
University of Mary	*Doctorate*: OT *Masters*: clinical and addiction counseling *Bachelors*: social work, psychology
Minot State University	*Masters*: education specialist in school psy. *Bachelors*: addiction studies, social work, psychology
University of Jamestown	*Masters*: clinical counseling *Bachelors*: psychology w/ addiction studies
Bismarck State College	*Associates*: human services, social work, psychology
Dickinson State University	*Bachelors*: psychology
Cankdeska Cikana Community College	*Associates*: social work
Dakota College at Bottineau	*Associates*: human services, psychology
Nueta Hidatsa Sahnish College	*Associates*: human services (addiction and social work concentrations)
North Dakota State College of Science (NDSCS)	*Associates*: social work, psychology, occupational therapy assistant
Valley City State University	*Bachelors*: human services, psychology
United Tribes Technical College	*Associate*: human & social services
Sitting Bull College	*Bachelors*: social work *Associates*: human services technician

PSYCHIATRISTS

Psychiatrists are professionals who hold a degree in medicine and specialize in behavioral health. They can make diagnoses of behavioral health conditions defined by the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5-TR) through observation and evaluation of human behavior, as well as prescribe medications for the treatment of these conditions. Since psychiatrists are medical doctors, the North Dakota Board of Medicine regulates their licensure in the state. To become licensed, psychiatrists must obtain a Doctor of Medicine or Doctor of Osteopathy degree, complete post-graduate training in psychiatry, complete a medical licensure examination, be able to practice medicine in a manner acceptable to the board, and maintain a practice history free of any discipline from the North Dakota Board of Medicine or other state board of medicine. There are 83 licensed psychiatrists working in North Dakota or 1.1 psychiatrists per 10,000 North Dakota residents.[2]

Demographics

The average age of psychiatrists in North Dakota is 51.9 years (*SD* = 12.3 years). This is slightly younger than the average age of direct patient care physicians in North Dakota which is 55. Forty-five (54.2%) are men and 38 (45.8%) are women. This gender distribution is dissimilar to the direct patient care physicians in North Dakota which includes 68% men and 32% women.[2]

Education

Psychiatrists are required to have a Doctor of Medicine (MD) degree or a Doctor of Osteopathy (DO) degree in order to be licensed as a psychiatrist in North Dakota. As part of their medical school education, psychiatrists are also required to have specialized training in the behavioral health field through postdoctoral work in a psychiatry residency program. The University of North Dakota (UND) is home to North Dakota's only medical school, which is accredited by the Liaison Committee on Medical Education (LCME), the Accreditation Council for Graduate Medical Education (ACGME), and the Accreditation Council for Continuing Medical Education (ACCME).[1] The UND School of Medicine and Health Sciences also has a psychiatry residency program with 24 residency slots. This allows North Dakota to fully train psychiatrists in state.

The majority (*n* = 75, 90.4%) of psychiatrists in North Dakota hold a Doctor of Medicine (MD) degree while 8 (9.6%) hold a Doctor of Osteopathic Medicine (DO) degree. Most of the psychiatrists who work in North Dakota graduated from medical schools outside of the U.S. (*n* = 30, 36.1%), followed by those who graduated from U.S. medical schools outside of North Dakota (*n* = 28, 33.7%), and those who graduated from the University of North Dakota (*n* = 25, 30.1%) (Figure 8.1). Psychiatrists working

in North Dakota graduated from medical school, on average, 23 years ago (*SD* = 11 years).[2]

Practice Characteristics

Of the psychiatrists working in North Dakota, 20 (24.1%) work in residential settings, 62 (74.7%) work in direct patient care settings, and 1 (1.2%) work in other settings. Most psychiatrists (*n* = 63, 75.9%) in North Dakota list psychiatry as their primary specialty followed by child psychiatry (*n* = 18, 21.7%). Only one lists addiction psychiatry as their specialty. The majority of psychiatrists in North Dakota work in urban settings (*n* = 74, 89.2%) (Figure 8.2).[2]

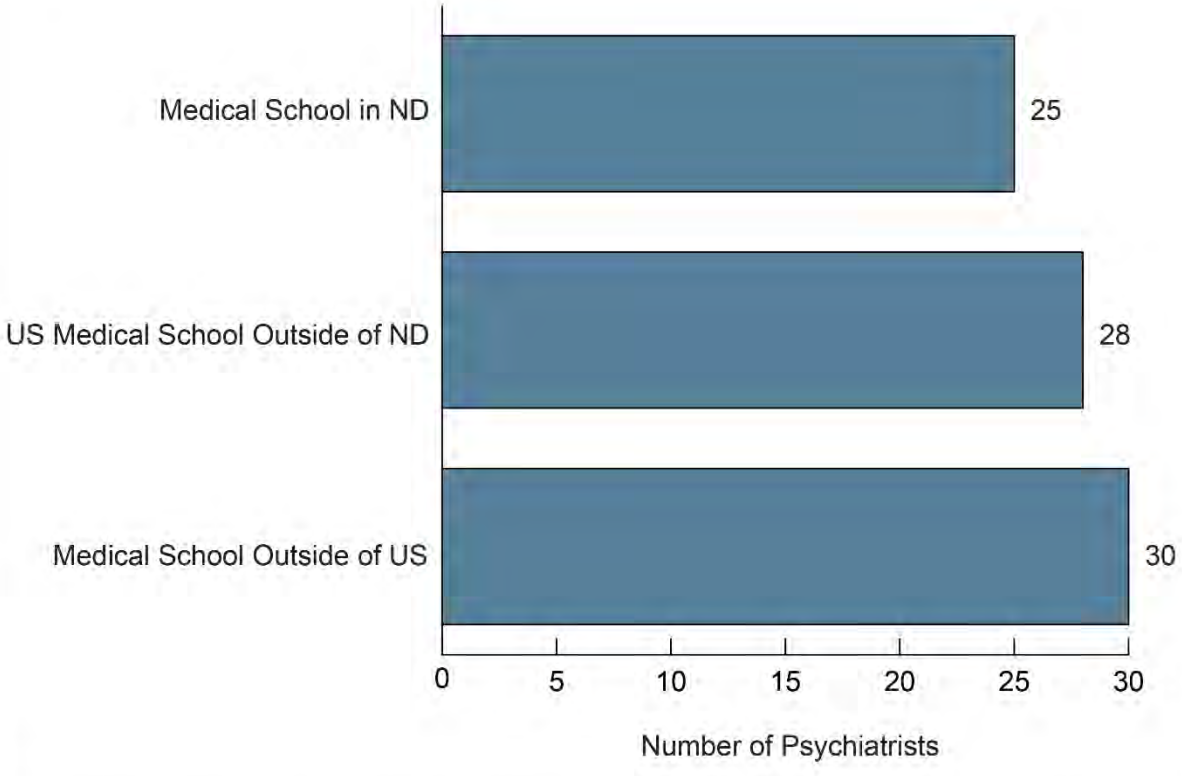

Figure 8.1. **Locations of schools attended by psychiatrists in North Dakota, 2021.[2]**

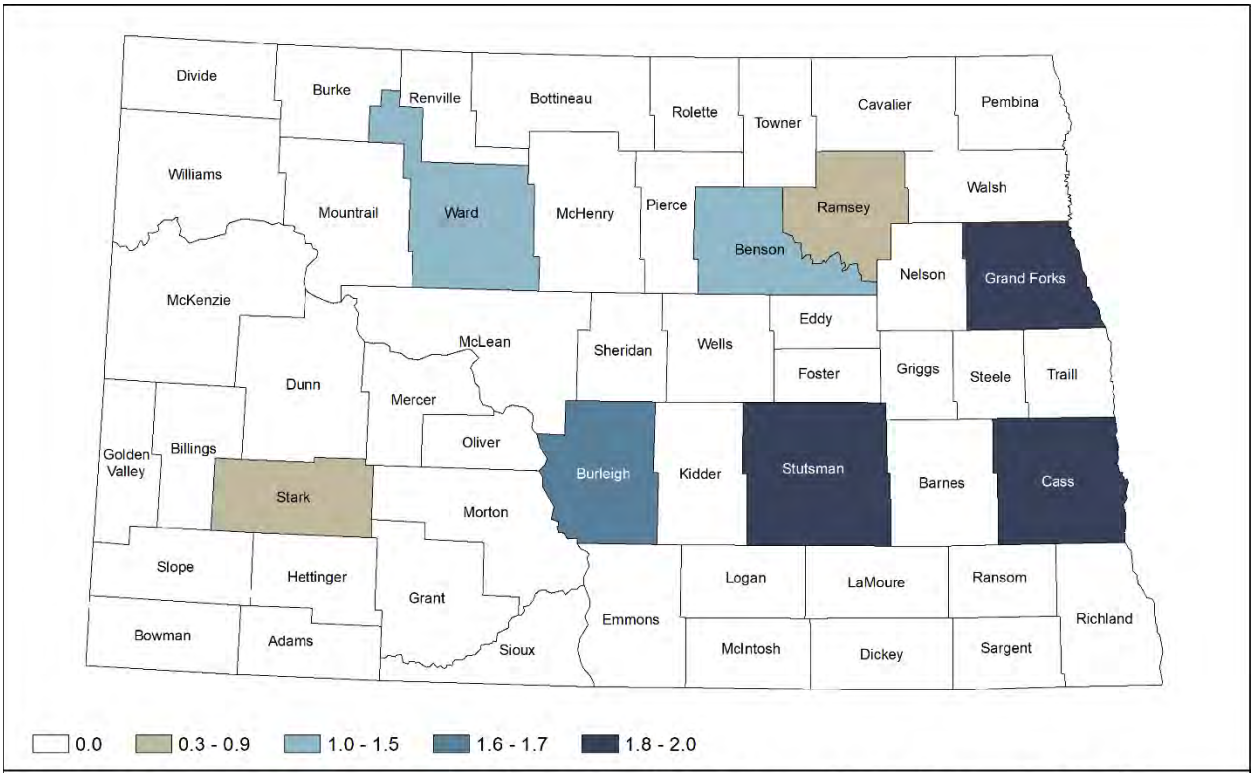

Figure 8.2. **Rate of psychiatrists per 10,000 North Dakota residents, by county, 2021.**[2]

PSYCHOLOGISTS

Psychologists are licensed mental health professionals who can treat mental illnesses through therapy, as well as administer and interpret psychometric tests/assessments to assist in diagnoses. Psychologists hold a doctoral degree in clinical or counseling psychology, usually a PhD or PsyD, from an American Psychological Association (APA) or Canadian Psychological Association (CPA) accredited program in order to be eligible for licensure in North Dakota. There are no other approved accrediting bodies. To be licensed in North Dakota, psychologists must adhere to the standards and ethics of the APA, complete at least two years of supervised professional experience, and complete written and oral examinations.[1] There are 272 licensed psychologists working in North Dakota or about 3.6 psychologists per 10,000 residents.[3]

Educational Programs in North Dakota

The University of North Dakota is the only institution in North Dakota with psychology training programs accredited by the APA. UND offers doctoral programs in both clinical and counseling psychology. These programs allow North Dakota to fully train psychologists in state and prepare individual practitioners for licensure after program completion.[1]

Practice Characteristics

Psychologists in North Dakota have been licensed for an average of 14 years (*SD* = 11 years). The majority of psychologists who work in North Dakota work in an urban setting (*n* = 162, 59.6%). Of the 272 licensed psychologists, 152 are located within three counties with urban areas, including Burleigh County, Cass County, and Grand Forks County (Figure 8.3).[3]

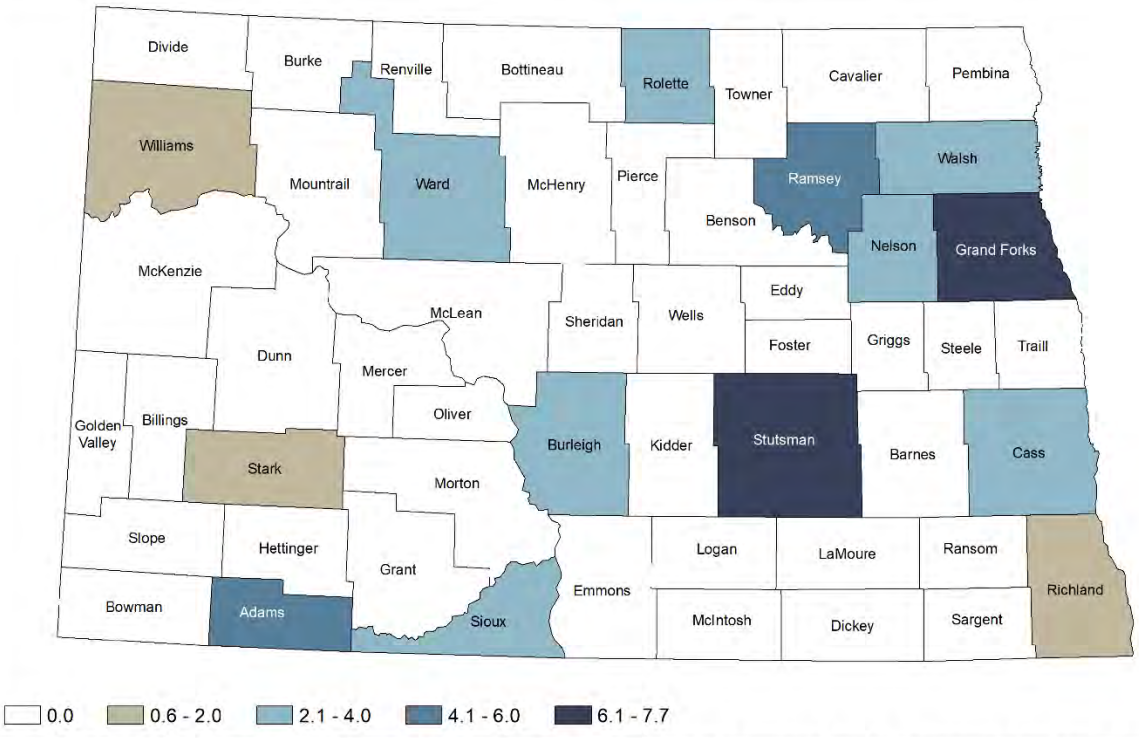

Figure 8.3. **Rate of psychologists per 10,000 North Dakota residents, by county, 2021.[3]**

COUNSELORS

Counselors are licensed behavioral health professionals who treat behavioral health conditions through individual, family, or group therapy. Counselors provide assessments, diagnoses, and therapeutic interventions to individuals, couples, families, and groups to achieve more effective emotional, mental, and social development and adjustment.[1] There are 519 licensed counselors working in North Dakota, including 90 licensed associate professional counselors (LAPC), 135 licensed professional counselors (LPC), and 294 licensed professional clinical counselors (LPCC).[4]

Education

Counselors are required to obtain a master's degree or higher within the field of counseling from an accredited school in order to be eligible for licensure in North Dakota. North Dakota State University (NDSU) offers a master's degree in clinical mental health counseling and one in school counseling. The Council for Accreditation of Counseling and Related Educational Programs (CACREP) approved accreditation for both programs at NDSU. The University of North Dakota, University of Jamestown, and University of Mary also offer master's degrees in counseling. UND offers four areas of specialization for the MA counseling degree including addiction counseling, community mental health counseling, child adolescent counseling, and rehabilitation. The clinical counseling program at the University of Jamestown is an online program. The University of Mary also offers areas of specialization including addiction counseling, clinical mental health counseling, and school counseling. The masters level programs at UND, University of Jamestown, and University of Mary are not listed with any accreditation bodies for counseling education.[1]

Licensure Requirements

LAPC and LPC

In order to receive LAPC licensure in North Dakota, counselors must have a master's degree in counseling from an accredited institution that meets the standards of the Board of Counselors Examiners, provide recommendations stating they will adhere to the standards of the profession, and write a plan to acquire supervised experience. LAPC is the preliminary licensure that is given before obtaining the full LPC licensure, and these professionals must acquire experience supervised by an LPC or LPCC. After obtaining at least two years of experience (and at least half of that being supervised), licensure as a LPC in North Dakota requires that the counselor write a statement of professional intent to practice in the state and the proposed use of the license, the intended population, and the procedures they intend to use, as well as complete an examination prescribed by the board.[1]

LPCC

To receive LPCC licensure, in addition to the requirements of the LPC, the counselor must complete: a total of 60 graduate semester credits, 12 of which may be obtained in documented training, clinical experiences, or courses consistent with the North Dakota Century Code clinical education guidelines; graduate clinical coursework including abnormal psychology and psychopathology, appraisal and diagnostic evaluation, and clinical counseling skills; 700 hours of training in supervised practical and/or internships relevant to the practice of counseling; two years (3000 hours) of post-master's supervised clinical experience in a clinical setting, 100 of those hours must

include supervision by a licensed professional clinical counselor; and a passing score on the National Clinical Mental Health Counseling Examination.[1]

Practice Characteristics

Most counselors in North Dakota work in an urban setting with 76.4% of LPCCs (*n* = 220), 80% of LPCs (*n* = 104), and 71.1% of LAPCs (*n* = 64) working in an urban setting (Figure 8.4, Figure 8.5).[4]

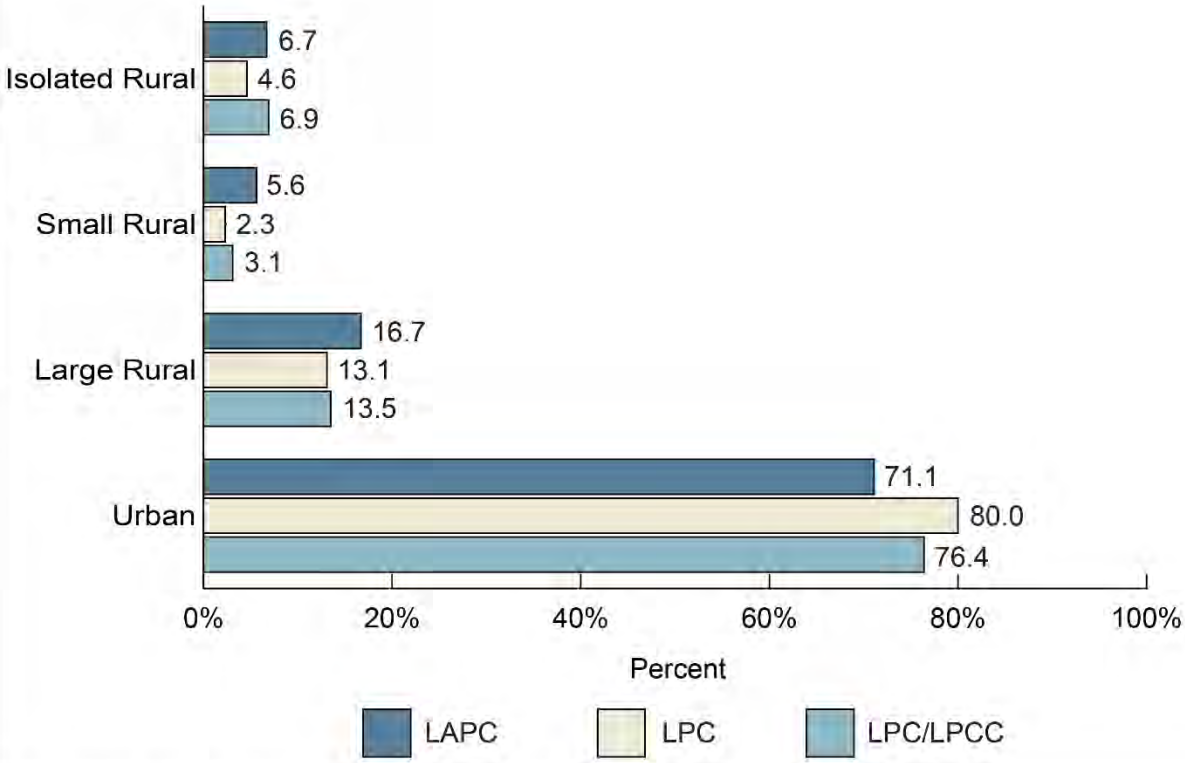

Figure 8.4. **Rural-urban designation for counselors in North Dakota, 2021.[4]**

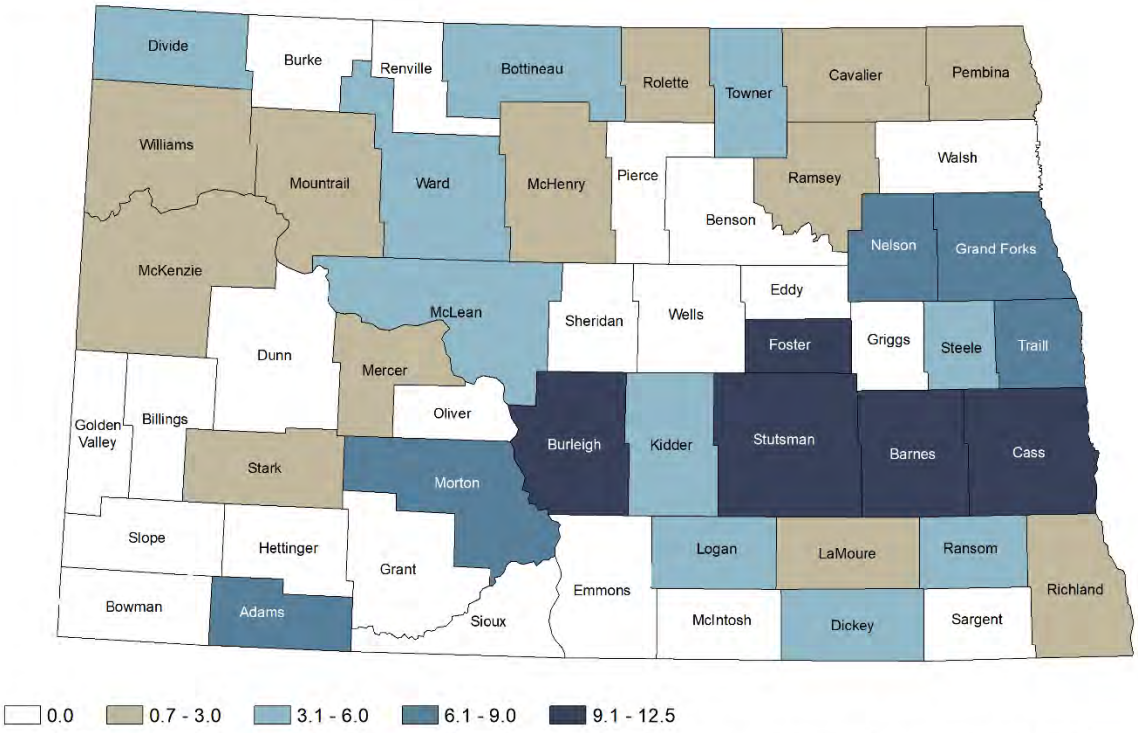

Figure 8.5. **Rate of counselors per 10,000 North Dakota residents, by county, 2021.[4]**

LICENSED ADDICTION COUNSELORS

Licensed addiction counselors (LAC) are behavioral health professionals who specialize in assessing and counseling individuals with substance related or addictive disorders through individual and/or group therapy. To be licensed as a LAC in North Dakota, one must have a bachelor's or higher degree in addiction studies, complete course work set forth by the North Dakota State Board of Addiction Counseling Examiners, complete written and oral examinations, complete a clinical training program, and adhere to the code of ethics.[1] There are 332 LACs working in North Dakota, which is equal to 4.4 LACs per 10,000 North Dakota residents. The majority of licensed addiction counselors working in North Dakota work in metropolitan areas (*n* = 219, 66.0%), followed by micropolitan areas (*n* = 71, 21.4%), and finally rural areas (*n* = 42, 12.7%) (Figure 8.6).[5]

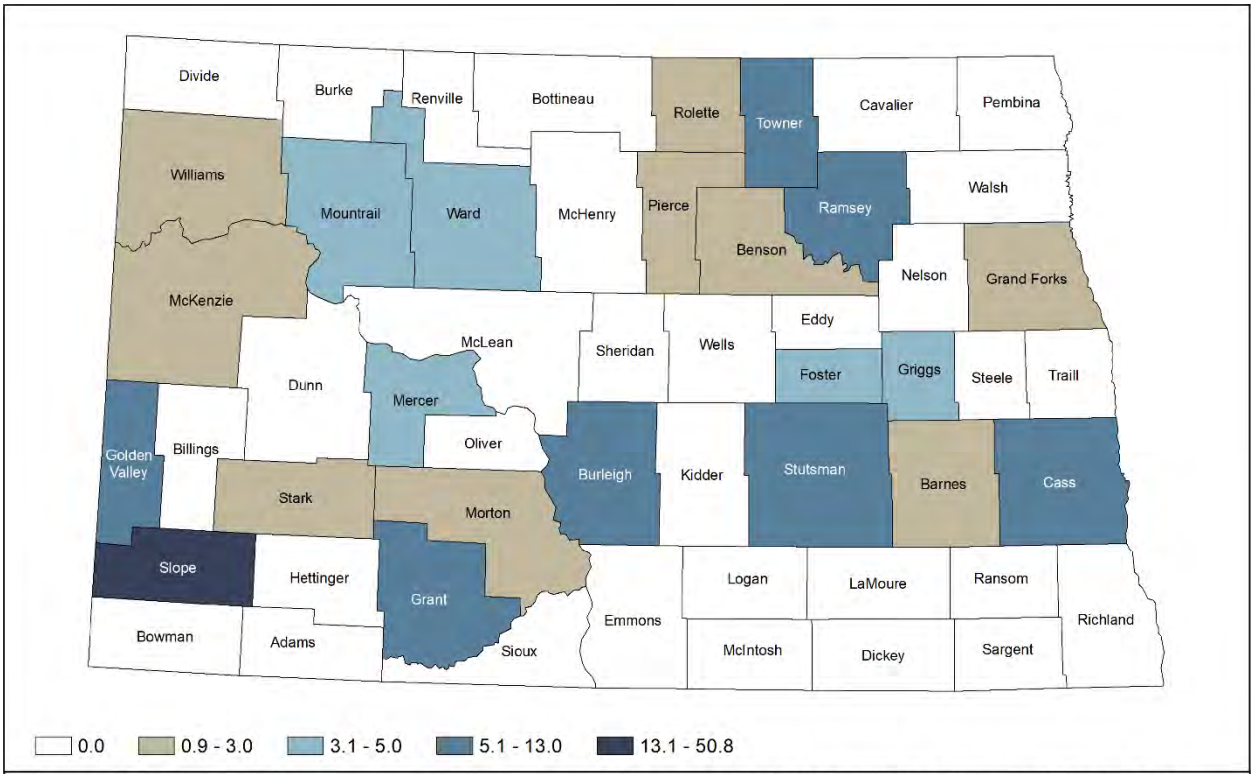

Figure 8.6. **Rate of licensed addiction counselors per 10,000 North Dakota residents, by county, 2021.[5]**

Educational Programs in North Dakota

In North Dakota there are four institutions of higher education that offer degrees or classes focused on addiction studies. The University of North Dakota offers a specialization in addiction counseling within the master's degree in counseling program and the Department of Social Work also offers a chemical dependency minor. The University of Mary offers a master's degree in addiction counseling as well as a minor in addiction counseling that can be combined with other degree programs they offer, such as a degree in social work or psychology. Minot State University offers a bachelor's degree in addiction studies and the National Addiction Studies Accreditation Commission (NASAC) accredits their program. In addition, the University of Jamestown offers a bachelor's degree in psychology with a concentration in addiction counseling.[1]

> ***"The majority of psychiatrists, psychologists, counselors, and licensed addiction counselors work in urban settings."***

LICENSED MARRIAGE AND FAMILY THERAPISTS

Marriage and family therapists (LMFT) are behavioral health professionals who specialize in marriage and family systems. They are able to diagnose and treat mental and emotional disorders within couples or families. Licensed associate marriage and

family therapist (LAMFT) is the preliminary licensure before the full licensure of licensed marriage and family therapist (LMFT). In order to be eligible for licensure in North Dakota, these practitioners must have a master's degree from an educational program approved by the licensing board. There are no colleges or universities in North Dakota that currently have degree programs that are accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE) but there are a variety of degree programs in psychology and counseling available in the state.[1] LAMFTs have the same capabilities as LMFTs, except LAMFTs are supervised by LMFTs. Currently, there are 3 LAMFTs and 54 LMFTs licensed in North Dakota. There also are 14 supervisors approved by the North Dakota Marriage and Family Therapy Licensure Board but only seven are located in North Dakota. The other seven supervisors are located either in Minnesota or South Dakota.[6]

SOCIAL WORKERS

Social workers are licensed professionals who work in a variety of fields related to human services with the aim of helping individuals and families improve their lives through the restoration or enhancement of biopsychosocial functioning. The three licensures obtainable in North Dakota are licensed clinical social worker (LCSW), licensed master social worker (LMSW), and licensed baccalaureate social worker (LBSW), with LCSWs having the most autonomy in practice and LBSWs having the least. LBSWs can do assessments, interventions, counseling, and case management or supervision, as well as educate and develop policies, programs, and activities. LMSWs have the same capabilities as LBSWs but have specialized knowledge and more advanced skills in these areas of practice. LCSWs have the same capabilities as LBSWs and LMSWs but have specialized clinical knowledge and training in the areas of practice, and can also diagnose and treat mental, emotional, and behavioral disorders, conditions, and addictions.[1] During the 2019 legislative session in North Dakota, the titles for licensed social workers changed. What are now LCSWs previously were called licensed independent clinical social workers; LMSWs previously were licensed certified social workers; and LBSWs previously were licensed social workers. There are 1,952 social workers licensed in North Dakota. Most are LBSWs (*n* = 1,282, 65.7%), followed by LCSWs (*n* = 360, 18.4%), and LMSWs (*n* = 310, 15.9%).[7]

Education

There are different educational and training requirements for the different social work licensures. To be licensed in North Dakota, LBSWs must have a baccalaureate degree in social work, pass an examination approved by the North Dakota Board of Social Work Examiners, and adhere to the code of social work ethics adopted by the North Dakota Board of Social Work Examiners. LMSWs have the same requirements as LBSWs, except they must obtain a doctorate or master's degree. LCSWs have the same requirements as LMSWs and LBSWs, but they must complete an additional 3,000

hours of supervised clinical social work experience under a LCSW.[1] On average, social workers in North Dakota have been out of school for approximately 14 years (*SD* = 11 years).[7]

The University of North Dakota, the University of Mary, and Minot State University all have bachelor's degree programs in social work that are accredited by the Council on Social Work Education (CSWE). The University of North Dakota also has a master's degree program in social work that is accredited by the CSWE. North Dakota State University (NDSU) offers a dual degree program in partnership with Minot State University. The dual degree program allows students the option to take all classes at NDSU and get a bachelor's degree in human development and family sciences from NDSU as well as a bachelor's degree in social work from Minot State University. Sitting Bull College is in the process of receiving full accreditation for their bachelor's degree program in social work. Their program currently is in candidacy status with the CSWE. Cankdeska Cikana Community College, Nueta Hidatsa Sahnish College, and the North Dakota State College of Science all offer associate degree programs in social work. This degree option is designed for students who are planning to pursue a bachelor's degree in social work once their associate's degree program is completed. It offers a cost-effective way for students to begin their education in social work.[1]

Practice Characteristics

The data were analyzed to determine the specific rural-urban designation for the various social work professionals in North Dakota based on the RUCA Codes. These analyses indicate that 1,547 (74.6%) of the social work professionals in North Dakota work in urban areas, followed by those in large rural areas (*n* = 364, 17.6%), isolated rural (*n* = 85, 4.1%), and small rural (*n* = 77, 3.7%). The results, categorized by licensure level, are listed in the table below and indicate that 929 (68.6%) of LBSWs, 268 (73.0%) of LMSWs, and 350 (71.2%) of LCSWs are working in urban areas. This indicates that most social work professionals work in urban settings (Figure 8.7, Figure 8.8).[7]

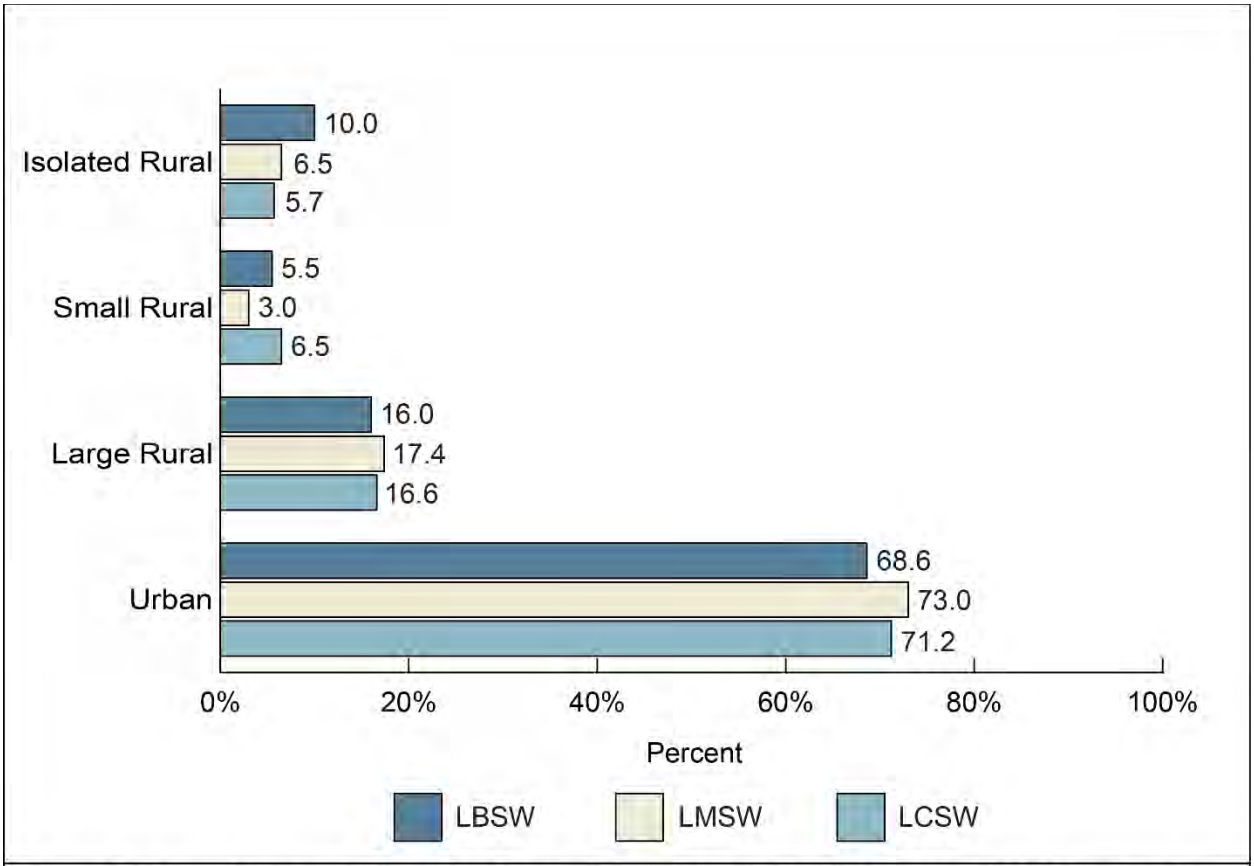

Figure 8.7. **Rural-urban designation for social workers in North Dakota, 2021.**[7] The titles for the social work licenses changed in 2019. The license titles are now Licensed Clinical Social Worker, Licensed Master Social Worker, and Licensed Baccalaureate Social Worker.

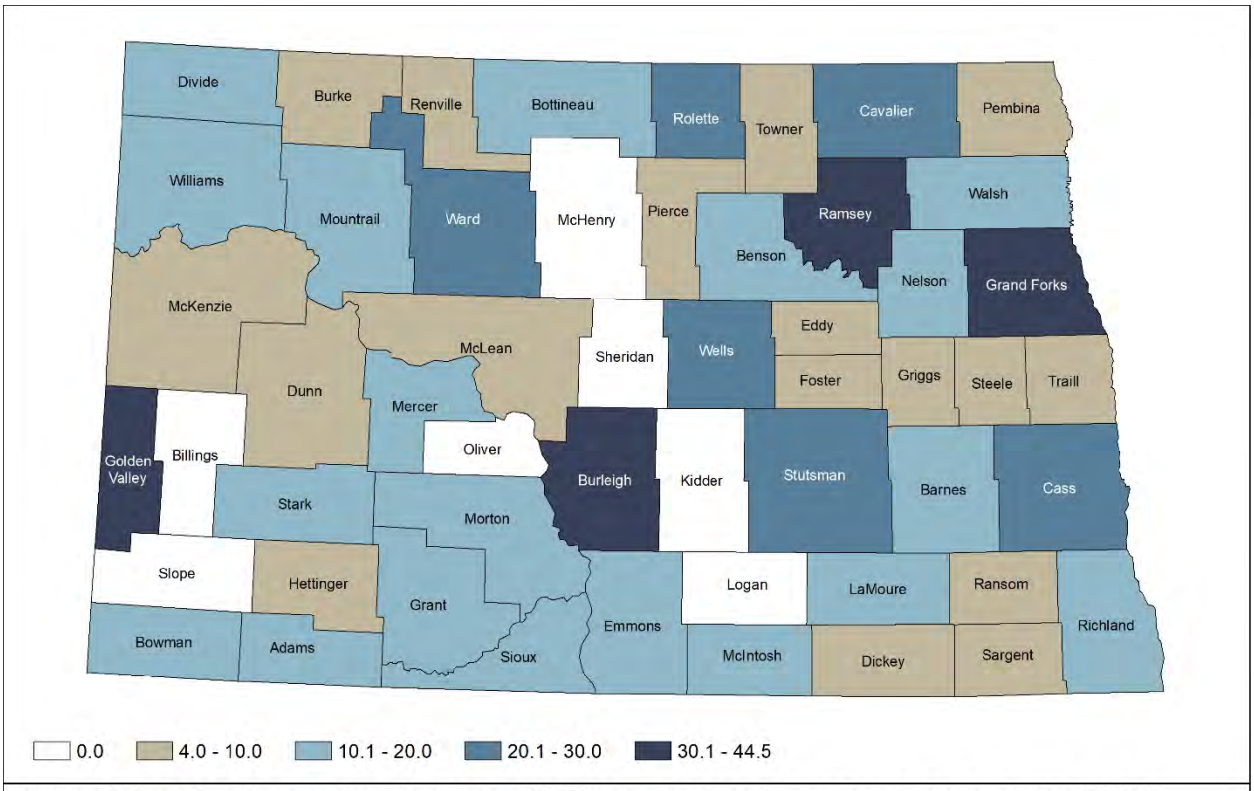

Figure 8.8. **Rate of social workers per 10,000 North Dakota residents, by county, 2021.**[7]

OCCUPATIONAL THERAPY PROFESSIONALS

Occupational therapy practitioners focus on helping clients gain/regain skills that allow them to live independently and engage in meaningful occupations. Settings where occupational therapy practitioners are found include, but are not limited to, acute care hospitals, rehabilitation centers, nursing homes, outpatient clinics, and/or school systems. Occupational therapists (OTs) also are qualified behavioral health professionals who provide evaluation and intervention for individuals at risk of psychiatric, addiction, behavioral issues, and cognitive disabilities. OTs provide therapy for individuals with the purpose of building and enhancing skills, and developing habits, routines, and roles so individuals are successful in their everyday lives. To be licensed as an occupational therapist in North Dakota, one must obtain a degree from an occupational therapy educational program accredited by the Accreditation Council for Occupational Therapy Education, complete a period of supervised fieldwork experience, and pass an examination approved by the National Board for Certification in Occupational Therapy.[1] Currently, there are 782 occupational therapy practitioners licensed and working in North Dakota, 620 occupational therapists (OTs) and 162 occupational therapy assistants (OTAs). Based on the population of North Dakota, there are 8.2 occupational therapists per 10,000 North Dakota residents and 2.1 occupational therapy assistants per 10,000 North Dakota residents.[8] The rate of OTs in North Dakota is higher than the national rate. In the U.S. there are 127,830 OTs which is equal to 3.9

OTs per 10,000 U.S. residents.[9] On average, occupational therapy professionals (OTs, OTAs) have been in practice in North Dakota for 13 years (*SD* = 10 years). Broken down by profession, it was found that occupational therapists have been practicing on average, for 13 years (*SD* = 10 years) and occupational therapy assistants have been practicing, on average, for 14 years (*SD* = 11 years).[8]

Practice Characteristics

The majority of the occupational therapy professionals (OTs, OTAs) in North Dakota (*n* = 627, 70.6%) work in urban areas, followed by large rural areas (*n* = 153, 17.2%), small rural areas (*n* = 58, 6.5%), and isolated rural areas (*n* = 50, 5.6%). Of the OTs working in North Dakota, 517 (72.4%) work in urban areas, and 197 (27.6%) work in rural areas. For OTAs, 110 (63.2%) work in urban areas and 64 (36.8%) work in rural areas. Rural areas can be further broken down into large rural, small rural, and isolated rural areas. For OTs, 124 (17.4%) work in large rural areas, 43 (6.0%) work in small rural areas, and 30 (4.2%) work in isolated rural areas. For OTAs, 29 (16.7%) work in large rural areas, 15 (8.6%) work in small rural areas, and 20 (11.5%) work in isolated rural areas (Figure 8.9).[8]

"Of the occupational therapists working in North Dakota, about 63.2% work in urban areas and 36.8% work in rural areas."

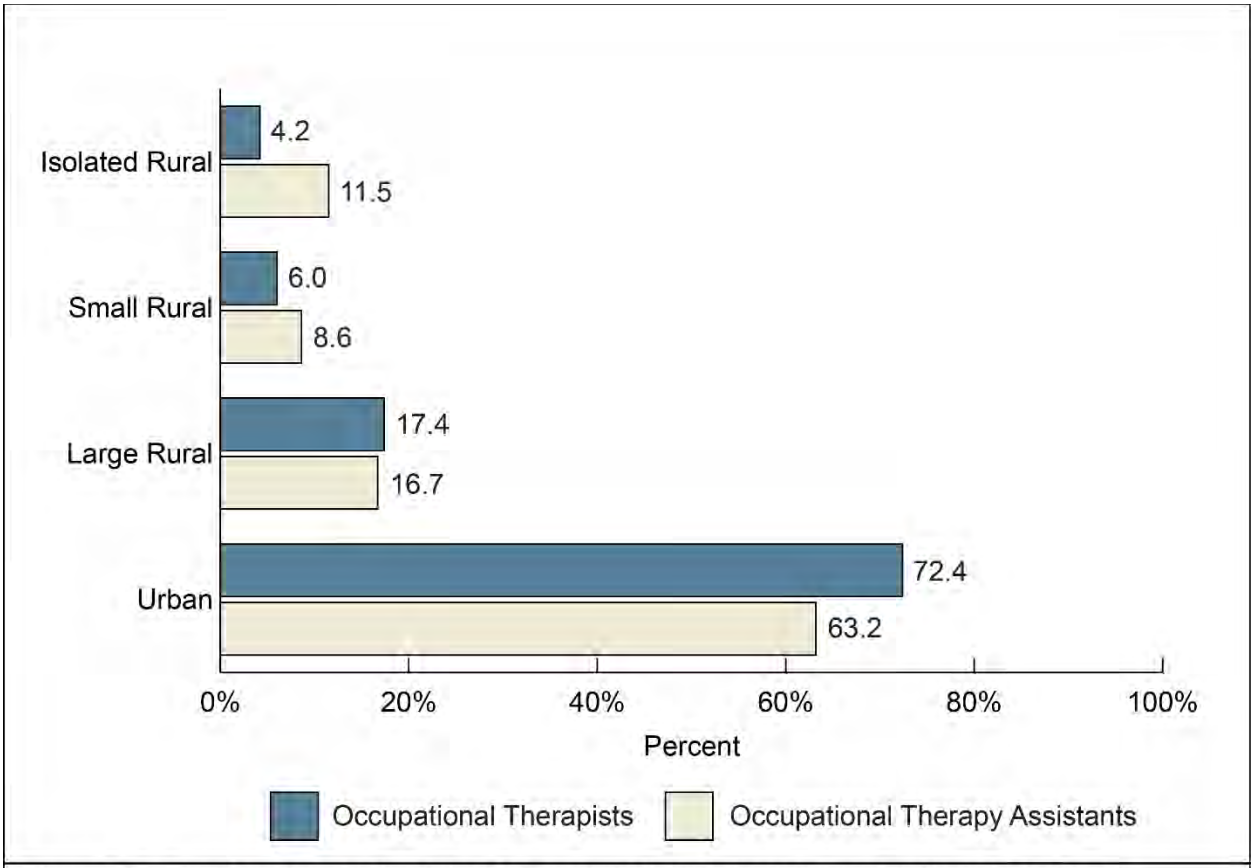

Figure 8.9. **Rural-urban designation for occupational therapy professionals in North Dakota, 2021.**[8]

University of North Dakota Occupational Therapy Program

The Occupational Therapy program at the University of North Dakota graduated the last masters of occupational therapy class with 56 students in May of 2021 and one student in May of 2022. Of this graduating class of students, 24 were originally from Minnesota, followed by North Dakota (*n* = 21), Wyoming (*n* = 7), and other states (*n* = 5). The first cohort of Occupational Therapy Doctorate students graduated in May of 2022. Of the class of 2022, 19 students were originally from Minnesota, followed by North Dakota (*n* =12), Wyoming (*n* = 8), and other states (*n* = 14). Of the 56 students who graduated in May through December of 2021, 38 (67.9%) completed an exit interview survey. Of these 2021 Occupational Therapy graduates, the majority were destined to be employed in North Dakota (*n* = 10, 26.3%) followed by Wyoming (*n* = 7, 18.4%), and then Minnesota (*n* = 5, 13.1%) and other states (*n* = 17, 44.7%). Other states include Arizona, California, Florida, Idaho, Montana, North Carolina, Tennessee, Texas, Utah, Virginia, and Wisconsin.[9] Of those 38 new graduate respondents, all were working as an occupational therapist. Thirty-four responded that they were working full-time positions with benefits and four indicated they were working full-time in per diem positions. Five graduates chose to take traveling positions. All 38 students from the

Occupational Therapy Class of 2021 reported their starting salary, and the majority of students indicated their salaries were in the $60,000-79,999 range. Responses included: $40,000-49,999 (*n* = 2; 5.3%); $50,000-59,999 (*n* = 8; 21.1%); $60,000-69,999 (*n* = 11; 28.9%); $70,000-79,999 (*n* = 12; 31.6%); $80,000-89,999 (*n* = 4; 10.5%); $90,000- 99,999 (*n* = 1; 2.6%). Practice settings for occupational therapy graduates include hospital (*n* = 9), outpatient clinics (*n* = 7), rehabilitation (*n* = 7) skilled nursing facilities (*n* = 7), mental health (*n* = 2), school systems (*n* = 2), home health (*n* = 1), community (*n* = 1) and other practice settings (*n* = 2). Influential factors in selecting employment were reported by graduates and included practice setting, location, and salary/wage. When asked about student loan debts that were specifically for OT education, there was a wide range of responses. These responses ranged from six students reporting they had less than $10,000 of debt to three students indicating that they had $90,000 to 99,000 student load debt. The majority of students reported they had between $30,000 to 39,000 of educational debt load (*n* = 7).[10]

BEHAVIOR ANALYSTS

Behavior analysts are professionals who use experimental and applied analysis of behavior and statistics to develop techniques and treatments that facilitate the evaluation and modification of behavior, especially when the behavior is maladaptive.[1] For example, in North Dakota behavior analysts work with children who have been diagnosed with autism and help develop treatment plans and adaptive strategies. According to the North Dakota Century Code (43-64), there are two licensure levels in North Dakota: the licensed assistant behavior analyst (LABA) and the licensed behavior analyst (LBA). These are new licensure titles recently approved by the North Dakota legislature during the 2019 legislative session. Licensed behavior analysts used to be referred to as licensed applied behavior analysts and licensed assistant behavior analysts used to be referred to as registered applied behavior analysts. To obtain these licenses, applicants must complete education, examination, and experience requirements established by the State Board of Integrative Health Care, such as certification from the Behavior Analyst Certification Board (BACB); have the physical, mental, and professional capability for practice of applied behavior analysis; and have a history free of any disciplinary action by the board.[1] There are 34 licensed behavioral analysts in North Dakota.[11]

BEHAVIOR TECHNICIANS

Behavior Technicians are paraprofessionals who practice under the supervision of either an LBA or LABA. They are responsible for the direct implementation of behavior analytic services. To be a behavior technician in North Dakota, an individual must meet requirements of the BACB, including at least a high school diploma or equivalent degree, passing a background check, 40 hours of training, completion of a competency assessment and the registered behavior technician (RBT) examination.[1]

MENTAL HEALTH TECHNICIANS/CASE AIDES

Mental health technicians and case aides are entry-level paraprofessionals with a basic understanding of mental illness and treatment that provide direct care services in inpatient facilities and outpatient agencies. To be certified as a mental health technician in North Dakota, applicants must have a high school degree, training in cardiopulmonary resuscitation (CPR), first aid, crisis intervention, Health Insurance Portability and Accountability Act (HIPAA) and confidentiality, as well as medication module training and mental health certificate training.[1]

PEER SUPPORT SPECIALISTS

Peer support specialists are individuals with behavioral health experience who use this experience to serve as a pro-social model, offer insight to an individual's care team, and provide support focused on advocacy, coaching, and mentoring. The only education or training required is a weeklong training through the NDDHS Behavior Health Division.[1]

PHYSICIAN ASSISTANTS

Practice Characteristics

North Dakota has a total of 512 physician assistants (PAs) licensed and working in the state, which is equal to 6.7 PAs per 10,000 North Dakota residents.[12] This rate is higher than the national rate. In the U.S. there are 132,940 PAs which is equal to 4.1 PAs per 10,000 U.S. residents.[13] Physician assistants in North Dakota have been licensed on average for 11 years (*SD* = 9 years). The majority of physician assistants in North Dakota work in urban areas (*n* = 349, 70.4%). Of the rural designations, isolated rural areas have the largest number of physician assistants (*n* = 60, 12.1%), followed by large rural areas (*n* = 54, 10.9%), and small rural areas (*n* = 33, 6.7%) (Figure 8.10, Figure 8.11).[12]

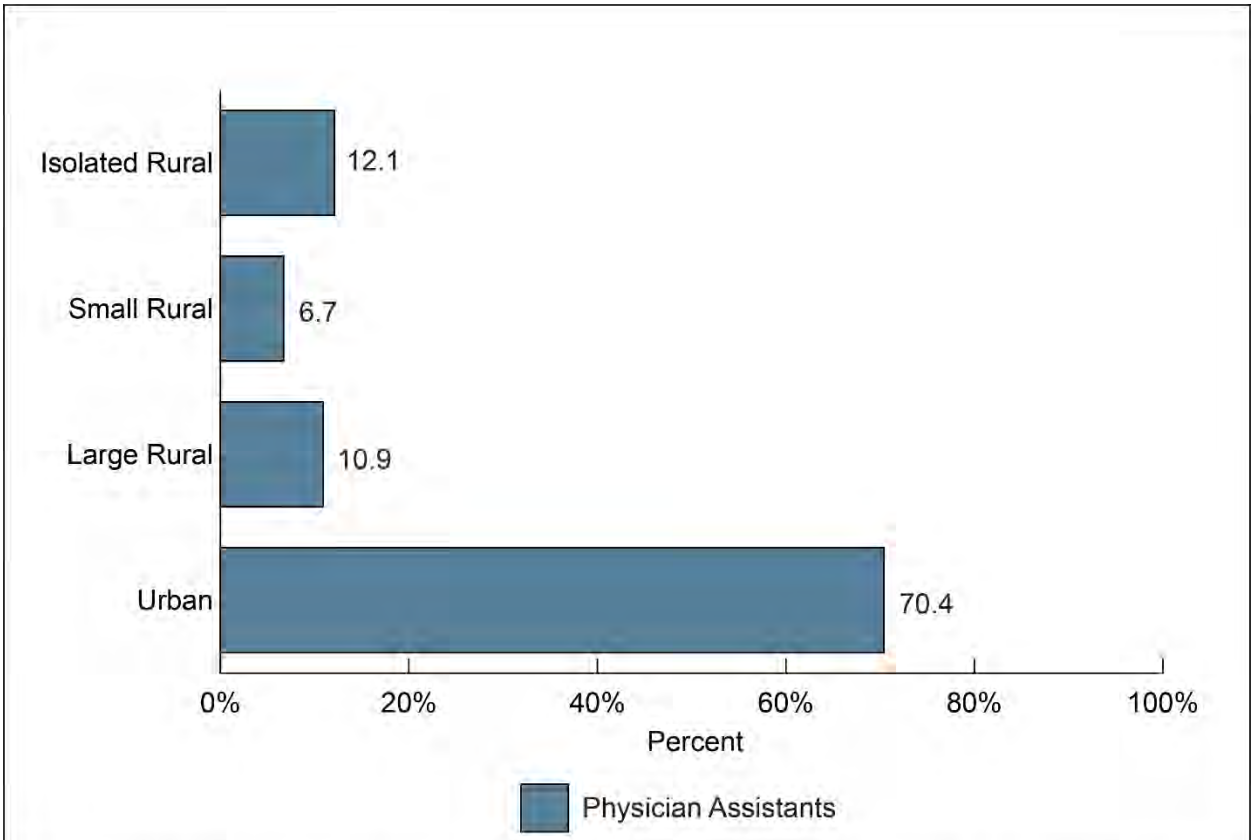

Figure 8.10. **Rural-urban designation for physician assistants in North Dakota, 2021.**[12]

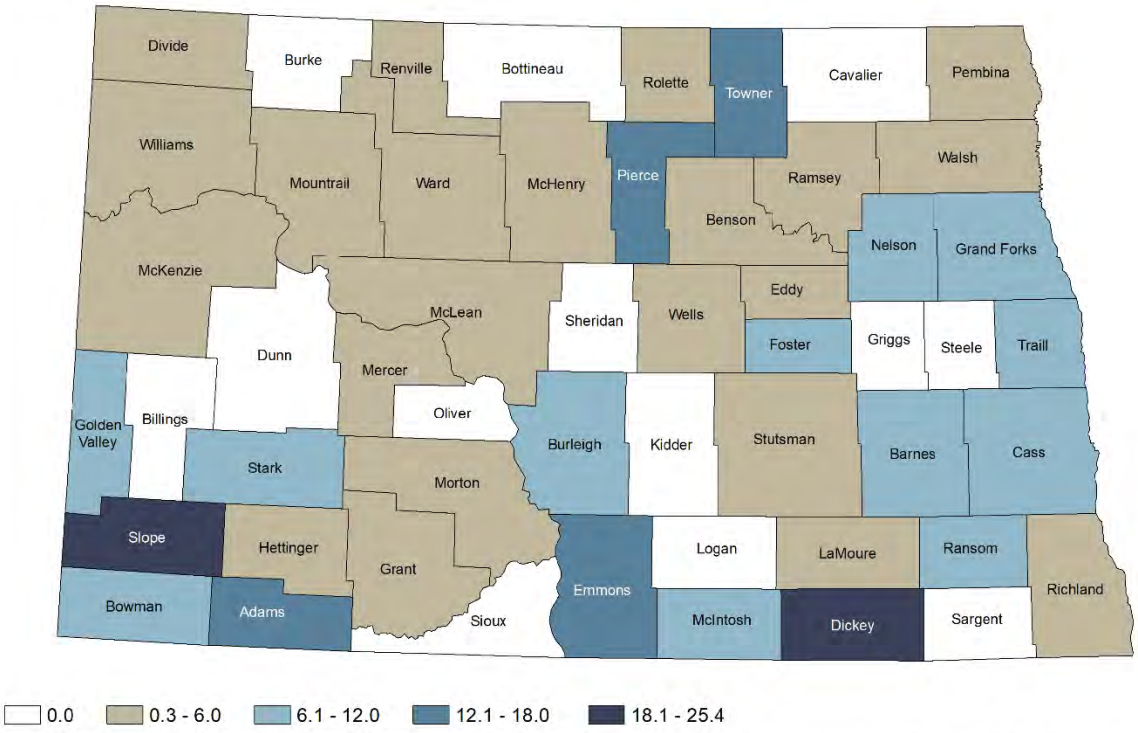

Figure 8.11. **Rate of physician assistants per 10,000 North Dakota residents, by county, 2021.[12]**

University of North Dakota Physician Assistant Program

In May 2022, the Department of Physician Assistant Studies at the University of North Dakota graduated 31 students. Summarized below are workforce survey responses of 28 graduates who completed an abbreviated workforce survey. Home states of graduates eligible for state licensing and employment include North Dakota (*n* = 8, 28.6%), Minnesota (*n* = 9, 32.1%), South Dakota (*n* = 5, 17.9%), Texas (*n* = 2, 7.1%) and one (3.6%) from the states of Iowa, Ohio, Virginia, and Alaska. When the survey was conducted, most respondents (*n* = 27, 96.4%) had secured full-time jobs and one was working part-time. The majority of graduates (*n* = 25, 89.3%) reported working in their home state.[14]

> ***"The PA program at UND continues to exceed national data with more than 50% of their graduates serving in rural areas in comparison with 15% as reported by the National Rural Health Association (NRHA)."***

The majority of employed graduates reported working in a primary care setting (*n* = 19, 67.9%). The next most common employment setting is in surgical specialties including orthopedics and general surgery (*n* = 5, 17.9%). Further, graduates also found employment in emergency medicine, pulmonology, and oncology (*n* = 4, 14.3%). In terms of care for rural areas, 53.6% (15 of 28) of the responding graduates are

practicing in rural areas (communities with a population of <25,000) and 46.4% (13 of 28) are working in rural/underserved primary care. The starting salary range for graduates of the Physician Assistant Studies program at the University of North Dakota is $90,000 - $154,000, averaging $110,000 per year.[14] The PA program at UND continues to exceed national data with more than 50% of their graduates serving in rural areas in comparison with 15% as reported by the National Rural Health Association (NRHA).[14,15]

PHYSICAL THERARY PROFESSIONALS

Physical therapists are healthcare professionals who examine individuals with mechanical, physiological, and developmental body structure impairments or activity limitations and/or participation restrictions in movement and alleviate the impairments through designing and implementing therapeutic interventions. To be licensed in North Dakota, one must graduate from a professional physical therapy education program accredited by a national accreditation agency approved by the North Dakota Board of Physical Therapy and pass the examination approved by the board. The most recent licensure data for physical therapists (PTs) and physical therapist assistants (PTAs) were obtained from the North Dakota Board of Physical Therapy in February 2022. The complete data set contained 1,275 licensed providers including 1067 PTs and 200 PTAs with one reportedly working as both types of providers and 7 licensees reporting neither provider type. Of the 1,067 PTs, 879 (82.3%) were employed, 80 (7.5%) were self-employed, and 36 (3.4%) reported a combination of self-employed and employed. The remaining 72 PTs did not report employment status. Of the 200 PTAs, 173 (86.5%) were employed as PTAs, 2 (1.0%) reported a combination of self-employed and employed. The remaining 25 (12.5%) PTAs did not report employment status.[16] In North Dakota, 1,076 PTs is equal to 14 PTs per 10,000 North Dakota residents. This rate is higher than the national rate of 6.9 PTs per 10,000 U.S. residents with a total of 225,350 PTs in the U.S.[17]

Demographics

The demographic data of gender revealed 72.6% of providers were women, 27.2% were men, and 0.2% preferred not to respond. Among the license types, 70.0% of PTs and 82.0% of PTAs reported being women. For race/ethnicity, the vast majority of licensees (*n* = 1,206, 94.6%) reported being white (non-Hispanic); with 94.9% of PT and 93.5% of PTA providers reported as white (non-Hispanic).[16]

Education

Physical therapists graduate with a Doctor of Physical Therapy (DPT) degree. The DPT, first introduced in North Dakota in 2006, has become the required entry-level degree nationally for physical therapists as of 2015. The majority of PTs practicing in

North Dakota have a Doctor of Physical Therapy degree (66.3%), followed by a master's degree (20.2%), and bachelor's degree (12.9%). An associate degree is the entry-level degree for physical therapist assistants and nearly all (95.5%) PTAs in North Dakota have this degree (Table 8.3). A majority (73.2%) of all practicing PTs and PTAs in North Dakota graduated from a North Dakota school. Specifically, 81.1% of physical therapists obtained their degree from a North Dakota school, 6.7% graduated from a Minnesota school and 12 individuals were educated in another country. The PTAs practicing in North Dakota included 33.5% educated in North Dakota and 43.5% educated in Minnesota.[16]

"73.2% of physical therapists obtained their degree from a North Dakota school."

Table 8.3
Educational attainment for North Dakota physical therapists and physical therapist assistants, 2021.[16]

	PT		PTA		Total	
Degree	**N**	**%**	**N**	**%**	**N**	**%**
Associate's	0	0.0	148	95.5	148	13.4
Bachelor's	122	12.9	5	3.2	127	11.5
Certificate	6	0.6	1	0.7	7	0.6
Master's	191	20.2	1	0.7	192	17.4
Doctor of Physical Therapy	627	66.3	0	0.70	627	56.9
All	**946**	**100.0**	**155**	**100.0**	**1,101**	**100.0**

Practice Characteristics

There were multiple practice settings identified for PTs and PTAs in the data set. The majority of PTs practice in an outpatient setting (59.0%), while a majority of PTAs practice in an extended care setting (36.1%), followed by the outpatient setting (34.9%) (Table 8.4). PTs and PTAs in North Dakota work with a multitude of individuals with various diagnoses, injuries, or conditions, meaning most do not work solely with individuals requiring only one type of care. Thus, the following percentages do not total 100%. Most PTs see individuals with orthopedic/sports conditions or injuries (64.8%), followed by individuals with neurological conditions or injuries (58.9%). A majority of PTAs see individuals with neurological conditions or injuries (69.0%) followed by individuals with cardiovascular or pulmonary injuries or conditions (49.7%) and orthopedic/sports injuries or conditions (47.7%) (Figure 8.12). The majority of all PTs (78.7%) reported providing care to adults ages 20-64 years and 67% reported providing

care to adults ages 65+. A majority of PTAs (77.4%) reported providing care to adults ages 65+ and 55.5% reported working with adults ages 20 – 64 (Figure 8.13).[16]

"A majority of PTs (89.5%) reported no planned changes in the near future, some (4.0%) expect to increase their hours of physical therapy or direct patient care, while 6.5% expect to decrease their hours or leave the field of physical therapy."

Table 8.4
Primary workplace for North Dakota physical therapists and physical therapist assistants, 2021.[16]

	PT		PTA		Total	
Primary Workplace	**N**	**%**	**N**	**%**	**N**	**%**
Academic Institution (post secondary)	41	4.3	0	0.0	41	3.7
Acute Care Hospital	76	8.0	11	7.1	87	7.9
Home Care	52	5.5	8	5.2	60	5.4
Inpatient Rehabilitation Facility	16	1.7	10	6.5	26	2.4
Industry	1	0.1	0	0.0	1	0.1
Non-patient care or non-clinical environment related to physical therapy	11	1.6	0	0.0	11	1.0
Outpatient clinic affiliated with a hospital, health system, military or other government agency	312	33.0	37	23.9	349	31.7
Outpatient clinic not affiliated with a hospital, health system, military or other government agency	246	26.0	17	11.0	263	23.9
Pediatric clinic (non-school based)	47	5.0	4	2.6	51	4.6
Skilled Nursing Facility, Long Term Care Facility, Assistive Living Facility or Group Home	76	8.0	56	36.1	132	12.0
School System	26	2.8	8	5.2	34	3.1
Other	42	4.4	4	2.6	46	4.2
All	**946**	**100.0**	**155**	**100.0**	**1,101**	**100.0**

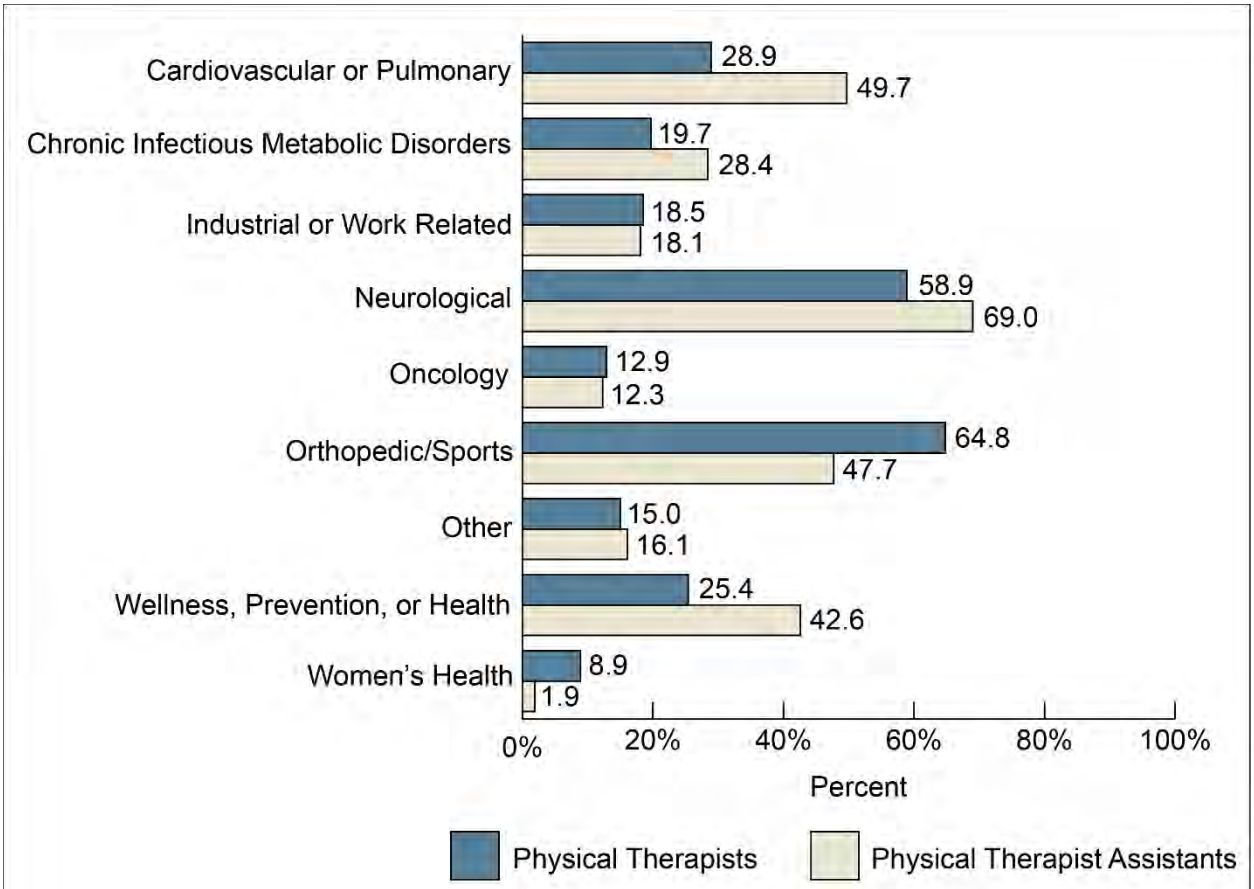

Figure 8.12. **Primary injuries or conditions treated by North Dakota physical therapists and physical therapist assistants, 2021.[16]**

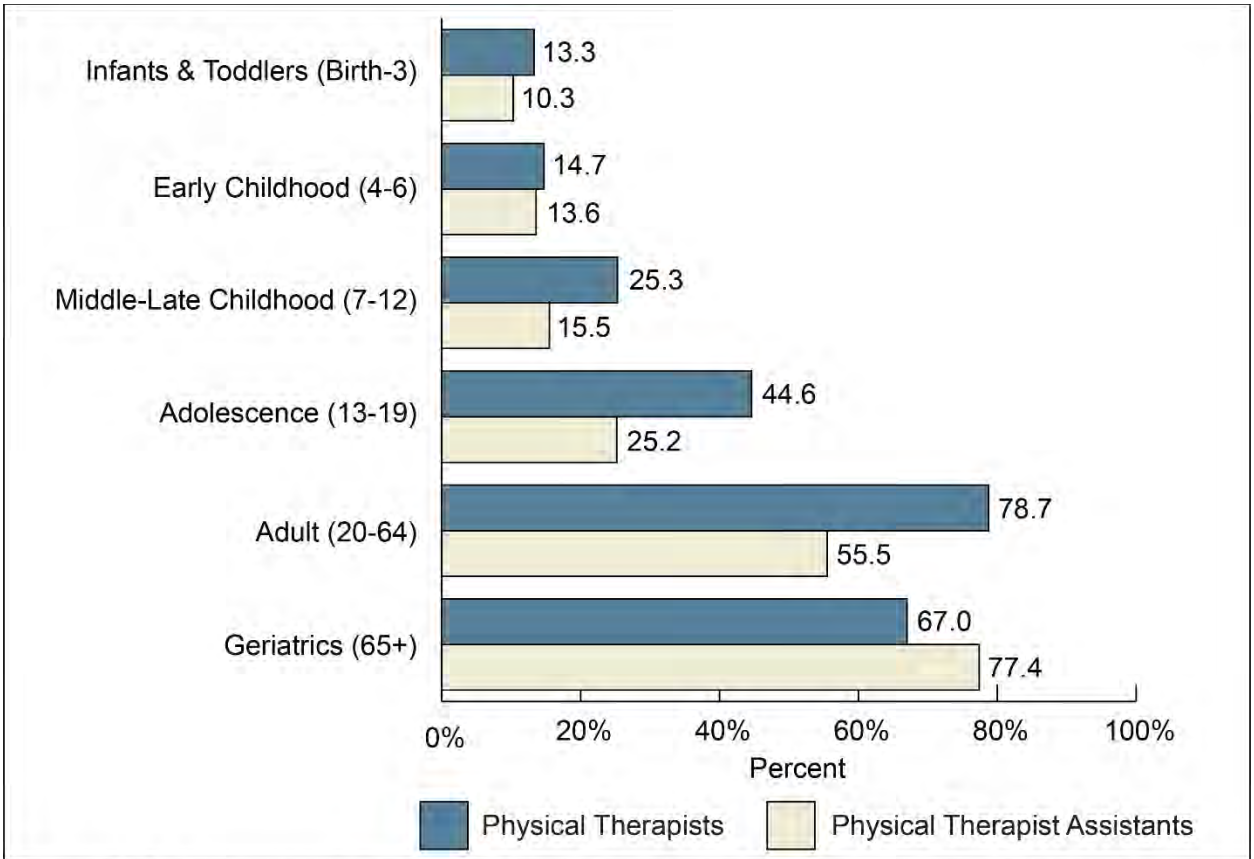

Figure 8.13. **Primary patient ages for North Dakota physical therapists and physical therapist assistants, 2021.[16]**

A majority (66.7%) of all PTs practice in an urban area and just over half (51.0%) of PTAs practice in an urban area as well (Figure 8.14, Figure 8.15, & Figure 8.16). A majority of PTs (89.5%) reported no planned changes to their state of practice in the near future, some (4.0%) expected to increase their hours of physical therapy or direct patient care, while 6.5% expected to decrease their hours or leave the field of physical therapy. A majority of PTAs (87.1%) reported no planned changes, 11.0% expected to increase their hours of physical therapy or direct patient care, and 1.9% expected to decrease their hours (Table 8.5).[16]

"A majority (66.7%) of all PTs were found to practice in an urban area while just under half (49.0%) of PTAs practice in a rural area."

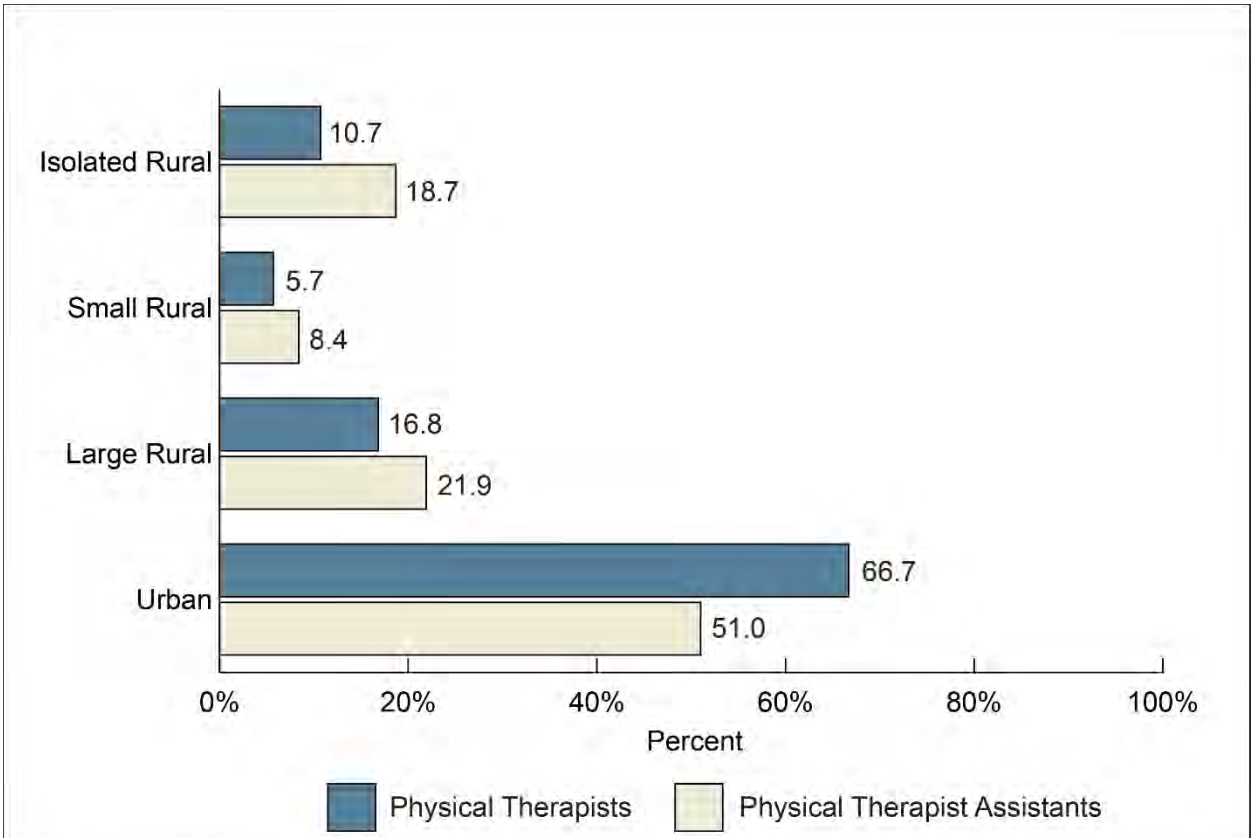

Figure 8.14. **Rural-urban designation for physical therapy professionals in North Dakota, 2021.[16]**

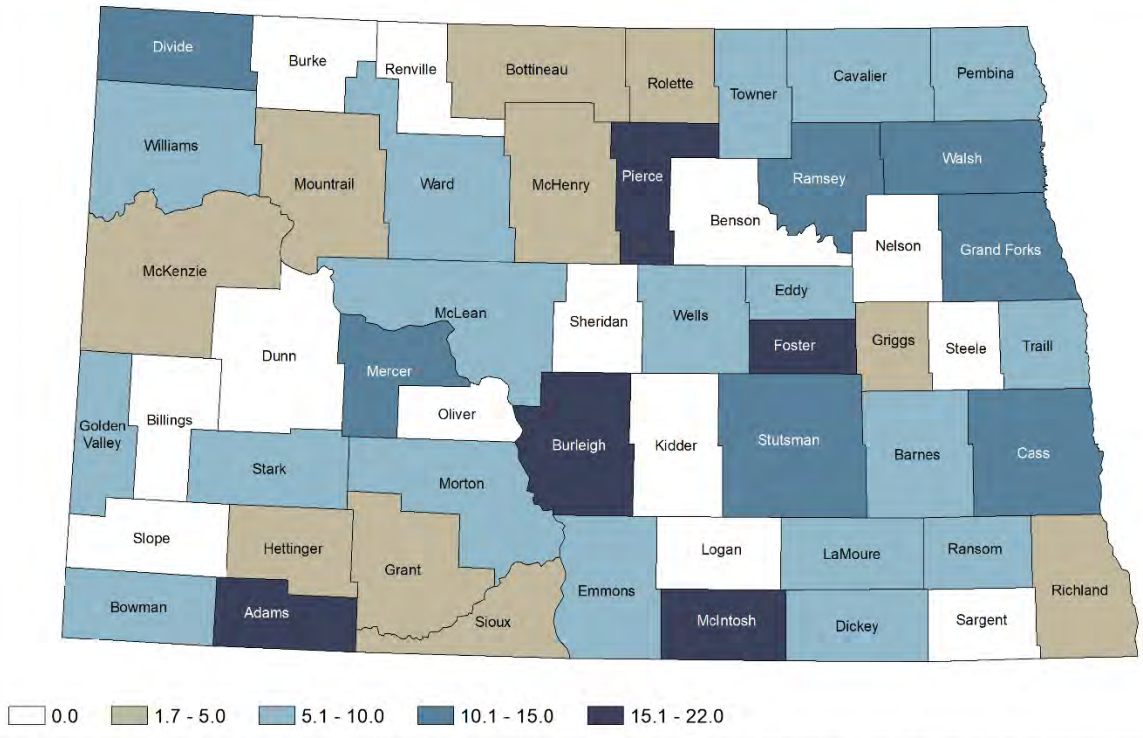

Figure 8.15. **Rate of physical therapists per 10,000 North Dakota residents, by county, 2021.[16]**

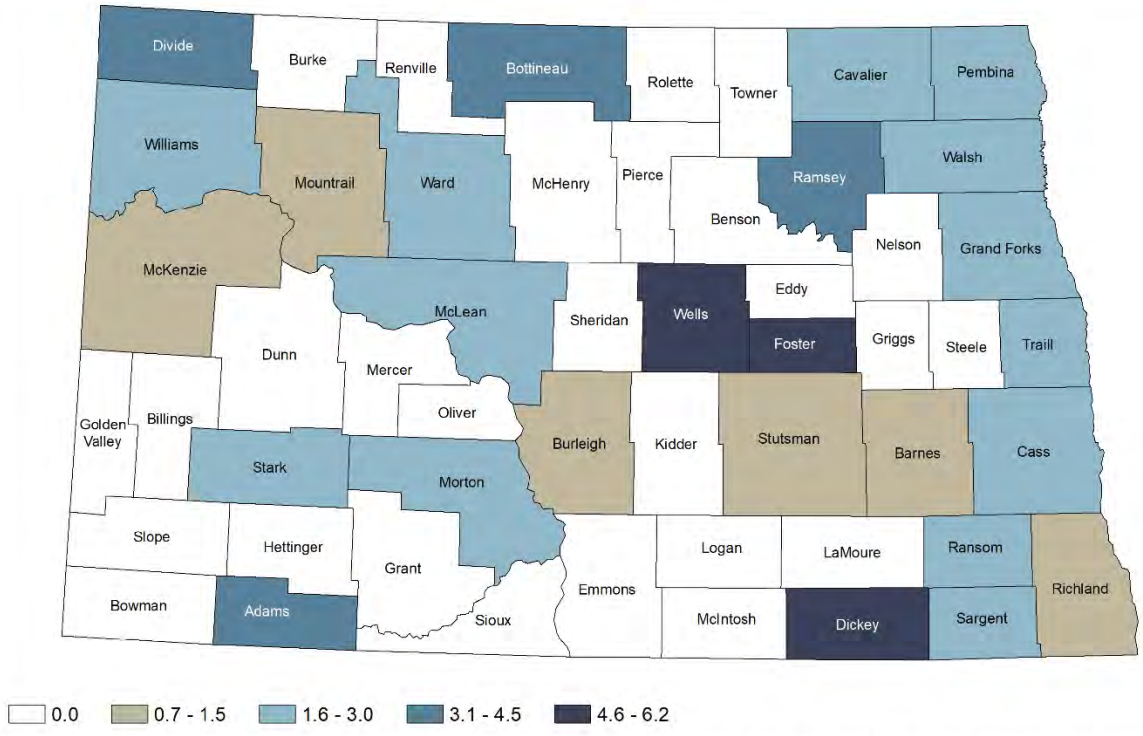

Figure 8.16. **Rate of physical therapist assistants per 10,000 North Dakota residents, by county, 2021.[16]**

Table 8.5
Future plans for North Dakota physical therapists and physical therapist assistants, 2021.[16]

	PT		PTA		Total	
Future Plans	**N**	**%**	**N**	**%**	**N**	**%**
Decrease my hours in the field of physical therapy	46	4.9	3	1.9	49	4.5
Decrease my hours of direct patient care	10	1.1	0	0.0	10	1.0
Increase my hours in the field of physical therapy	24	2.5	13	8.4	37	3.4
Increase my hours of direct patient care	14	1.5	4	2.6	18	1.6
No planned change	846	89.5	135	87.1	981	89.2
Stop working in the field of physical therapy	5	0.5	0	0.0	5	0.5
All	**945**	**100.0**	**155**	**100.0**	**1,100**	**100.0**

University of North Dakota Doctor of Physical Therapy Program

The UND School of Medicine and Health Sciences Doctor of Physical Therapy program graduated 49 individuals in May 2021. An electronic survey was distributed to the graduates approximately one year after graduation. A total of 24 students responded to the survey for a response rate of 49.0%. The original class included 26 (53.1%) students from North Dakota, 20 (40.8%) from Minnesota, and the remaining students were from Wyoming (2.0%) and other states (5.0%). All 24 (100%) of the graduate respondents were employed as physical therapists in a full time (87.5%) or per diem/as needed or other (12.5%) position. There were 7 (29.2%) employed in North Dakota while the remainder of the respondents reported employment in Minnesota (37.5%), Wyoming (17.0%), and one person was employed in each state of Arizona, Florida, Idaho, and Maryland. The primary area of practice for the graduates was an outpatient clinic (67.0%). The majority of respondents (86.0%) reported an initial salary between $55,000 and $75,000.[18]

NUTRITIONISTS AND DIETICIANS

Licensed Registered Dietitians

In North Dakota, there are 501 licensed registered dietitians. Currently there are 6.6 licensed registered dietitians per 10,000 North Dakota residents working in North Dakota. Licensed registered dietitians working in North Dakota have been practicing for an average of 12 years (*SD* = 11 years).[19]

Licensed Nutritionists

In North Dakota, there are 35 licensed nutritionists. That amounts to 0.5 licensed nutritionists per 10,000 North Dakota residents working in North Dakota. Licensed nutritionists working in North Dakota have been practicing for an average of 10 years (*SD* = 11 years).[19]

PHARMACY PROFESSIONALS

Pharmacy Technicians

There are 930 pharmacy technicians licensed and working in North Dakota (Figure 8.17). Most pharmacy technicians work in urban areas (*n* = 550, 59.2%), followed by large rural areas (*n* = 166, 17.9%), isolated rural areas (*n* = 158, 17%), and small rural areas (*n* = 56, 6%). Pharmacy technicians in North Dakota have been licensed for an average of 10 years (*SD* = 8 years).[20]

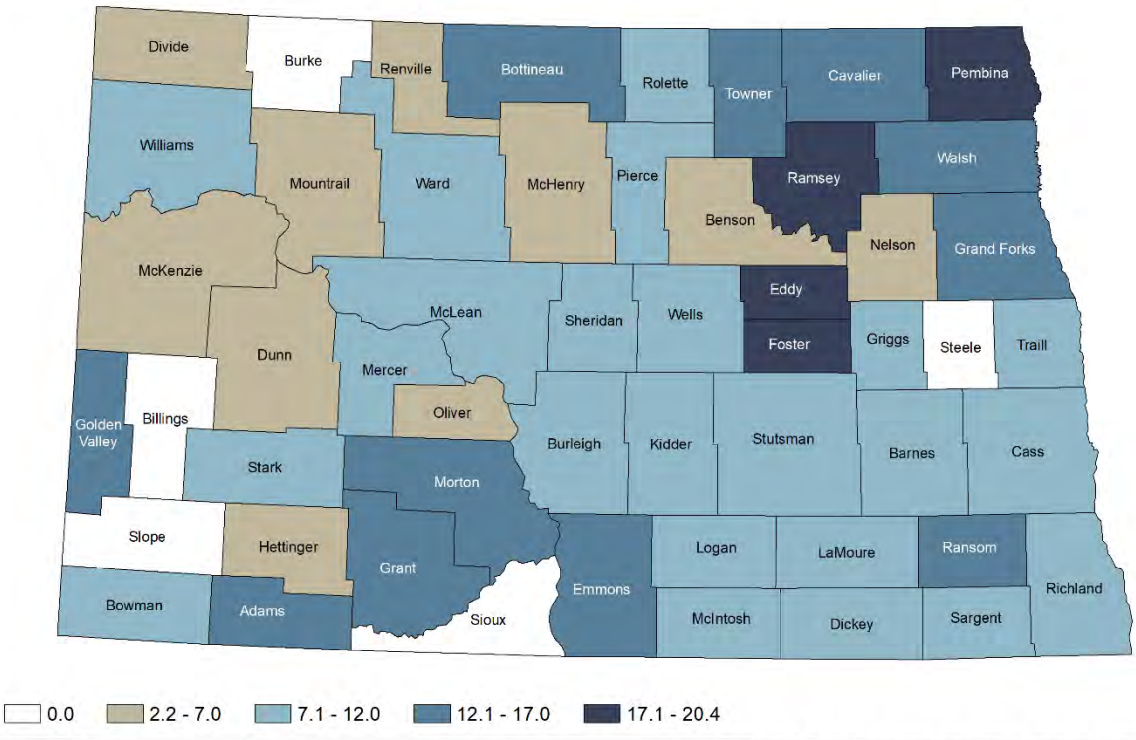

Figure 8.17. **Rate of pharmacy technicians per 10,000 North Dakota residents, by county, 2021.[20]**

Pharmacists

There are 1,319 pharmacists licensed and working in North Dakota (Figure 8.18). Most pharmacists in North Dakota work in urban areas (*n* = 947, 71.8%). The next most common area in which pharmacists in North Dakota work is large rural areas (*n* = 169, 12.8%), followed by isolated rural areas (*n* = 152, 11.5%), and small rural areas (*n* = 51, 3.9%) (Figure 8.19). Pharmacists in North Dakota have been licensed for an average of 15 years (*SD* = 13 years).[20]

> ***"Most pharmacists in North Dakota work in urban areas (71.8%). The next most common area is large rural areas (12.8%), followed by isolated rural areas (11.5%), and small rural areas (3.9%)."***

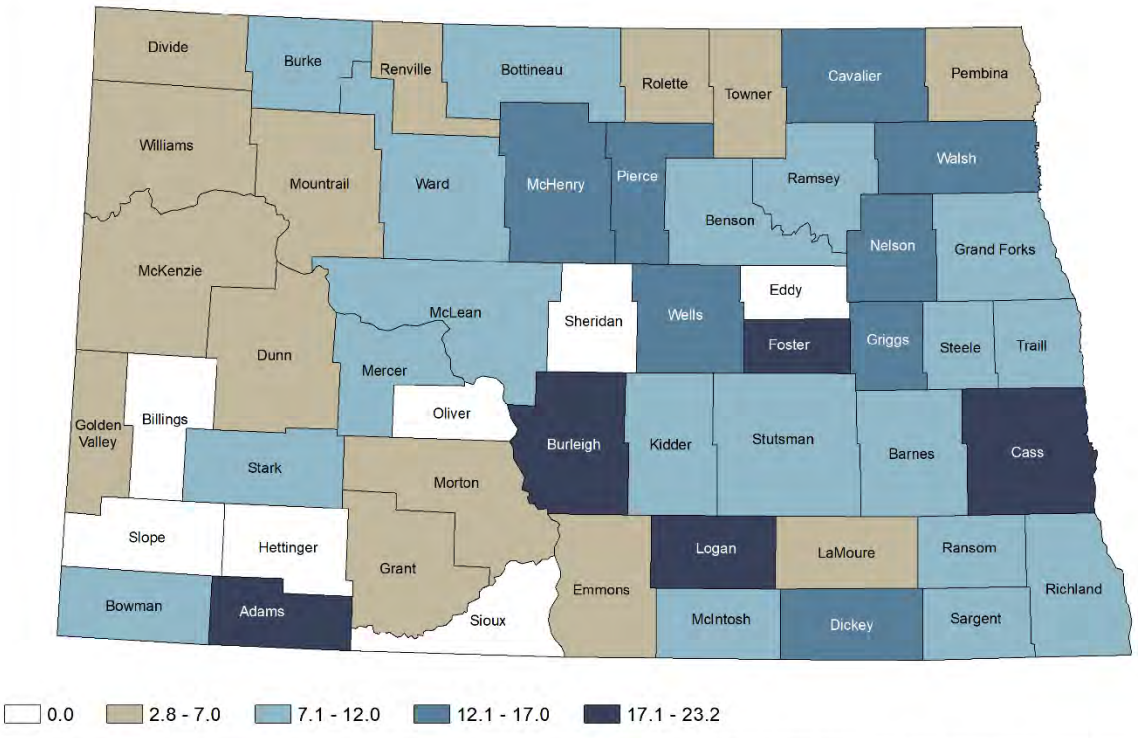

Figure 8.18. **Rate of pharmacists per 10,000 North Dakota residents, by county, 2021.[20]**

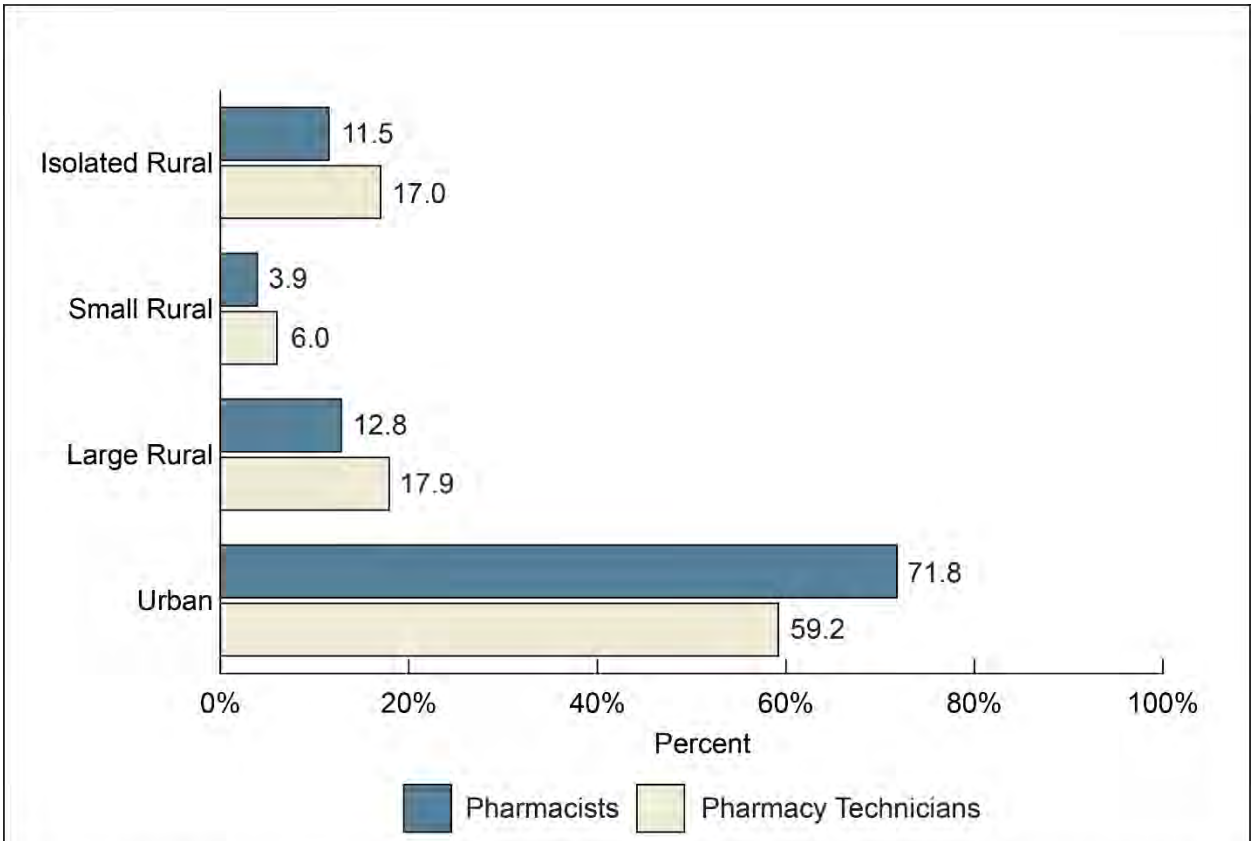

Figure 8.19. **Rural-urban designation for pharmacy professionals in North Dakota, 2021.[20]**

MEDICAL LABORATORY SCIENTISTS

There are 1,151 medical laboratory scientists licensed in North Dakota. Medical laboratory scientists are licensed in three categories: as scientists/technologists, technicians, or specialists. Most of the medical laboratory scientists licensed in North Dakota are licensed as clinical laboratory scientist/medical technologists (*n* = 857, 74.5%), followed by clinical laboratory technician/medical laboratory technician (*n* = 294, 25.5%). Currently there are 15.1 medical laboratory scientists per 10,000 North Dakota residents licensed in North Dakota and 11.9 medical laboratory scientists per 10,000 North Dakota residents working in North Dakota.[21] These numbers are higher compared to the average for the U.S. In the U.S. there are 329,200 clinical laboratory technologists/technicians which is equal to 10 clinical laboratory technologists/technicians per 10,000 U.S. residents.[22]

"Currently there are 15.1 licensed medical laboratory scientists per 10,000 North Dakota residents and 11.9 medical laboratory scientists per 10,000 North Dakota residents working in North Dakota."

Based on the population of North Dakota, it was found that there are 11.3 clinical laboratory scientist/medical technologists per 10,000 North Dakota residents licensed in North Dakota and there are 9.1 clinical laboratory scientists/medical technologists per 10,000 North Dakota residents working in North Dakota. There are 3.9 clinical laboratory technician/medical laboratory technicians per 10,000 North Dakota residents licensed in North Dakota and 2.8 clinical laboratory technician/medical laboratory technicians per 10,000 North Dakota residents working in North Dakota.[21]

Education

Clinical laboratory scientists/medical technologists working in North Dakota have been in practice, on average, for 13 years (*SD* = 11 years). Clinical laboratory technicians/medical laboratory technicians have been in practice, on average, for 18 years (*SD* = 12 years).[21]

Practice Characteristics

Most medical laboratory scientists working in North Dakota work in urban areas (*n* = 536, 59.4%), followed by those working in isolated rural areas (*n* = 150, 16.6%), large rural areas (*n* = 140, 15.5%), and small rural areas (*n* = 48, 5.3%). Twenty-eight responses did not have a rural-urban designation. When examining rural-urban designation by profession it was found that of the 691 clinical laboratory scientist/medical technologists working in North Dakota, 408 (59.0%) work in urban areas, 118 (17.1%) work in large rural areas, 36 (5.2%) work in small rural areas, and 104 (15.1%) work in isolated rural areas with 25 individuals not reporting practice location. Of the 211 clinical laboratory technician/medical laboratory technicians working in North Dakota, 128 (60.7%) work in urban areas, 22 (10.4%) work in large rural areas, 12 (5.7%) work in small rural areas, 46 (21.8%) work in isolated rural areas, and three (1.4%) did not have a rural-urban designation (Figure 8.20).[21]

> ***"Most medical laboratory scientists working in North Dakota work in urban areas (59.4%), followed by those working in isolated rural areas (16.6%), large rural areas (15.5%), and small rural areas (5.3%)."***

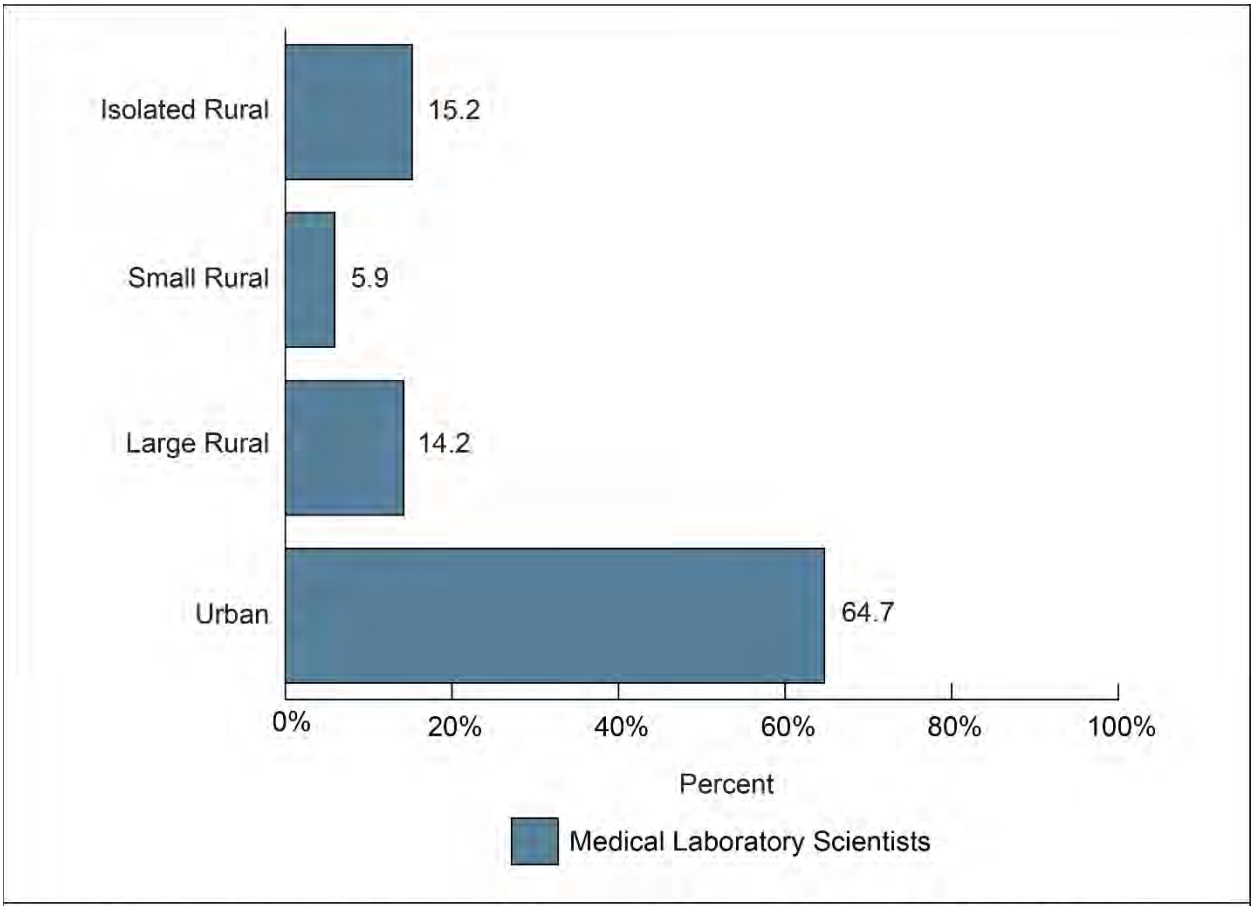

Figure 8.20. **Rural-urban designation for medical laboratory scientists in North Dakota, 2021.**[21]

University of North Dakota Medical Laboratory Science Undergraduate Program

The UND School of Medicine and Health Sciences Department of Medical Laboratory Science (MLS) graduated 80 certification-eligible individuals through traditional (*n* = 48) and non-traditional (*n* = 32) undergraduate routes for the academic year of 2020-2021. The traditional route class included 16 (33.3%) students from Minnesota, 11 (22.9%) from North Dakota, 7 (14.6%) from South Dakota, 5 (10.4%) from Montana, 4 (8.3%) from Wisconsin, and 5 (10.4%) from other locations including Iowa, New Jersey, Texas, and international. An electronic exit survey seeking employment information was distributed to traditional route MLS program graduates. A total of 33 responses to the survey were received, for a response rate of 68.8%. A 100% placement rate was identified for those seeking employment in the field. Fifty-seven percent of respondents originally from North Dakota remained in North Dakota for employment. Eleven percent of respondents not originally from North Dakota reported staying in the region (North Dakota or Minnesota) for employment. The primary area of practice for respondents was a clinical laboratory within a hospital of >100 beds (75.0%). Respondents reported an average starting salary of $53,340.[23]

DENTAL PROFESSIONALS

Dental professionals such as dentists, dental hygienists, and dental assistants are important health care providers in North Dakota. According to the most recent licensure data there are 453 licensed dentists in North Dakota, which amounts to 6.0 dentists per 10,000 North Dakota residents licensed and working in North Dakota (Figure 8.21). Licensed dentists have been practicing, on average, for 16 years and 9 months (*SD* = 13 years, 9 months).[24]

"There are 453 licensed dentists in North Dakota which amounts to 6 dentists per 10,000 North Dakota residents licensed and working in North Dakota."

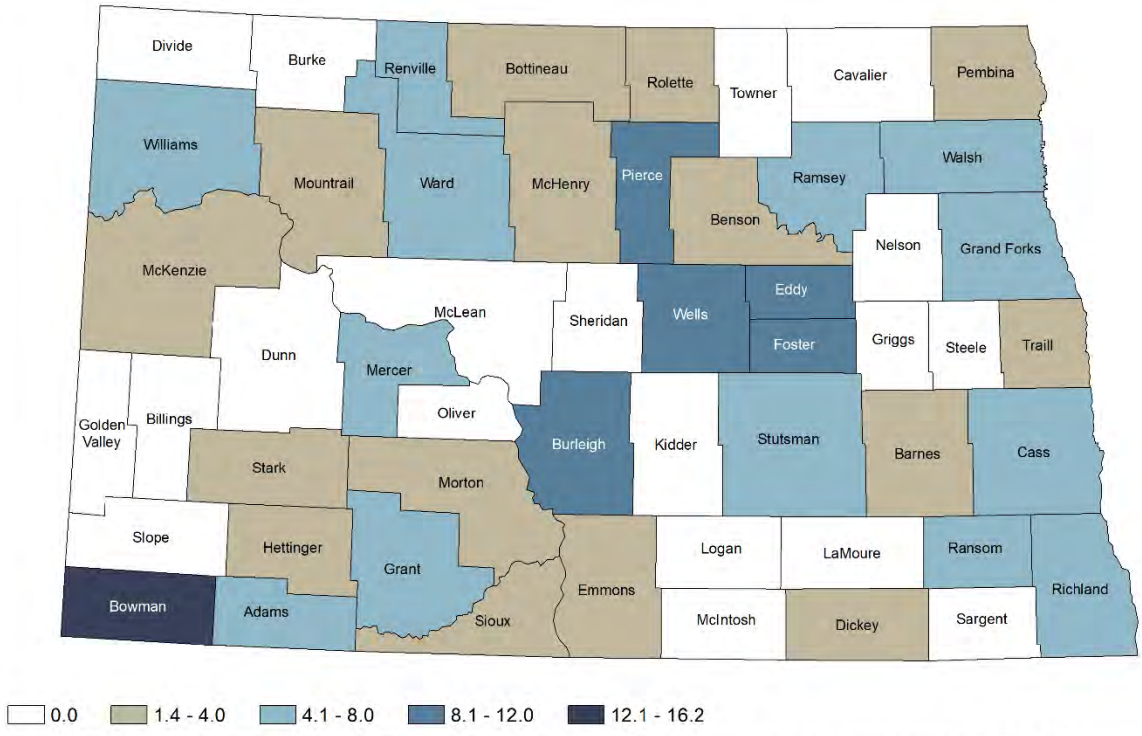

Figure 8.21. **Rate of dentists per 10,000 North Dakota residents, by county, 2021.[24]**

Practice Characteristics

About 19.0% of the dentists in North Dakota reported working in specialty areas; of these, 25 (5.5%) reported orthodontics, 23 (5.1%) reported oral and maxillofacial surgery, 17 (3.8%) reported pediatric dentistry, 12 (2.6%) reported endodontics, five (1.1%) reported periodontics, four (1.0%) reported prosthodontics, two (0.4%) reported general dentistry, and one (0.2%) reported oral and maxillofacial radiology (Table 8.6). Most licensed dentists working in North Dakota work in urban areas (*n* = 287, 63.4%), followed by large rural areas (*n* = 91, 20.1%), isolated rural areas (*n* = 52, 11.5%), and

small rural areas (*n* = 23, 5.1%). Overall, 166 (36.7%) of the dentists working in North Dakota work in rural areas (Figure 8.22).[24]

> ***"Most licensed dentists working in North Dakota work in urban areas (63.4%), followed by large rural areas (20.1%), isolated rural areas (11.5%), and small rural areas (5.1%)"***

Table 8.6
Specialty areas for dentists in North Dakota, 2021.[24]

ADA Specialty	N	%
Endodontics	12	13.5
General Dentistry	2	2.3
Oral & Maxillofacial Radiology	1	1.1
Oral & Maxillofacial Surgery	23	25.8
Orthodontics	25	28.1
Pediatric Dentistry	17	19.1
Periodontics	5	5.6
Prosthodontics	4	4.5

Frequency Missing = 370

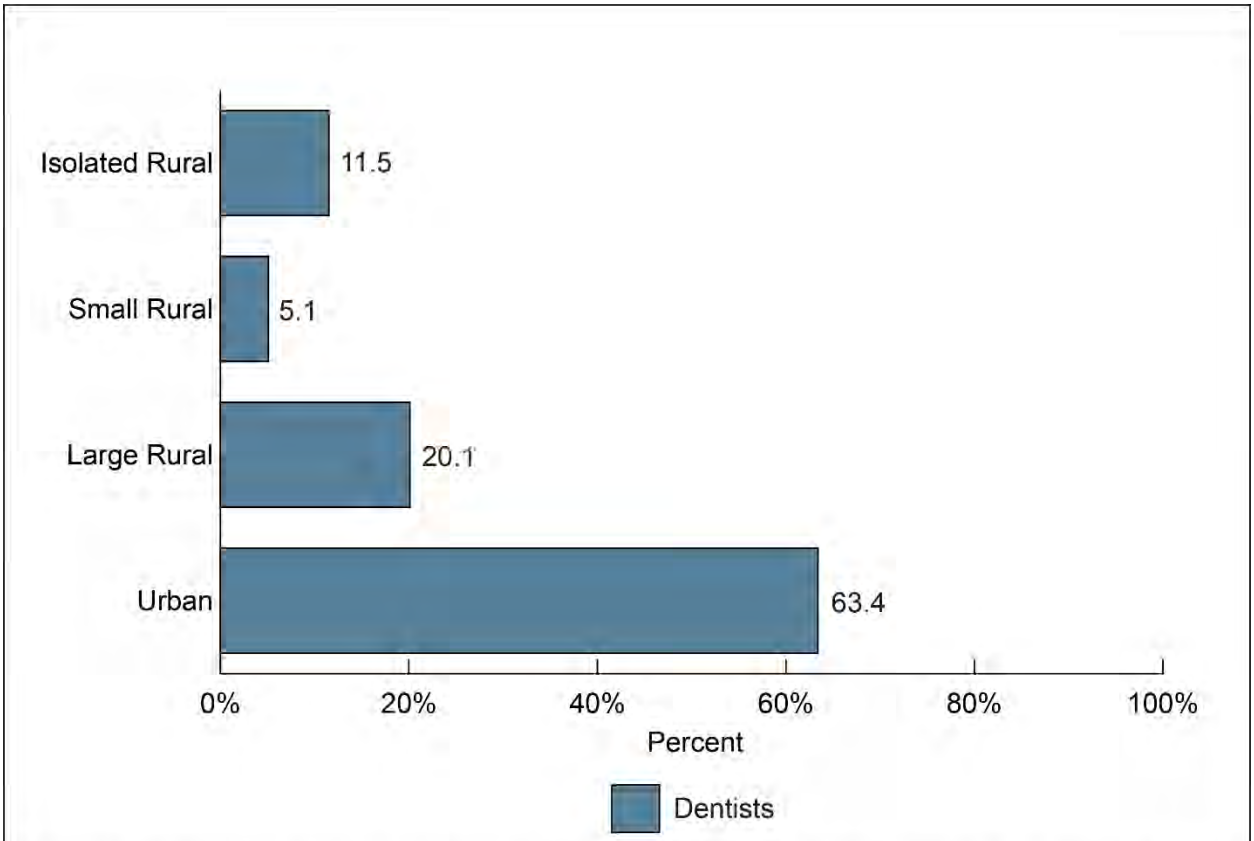

Figure 8.22. **Rural-urban designation for dental professionals in North Dakota, 2021.[24]**

ATHLETIC TRAINING PROFESSIONALS

There are approximately 260 certified athletic trainers in North Dakota.[25] In the U.S. there are 26,070 athletic trainers which is equal to 0.8 athletic trainers per 10,000 U.S. residents.[26]

UND Athletic Training Program

The athletic training program is a masters level degree program within the Department of Sports Medicine. The master's program began in 2022 and the Bachelor of Science in athletic training program will transition to a master of athletic training in 2023. The master's program will prepare students for entry-level positions within the field of athletic training as well as prepare them to take the certification exam to become certified athletic trainers. The first graduating class of the new Master of Athletic Training degree will be in the Spring of 2024. The B.S. in Athletic Training degree has been in place since 1990.[27] Over the past 3 academic years (2019-2022), the B.S. program has graduated 22 students and 18 (81.8%) of those graduates passed the certification exam. Of the graduates from the past 3 academic years, 17 (77.3%) are employed as athletic trainers.[28]

SARS-CoV-2 IMPACTS

The SARS-CoV-2 pandemic affected every aspect of the healthcare system in the United States, including the healthcare professionals providing care. One place in particular where a shift was observed was an increase in demand for behavioral health services and by extension a need for more behavioral health professionals. The pandemic created barriers to receiving care for those who had already been diagnosed with a behavioral health condition and the reality of life during the pandemic put more mental stress on others within the population, leading to a growth in patients needing services. Use of tele-behavioral health services is one way in which behavioral health providers and organizations have tried to expand their reach and serve patients during the pandemic.[29] Overall there was a decrease in the number of in-person healthcare services delivered during the start of the pandemic in early 2020, and while ambulatory visits rebounded later in the year, they still remained below what was considered average for a given year. In contrast the number of virtual healthcare visits spiked in early 2020 and eventually leveled off at a rate much higher than pre-pandemic levels of telehealth services.[30]

There also was an observed effect on the education of medical students, including those in psychiatric residency programs. Many clinical training placements for medical students were canceled or deferred during the peak of the pandemic. Those in residency programs had to learn quickly how to incorporate telehealth services into their practice with a reduction in in-person experiences with patients and their supervising faculty members. Alternative learning experiences had to be explored in order for medical students and residents to attain particular competencies.[31] However, not all healthcare services can be delivered in a virtual format. One example of this is with physical therapy practitioners (PTs). While some effort was made to deliver services to certain patients through a virtual format, many physical therapy practitioners and organizations saw significant impacts from the pandemic. The clinics that stayed open during the pandemic saw fewer clients, a decrease in referrals, and a decrease in care hours. This in turn affected revenue and there was a noted increase in physical therapy practitioners filing for unemployment.[32]

Oral healthcare services are one area where it is very difficult to provide services virtually and this industry saw significant impacts from the pandemic. Some practices closed temporarily in the early weeks of the pandemic, and some were closed but would provide services on an emergency basis. When services were provided during the pandemic, extra precautions had to be taken, more personal protective equipment (PPE) was used, and the physical presence of patients in congregate areas had to be reduced.[33] The use of PPE and enhanced infection control procedures did result in lower rates of prevalence of COVID-19 among dentists in the U.S.[34]

SARS-CoV-2 Impacts on Healthcare Profession Educational Programs

One of the most significant impacts that the SARS-CoV-2 pandemic had on the healthcare profession educational programs in North Dakota was that a majority of classes during the spring semester of 2020 were moved to a remote learning format. All classes that were able to be taught online through distance learning transitioned to that format at the University of North Dakota (UND). This included classes for students in the medical school program, physical therapy program, occupational therapy program, athletic training program, medical lab sciences program, public health program, and physician assistant program. Not all classes or credit requirements for every program could be done through a remote learning format and that led to each program having to make unique adjustments to their curriculums and teaching methods in order to make sure their students were able to meet the graduation requirements.

The sports medicine department had to halt their clinical education for the athletic training (AT) program in the spring of 2020 but as an alternative the department switched to using Problem Based Learning (PBL) cases for the students to work through. This modification was approved by the accrediting body temporarily and the AT program was able to return to clinical education in the fall of 2020.[35] The department of medical laboratory sciences rearranged the curriculum in order to accommodate the need for students to complete lab experiences that could not be delivered in a remote learning format.[36]

The department of physical therapy also adjusted their curriculum for their first-year students since those students were not able to participate in the typical clinical skills lab activities. The department implemented a clinical skills bootcamp for the 2020 summer session in order to provide students with an opportunity for intensive, hands-on skills sessions. Other curriculum sequence changes were made in order to move some clinical skills experiences into the fall 2020 semester when students were able to return to some in-person educational settings.[37]

The North Dakota State University (NDSU) School of Pharmacy also had to make some adjustments to their curriculum due to delays in students being able to complete their clinical experiences during the pandemic. Many students were not able to complete their introductory or advanced clinical experiences during the summer of 2020 and those had to be delayed to the summer of 2021. The experiential education team worked to ensure that students had the necessary opportunities to complete their clinical hours through a mix of problem-solving, creativity, and schedule adjustments. A positive impact noted by the School of Pharmacy is that many of their students in the 2021 and 2022 graduating classes were able to serve the communities in which they completed clinical/fieldwork experiences through SARS-CoV-2 vaccination programs. Many of the students received great clinical experience with vaccine program set-up, delivery, and assessment in settings all across the state and beyond.[38]

The UND Department of Occupational Therapy not only had to transition its classes into an online format during the pandemic, but the program also was

transitioning from a masters program to a doctorate program. The last two classes of the masters program were the classes of 2020 and 2021. For the class of 2020 the academic fieldwork coordinators worked with fieldwork supervisors, designed telehealth learning opportunities, and projects that met the standards of an accredited program to ensure that the students would be able to graduate on time. For the class of 2021, more of the curriculum was restructured. Fieldwork experiences were postponed through the summer of 2020, the department re-sequenced the graduate year so that students completed didactic courses during the summer, and then the fieldwork placements were scheduled for the fall. The doctoral level curriculum was taught for the first time starting in 2020 and some modifications had to be made. Fieldwork experiences continued in a virtual format using simulation software, videoing clients with faculty following instruction from the students to demonstrate assessment techniques and talking through their clinical reasoning and intervention planning. Some of the classes had to move online during the summer of 2020 and in the fall, classes resumed in-person with a modified format including breaking the classes into smaller groups while some classes remained online.[39]

The UND Department of Physician Assistant Studies made some adjustments to clinical experiences for students during the spring and summer sessions in 2020. For students who were not able to complete clinical experiences in specific areas such as general surgery or emergency medicine due to SARS-CoV-2 restrictions, the students were able to delay their clinical experiences until they were able to go back to their clinical sites and use alternative virtual learning activities in order to work towards the required competencies.[40]

All programs were able to graduate the majority of students on time. There were a very small number of students in several programs who were not able to complete clinical experiences or internship hours due to pandemic restrictions at various facilities but were able to complete the rest of their course work. Those who had delays in completing required clinical requirements were able to graduate with minimal delay once their clinical experiences or internships hours were completed. In some cases, the pandemic allowed students in fields such as pharmacy and public health unique opportunities to complete clinical experiences or internships by assisting in pandemic response through vaccination and contact tracing efforts. Despite the impacts of the pandemic, the healthcare professions educational programs did everything possible to ensure that students received sufficient educational experiences in order to meet graduation requirements and be successful professionals in their chosen fields. Based on information from the programs, it is evident that the programs were successful in ensuring students were able to graduate in a timely fashion while meeting the necessary requirements and move the students into the workforce.

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CHAPTER NINE: Healthcare Organization and Infrastructure in North Dakota

HOSPITALS AND HEALTH SYSTEMS

A health system is a broader organizational structure composed of a hospital, clinic system, and other healthcare elements (ambulance, nursing home, and others). There are a variety of different hospital categories that may be components of a health system. According to the North Dakota Department of Health (NDDoH), there are 56 hospitals in the state. Of these 52 hospitals, there are 37 critical access hospitals (CAHs), six general acute Prospective Payment System (PPS; tertiary) hospitals, two psychiatric, one Indian Health Service (IHS), two long-term acute care, two transplant, one specialty, and one rehabilitative hospital.[1,2]

The distribution of North Dakota hospitals is displayed in Figure 9.1 along with the counties that are federally designated as health professional shortage areas (HPSAs). The tertiary hospitals, sometimes called referral hospitals, are located in the four largest cities in the state, and the CAHs supplement the six largest hospitals (Altru Health System in Grand Forks, Trinity Health in Minot, Sanford Health in Bismarck and Fargo, Catholic Health Initiatives [CHI]-St. Alexius Medical Center in Bismarck, and Essentia Health in Fargo) by providing hospital coverage elsewhere. Tertiary hospitals imply the third level of care as primary and secondary hospitals make referrals to tertiary hospitals that offer specialty care services. In addition, there are several other hospitals that provide a distinct level of care.

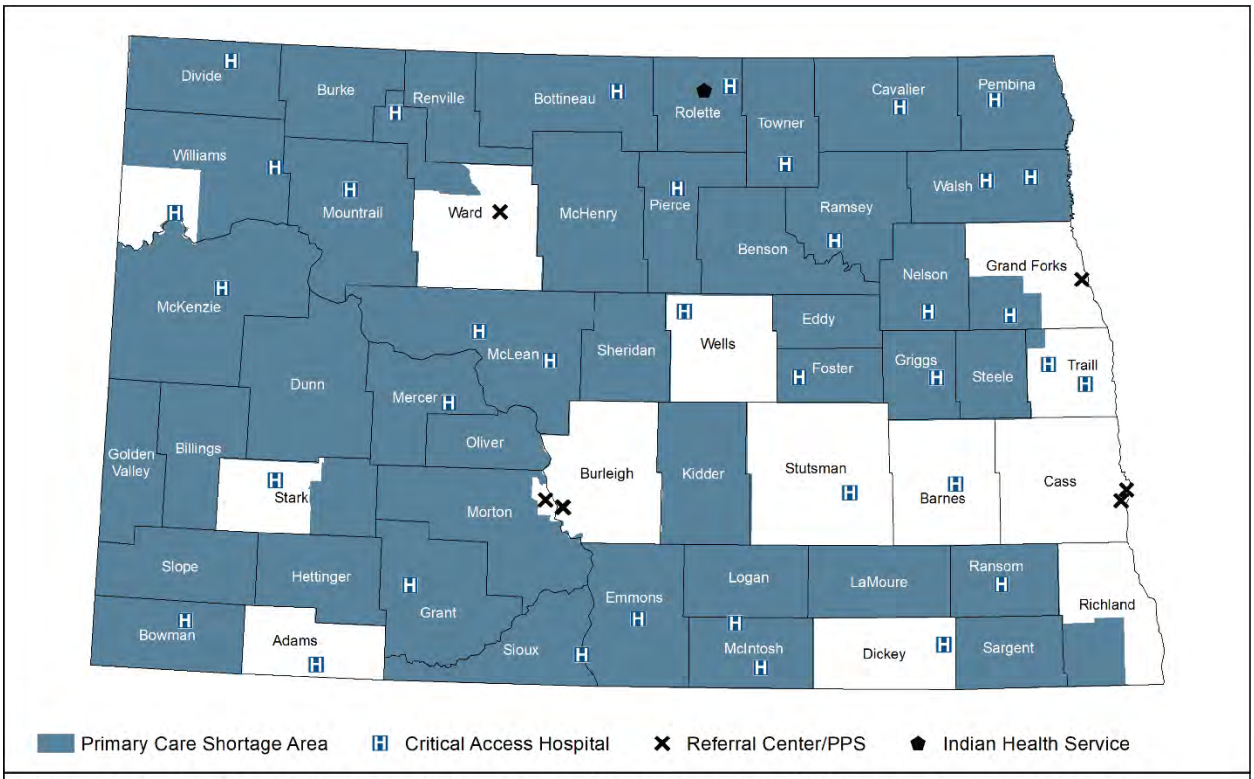

Figure 9.1. **North Dakota hospitals and Health Professional Shortage Areas, 2022.**[1,2]

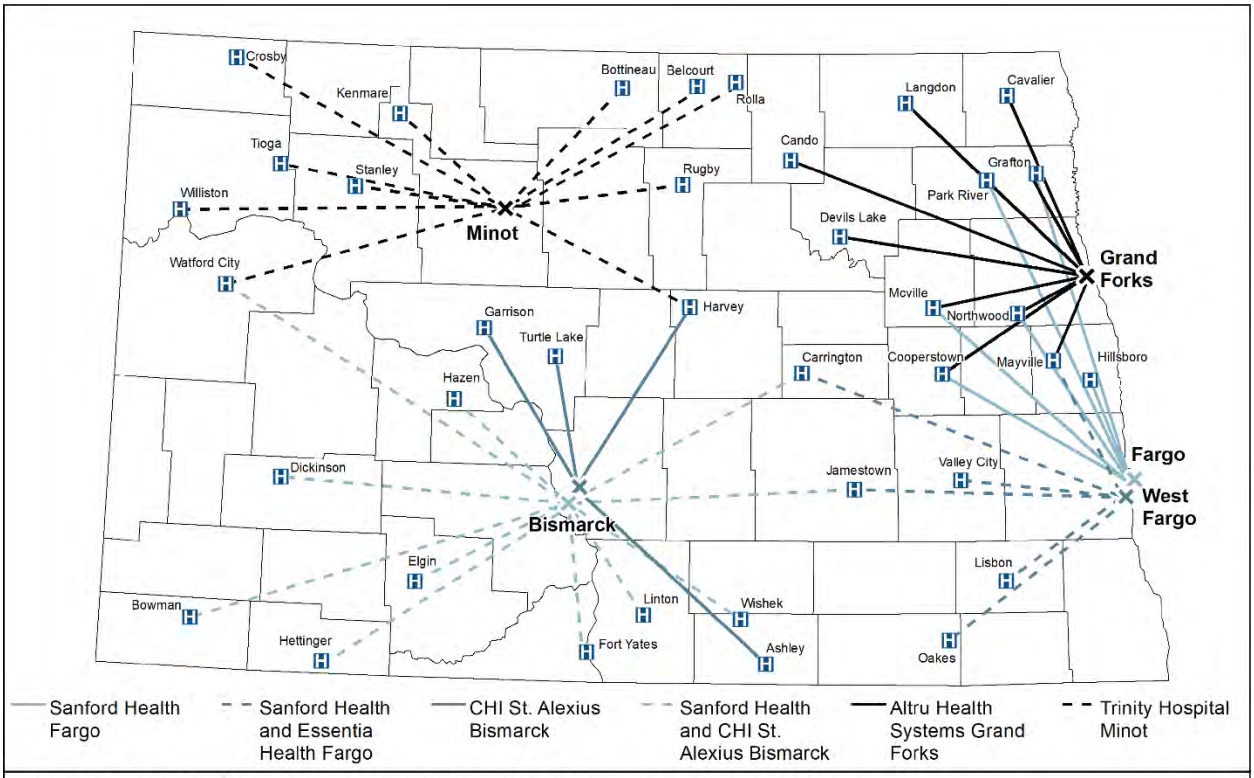

Figure 9.2. **North Dakota hospitals and tertiary networks, 2022.**[1,2]

The United States Department of Veterans Affairs (VA) and its Veterans Health Administration operates a federally funded hospital for veterans in Fargo, ND, that is similar to and complements the six largest hospitals in the state. Outpatient care through the Fargo VA Hospital also is provided by eight associated community-based outpatient clinics (CBOC) that are located throughout the state. The CBOCs are found in Bismarck, Devils Lake, Dickinson, Grafton, Grand Forks, Jamestown, Minot, and Williston.[3]

CAHs are rural hospitals that must meet the following specific federal guidelines: cap of 25 acute-care beds, an average length of stay of 96 hours or less, located at least 35 miles from another hospital, and reimbursement on an allowable-cost basis as opposed to a PPS, which is used by the tertiary hospitals.[4] All rural hospitals in North Dakota, less one IHS hospital, are CAHs and are nonprofit.

All 37 CAHs have important networking relationships with the tertiary hospitals located in the four largest cities in North Dakota. Each city thus forms a tertiary care geographic region (see Figure 9.2). Most of the CAHs are located an hour or more by surface transportation from their tertiary referral center. This is especially concerning in inclement weather when the transfer time can be substantially longer or even impossible. CAHs take care of an older population relative to the tertiary hospitals because North Dakota's rural population tends to be older.

Nationally, as well as in North Dakota, the hospital market continues to consolidate. In comparison to South Dakota, rural North Dakota hospitals tend to have more independence and autonomy in that they are community-controlled, nonprofit

hospitals. North Dakota is unique in that there are no for-profit hospitals. There are 15 CAHs that have more formalized relationships with a tertiary hospital where more decision-making rests with the larger facility. All CAHs must operate with some form of communication and transfer agreement with a referral hospital. All of the CAHs work with at least one regional tertiary hospital on quality improvement efforts. The tertiary health systems also operate a number of primary care medical clinics either in conjunction with a CAH or sometimes in a more competitive model.

Nearly all hospitals, including rural hospitals, face challenges that affect their ability to provide quality healthcare services. Common issues plaguing rural hospitals include healthcare workforce supply; reimbursement from both public and private payers; access to behavioral and/or mental health services; community economic conditions; and population changes. 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. For a more comprehensive discussion of these topics, please see the 5th edition of this Report.

AMBULATORY CARE

There are approximately 300 primary care and specialty clinics in the state. There are 56 federally certified Rural Health Clinics (RHCs) in the state that serve as primary care clinics (Figure 9.3).[5] CAHs own and operate most of the RHCs as provider based RHCs with the remaining RHCs being either owned by a tertiary provider (six RHCs) or are independent clinics generally owned by a physician or group practice. All of the North Dakota provider-based clinics are owned by hospitals, primarily CAHs, which are nonprofit entities in this state; therefore, the provider-based RHCs are nonprofit. Under federal law, RHCs, both provider-based and independent, can be for-profit or not-for-profit, public, or private.[6]

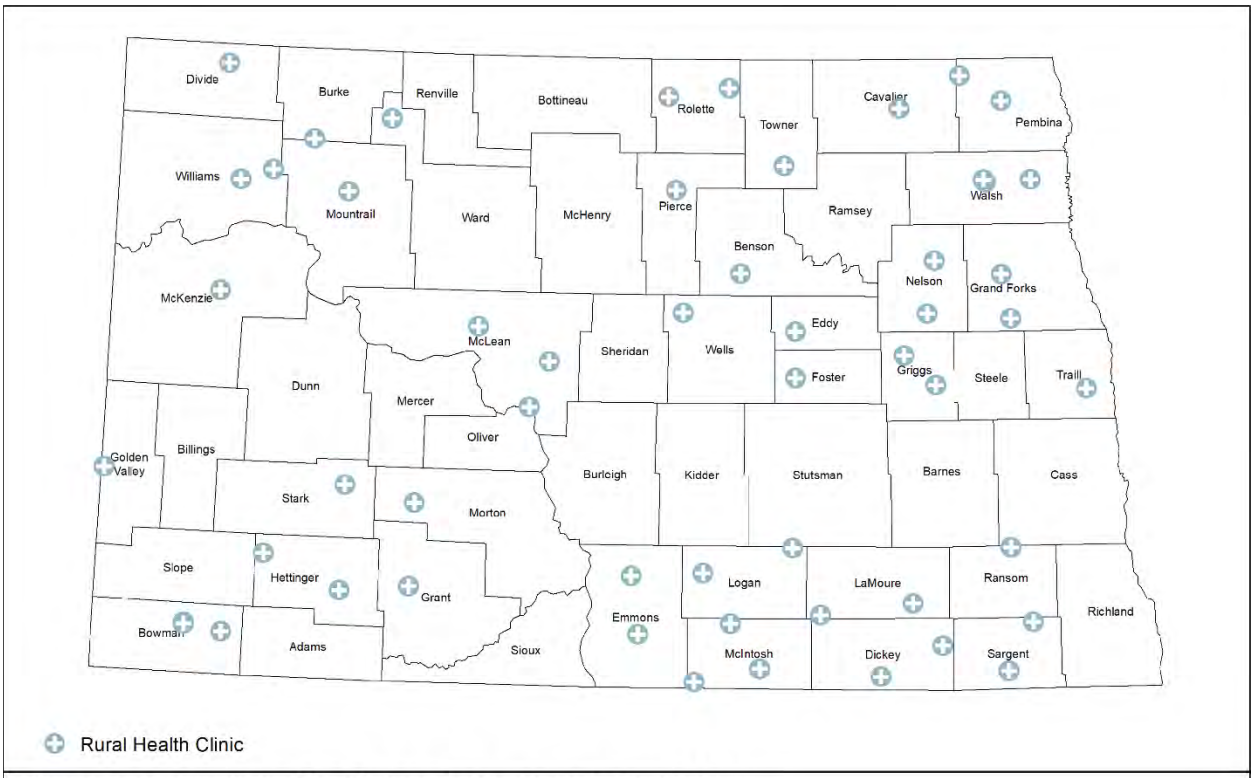

Figure 9.3. **Rural Health Clinics in North Dakota, 2022.[6]**

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 16 communities (Figure 9.4).[7] Twelve of the communities are rural, and five are urban (Bismarck, Fargo, Grand Forks, Minot, and West Fargo). For a comprehensive discussion of RHCs and FQHCs, please see the 5th edition of the Biennial Report.

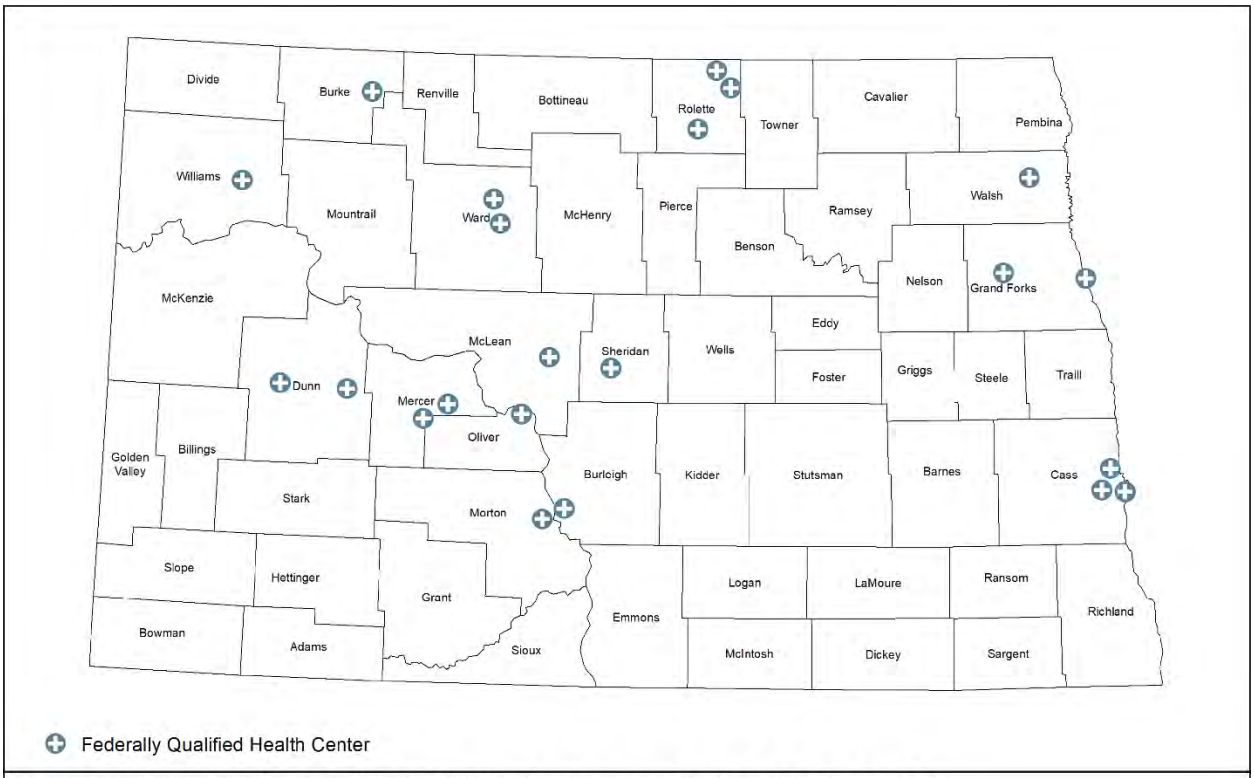

Figure 9.4. **Federally Qualified Health Centers in North Dakota, 2022.[7]**

EMERGENCY MEDICAL SERVICES

Emergency medical services (EMS) are a fundamental service and health delivery function. EMS commonly refers to emergency medical care for people who have had a sudden or serious injury or illness, or who have suffered major trauma.[8] North Dakota infrastructures include advanced life support (ALS) systems, basic life support (BLS) systems, and quick response units (QRU), and employ paramedics in both rural and urban areas. Advanced life support (ALS) systems must be staffed by paramedics. There are 133 ground ambulance units in North Dakota.[8] There are 51 quick response units (QRU) that respond to a scene but cannot transfer patients to a hospital.[9]

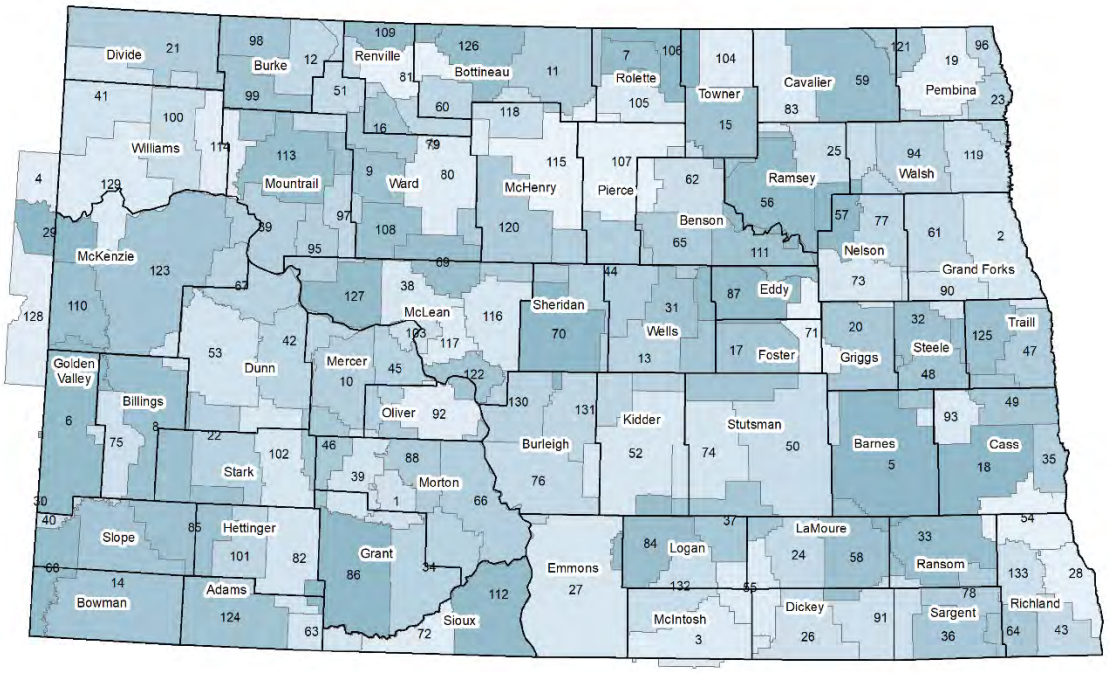

Figure 9.5. **Ambulance service areas in North Dakota, 2022.[9]**

TRAUMA SYSTEM AND CENTERS

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.”[11] In the United States, traumatic injuries were estimated to be responsible for more than 200,000 deaths in 2020, with an estimated death rate of 60.6 per 100,000 persons.[11] Trauma ranked as the fourth-leading cause of death and was the leading cause of death for people 45 years of age or younger.[12]

All hospitals, including all 37 CAHs but with the exception of one IHS hospital, are designated as trauma centers (Figure 9.6). Verification of trauma center status is based on nationally recognized standards set by the American College of Surgeons Committee on Trauma. The standards include 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.

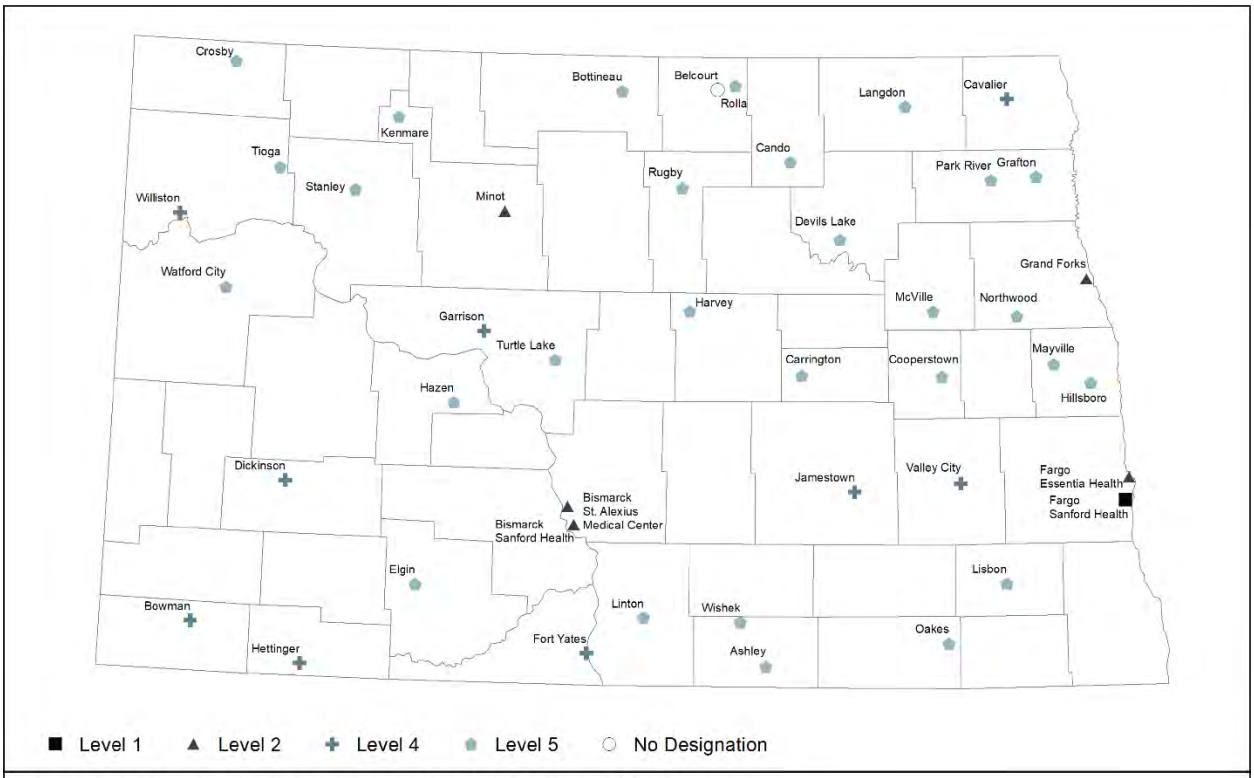

Figure 9.6. **Trauma centers in North Dakota, 2022[12].**

There are five trauma center levels.[12] Level I is a comprehensive regional resource—tertiary care center—providing total care for every area of injury from prevention to rehabilitation. There is one Level I trauma center in North Dakota that offers 24-hour immediate coverage by general surgeons, including orthopedic surgery, neurosurgery, anesthesiology, emergency medicine, radiology, and critical care. It also is a referral resource for communities in nearby regions, provides leadership in prevention and public education for surrounding communities, provides continuing education, incorporates a comprehensive quality assessment program, operates an organized teaching and research effort for innovation in trauma care, screens for substance abuse and patient intervention, and meets an annual minimum volume of trauma patients.[12] North Dakota has five Level II trauma centers. A Level II facility is able to initiate definitive care to all injured patients. It offers 24-hour immediate coverage by general surgeons, including orthopedic surgery, neurosurgery, anesthesiology, emergency medicine, radiology, and critical care. Five of six tertiary hospitals are all Level II trauma centers.[12] North Dakota does not have any Level III trauma centers. This level can provide prompt assessment, resuscitation, surgery, intensive care, and stabilization of injured patients. Level IV trauma centers provide advanced trauma life support before transfer of patients to a higher-level trauma center.[12] This level provides evaluation, stabilization, and diagnostic capabilities for injured patients. Nine CAHs have this designation. Level V trauma centers are the most common in North Dakota with 28 CAHs having this designation. A Level V trauma center provides initial evaluation, stabilization, and diagnostic capabilities and prepares patients for transfer to

higher levels of care.[12] All CAHs have transfer agreements for patients requiring more comprehensive care at a Level I through Level III trauma center.

LONG-TERM CARE AND AGING SERVICES

North Dakota must contend with an aging population that has a corresponding effect on policy decisions at both the state and federal level as it relates to health infrastructure, health status, education, housing, transportation, economic development, and other sectors. Long-term care (LTC) services are a function of healthcare that is directly affected by population factors, particularly the aging of the population. In North Dakota, long-term care facilities include assisted living, basic care, and nursing care. Each is a different type or level of care with corresponding services.

According to the North Dakota Long Term Care Association, one out of every two North Dakotans will require some type of LTC service during their life. 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. Older women are two times as likely as men to live 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) needing continuous supervision, 3) falls, 4) dementia, and 5) complex medical needs.[13] North Dakota has 77 skilled nursing facilities, 75 assisted living facilities, and 65 basic care facilities (Figure 9.7).[14]

Figure 9.7. **Long term care facilities in North Dakota, 2022.[14]**

At the state level, the Aging Services Division of the North Dakota Department of Health and Human Services administers programs and services that enhance the quality of life and help elders and people with physical disabilities live independently in their homes and communities. Aging Services provides a number of services including the following: dementia care services program, adult family foster care licensing, Older Americans Act supportive services, Older Americans Act nutrition services, payment for the establishment of guardianship services, LTC ombudsman program, senior community service employment program, telecommunications equipment distribution program, and vulnerable adult protective services.[15]

PHARMACIES

North Dakota has more than 260 pharmacies with 149 (57%) located in rural areas (Figure 9.8).[16] Three rural counties have no pharmacies. A majority of pharmacies in North Dakota are outpatient pharmacies, accounting for 57% of all pharmacies in the state. This is followed by hospital pharmacies (20%) and tele-pharmacies (8%).

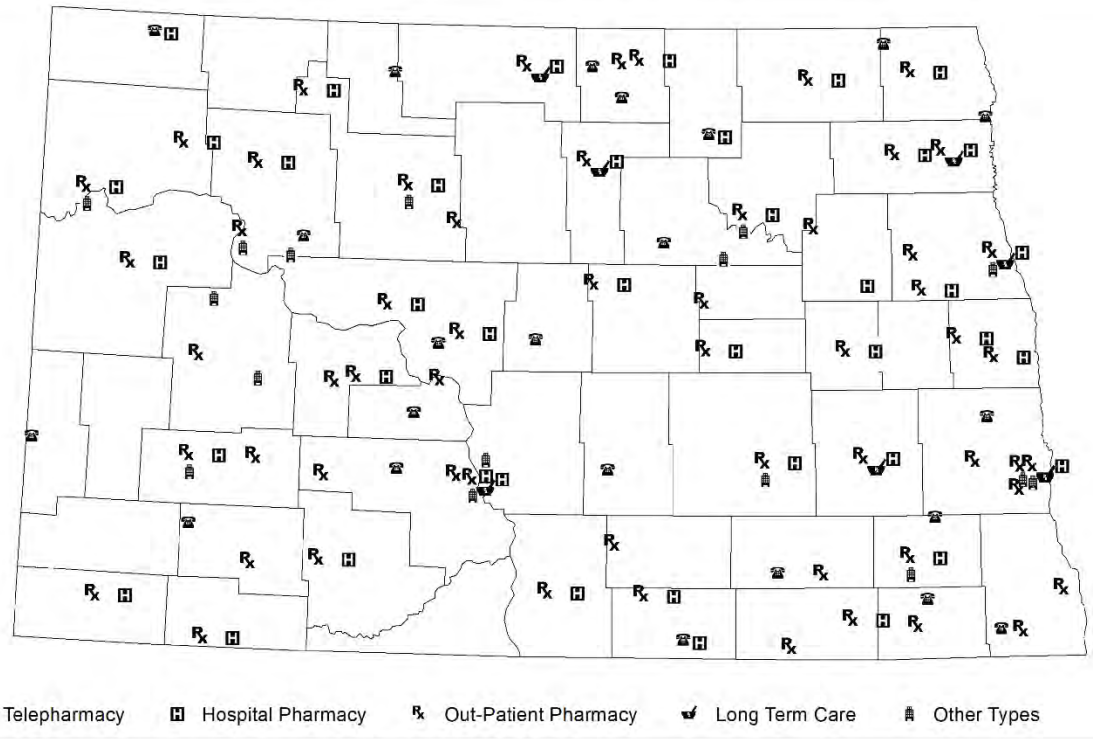

Figure 9.8. **Pharmacies in North Dakota, 2022.[16]**

PUBLIC HEALTH

Public health is an important and fundamental set of health and environmental services that have made significant contributions to improving the health status of most

Americans, rural and urban. Public health covers a wide scope of activities, and can be defined as “the science of protecting the safety and improving the health of communities through education, policy making and research for disease and injury prevention.”[17] Some of the accomplishments associated with public health include: development and widespread access to vaccinations, control of infectious disease (e.g., through emphasis on clean water and improved sanitation), fluoridation of drinking water, provision of safer and more healthful foods, access to family planning, increased motor vehicle safety, and tobacco control. Disease prevention and health promotion are highly associated with public health.

Public Health Units

While each public health unit can determine its own mission and primary focus, there are some common services provided within the state. All North Dakota public health districts provide the following: immunizations (for all ages), blood pressure screening (adults and school-age children), scoliosis screening (school-age children), vision screening (school-age children), high-risk infant follow-up, and vitamin B12 injections. In addition, most but not all units provide the following services: maternal and child health (e.g., home visits, sudden infant death syndrome prevention follow-up visits, and child health services); health promotion (e.g., diabetes, foot care, and community wellness programs); communicable disease (e.g., tuberculosis and skin and scalp conditions); school health (e.g., hearing screenings and AIDS education); environmental health (e.g., public water system inspection, environmental sanitation services, and water pollution control); occupational health nurse activities; mental health; skilled nursing activities; and maternal and child health initiative grants.

North Dakota’s public health system is decentralized with 28 independent local public health units working in partnership with the NDDoH (Figure 9.9).[18] The 28 local public health units are organized into single- or multi-county health districts, city-county health departments, or city-county health districts. Seventy-five percent of the local health units serve a single county, city, or combined city-county jurisdiction, while the other 25% serve multi-county jurisdictions (*Table 9.1*). The majority of the multi-county 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.

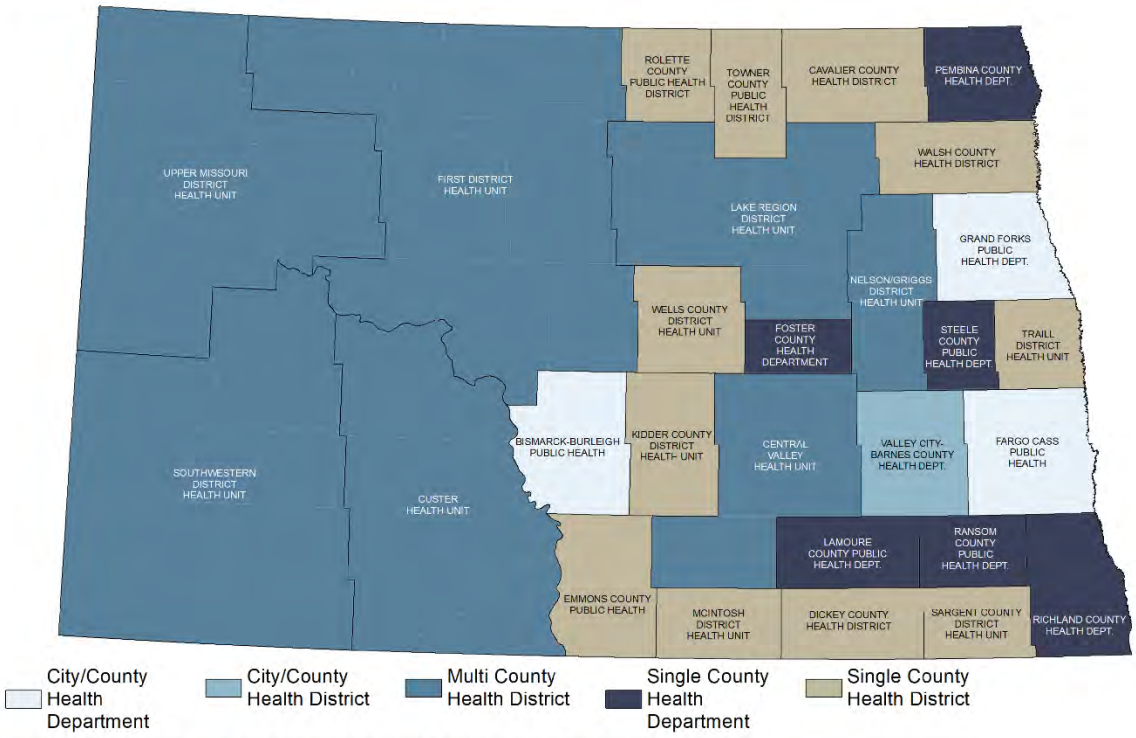

Figure 9.9. **Public health units in North Dakota, 2022.[18]**

Table 9.1
Public health units by type and number of counties, 2022.[18]

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**

COLLABORATIVE EFFORTS DURING SARS-CoV-2

In the spring of 2020, the state of North Dakota, like the rest of the world, was in the early stages of preparing for the widespread arrival of SARS-CoV-2. While the rest of the world was in different stages of impact, North Dakota largely was still in a planning phase. More information can be found on this topic in Chapter 4, but what follows below are illustrations of effective partnerships and efforts to address the global health crisis in a rural state such as North Dakota.

UND's Public Health Program Response

In March of 2020, the Public Health Program at the University of North Dakota was contacted by the North Dakota Department of Health to assist in case investigations and contact monitoring.[19] This was a collaboration between the UND School of Medicine and Health Sciences (SMHS) team and UND Student Health Services (SHS). The preliminary stages of the effort included rapidly assembling a team and adopting a workflow and process to manage the influx of SARS-CoV-2 contact reports. The partnership between SMHS and SHS worked directly with individuals who tested positive for SARS-CoV-2 and had been diagnosed with COVID-19 (cases) or had been identified as household or close contacts (contacts).[20]

The efforts at UND were conducted between March of 2020 and May of 2022. During that time frame a total of 47,247 cases and contacts were assigned to UND with 77% consisting of cases and 23% contacts of cases. The northeast region of the state had the highest number of cases and contacts investigated by UND with 17,698. Of those, Grand Forks County had 10,617 cases and contacts. The counties of Ward and Burleigh respectively had 7,855 and 4,717 cases and contacts.[20]

As illustrated in Chapter 4, two peaks of infections and hospitalizations were found in late 2020/early 2021 and late 2021/early 2022. The number of cases and contacts investigated during these time frames mirrored the hospitalization and infection data. Over the span of the efforts conducted at UND, a total of more than 180 case investigators worked more than 80,000 hours over 26 months and provided 36,579 case investigations and 10,671 close contact notifications.[20]

Public Health and Health System Vaccination Efforts

In early 2021, North Dakota received SARS-CoV-2 vaccine doses for the general public. In an effort to reach the largest number of people possible for the specific purpose of vaccinations, centralized locations were established for vaccination clinics. These were established in collaboration with partners from public health, health systems, and other community and governmental organizations. This allowed for a coordinated effort across agencies at a state and local level to provide information that was consistent across the state. Individuals could utilize consistent information to determine if they were eligible to be vaccinated based on qualifying criteria, locate their most convenient vaccination location, and to call a specific phone line to schedule a visit. The following example is based on the vaccine delivery in the Grand Forks region. Other collaborative efforts were conducted throughout the state; this particular one is being utilized for illustrative purposes.

On January 20th, 2021, a community vaccination site was opened in the Alerus Center in Grand Forks. This effort was supported by the Alerus Center, Altru Hospital, City of Grand Forks, North Dakota Department of Health, North Dakota National Guard, the University of North Dakota College of Nursing and Professional Disciplines, the University of North Dakota Master of Public Health Program, and numerous community

volunteers.[21] This allowed the region to optimize the acquisition and delivery of the vaccine via a large-scale inoculation site.[22] While this effort met a large volume of need, a specific focus was also placed on delivering vaccines to home-bound individuals.

Information for the general public was disseminated via various mechanisms to ensure that accurate information was made available, with a large use of social media messaging utilized to provide concise information that was easily shared. The intent of the effort was to provide an established location to inoculate as many people as rapidly and efficiently as possible during peak demand.[23] According to the Grand Forks Public Health 2021 Annual Report, over 37,000 vaccines were administered via this collaborative effort between January and May of 2021.[23]

SUMMARY

Healthcare in North Dakota is delivered through more than 300 ambulatory care clinics, 52 hospitals, 77 skilled-nursing facilities, 65 basic-care facilities, and 75 assisted-living facilities, supported by an array of EMS providers, trauma centers, pharmacies and 28 public health units. As a general rule, the further a 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 but have a significant impact both on the health of individuals and 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.

National health goals are focusing on better health, better care, and lowered costs. The health delivery system is going through profound change. Improvements in population health and a realignment of provider payments to incorporate those improvements is a new and fundamental reality. For North Dakota, increased financial access (e.g., greater insurance options) does not necessarily translate into direct physical access when the financial viability and organizational survivability of some facilities, especially rural, still is an issue. The associated workforce shortages or maldistribution of some health professionals remains an important issue.

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CHAPTER TEN: Quality and Value of Healthcare

NATIONAL OVERVIEW

The quality and safety of care 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 be considered when reforming or redesigning the health system. In addition, the quality of care provided to the population and the patient outcomes produced are equally important facets of reform. This chapter will focus on two areas: quality of care and health reform in North Dakota.

The Institute of Medicine's (IOM) six principal aims to improving health—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 will need to contend with systemic, societal, and policy change. The IOM, along with other organizations, has called for a modernized or modified healthcare system predicated on openness, responsiveness, and shared responsibility. The federal Agency for Healthcare Research and Quality (AHRQ) applies these six aims in its nationwide analysis and assessment of health quality, which is called the National Quality Strategy (NQS).[2]

Better care is anticipated by fully implementing the IOM's goals to achieve a healthcare delivery system that is more patient-centered, employs evidence-based science, addresses safety, and targets effectiveness and efficiency to improve access and achieve greater equity. Better health of the population should be 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 all are efforts to improve health status and to lower the growth in healthcare costs.

To help achieve these aims, the NQS established six priorities to help focus the efforts of public and private partners:

1. Making care safer by reducing harm caused in the delivery of care
2. Ensuring that each person and family is engaged as partners in their care
3. Promoting effective communication and coordination of care
4. Promoting the most effective prevention and treatment practices for the leading causes of mortality, starting with cardiovascular disease
5. Working with communities to promote wide use of best practices to enable healthful living
6. Making quality healthcare more affordable for individuals, families, employers, and governments by developing and spreading new healthcare delivery models.[3]

The six NQS priorities show the continuing development of thought relative to a transformative approach to the healthcare delivery system. The six IOM principles of 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.

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, including providers, payers, policymakers, academics, and advocacy groups, recognizes the need to better align or build viable linkages between those who practice healthcare and those who generate knowledge of the healthcare system and the resident components of that system. A 2015 summary report 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 processes.[4]

An important element discussed in the proceedings was the idea that to transform the healthcare delivery system, research could not reach a natural progression without understanding the implementation of research into the real world,

and delivery systems that relied on the knowledge and present organizational structure could not be expected to transform to the level of significant change. In August 2016, the National Academies of Sciences, Engineering, and Medicine's Roundtable on the Promotion of Health Equity and the Elimination of Health Disparities issued its findings.[7] This work incorporates another element of a transformative system: the role of the private sector or of the contributions of private-public partnerships and the implications for healthcare, health equity, and health status. The movement to value incorporates a focus on: quality improvement as argued by the IOM, AHRQ, and many other sources; changing the structure, orientation, financing, and performance of the health system; and the actors who serve as agents for change. The latter point, from the National Academies, is that the range of participants goes beyond the public sector and how the health system adapts or does not adapt to public instruments and new policy directives, as it also involves the needs of the private business sector. Employers pay for the majority of private health costs and have a vested interest in a transformative health system and the implications for economic opportunity, including workforce productivity and availability, better employee health, and improved community health. Private and public collaboration lends itself to the concept of community benefit embedded in health reform as a responsibility of the health system to facilitate improved population health. Collaborative models are a vehicle for health, business, transportation, housing, and other sectors to fashion comprehensive changes to population health.[5]

A recent report[6] originated from discussions involving national experts on payment strategies to support high quality care. The focus was on people with serious health conditions such as cancer, chronic obstructive pulmonary disease (COPD), and heart disease. A range of ideas were discussed, including the following: 1) incorporating more social services as an integrated approach; 2) changing Medicare to better incentivize care coordination; 3) relying less on an acute care model where reimbursements "trickle down" and instead use more community-based networks; 4) supporting delivery system reform that more adequately connects social services, long-term services, and support structures to the patient; 5) including a hospice and palliative care benefit in integrated financing and delivery; and 6) encouraging more health systems and state and local governments to lead in innovation for quality, accessibility, and affordability.[6]

Healthcare is struggling with and contemplating many of the same issues from its past, including 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 to improve not only the system of care at a global level but also to create real concrete change in health and medical outcomes at the individual and community levels. Better care, better health, and more affordable care have become focal points in the redesigned American healthcare system.

ASSESSMENT OF HEALTH QUALITY IN NORTH DAKOTA

Overall Assessment

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, the number of health organizations and providers collecting and using quality-related measures grow each year. Both the scientific knowledge and the policy directives that guide and shape the incorporation of data metrics and evidence-based principles become more refined and pronounced over time. The recognition on the part of policymakers and health advocates of the importance in understanding how healthcare systems and providers intervene to promote optimal health and the actual collection and analysis of health outcome data are fundamental factors in a transformative U.S. healthcare system.

AHRQ Assessment

In a recent report, the AHRQ rated North Dakota as average in comparison with other states in regard to overall healthcare (Figure 10.1).[7] In previous reports, North Dakota was reported as average or strong. States are graded as very weak, weak, average, strong, and very strong.[7] On all health care quality measures, North Dakota was in the top 10. South Dakota was in the middle 31 and Minnesota in the top 10.[8] North Dakota was rated strong for person-centered care, effective treatment, and care coordination. It was rated average for patient safety and healthy living. In comparison to its base year, North Dakota improved on patient-centered care and effective treatment but declined slightly on patient safety, care coordination, and healthy living. Structural access saw no change. Diseases and conditions where North Dakota scored three strong ratings included cancer, HIV and AIDS, and mental health and substance use disorder. North Dakota declined from strong to average for diabetes. Priority populations saw North Dakota maintain the same rating but with slightly lower scores for white and non-Hispanic white. North Dakota was rated weak for private insurance and strong for public insurance. Ratings remained essentially the same for type of care, including being rated strong for acute care and prevention. Setting of care showed North Dakota improving slightly within the average level ambulatory. However, the state declined from strong to average for home health-hospice and nursing home settings.

For 2021, there were 132 individual measures (126 in 2017). North Dakota was deemed to have achieved or improved upon its benchmark year on 40 of the measures. It was scored as close to the benchmark on 76 and rated far below from the benchmark on 16 measures. The state's best measures were for hospital admissions for heart failure per 100,000 population; hospital admissions for chronic obstructive pulmonary

disease or asthma per 100,000 population; and hospital admissions for immunization-preventable influenza per 100,000 population. Its weakest measures were: long stay nursing home residents with moderate to severe pain; long stay nursing home patients who had a fall with a major injury; patients on hemodialysis with low hemoglobin; people age 13 and over living with HIV who know their serostatus; and adults who received a blood cholesterol measurement in the last 5 years.

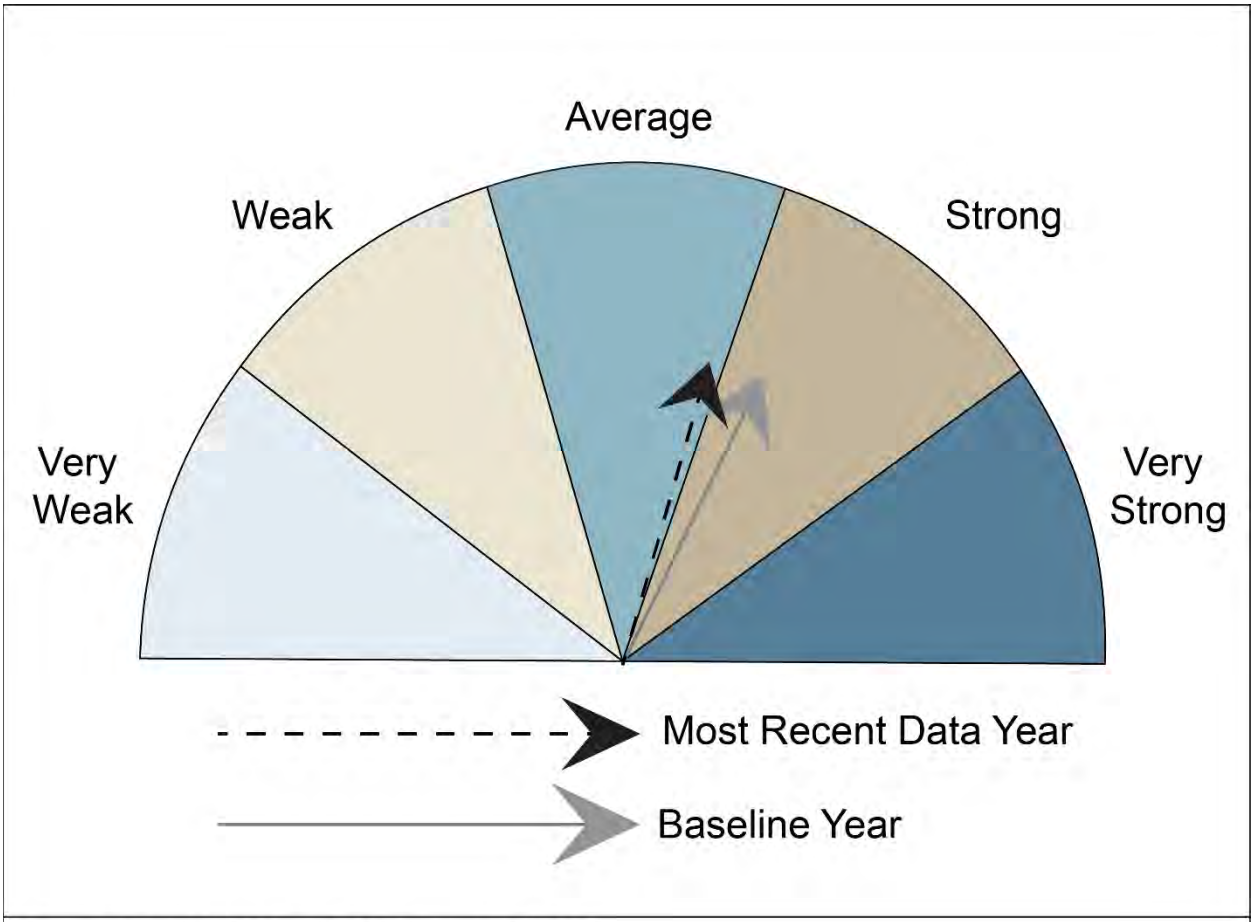

Figure 10.1. **AHQR quality measures, 2022.[7]**

Commonwealth Fund Assessment

The *Commonwealth Fund's* scorecard for 2020 showed North Dakota ranked 29 out of 51, which is a decline from its position of 22 in 2018.[9,10] 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 10.1 for 2018, 2020, and 2022. Based on the Commonwealth Fund assessment, North Dakota has experienced variance on nearly all measures except health care access which has improved slightly.

Since a metric like access is so pivotal in understanding health, we will review some findings. North Dakota has seen an improvement of the number of children with

health insurance, and also a reduction of individuals under age 65 having high out of pocket medical costs in relation to their household income.

The *Commonwealth Fund report* found that the most improved indicators for North Dakota were adults with inappropriate lower back imaging, children without all recommended vaccines, and potentially avoidable emergency department visits age 18-64. The report also identified indicators that had worsened such as children who did not receive needed mental health care, primary care spending as a share of total costs for ages 18-64, and preventable hospitalizations ages 18-64.

Table 10.1
North Dakota rankings associated with the Commonwealth Fund State Scorecard, 2022.[9,10]

Category	2018	2020	2022
Access	24th	23rd	23rd
Prevention and Treatment	23rd	20th	38th
Avoidable Hospital Use and Costs	9th	11th	16th
Equity	27th	11th	25th
Healthy Lives	26th	15th	32nd
COVID	-	-	41st

Commonwealth Fund SARS-CoV-2 Assessment

In 2022, The Commonwealth Fund added a new dimension to the state scorecard titled COVID-19, which was focused on SARS-CoV-2.[10] Data for this dimension were captured for the time frame of February 1, 2020 through March of 2022. Table 10.2 illustrates the indicators that contributed to this dimension. In terms of the Commonwealth Fund indicator scores, a state rank value of 26 or higher indicates that the state is ranked in the lower, or worse, half of a particular indicator. Overall, North Dakota's state rank for the SARS-CoV-2 dimension was 41. This lower ranking reflected that nearly all indicators were below the 50th percentile and only one indicator was above the 50th percentile. This indicator was days of high Intensive Care Unit (ICU) stress during the COVID-19 pandemic (ranked 16th). The remaining indicators in order of declining rank were excess deaths associated with COVID-19 per 100,000 population (28th), hospital admissions for confirmed COVID-19 cases per 100,000 population (30th), number of days until 70 percent of the state's population age 12 and older was fully vaccinated against COVID-19 (31st), adults age 18 and older who are fully vaccinated against COVID-19 and who have a booster dose (42nd), days of hospital staffing

shortages during the COVID-19 pandemic (46th), and deaths from COVID-19 among nursing home residents per 1,000 beds (47th).

One identified challenge in interpreting these results is one that can be seen across all data obtained during and as an ongoing effect of the SARS-CoV-2 pandemic. In the *Commonwealth Fund* comparison discussed here, North Dakota was found to have weathered the situation worse than most other states. What the data do not account for was the relative level of preparedness of any given state to respond to a pandemic *prior* to it happening. Previous chapters have discussed the unique challenges extant in North Dakota that are due to the geographic and population-based characteristics of the state. Moving forward, it will be of utmost importance to appropriately evaluate national and state level data with an ongoing level of scrutiny that serves to identify data findings that occurred *during* the pandemic as well as those that occurred *due* to the pandemic.

Table 10.2
Commonwealth Fund COVID-19 indicators for North Dakota, 2022.[10]

COVID-19 Indicators	State Rate	U.S. Average	Best State Rate	State Rank
Adults age 18 and older who are fully vaccinated against COVID-19 and who have a booster dose	29%	37%	55%	42nd
Number of days until 70% of the state's population age 12 and older was fully vaccinated against COVID-19	-	354	182	31st
Days in high ICU stress during the COVID-19 pandemic	32	112	0	16th
Days of hospital staffing shortages during the COVID-19 pandemic	333	50	0	46th
Hospital admissions for confirmed COVID-19 cases, per 100,000 population	1,538	1,443	564	30th
Excess deaths associated with COVID-19, per 100,000 population	336	345	110	28th
Deaths from COVID-19 among nursing home residents, per 1,000 beds	124	94	19	47th

Hospital Consumer Assessment of Healthcare Providers and Systems (HCAPS)

For full a discussion of this topic, please refer to the comprehensive discussion included in the *Sixth Report*. The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAPS) data is reliant on self-report data. As such, complete reporting during the pandemic was difficult for organizations to accomplish. This led to data lags and incompleteness that resulted in insufficient data for an in-depth analysis for this edition of the *Biennial Report*. Future editions will resume reporting on this important area.

Health Reform in North Dakota

For a discussion on this topic please refer to the comprehensive discussion included in the *Fifth Report*.

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CHAPTER ELEVEN: Healthcare Workforce Development

All six prior editions of the *Biennial Report* have considered healthcare workforce issues in considerable detail. The *Sixth Report* in 2021 reassessed the various options available to increase the in-state healthcare workforce: recruit from outside the state, increase the number of trainees, and retain more graduates for practice within North Dakota. It concluded that the best plan for the state's healthcare workforce development would be an approach that combined increasing both the number of graduates and the retention of practitioners. Those two concepts became two of the four important building blocks (along with reducing disease burden and improving the efficiency of our healthcare delivery system) of the Healthcare Workforce Initiative (HWI) that subsequently was proposed by the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) Advisory Council, endorsed by the North Dakota State Board of Higher Education, and approved and funded by the 62nd, 63rd, 64th, 65th, 66th, and 67th Legislative Assemblies. Almost all of the components of the HWI have been implemented by UND under the oversight of its Advisory Council. For example, medical and health sciences class sizes have been expanded to the desired and approved levels on schedule. However, the one outlier was that residency slot expansion (a residency is post-MD degree graduate medical training required of all physicians before they can get a full license to practice medicine) envisioned under the approved HWI plan had to be temporarily truncated owing to budget challenges during the 2019-21 biennium. HWI funding for an approved new family medicine residency program based in Fargo was not possible at that time, but fortunately Sanford Health generously agreed to provide the required financial support so that this residency program is now up and running (under the umbrella of UND programs). Sanford Health similarly agreed to fund an orthopedic surgery residency program also based in Fargo. The temporary slowing of adding new residency slots now has ended, as evidenced by the newly approved residency program in pediatrics that is slated to begin enrolling resident trainees in 2024.

One important aspect of any plan such as the HWI that relies on educational programs to balance the supply of healthcare professionals with the need for their services is that it necessarily requires a relatively long lead time to achieve its goal, since the training of additional physicians, for example, takes a minimum of seven (and often more) years from the time a student enters medical school until that doctor is ready to see patients in the community.

Since the HWI plan that has been implemented utilizes a variety of approaches both to increase retention and expand class sizes, it might be useful to review the rationale for those approaches and to reevaluate why recruitment of healthcare professionals from outside the state is believed to be an inferior option.

RECRUIT FROM OUTSIDE NORTH DAKOTA

One approach to meeting workforce needs is to recruit physicians and other healthcare professionals from training programs or employed positions outside of North Dakota. Indeed, this approach has always played a role in filling the state's workforce

complement, and it likely will continue to play an ongoing (albeit more limited) role even as the impact of the HWI becomes more apparent over time. Even if the current healthcare workforce supply were adequate, however, there would be an ongoing need to replace a portion of current healthcare providers resulting from normal and expected turnover in the workforce (from retirement, death, relocation, or change in job status), which for physicians typically is at least 5% per year. For North Dakota, this means that nearly 100 new physicians are needed annually—whether locally produced or recruited externally—just to *maintain* current physician workforce levels.

Recruitment may come from physicians located in other states or other countries. The recruitment of international medical graduates (IMGs) has been particularly important for filling a gap in rural primary care needs.[1] Currently, about 1 in 4 physicians practicing in North Dakota are IMGs (similar to the U.S. as a whole). Some but not all analyses have suggested that proportionally more IMGs than U.S. medical graduates (USMGs) practice in underserved settings. Recent studies have indicated that graduates in general are trending away from practice in rural underserved areas. A state comparison of the percentages of generalist IMGs and USMGs shows that North Dakota has significantly fewer IMG physicians in metropolitan areas, significantly more IMGs in micropolitan areas, and 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 expectation that it will be possible in the future to recruit additional IMGs to meet future needs likely will be difficult for several reasons. First, there is no reason to assume that the national trend for IMGs will be dissimilar to USMGs, whose career choices typically do not gravitate toward primary care and especially rural primary care practice (physicians who graduate from the UND SMHS, however, tend to buck the national trend; our graduates are much more likely to go into family medicine (92nd percentile), primary care (99th percentile), or practice in a rural area (98th percentile) than graduates of all other medical schools).[2]

Rules regarding J-1 visa waivers are in evolution and will have an effect (positive or negative) on the availability of IMGs. IMGs often come from developing nations, and there is a continuing debate over the effect of retaining IMGs for service in the United States rather than encouraging service to their own countries of origin.[1] The question has been posed whether it is proper and ethical to encourage a “brain drain” whereby the best and brightest physicians from developing countries come to the United States rather than remain home and help to provide for even more pressing medical needs there?

It is important to note that when North Dakota communities recruit for professional talent from outside the state, they compete on the world market. Intense competition for scarce human resources often requires that healthcare facilities offer premium compensation to attract workers, which in turn raises costs to North Dakota patients. This is particularly true in the most rural of our communities, where the work is demanding and professionals have access to fewer support mechanisms than they could find in larger communities. Cost considerations aside, in order to meet additional

future shortages through external recruitment, North Dakota would have to recruit more successfully against other competitors than it does at present.

There are additional factors that bear consideration. Anecdotal data suggest that the turnover rate of physicians recruited from out of state is about double that of locally produced physicians. Given the substantial expense of physician recruitment that has been estimated at $250,000 or more per physician, the need to recruit twice as often does and will add considerable financial pressure to the already constrained financial resources of hospitals operating on slim operating margins (especially the critical access hospitals in rural North Dakota). Additionally, it takes additional time for nonresident physicians to acculturate to the North Dakota experience, and the longer this process takes, the more likely there will be turnover of the position.

INCREASE THE NUMBER OF HEALTHCARE PROFESSIONALS TRAINED IN NORTH DAKOTA

A second strategy (one that is a benchmark of the HWI) is to grow our own physicians and other healthcare professionals by increasing the number of health professionals trained in the state. As noted above, this approach has a built-in time lag of a minimum of seven years for physicians to complete education and training, and a somewhat shorter time frame for other healthcare professionals.[3] However, the educational process itself does not necessarily guarantee a specific number or type of physicians or healthcare professionals to meet the healthcare needs of rural North Dakota communities, since a trainee's choice of career pathway ultimately is a matter of personal choice that can be influenced but not dictated.

What are the Needs of North Dakota?

To understand the need, it is important to 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 1,600 or 197 per 100,000 population. This compares with the U.S. average of 275. The current number of active patient-care physicians in North Dakota in primary care is 674 or 78 per 100,000 population, which is higher than the U.S. median of 77.[4] While these data suggest that North Dakota is doing reasonably well, the United States currently is experiencing an aging healthcare workforce with a geographic maldistribution that is not adequately meeting the current needs of many communities, especially rural. This is especially true for North Dakota. Rural communities have too small a population to support specialists, and they rely on primary care physicians and other providers to adequately and affordably meet healthcare needs. Nationally, one-third of all physicians are in primary care, while almost one-half of physicians in primary care (mostly family physicians) are in rural communities.[4] Family physicians provide the broadest care to all segments of the population and are essential to addressing the healthcare needs of North Dakota's

rural and remote communities. But rural communities have experienced a chronic shortage of primary care physicians for many decades.

The challenge for rural communities is to attract and retain healthcare professionals to areas where technology is less advanced, salaries may be less competitive, and geographic or other challenges exist (especially spousal ones). The current healthcare workforce is aging, and younger healthcare professionals typically seek more specialization and a better work–life balance. Healthcare delivery methods will continue to evolve in order to address the increasing demand for management of chronic diseases; care of the aging with increasing dementia; and the need to address significant population health issues such as obesity, physical inactivity, and cigarette smoking. And these issues are inter-related—successfully addressing population health issues likely will result in longer survival and thus a paradoxical *increase* in the number of people with chronic diseases. These complex and challenging realities require thoughtful strategies (such as the HWI) to ensure the right healthcare professionals with the right skills are available to keep our citizens and populations healthy.

National Recommendations for Increasing Health Professions Students

In June 2006, the Association of American Medical Colleges (AAMC) recommended a 30% increase in U.S. medical school enrollment and an expansion of graduate medical education (GME) positions to accommodate the growing demand for healthcare professionals.[5] The AAMC periodically has updated its workforce predictions and recommendations. Its analysis in 2017 found that the recommended 30% increase in medical school slots had been achieved in the prior decade or so, and as a consequence the AAMC initially moderated its projection of future physician workforce shortages. Nevertheless, the most recent AAMC report in 2021 increased its projected shortfall to between 38,800 and 125,100 physicians nationwide by 2034, with primary care practitioners and surgeons the specialties with the greatest predicted shortages.[6] Because GME (residency training) is a requirement for licensure in the United States, the AAMC and others have emphasized that simply increasing the number of graduating medical students without ensuring a commensurate growth in the number of residency training positions will not eventuate in more physicians; there will be a bottleneck at the residency level. However, the number of federally sponsored GME positions has been essentially frozen since 1997 by the Balanced Budget Act, and the growth of GME slots since then has been slow—less than half the rate of growth of medical student positions.

There had been considerable debate by experts regarding the AAMC recommendation for a 30% increase in the number of first-year medical school slots; in retrospect, the recommendation would appear to have been too conservative. An AAMC report on the complexities of projecting physician supply and demand from 2008 identified the following findings that supported the prediction of increasing demand.[3]

- Aging of the population will drive demand for healthcare services sharply upward.
- The growing U.S. population.
- Increased health coverage (including expanded insurance coverage as a consequence of the Affordable Care Act) that increased the demand for healthcare services.
- Increased clinical productivity (that is to say, more efficient healthcare delivery) is hard to accomplish because of the increasing complexity of care of current (and future) patients.
- Increasing the numbers and roles of physician assistants and nurse practitioners may help, but the full effect is difficult to predict.
- Effects of the healthcare workforce shortage will include longer wait times, increased travel distances, shorter visit times, expanded use of non-physicians, higher prices, and possible reduced access to the healthcare system.
- Shortages are expected to continue to be especially problematic in poor, rural, and urban communities.[7]
- A 30% increase in the number of matriculated medical students and a commensurate increase in GME positions (which seems unlikely for the foreseeable future) will only moderate but not eliminate the mismatch between the demand for and the supply of healthcare services.

These issues have been exacerbated by the negative impact of the pandemic on the general status of provider job satisfaction – there has been a noticeable increase in the sense of burnout and job dissatisfaction among providers, that may accelerate the selection of earlier retirement by an aging provider workforce.

North Dakota's Production of Medical Students

The UND SMHS is the only medical school in North Dakota. The number of students enrolled in medical school in the years 2019–2021 was 301 or 39.5 per 100,000 population. This ranks nationally as 4th out of the 50 states.[4] For the freshman medical student class of 2020, 83% of the seats (not including the seven seats committed to the federally funded Indians Into Medicine Program) were occupied by students from North Dakota or Minnesota (with ties to North Dakota). North Dakota had 175 residents in training (up from 136 in 2016-17), which ranked at 44th out of 50 states, but had 106 primary care residents, ranking 19th out of 50.[4] Compared with the national benchmark, it is evident that the UND SMHS is doing an excellent job of educating North Dakota students in medicine. Compared with other states, North Dakota has more capacity for training residents and, with the state-supported expansion of residency training slots through the HWI, will be graduating more North Dakota–trained physicians in the coming years.

The UND SMHS consistently has ranked in the top five schools in the country for the percentage of students choosing a family medicine residency program; in the past several years, it has ranked No. 1. In a recent study of medical schools that looked at social mission based on producing primary care physicians, physicians who serve Health Professional Shortage Area (HPSA) communities, and educating students from underrepresented minorities, the UND SMHS ranked in the top 20% of all U.S. schools.[8] The UND SMHS has done very well in producing primary care physicians (99th percentile) and educating students from underrepresented minorities. The diversity of its students is primarily a result of its nationally recognized Indians Into Medicine (INMED) Program that ranks first in the United States in graduating students from federally recognized tribes.

One result of the general countrywide decline in medical student interest in primary care residencies has been the increased number of international medical school graduates (IMGs) in these residency programs.[9,10] In North Dakota, the number and percentage of residents who are IMGs is 74 and 42.3%, which ranks 2nd 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.[4,7] As IMGs become settled in the United States, they tend to move away from their initial practice site. One longitudinal comparison of U.S. medical graduates with IMGs showed that almost 90% of U.S. graduates were practicing in urban settings in the United States.[9]

Factors Affecting the Selection of Primary Care and Rural Practice

Rural communities in North Dakota will continue to need high-quality physicians and, in particular, primary care physicians and other healthcare professionals who can provide primary care. There are many personal and experiential factors that affect an individual's decision to choose a specialty and to select a practice site. But the two enduring factors that best predict a student's residency (and eventual practice) choice have been found repeatedly to be the "fit" of the particular specialty with the interests of the student and the right work-life balance associated with that specialty choice.

A 2009 report[11] from the Robert Graham Center suggested that two things are clear regarding primary care: there is a problem with sufficient access to primary care physicians in rural and impoverished areas, and current practice configurations or organizations will have great difficulty absorbing all currently uninsured patients if universal access to healthcare insurance coverage were to be achieved. For these reasons and others, it is especially important to understand the factors that influence the decision of medical students and residents in their choice of where to practice, and North Dakota needs to consider providing further opportunities for support and encouragement in this decision.

What can be done to help ensure the right number of the right physicians? Studies have shown that medical students' choices of primary care or specialty careers beyond

the considerations of specialty “fit” and work-life balance are influenced by the following:[11–15]

- Student-related factors such as gender, race and ethnicity, socioeconomic status, rural or urban background, and attitudes and values.
- Exposure to required family medicine curriculum during the third or fourth year of medical school.
- Income differences between specialties.
- Institutional factors such as state funding, Title VII Health Professions
- Student Loan funding, and the strength of family medicine departments.

Each one of these items is important, but none are a direct or certain predictor of career choice. Awareness of the personal factors helps to identify the potential influences on choices and may help in addressing these factors through the recruitment and admissions process. Educational experience throughout medical education and residency can be designed to assure quality experiences in primary care and at rural sites.

One systematic review of the literature has shown that medical students with experience in a rural setting are more likely to choose a career in primary care and are three times more likely to practice in a rural community compared to the national average.[12] The most successful outcomes for addressing the rural physician shortage have been the employment of comprehensive medical school rural programs.[12] There are six U.S. programs that met the criteria (developed by the authors of a recent article) that included the primary purpose of increasing the supply of rural physicians. These criteria are having a defined cohort of students, having a focused admissions process, and having a specific rural curriculum or an extended full-time required rural clinical curriculum. These programs are similar to the UND SMHS Rural Opportunities in Medical Education (ROME) Program. All of these programs increased the supply of rural physicians with an average of 53% to 64% of their graduates in practice in rural communities. This compares with the national rate of 3% for recent medical school graduates planning on rural practice or the 9% of physicians currently practicing in rural communities.[13, 14]

In 2000, a national survey reported predictors of generalist physicians’ decisions to care for underserved populations (most rural areas are underserved), and identified four independent factors:[14]

- Identifying oneself as a member of an underserved ethnic or minority group.
- Growing up in a rural or inner-city area.
- Strong interest before medical school in practicing medicine in underserved areas.
- Participation in the National Health Service Corps.

Another survey confirmed the factors of coming from a rural background and being a member of an underrepresented minority, and also included the factor of older age.[15] Note that all of these factors are identifiable at the time of admission to medical school, and thus could be influenced by admission criteria. Recognizing this, the UND SMHS has an admission process that gives additional weight to rural origin, rural experience, and rural commitment as it considers student applicants to its medical school curriculum.

Why Does Primary Care Matter?

How important is it to have adequate numbers of primary care providers in our communities? Studies have shown that a greater supply of primary care physicians is associated with lower mortality from all causes, whereas a greater supply of specialty physicians is associated with higher mortality. States with higher ratios of primary care physicians to population had better health outcomes, including lower rates of death from heart disease, cancer or stroke; infant mortality; low birth weight; and self-reported poor health. This was even after controlling for sociodemographic measures that can be related to poorer health (such as age, education, income, and unemployment) and lifestyle factors (seat belt use, obesity, and smoking). This relationship of improved health with increased primary care also is demonstrated in international studies. In addition to health benefits, there are reductions in healthcare system costs and reductions in disparities across population subgroups.

What is it about primary care that results in these improved health outcomes? Six mechanisms are thought to account for the beneficial effect of primary care on population health:[16, 17]

- Greater access to needed services.
- Better quality of care.
- Greater focus on prevention.
- Early management of health problems.
- Cumulative effect of the main primary care delivery characteristics.
- Role of primary care in managing and avoiding unnecessary and potentially harmful care.

The U.S. 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 U.S. should move toward having 50% of active patient-care clinicians (physicians, nurse practitioners, and physician assistants) in primary care practice.[16] A comparison of health and healthcare systems in the U.S. and Canada demonstrates these differences. In the U.S., 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 U.S. Canada ranks significantly higher in most

measures of health outcomes than the U.S. and has fewer social disparities in healthcare and health outcomes. This has been attributed to specific healthcare system characteristics and the strong primary care infrastructure in Canada.[18]

Challenges to Addressing the Health Workforce Pathway and Need for the Health Professions

Seeking and encouraging applicants from rural communities to apply to healthcare professions schools is an important part of any plan to improve healthcare workforce needs,[19] as has been done at the UND SMHS. Some rural educational systems are not able to provide the strong science and math background necessary for success in medical school, and this challenge may increase as a result of recent economic challenges. Additional potential challenges for rural students include coming from a lower educational and socioeconomic status, having fewer role models in healthcare, experiencing less encouragement for attaining advanced degrees, less technology familiarity, and the need to travel to obtain a medical education. It is important to note, however, that studies have shown no significant academic performance differences between students from rural or urban backgrounds.

Increasing the Numbers of Health Professions Students and Residents

Recognizing the healthcare workforce needs in North Dakota and the nation, the UND SMHS, through the HWI, has increased the number of its healthcare professions students and residents by around 25%.

Ensuring an increase in the number of students interested in primary care and rural practice necessitated additional operational changes. These included continued support of the RuralMed Program, curricular changes in the early years to assure the development of competency in primary care, and additional rural community sites and rural physicians for clinical training. Geriatric, population health, and public health programs have been added at the UND SMHS and will be critical factors 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.

The increased number of resident training slots in North Dakota have been designed specifically to attract the interest of our own medical school graduates and to assure an effective workforce for North Dakota. Adding more students to our primary care programs with an option for further training in geriatrics, public health, management of chronic disease or mental health, and disease prevention and health promotion is a priority.

Conclusion

The decision to increase the number of healthcare professionals trained in North Dakota ("growing our own") to meet the current and future healthcare needs of the population is a critically important component of the HWI. There is a need for all physicians but particularly in the specialties of primary care and surgery. There is a corresponding need for other healthcare professionals to complement the work of physicians, and the numbers needed will require ongoing assessment. Successfully meeting those needs will result in improved population health status, help to control costs, and improve quality. While there is a significant time lag in "growing our own," the selection of students from rural North Dakota communities with a commitment to rural practice will increase the likelihood of successful rural and primary care recruitment. The UND SMHS is striving to meet current and anticipated workforce needs by partnering with North Dakota Area Health Education Centers (AHECs) and others to address the resources and opportunities required to increase the number of North Dakota students interested in and prepared for a healthcare professions education. There are a wide variety of programs and activities in place across North Dakota to encourage students to pursue healthcare careers, and even more are planned (see Appendix A).

INCREASING THE RETENTION OF HEALTHCARE PROFESSIONALS

Successful recruiting of students and residents into primary care and rural practice is one step in addressing the workforce needs of North Dakota. An equally important step is to improve the retention of healthcare professionals who graduate from a North Dakota program for rural practices and communities within the state.[19]

Factors Affecting Retention

The first, and necessary, step in addressing the healthcare needs of rural North Dakotans is to recruit and retain physicians and other healthcare professionals to practice primary care in rural communities. If they don't stay and practice in those communities, however, we will not be effectively meeting the needs of those communities. Factors that affect students' specialty selection also may affect retention:[20]

- Start-up grants or practice development subsidies.
- Tax credits for rural or underserved area practices.
- Providing substitute physicians (locum tenens support).
- Malpractice immunity for providing voluntary or free care.
- Payment bonuses or other incentives by Medicaid or other insurance carriers.
- Subsidies for the installation of effective electronic health records.

Very few studies have been done regarding retention of physicians in communities beyond the study of the effects on physicians of mandatory service for the National Health Service Corps or other obligations. In a recent study, it appears that recruitment and retention are distinct processes. Generally, the factors that influence recruitment are not directly related to retention. Physicians have reported over time that staying in practice in a rural community is affected by local poverty, social and professional isolation, a lack of amenities, and the hardship of rural practice—long hours, frequent on-call shifts, and lower income than in more urban settings.[20]

Approaches to Improving Retention

Using repeated surveys, a study by Pathman and colleagues[20] compared the retention of physicians in rural HPSA communities with rural non-HPSA communities and found no significant difference between the two. The conclusion of this study confirms other studies that found that the principal factor affecting rural physician shortages is that too few physicians are recruited there in the first place, and not that there are more problems retaining those successfully recruited. There were two characteristics of the physicians who remained in rural practice longer—owning their practice and being on-call fewer than two times a week. Even though recruitment may be the primary factor, these issues affecting retention are more modifiable than many of the issues affecting recruitment. Suggestions to improve retention include the following:

- Promoting practice ownership through low-interest loans and start-up guarantees.
- Offering leadership opportunities.
- Providing a greater voice in clinic policies and work schedules.
- Reducing on-call frequency by coordinating cross-coverage.
- Providing telephone triage systems.
- Providing full-time physician staffing in local emergency rooms.

The Need to Study and Evaluate the Effectiveness of Programs

There continues to be a need to study and to better understand the factors or approaches that positively affect retaining quality physicians in a community. An international report that included an extensive review of the literature has shown that while most studies on retention are done on physicians, there is little information on financial incentives and there is a lack of coherence between the strategy to retain physicians and the factors that matter to healthcare workers in choosing and remaining in a location.[21]

Another international study addressed whether compulsory programs such as the National Health Service Corps are effective in retaining providers in rural or remote areas.[22] The conclusion of the study was that no rigorous assessment has been done to

compare the outcomes between workforce disparities in countries with compulsory service to those without compulsory service. Conclusions, in addition to further evaluation, are that for success in any compulsory program, good planning and transparency of the rationale and requirements are important. Also, successful retention depends on the support of the healthcare system and the benefits to the healthcare worker: pay, housing, continuing education, and clinical backup or supervision.

Continuing Professional Development

Communities can help retain good physicians and healthcare professionals by being aware of the challenges and needs for their continuing education and development. Two unique aspects of rural medical practice are the scope of practice and the distance from major urban centers with specialist services. Rural practice includes clinic, house calls, nursing home care, hospital admissions and care, emergency room care, obstetric care, general surgery, and anesthesia. Rural physicians perform a wider range of procedures than providers in more urban settings, play an important role in the initial management of trauma, and have to provide care unique to location, such as wilderness or industrial areas, specific cultural groups, or agricultural medicine. The reality of rural practice attracts certain types of individuals interested in this breadth and variety. Continuing in this practice requires the confidence and skills that come from support and access to continuing professional development.[23] Learning new information or skills and spending time away with peers is essential to continuing a healthy and rewarding practice. One challenge is that rural physicians generally cannot leave their communities for continuing education or professional development. Medical schools can be helpful in retention of rural physicians by creating programs for education and training that provide content that is needed by rural physicians, methods that are accessible through outreach to the community or distance technology, or immersion retraining experiences. Communities can support their physicians by providing financial support for professional development, arranging for physician coverage, and arranging for interesting exchange opportunities between rural and urban physicians. The needs of rural physicians are unique and can only be met successfully if there is flexibility and variety to address different needs. An example of how the UND SMHS can help in this regard was its Rural Surgery Support Program, where the SMHS provided, on a temporary basis, a highly qualified general and trauma surgeon to local (typically rural) communities in need of such services for a limited time. The SMHS thus provided a local and internal locum tenens service to the communities of North Dakota.

Increased Retention of Graduates

It is known that medical students, especially those interested in primary care, have an increased likelihood of practicing in the vicinity of where they did their residency training. One approach to increasing the needed workforce is to attract students to and

retain individuals from our own residency programs. There are a variety of interventions that are likely to increase the retention of graduating physicians within the state. These include revising and refining the admissions process to select students most likely to remain within the state to practice and revising the curriculum to ensure optimal exposure to primary care experiences. It is important to provide robust longitudinal clinical experiences in rural communities (such as through the Minot Integrated Longitudinal Experience (MILE) at the SMHS). Reducing debt burden through the RuralMed 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, addresses one issue that may affect the decision to practice rural primary care—that of extensive debt load from medical school tuition. Role models are extremely important and influential in decision-making for our students and residents.

Conclusion

Research has shown that the principal factor in addressing a physician shortage challenge is successful recruitment.[20] To be successful in keeping a quality healthcare workforce, however, there are modifiable factors related to educational and work experience that will lead to better retention that should also be considered. Increasing the types and length of experience in rural communities during medical and other health career student 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 the UND SMHS hopes to increase those numbers. The UND SMHS will continue to advocate for funding for scholarships or loan repayment for students who commit to rural practice (such as the RuralMed Program). It will work in partnership with rural health systems and physicians to encourage and support mentoring. The UND SMHS will continue to inform and advocate for issues related to reimbursement and practice support in partnership with healthcare systems and local and state government that can help to further ameliorate the long-standing problem of adequate rural healthcare delivery.

ROLE OF ADVANCED PRACTICE PROVIDERS

Increased deployment and utilization of non-physician providers, especially physician assistants and nurse practitioners, is an important component in addressing North Dakota's healthcare workforce needs now and in the future. The training and use of such providers in North Dakota is explored in more detail in Chapters 7 and 8 of this *Biennial Report*. Precisely what role such advanced practice providers (APPs) fill, however, remains unclear. The hope and expectation is that APPs would complement physician providers by providing needed basic clinical services to patients who are otherwise underserved; thus, APPs are especially important in the most rural communities, where their increased deployment would ameliorate some level of physician shortage. It is hoped that an APP might, in effect, be a substitute for a

physician. And while APPs do provide such a service especially in rural areas of North Dakota, it is not clear what fraction of APPs function in this role. From a national perspective, many APPs are providing other non-primary care services to patients; many APPs, for example, work in subspecialty areas.[24] While these services may well be needed and important, they do not necessarily alleviate the problem of physician shortages in rural areas. Thus, APPs are not the sole answer to the problem of healthcare provider shortages in rural regions of North Dakota, but they are a component of the solution. To what extent they will be an even more effective positive force in the future remains to be seen.

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CHAPTER TWELVE: Conclusion

Using updated employment and demographic datasets and incorporating the results of several recent comprehensive statewide cross-sectional healthcare workforce studies, this *Seventh Biennial Report: Health Issues for the State of North Dakota 2023* concludes with a similar takeaway bottom line message as the *First, Second*, *Third*, *Fourth, Fifth, and Sixth Biennial Reports* did—that continued implementation of the Healthcare Workforce Initiative (HWI) is having and increasingly will have a significant positive effect on helping to narrow the gap between the demand for and the supply of finite healthcare resources. Furthermore, absent full implementation of the HWI, North Dakota likely will face a major gap between the societal demands for healthcare and the capacity of the healthcare system to deliver that care.

Chapter 2 provides a new overview of social determinants of health. This topic has been addressed in previous reports; however, there is increased awareness and appreciation that social determinants are key factors in health outcomes in the state (and elsewhere) and focusing on them also serves to highlight areas that have disparities or need additional focus. Social determinants of health, while not a new topic, provide additional insight as to how North Dakota might best address health care for the entire population of the state and prioritize efforts to serve as many people as possible.

As Chapter 3 demonstrates, the general level of health in North Dakota is reasonably good, and for eight of 10 general health measures (including metrics like cholesterol level and the frequency of high blood pressure, diabetes, and colon cancer screening), North Dakota fares better than the rest of the country on average. In previous reports it has been noted that North Dakota's age-adjusted mortality rates have exceeded the national average. That trend narrowed and then reversed; however, it is more the result of increasing national mortality rates than decreasing state-level deaths with both North Dakota and the nation experiencing excess deaths due to the pandemic.

As was found in the six previous *Biennial Reports* that were released in 2011, 2013, 2015, 2017, 2019, and 2021, rural depopulation, out-migration of the young from the state, an increasingly older adult population, low population density in some regions, and recent localized population growth in the major cities and in the Oil Patch are exacerbating the imbalance between a rising demand for healthcare and the available supply of providers. The imbalance between supply and need for healthcare resources is both quantitative (to a relatively minor degree) and distributional (to a major degree), in that while North Dakota is short of specific providers, the healthcare providers we have are distributed disproportionately in the metropolitan areas in excess of what population demands would otherwise require. Some of the apparent maldistribution is entirely appropriate, since it is desirable to have specialists regionalized in more urban areas to maximize the efficient delivery of healthcare services.

However, since even family physicians—the bulwark providers of care in rural areas—are disproportionately found in metropolitan areas, it is clear that major challenges remain in recruiting and retaining needed providers in more remote areas. Importantly, family physicians constitute the physician group whose geographic

distribution is the most optimal compared with all other physician provider groups. A similar pattern of more providers relative to the population in urban compared with rural regions is found for non-physicians 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. Part of the solution to the maldistribution problem is a larger role for telehealth, as was demonstrated during the recent pandemic. Through the use of telehealth approaches, the practitioner can be brought to the patient – wherever the patient is located – rather than the other way around, as has been the traditional approach.

The *First Biennial Report* concluded that North Dakota had a paradox regarding its healthcare workforce, which it characterized as shortages in the midst of plenty. The size of the physician workforce in North Dakota in 2011 was found to be at or better than national norms for many specialties (although for the overall physician workforce North Dakota lagged the rest of the country on average), but with maldistribution of providers resulting in shortages especially in micropolitan and rural areas. As was emphasized in subsequent *Biennial Reports* and confirmed in the current *Seventh Biennial Report*, North Dakota may have slipped as to the size of its physician workforce relative to the population, and it continues to lag the rest of the United States in the number of physicians relative to its population.

As found in the six prior *Biennial Reports*, the current shortage of physicians is only going to increase as the population grows and ages in the future if there is not continued implementation of the HWI. And the shortage of workers in the healthcare field over the next 15 years will not be limited to physicians. An entire cadre of additional healthcare providers - from nurses to physician assistants to occupational and physical therapists to medical laboratory specialists and others - will be needed to ensure that effective, efficient, and appropriate healthcare is available to all North Dakotans, as is envisioned in the HWI.

The population projection model used in the *First Biennial Report* was predicated on an assumption of modest population growth based on forward trending of historical patterns, and a major influence from the aging of our current population. In our *First Biennial Report*, we underweighted (relative to national projections) the effect of population growth, since we assumed (as others did at the time) that the stable-growth model would continue to apply in the future. As discussed in detail in Chapter 1 of the *First Biennial Report*, the stable-growth model that we utilized predicted a population increase to only 796,000 people by 2040, which is a slower growth rate than the country as a whole (note that the population of North Dakota was estimated to be about 755,000 people in 2017, which would imply a growth rate of only 0.2% per year over the 25 years from 2015 to 2040). The workforce projections that we utilized in the initial report were based on that stable (and slow) growth model. Any significant population growth in excess of that previously projected obviously would necessitate an even larger growth in the health workforce than previously anticipated.

We were intentionally conservative in estimating physician needs in our *First Biennial Report*—in retrospect, probably too conservative. We adapted and applied national workforce predictions to North Dakota, but intentionally adjusted the calculations downward so as to not overestimate healthcare workforce needs. The national workforce modeling calculations anticipate that future workforce needs are driven primarily by population growth (about two-thirds of the effect in the model) and less so by the aging of the population (about one-third of the effect). Since North Dakota has a disproportionately large older adult population (more than the national average), we over-weighted the effect of aging in our modeling of healthcare workforce needs for the state at the same time that we underweighted the effect of population growth. Thus, we used a model that applied national estimates to the North Dakota population, and then we reduced the predicted shortage by 50% to account for lower anticipated population growth. The *First Biennial Report* estimated that the physician shortage by 2025 would be 210 physicians—50 short as of the 2011 baseline, and 160 more needed by 2025, for a total shortage of at least 210 by 2025.

Utilizing updated census data and population growth modeling, the *Second Biennial Report* found that the shortage in 2013 likely had grown to between 100 and 200 physicians (not to mention other healthcare workers). Thus, using our old estimates of future population growth, the revised estimate provided in the *Second Biennial Report* was that 260 to 360 more physicians will be needed by 2025 (i.e., 100 to 200 needed immediately plus 160 needed by 2025).

The *Third Biennial Report*, issued in the midst of the oil boom, concluded that 500 additional physicians likely was a conservative estimate of the number of additional physicians needed in North Dakota by 2025 if the population continued to grow as rapidly as it did at the peak of the boom. The number did not include the need for replacement of physicians who retire, leave the state, or cease practicing medicine for other reasons. As discussed in Chapter 5 of this current *Report*, the age at which North Dakota's physicians retire will have a significant effect on future healthcare workforce size and the extent of the physician shortage. It is perhaps the most important factor impacting future physician supply, since more than 40% of the US physician workforce is aged 55 years and older. Delaying or accelerating retirement age by only two years, for example, can have almost a 10% effect on future workforce size. Taking these factors into consideration, it is likely that the prior estimate of roughly 500 additional physicians needed by 2025 still is correct, even factoring in slower ongoing population growth.

All six prior *Biennial Reports* concluded with a strong endorsement of the HWI, the multifaceted plan to address the healthcare needs of North Dakota, and emphasized necessary steps to reduce disease burden, increase the healthcare workforce through enhanced retention of graduates as well as expansion of class sizes, and achieve a better-functioning healthcare delivery system through more cooperation and coordination. In view of the realization that the state's workforce needs likely are even larger than previously estimated, those recommendations are reinforced in this *Seventh Biennial Report* with added emphasis on the imperative to continue with full implementation of the Healthcare Workforce Initiative. It is important that the three major

stakeholder groups involved in the HWI—the North Dakota Legislature that provides the funding; the UND SMHS that does the training and provides the programmatic support for the HWI; and the healthcare enterprise and local communities throughout the state that provide essential partnerships that are vital to the success of the HWI—continue to work together in the cohesive and effective manner they have in the past to ensure the continuing success of the HWI.

A second major conclusion of this *Seventh 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) are needed to address a variety of intertwined mental and behavioral health issues that are present throughout the state but are especially challenging in the more rural regions.

A final recommendation is for full implementation of the recently completed *Strategic Plan for Health* and its ambitious goal for North Dakota to become the healthiest state in the nation. The three important initial steps for beginning this quest will be to raise awareness of the health implications of policy and legislative decisions, expand statewide public health expertise and leadership capacity, and enhance cross-sector collaboration and integration of the numerous entities involved in the healthcare enterprise within (and outside) the state.

CHAPTER THIRTEEN: Recommendations: Healthcare Planning for North Dakota

The proactive approach taken by the last six North Dakota Legislative Assemblies to address the current and especially the anticipated future healthcare workforce and healthcare delivery challenges facing the state already is having a positive effect that should grow as the Healthcare Workforce Initiative (HWI) becomes even more impactful 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 (the University of North Dakota [UND] and North Dakota State University [NDSU]), and expansion of the RuralMed Program (which encourages physician graduates to set up their practices in rural areas of North Dakota). Phase II of the HWI began in 2013, following the 63rd Legislative Assembly and provided support for additional expansion of the class and residency cohort along with continued support for the multiple other provisions of the HWI. Implementation of the HWI was continued with support from the 64th through 67th Legislative Assemblies.

Implementation of the HWI also required the construction of a new facility for medical and health sciences education that would accommodate the increased class sizes and permit consolidation of previously scattered UND health sciences programs into one building, thus facilitating interprofessional education. Construction of the new facility was completed on time and on budget in 2016, and the move into the new building occurred during the spring and summer of 2016, just in time to welcome the medical student Class of 2020 as well as the health sciences students starting their classes later that fall.

The Healthcare Workforce Initiative is designed to help meet North Dakota's healthcare delivery issues by utilizing four foundational approaches:

- Reduce disease burden, thus lowering the demand for healthcare services and related costs.
- Retain more physician and other healthcare provider graduates for clinical practice within the state.
- Train more physicians and other healthcare providers by increasing the medical, health sciences, and resident class sizes.
- Improve the efficiency of the healthcare delivery system in North Dakota principally through the training of healthcare providers who are proficient in team-based, interprofessional healthcare delivery methods.

This combination of reducing demand and increasing supply of various healthcare resources, along with necessary improvements in the healthcare delivery system, should bring the healthcare demand and supply equation into significantly better balance in North Dakota over the next 10 to 15 years.

REDUCE DISEASE BURDEN

It is axiomatic to say that the best way to treat disease is to prevent it in the first place. Although simple in concept, disease prevention has proven to be much more difficult to achieve in practice. Nevertheless, the HWI incorporates several concrete steps to encourage and highlight disease prevention and reduction. The HWI includes these strategies to reduce chronic and acute disease, all of which have been implemented:

- A Department of Population Health at the UND School of Medicine and Health Sciences has been inaugurated under the leadership of Dr. Gary Schwartz, chair of the department. The department's focus is on developing programs that positively influence the health-related behaviors of North Dakotans.
- The Master of Public Health Programs at UND and NDSU continue to grow. The program at UND has been strengthened further by the initiation of a first-in-the-nation Ph.D. track in Indigenous Health.
- A variety of additional residency training programs at the UND SMHS have been implemented beyond the initial five that were already in place, including neurology, orthopedic surgery, hematology-oncology, pediatrics, and geriatrics. The geriatrics program consists of a special advanced clinical training residency program in geriatric medicine for physicians who have recently completed a family medicine or internal medicine residency (i.e., a one-year residency in geriatrics following the completion of the standard three-year family medicine or internal medicine residency).

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 they make about eating, smoking, physical inactivity, and other considerations.[2] In fact, these health-related behaviors account for nearly 40% of all deaths in the United States.[2] As an example, chronic diseases such as heart disease, type 2 diabetes, and cancer are among the most common and costly health problems. However, they are also among the most preventable because they share - as common contributing causes - undesirable health-related behaviors. One of the best ways to "cure" these widespread diseases is to improve health literacy and the choices people make that affect their health. The potential effect of prevention is substantial. The U.S. Centers for Disease Control and Prevention estimates that if tobacco use, poor diet, and physical inactivity were eliminated in the United States, it would prevent 80% of heart disease and stroke, 80% of type 2 diabetes, and 40% of cancer.[3]

In North Dakota, there is good evidence that health-related behaviors can be improved 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 21.1% in 2007 to 12.6% in 2017.[4] Successful improvement of health-related behaviors can avoid not only an enormous toll of suffering and death from disease but also can be accomplished at far less expense than treating the resulting diseases.[1] Based on the foregoing factors, the new Department of Population Health and the Master of Public Health Programs and their respective faculty members at UND and NDSU are focusing on public education and other efforts to positively affect the health-related behaviors of North Dakotans.

Master of Public Health Programs

One of the most practical approaches to improving health education and other public health initiatives in the state is to prepare its health professionals to undertake these roles as they enter practice. Specifically, having individuals with graduate training in public health (Master of Public Health degree) can augment capacity and reduce disease burden. UND and NDSU have partnered to create two collaborative graduate-level programs in public health that truly are cooperative. Since the programs began accepting students in 2012, they have grown and matured. The first graduates of the programs are now beginning to have a positive effect on the health of the public.

RETAIN MORE GRADUATES

As outlined previously in this *Biennial Report*, there are a variety of interventions (many of which are accepted best practices based on national consensus) that the UND SMHS has implemented that are likely to increase the retention of graduating physicians for eventual clinical practice within the state. These include the following:

- A revised and refined medical school admission process designed to select students most likely to remain within the state to practice.
- A revised curriculum to ensure optimal exposure to primary care experiences and to provide increased longitudinal clinical experiences in rural communities, actions that are associated with an increased retention rate.
- Reduced debt burden through the RuralMed Scholarship Program, where the four-year tuition costs of medical school are defrayed if the physician agrees to practice in a rural area of North Dakota for five years. This effort has been augmented by a focused approach to garnering more philanthropic support for student scholarships.
- Partnerships with physicians and healthcare systems to optimize and enhance mentoring and affinity relationships.

TRAIN MORE PHYSICIANS AND HEALTHCARE PROVIDERS

Increasing retention efforts is a necessary but not sufficient approach to meeting the state's healthcare workforce shortage. Accordingly, an essential component of meeting the healthcare workforce needs of North Dakota is to expand class sizes or, to use the colloquial expression, "widen the pathway." In response to a charge from the Association of American Medical Colleges, total medical school class size across the United States has been increased by more than a third. The UND SMHS now has successfully increased medical class size by almost that same magnitude as a consequence of the HWI, and this should help ensure an adequate physician workforce in the future for North Dakota when coupled with the other efforts already underway and planned.

But simply increasing the medical student class size will be insufficient to meet the needs of North Dakota unless additional residency slots are available in the state for postgraduate training. The optimal retention of physicians occurs when the students go to school and enter residency within the same state; in those cases, about 2 out of 3 students remain in-state. Simply increasing class size will result in only about 1 out of 3 physicians remaining in-state for ultimate practice. Accordingly, the HWI as originally proposed incorporates a total of 17 new residency slots per year (total of 51 slots overall), but this number has been augmented over the years, partly as a consequence of additional financial support provided by a major regional healthcare provider organization.

Available slots have been committed to the following residencies or fellowships: family medicine, geriatrics, hospitalist, psychiatry, orthopedic surgery, neurology, hematology-oncology, pediatrics, and general surgery. Many of these offer training specific to rural practice.

The healthcare workforce shortage is not limited to physicians, however. Accordingly, the HWI also has allowed an expansion of 30 students per year (total of 90, or an increase of about 15%) for health sciences students trained by the UND SMHS.

IMPROVE THE EFFICIENCY OF THE HEALTHCARE DELIVERY SYSTEM

There are numerous health system initiatives already underway locally, regionally, and nationally—and many others proposed—that strive to improve the efficiency of our healthcare delivery system, with a goal of providing better care at lower cost in a more patient-friendly manner. Additionally, especially given the unique and difficult challenges of depopulation and low population density in rural North Dakota, alternative healthcare delivery models, including enhanced use of non-physician providers, telemedicine and other virtual care delivery methods, home care, and medical homes, need to be explored and expanded.

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 UND SMHS's curriculum (along with the specially designed space in the new facility) has been redesigned to encourage and permit broadened interprofessional education. In support of interprofessional education, the new building has eight learning communities that provide the physical spaces where students from a variety of professions learn together.

RECOMMENDATIONS FOR MEETING NORTH DAKOTA'S HEALTHCARE WORKFORCE NEEDS

Ongoing (and full) funding for the HWI by the 68th Legislative Assembly and others to follow is absolutely essential. North Dakota is one of the few states in the nation that has taken a forward-looking and proactive approach to healthcare needs through the HWI, and it is poised to reap the benefits of this approach in the next decade and beyond. Results so far have been quite positive; there are young physicians who are recent graduates of the UND SMHS, its residency programs or both who are or will be moving to Hettinger, Devils Lake, and Williston among other communities that have labored for years heretofore to attract physicians. In addition to continuing to endorse and support the full implementation of the HWI, there are a variety of other approaches that policymakers might consider during the 68th Legislative Assembly:

- North Dakota state income tax credit for healthcare practitioners who volunteer to teach healthcare students.
- Creation of a RuralMed-like (or other financial incentive) program to encourage rural practice for other needed non-physician providers (e.g., addiction counselors, medical laboratory technicians, and nursing assistants).
- Support for expanded mental and behavioral healthcare.

STRATEGIC PLAN FOR HEALTH[5]

No one could have predicted the impact COVID-19 has had on the world, our nation, and on the state of North Dakota. Even before the pandemic, there were signs that many North Dakotans were not experiencing life to the fullest because of health-related issues. Among some communities and groups, disparities in health and wellbeing have been growing. Poverty, unstable housing, food insecurity, interpersonal violence, substance addiction, and lack of access to physical and mental healthcare affect too many North Dakotans, making it hard, if not impossible for them to live their best lives.

Given the unprecedented circumstances of COVID-19, Governor Burgum recognized the opportunity to revitalize and transform the state's public health infrastructure to be more responsive and supportive of North Dakotans' overall health and wellbeing. He appointed a State Chief Health Strategist, Dr. Joshua Wynne, University of North Dakota Vice President for Health Affairs and Dean, School of Medicine and Health Sciences, to lead the state in developing a strategic plan with the goal of North Dakota becoming the healthiest state in the nation.

In May 2020, Dr. Wynne established the Health Strategies Planning Group (HSPG), a team of public health experts, and charged them with identifying ways to achieve Governor Burgum's bold goal. The HSPG embraced the opportunity to develop innovative approaches to building policies, systems, and infrastructure needed to support a more robust response to public health crises and transform North Dakota into the healthiest state in the nation.

North Dakota has a historic opportunity to develop a more comprehensive, collaborative and strategic approach to public health. Now is the time to optimize our capacity to execute both day-to-day activities and establish a stronger strategic direction which will harness the creative, spirited energy of our state to accomplish more than just doing things better – it is time to do better things.

The Strategic Plan proposed a population health approach that identifies and understands how individual and community health is impacted by programs and policies across all sectors. This plan presents a path forward to achieve our goal for North Dakota residents to be the healthiest in the nation. Working together across public, private, non-profit, and tribal sectors, and from individual effort to statewide initiatives, the Plan will succeed. The Strategic Plan was completed and presented to Gov. Burgum in 2021, and it has been internalized in the planning process for the newly centralized (2022) Department of Health and Human Services in the Executive Branch of state government.

In becoming the healthiest state in the nation, health and wellbeing will improve for all North Dakotans. It means everyone has the opportunity to live as long in a manner that allows them to live their best lives. Some groups in North Dakota generally do very well and do not have issues with basic needs such as housing instability, food insecurity, interpersonal violence, or poor physical and/or mental health. However, there are populations in North Dakota that experience disproportionate disparities of health and wellbeing. Becoming the healthiest state in the nation requires North Dakota to focus on reducing disparities and establishing policies and structures that equitably support the health and well-being of all North Dakotans.

Listed below are key concepts that are important conceptual components of the Strategic Plan:

Population Health

Population Health is a conceptual framework for assessing the health outcomes of a group of individuals and the distribution of such outcomes within the group. It also

incorporates policy development, research agenda, and resource allocation that flow from these assessments. Population health is measured by health status indicators and influenced by social, economic, and physical environments; personal health practices; individual capacity and coping skills; human biology; early childhood development; and health services. Healthcare systems, public health, and social policy all impact population health.

Health Equity

Health Equity provides a fair and just opportunity for every individual to be as healthy as possible. Obstacles to health such as poverty, discrimination, and their consequences, including lack of quality education and housing, safe environments, and health care are removed.

Health in All Policies

Health in All Policies (HiAP) is a collaborative approach that integrates and articulates health considerations into policymaking across sectors to improve the health of all communities and people. HiAP recognizes that health is created by a multitude of factors beyond healthcare and traditional public health activities.

Public Health

Public Health is the combination of all evidence-based public and private efforts that preserve and promote health and prevent disease, disability and death at the population level.

Social Determinants of Health

Social Determinants of Health (SDoH) are the conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks (e.g., housing, community safety, educational attainment, food security).

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 is having a significant positive effect on the healthcare delivery challenges faced by the state. The HWI is only part of the solution, but it is a crucial element since it primarily addresses the educational foundation upon which the entire healthcare delivery system is based. Coupled with synergistic approaches by insurers, healthcare delivery institutions, other educational

organizations, and policymakers, it will form part of the foundation of a revised and improved healthcare delivery system in the state.

Deliverables

Continued full implementation of the HWI, the Strategic Plan for Health, and the other healthcare educational programs of the UND SMHS will help achieve a variety of goals that should be considered the deliverables to be received in exchange for funding of the HWI. The most important deliverable will be an adequate supply and distribution throughout North Dakota of caring, team-oriented primary and subspecialty-care practitioners schooled in interprofessional care. About half of the needed practitioners will result from a variety of increased retention efforts, and the other half will come from the expansion of class sizes and additional residency slots. Inherent in the plan is the anticipation that it will address the twin challenges of provider availability in North Dakota—an adequate supply of providers, as well as an appropriate distribution of those providers throughout all three population areas of the state (metropolitan, micropolitan, (large rural), and rural).

In addition to the obvious and necessary improvement in healthcare delivery throughout North Dakota, the increased number of healthcare providers will have a direct positive effect on the economic environment in the state as a result both of their increased employment and the "halo" effect that has been reported to generate $1 million or more annually as a consequence of each additional physician practitioner employed.

It is anticipated that the UND SMHS will continue to generate at least $2 of additional revenue for every $1 appropriated by the Legislative Assembly. The additional revenue currently is composed of $0.60 as a result of tuition, $0.77 in grants and contracts (most often federal funds), $0.70 in ancillary income such as from physician practice plans and contributions from the federal government to fund certain residency training costs, and $0.16 from the mill levy. Currently, the UND SMHS generates over $140 million biennially in additional revenue to that provided by the State of North Dakota. The total direct economic impact of the UND SMHS over the next three biennia should approach three-quarters of a billion dollars.

Because much of the budget of the HWI is being allocated to cover clinical training in the community, a substantial portion of the appropriated and ancillary funds are being expended in areas other than Grand Forks County. A final positive direct impact of the HWI (specifically because of the new building in Grand Forks) will be an additional facility and administration (F&A) indirect cost return associated with federal and other research grants. Current estimates suggest that UND will garner almost $1 million per year in additional revenue simply as a result of the construction of the new building that incorporates research space. This is because the F&A rate that any university receives is the result of a calculation by the federal government as to the indirect costs associated with its sponsorship of research at that institution. Much of the SMHS's former research space was constructed on the basis of earmarks and other

federal dollars, which renders the space exempt from the calculation of F&A. With the construction of additional research space using nonfederal dollars (as was done in the new building), the F&A rate will increase, thus generating additional income for UND for as long as part of the building is used for research. Thus, given an expected building life of 50 years, the increased F&A rate alone should generate an additional $50 million (assuming consistent research grant productivity).

Given the track record to date of the HWI and the predicted long-term positive impact on healthcare delivery in the state, it is essential that the UND School of Medicine and Health Sciences receives ongoing and continued support and funding from the North Dakota Legislature. For the 68th Legislative Assembly, the highest imperative is to continue full and stable funding of the HWI as well as for the UND SMHS as a whole.

Beyond the activities and programs of the UND SMHS, there are a variety of other initiatives that have been outlined in the *Strategic Plan for Health*[5] that, taken together, can propel North Dakota toward the goal of becoming the healthiest state in the nation. To accomplish this lofty goal ("deliverable"), a variety of pathway steps are needed:

- The availability of timely information and assessments of needs, impacts, and desired outcomes so that policymakers can make informed decisions to promote policies, programs, and services that optimize health for individuals and communities.
- A healthcare (and especially a public health) workforce that has the knowledge, skills, and training to meet current and future challenges.
- A transformation in the delivery of health and social services across all healthcare and related sectors to improve health outcomes, increase integration, and reduce costs.

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Appendix A

Healthcare Workforce Pathway Activities – Affiliated with the University of North Dakota (UND) School of Medicine and Health Sciences (SMHS) and the UND SMHS Center for Rural Health (CRH) regarding K-16 activities

- **Activity:** Health Insurance Portability and Accountability Act (HIPAA) Training (online). **Description:** Training on privacy and security of protected health information available at no cost, which is required for job shadowing in healthcare facilities. **Target Audience:** Middle school & High school students. **Partner(s):** CRH. **Total Participants:** 4,412. **Communities Reached:** Statewide. **Lead SMHS Program/Funding Source:** State Appropriated Workforce, CRH State Office of Rural Health (SORH) Grant (federal: HRSA, FORHP).

- **Activity:** HOSA - Future Health Professionals. **Description:** A student organization that promotes career opportunities in the healthcare industry. **Target Audience:** Middle school & High school students. **Partner(s):** Sanford Health Foundation, UND School of Medicine and Health Sciences and Center for Rural Health, Mayville State University, ND Career & Technical Education, Altru Health System, Bison Electric, ND Dental Foundation, Rasmussen University, Williston State, BCBS of ND, Bank of ND, Grand Forks Visitors Bureau, Devils Lake Tourism, Lake Region State College, UPS. **Total Participants:** 556 members and 20 chapters (5 new). **Communities Reached:** Beulah-Hazen (Beulah-Hazen High Schools) Bismarck (Bismarck High School, Central Region Area Career & Technology Center, Century High School, Legacy High School); Fargo (Fargo North High School, Fargo South High School, West Fargo High School, Sheyenne High School); Grafton (North Valley Career & Technology Center); Grand Forks (Grand Forks Central High School, Red River High School); Horace (Horace High School); Killdeer (Killdeer Public School); Mandan (Mandan High School); Minot (Minot Public Schools); Northwood (Northwood Public School); Oakes (Southeast Region Career and Technology Center); Petersburg (Dakota Prairie High School); Thompson (Thompson High School. **Lead Funding Source:** State: ND AHEC, ND Department of Commerce, Sanford Health, ND Rural Health Association, US Army, CRH SORH (Federal: HRSA, FORHP), State Appropriated Workforce, and UND SMHS; Federal: HRSA & ORHP.

- **Activity:** In-A-Box and other educational materials loan programs. **Description:** In-A-Box Program includes health and science activities. In addition, the CRH has a number of resources available to schools, youth organizations, health facilities, education cooperatives, etc. **Target Audience:** Grades K–12. **Partner(s):** CRH. **Total Participants:** Numbers not available. **Communities Reached:** Statewide. **Lead SMHS Program/Funding Source:** State Appropriated Workforce, CRH SORH (federal: HRSA, FORHP).

- **Activity:** Indians Into Medicine (INMED) Programs. **Description:** A comprehensive program designed to assist American Indian students who aspire to be health professionals to meet the needs of tribal communities. **Target Audience:** **Indigenous and American** 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 to prepare for Medical School and other Professional/Graduate degree programs. **Partner(s):** Tribal communities and other national education organizations. **Total Participants:** As of spring 2022, the program has graduated 271 medical doctors. The program has also graduated over 350 students in nursing, clinical psychology, and other health sciences. A total of 50 students in grades 7-12 attend the Summer Institute each year. Native Educators University Research Opportunity (NEURO) This comprehensive professional development program (K-12 teachers) aims to build on and improve teachers' understanding of the scientific process and support them in their science pedagogy in an effort to provide learning environments for American Indian students that foster scientific inquiry and promote the attainment of careers in healthcare - 17 teachers in 2019-2022. **Communities Reached:** Tribal communities across the US, focusing on the northern plains; primary, secondary, and collegiate level academic institutions (including tribal colleges in and around the 5-state priority area). **Lead SMHS Program/Funding Source:** Indian Health Service (IHS) grant, National Institutes of Health grant, (federal) from the IDeA (Institutional Development Award) Network for Biomedical Research Excellence (INBRE) Program of the National Center for Research Resources; and (state) SMHS.

- **Activity:** Rural Collaborative Opportunities for Occupational Learning in Health (R-COOL-Health) Scrubs Camps. **Description:** 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. **Target Audience:** Grades 5–12. **Partner(s):** Schools, health facilities, and job development authorities statewide. **Total Participants:** 104 camps to date hosted a total of 7,866 students; 2009/2010: 14 camps funded, 1,016 students from 61 communities; 2010/2011: Nine camps funded, 441 students from 36 communities; 2011/2012: Nine camps funded, 407 students from 56 communities; 2012/2013: Nine camps funded, 682 students from 57 communities; 2013/2014: Nine camps funded, 653 students from 56 communities; 2014/2015: Eight camps funded, 699 students from 56 communities; 2015/2016: 9 camps funded, 830 students from 57 communities; 2016/2017: 10 camps funded, 891 students from 70 communities; 2017/2018: 10 camps funded, 931 students from 57 communities; 2018/2019: 9 camps funded, 953 students from 64 communities; 2019/2020: 8 camps funded (additional 8 were offered funding but had to cancel because of COVID-19), 381 students from 28 communities; 2020/2021: 7 camps funded (additional 8 camps were funded but canceled due to COVID-19), 1,226 students from 86 communities; 2021/2022: 9 camps funded (additional 1 canceled because of COVID-19), 1,048 students from 121 communities.

Communities Reached: Adams, Alexander, Ambrose, Aneta, Argusville, Ashley, Aurthur, Armenia, Battleview, Beulah, Bisbee, Blaisdell, Blanchard, Bottineau, Bowdon, Bowman, Burke, Buxton, Cando, Carson, Carrington, Cavalier, Center, Clifford, Colfax, Columbus, Crosby, Crystal, Dahlen, Dakota Prairie, Dawson, Devils Lake, District 8, Donnybrook, Drayton, Dunseith, Edinburg, Edmore, Egeland, Elgin, Ellendale, Erie, Esmond, Fairmont, Fessenden, Finley, Flasher, Fort Totten, Fortuna, Four Winds, Gackle, Garrison, Galesburg, Garden Valley, Gardner, Gilby, Grandin, Glen Ullin, Golden Valley, Grant County, Granville, Grenora, Halliday, Hamar, Hankinson, Harwood, Hatton, Hazen, Hazelton, Hettinger, Hillsboro, Hoople, Hope, Hunter, Hurdsfield, Inkster, Jamestown, Killdeer, Kloten, Kenmare, Kramer, Lakota, Langdon, Leeds, Lidgerwood, Lignite, Lisbon, Linton, Maddock, Martin, Mandaree, Mayville, Max, Maxbass, McVille, Michigan, Milton, Minnewaukan, Minto, Mott, Munich, Napoleon, Nedrose, Newburg, New England, New Leipzig, New Rockford, New Town, New Salem, Niagara, Noonan, North Shore, Northwood, Oberon, Oakes, Orr, Osnabrock, Page, Palermo, Park River, Parshall, Pekin, Petersburg, Pettibone, Plaza, Pick City, Portland, Powers Lake, Ray, Reile's Acres, Reynolds, Robinson, Rolla, Rolette, Ross, Round Prairie, Rugby, St. Michael, Scranton, Selz, Sharon, Sheyenne, Souris, South Prairie, Stanley, Stanton, Starkweather, Steele, Surrey, St. Thomas, Tappen, Tate Topa, Tioga, Tokio, Tolley, Tolna, Trenton, Tuttle, Underwood, Upham, Wahpeton, Walhalla, Warwick, Watford City, Westhope, Whitman, Wildrose, Willow City, Williston, Wilton, Wishek, Wolford, Wyndmere, and Zap. **Lead SMHS Program/Funding Source:** CRH SORH (federal: HRSA, FORHP); (state) appropriated funds designated for workforce development. **Partners**: Community health providers, University and Technical College faculty and students.

- **Activity:** Rural Collaborative Opportunities for Occupational Learning in Health (R-COOL-Health) Scrubs Academy I. **Description:** 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. Due to COVID-19 the Academy was not held in 2020-2022. **Target Audience:** Grades 6–8. **Partner(s):** Health professions educators, health providers, health career students. **Total Participants:** Nine (Tenth was canceled due to COVID-19) Scrubs Academies have been held at the UND SMHS with a total of 512 students attending. 2011: 38 students from 21 communities; 2012: 45 students from 22 communities; 2013: 56 students from 27 communities; 2014: 51 students from 25 communities; 2015: 56 students from 25 communities; 2016: 55 students from 26 communities; 2017: 56 students from 21 communities; 2018: 80 students from 38 communities; 2019: 84 students from 27 communities. 2020-2022: Canceled due to COVID-19. **Communities Reached:** Argusville, Arthur, Ayr, Battleview, Beach, Berlin, Berthold, Beulah, Bismarck, Bottineau, Carrington, Cavalier, Courtenay, Crookston, MN, Dawson, Devils Lake, Dickinson, Drayton, East Grand Forks, MN, Eldridge, Ellendale, Emerado, Enderlin, Esmond, Fargo, Fishers, Fordville, Frontier, Gackle, Grafton, Grand Forks, Grandin, Harvey, Hatton, Harwood, Hazen, Hecla, SD, Horace, Hunter, Jamestown, Kathryn, Lakota, LaMoure, Larimore, Leeds, Leonard,

Lisbon, Mandan, Manning, Mayville, McKenzie, Mekinock, Milnor, Minot, Minto, Mohall, Monango, Mott, New Rockford, New Town, Northwood, Oakes, Oriska, Palermo, Park River, Pembina, Powers Lake, Ray, Reile's Acres, Rolette, Rolla, Roseau, MN, Ross, Rugby, Sentinel Butte, Stanley, Sykeston, Thompson, Towner, Upham, Valley City, Verona, Voltaire, Wahpeton, Washburn, West Fargo, Wilton, Wyndmere, and Ypsilanti. **Lead SMHS Program/Funding Source:** CRH State Office of Rural Health Grant program (federal: HRSA, FORHP); (state) appropriated funds designated for workforce development.

- **Activity:** HappiGenius. **Description**: CDC Grant Awarded to North Dakota State Office of Rural Health providing a neuroscience-based resilience curriculum program for students ages K-5. **Target Audience:** Anyone ages high school and older, HOSA members. **Partners:** ND State Office of Rural Health, UND Center for Rural Health. **Total Participants:** 44. **Communities Reached**: Grand Forks, Northwood, Bismarck, Ellendale, Fargo, Thompson, Dickinson, Ellendale, Thompson, Dickinson, Carrington, Cando, Hazen, Hettinger, West Fargo, Rolette, Argusville, Nelson-Griggs, Fort Yates, Park River, Divide County, Mandan, Beulah, Minot, Scranton, Watford City, Rugby, Crosby, Bowman. **Lead Funding Source:** AHEC funded through a subcontract with the CRH, CRH funded through a subcontract with the North Dakota Department of Human Services, funded through a CDC COVID-19 Equity Grant.

Healthcare Professional Continuing Education and Training

- **Activity:** Dakota Conference on Rural and Public Health. **Description:** Annual conference to share strategies for building and sustaining healthy communities in North Dakota. **Target Audience:** Healthcare administrators, professionals, students, educators, legislators, and state agencies. **Partner(s):** UND; UND College of Nursing and Professional Disciplines; Altru Health System; North Dakota Rural Health Association; North Dakota Public Health Association. **Total Participants:** 2013: 258 attendees; 2014: 312 attendees; 2015: 396 attendees; 2016: 399 attendees; 2017: 386 attendees; 2018: 273 attendees; 2019: 222 attendees; 2020: Canceled due to COVID-19; 2021: 297attendees; 2022: 399 attendees. **Communities Reached:** 2013 Mandan (statewide participation); 2014 Grand Forks (statewide participation); 2015 Minot (statewide participation); 2016 Grand Forks (statewide participation); 2017 Minot (statewide participation); 2018 Grand Forks (statewide participation); 2019 Minot (statewide participation); 2020 Virtual (statewide participation); 2021 Grand Forks (statewide participation). **Lead SMHS Program/Funding Source:** CRH SORH (federal: HRSA, FORHP) - Funded by sponsorships/exhibitors and registration fees.

- **Activity:** Rural Clinical Rotation Support. **Description:** Travel assistance for rural clinical rotation. **Target Audience:** Post-secondary health profession students. **Partner(s):** All ND colleges and universities. **Total Participants:** 65. **Communities Reached:** Beulah, Belcourt, Bismarck, Bottineau, Devils Lake, Dickinson, Fargo, Grafton, Grand Forks, Hazen, Hillsboro, Hettinger, Jamestown, Linton, Lisbon,

Mandan, McClusky, Minot, Northwood, Oakes, Richardton, Tioga, Valley City, Wahpeton, Watford City, Williston, Wishek. **Lead Funding Source:** AHEC (Federal: HRSA).

- **Activity:** Mind Matters Conference on Brain Injury. **Description:** Conference highlights new trends, innovative approaches, and collaborative models of care for individuals living with a brain injury. **Target Audience:** Survivors, family members, and professionals. **Partner(s):** Sanford Health, Onword Therapy, Rehab Visions, Progressive Therapy Associates, Post-Acute Medical (PAM) Health Rehabilitation Hospital, Protection and Advocacy. **Total Participants:** 2021: 92; 2022: 102 **Communities Reached:** 2019: Bismarck (statewide participation) 2020: Canceled due to COVID-19. 2021: Virtual, statewide and beyond 2022: virtual, statewide and beyond. **Lead SMHS Program/Funding Source:** CRH funded through a subcontract with the North Dakota Department of Human Services. ACL Grant 1.5 million over 5 years

- **Activity:** Certified Brain Injury Specialist training. **Description:** Formal training of best practices in the world of brain injury, formal testing and certification through the Brain Injury Association of America. **Target Audience:** professionals that work with individuals with brain injury. **Total Participants:** July 2019:44; attendees, December 2019: 22 attendees; October 2021: 31 attendees; April 2021: 15 attendees; October 2022: 10 attendees **Communities Reached:** Statewide participation and beyond for virtual attendees. **Lead SMHS Program/Funding Source:** CRH funded through a subcontract with the North Dakota Department of Human Services.

- **Activity:** Online Brain Injury Courses. **Description:** 5 online courses accessible and free to participants via University of North Dakota's Blackboard course management system. Courses titles include: Introduction to Brain Injury, Cognitive and Behavioral Consequences of Brain Injury, Pediatric Brain Injury, Primary Care and Brain Injury, and Substance Use and Brain Injury. **Target Audience:** brain injury survivors, caregivers, family members and professionals. **Partner(s):** North Dakota DHS Medicaid and Aging Services Divisions. **Total Participants:** 1,453. **Communities Reached:** Courses are available nationwide. **Lead SMHS Program/Funding Source:** CRH funded through a subcontract with the North Dakota Department of Human Services

- **Activity:** AHEC Scholars. **Description:** AHEC Scholars is a 2 year nationally recognized certificate program for health professions students interested in supplementing their education by gaining additional knowledge and experience in rural and/or underserved settings. **Target Audience:** Post-secondary health profession students. **Partners:** All ND colleges and universities. **Total Participants:** 30 active participants. **Communities Reached:** Ashley**,** Beulah, Bismarck, Devils Lake, Dickinson, Elgin, Fargo, Fort Yates, Garrison, Glen Ullin, Grafton, Grand Forks, Hazen, Hettinger, Jamestown, Linton, Mandan, Mayville, Minot, Northwood, Park River, Scranton, Stanley, Valley City, Wahpeton, Washburn, Watford City, Williston, Wishek. **Lead Funding Source:** AHEC (Federal: HRSA)

- **Activity:** ND Resiliency Program. **Description:** CDC Grant Awarded to North Dakota State Office of Rural Health to provide resiliency training. **Target Audience:** Community Organizations in ND. **Partners:** ND State Office of Rural Health, UND Center for Rural Health. **Total Participants:** 29 Organizations. **Communities Reached:** Beulah, Bowman, Carrington, Cavalier, Crosby, Ellendale, Grand Forks, Hazen, LaMoure, Lisbon, Minot, Oakes, Park River, Reeder, Stanley, Valley City, Watford City. **Lead Funding Source:** AHEC funded through a subcontract with the CRH, CRH funded through a subcontract with the North Dakota Department of Human Services, funded through a CDC COVID-19 Equity Grant.

Recruitment and Retention

- **Activity:** Primary Care Office (PCO). **Description:** 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. **Target Audience:** 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. **Partner(s)**: ND Oral Health, ND Dental Association, NDDOH, HRSA BHW Division of Regional Operations Denver; Community Healthcare Association of the Dakotas; PCO Network; academic partners in the North Dakota University System, and AHEC. **Total Participants:** 158 providers currently serving (54 NHSC loan repayment; 75 state healthcare professionals' loan repayment; 11 Federal State Loan Repayment; 17 Dental Loan Repayment; 54 J-1 visa providers). **Communities Reached:** 98 **Lead SMHS Program/Funding Source:** UND Center for Rural Health through an NDDOH subcontract (federal: HRSA BHW).

- **Activity:** Rural Recruitment and Retention Network (3RNet) Membership. **Description:** A national Web-based network helping health professionals find jobs in rural and underserved areas throughout the country. **Target Audience:** Health professionals and healthcare organizations. **Partner(s):** N/A. **Total Participants:** 19,735 health profession candidates referred to rural healthcare entities. 52 providers placed in communities including: MD, PA, NP, RN, Radiology Technician, Dentist. **Communities Reached:** 36 (rural) CAHs, three IHS, and five federally qualified community health centers. **Lead SMHS Program/Funding Source:** CRH State Office of Rural Health Grant Program (federal: HRSA, ORHP); (state) appropriated funds—designated for workforce.

Flex-Supported Education Activities:

- **Activity:** North Dakota Critical Access Hospital (CAH) Quality Network Annual CAH Meeting. **Description:** State meeting to share and discuss best-practice models

from across North Dakota with reference to CAH Quality Activity, CMS Conditions of Participation (CAH regulation education). **Target Audience:** CAH CEO, Directors of Nursing, Nurses, Quality Improvement Coordinators, Risk Managers and others as facility determines. **Partner(s):** ND Department of Health Facilities, ND Department of Health Infection Prevention, BCBS ND, Quality Health Associates, ND Health Information Technology. **Total Participants:** 2020: canceled due to pandemic; 2021: offered virtual to 36 CAHs and 55 RHCs. **Communities Reached:** Statewide CAH and RHCs. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Support toward CAH and RHC-finance related webinar education. **Description:** The North Dakota Flex Program provided education through Eide Bailly (accounting firm) for both a CAH webinar series and an RHC webinar education series aimed at CEOs, CFOs, and department managers. These interactive sessions are designed to increase knowledge and understanding of issues relative to CAH financial performance. **Target Audience:** North Dakota Critical Access Hospitals, CEOs, CFOs, business office staff. North Dakota Critical Access Hospitals, CEOs, CFOs, business office staff. **Partner(s):** Eide Bailly. **Total Participants:** CAH series- 5 attendees; RHC series- 15 attendees **Communities Reached:** Offered to CAHs and RHCs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** RHC Financial and Operational Benchmarking Analysis and Education. **Description:** Benchmarking and analysis of ND RHC financial and operational data obtained from current RHC Cost Reports. Identify state baseline for benchmarking and identify state aggregate improvement targets. Findings presented at ND RHC Network Quarterly Meeting. **Target Audience:** All ND RHC leadership. **Partner(s):** Eide Bailly. **Total Participants:** 50 RHC attendees **Communities Reached:** Offered to RHCs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Board Education for North Dakota CAH **Description:** Two educational webinars provided on hospital board basic functions and responsibilities. Three educational webinars provided on hospital board case studies and situational learning. **Target Audience:** CAH Hospital Leadership and Board Members**. Partner(s):** Eide Bailly, Executive Speakers Bureau. **Total Participants:** 2020-canceled; 2021- June 29th-17 attendees; July 6th- 17 attendees; July 13th- 23 attendees; July 27th- 11 attendees; Aug 10th- 7 attendees **Communities Reached:** Offered to CAHs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Billing and Coding Bootcamp provided for ND CAHs and CAH-owned RHCs. **Description:** This online course covered the core principals of creating medical documentation in order to report accurate and complete quality metrics and turn the documentation into the CPT/HCPCS-II/ICD-10 CM codes, and formatting medical bills according to carrying rules of insurance companies. **Target Audience:** North Dakota Critical Access Hospitals - CFOs, billing and coding staff, business

office staff. **Partner(s):** Association for Rural & Community Health Professional Coding (ArchProCoding). **Total Participants:** 2020- RHC focus- 57 attendees; 2021- RHC focus- 58 attendees; CAH focus-37 attendees. **Communities Reached:** Offered to CAHs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Revenue Cycle A-Z webinar series **Description:** Education discussing topics pertinent to CAH Revenue Cycle. Topics included KPIs, inpatient services, outpatient services, swing bed, RHCs, coding, modifiers, and much more. **Target Audience:** North Dakota CAH – CFOs and business office staff. **Partner(s):** Eide Bailly **Total Participants:** 24 attendees. **Communities Reached:** Offered to CAHs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Leadership education on care coordination. **Description:** Engaged a subject matter expert to provide education on how to improve and establish a care coordination framework that guides rural and community healthcare organizations to achieve success. **Target Audience:** ND CAHs and RHCs. **Partner(s):** National Rural Health Resource Center. **Total Participants:** 2020- 48 attendees. **Communities Reached:** Offered to CAHs and RHCs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** CAH and RHC webinar series on Care Coordination **Description:** Education provided to attendees on relevant aspects of care coordination to include social determinants of health, building a care coordination program and processes, and community outreach. **Target Audience:** ND CAHs and RHCs **Partner(s):** National Rural Health Resource Center. **Total Participants:** 2021- 16 facilities. **Communities Reached:** Offered to CAHs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Education on Palliative Care using Project ECHO platform. **Description:** Provided education to expand rural community based palliative care throughout North Dakota. **Target Audience:** CAH Directors of Nursing, Social Services, providers and others as facility determines. **Partner(s):** CRH staff. **Total Participants:** 2021- March- 4 attendees, May – 3 attendees**. Communities Reached:** Offered to CAHs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Building rural community-based Palliative Care programs **Description:** Recruiting new CAH to develop a Palliative Care program. **Target Audience:** CAH Directors of Nursing, Social Services, providers, Pastoral Care, and other community members. **Partner(s):** CRH Staff. **Total Participants:** 2021- 2 CAHs **Communities Reached:** Offered to 12 CAHs. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Education on Provider Orders for Life Sustaining Treatment (POLST). **Description:** Monthly virtual education for scripting conversations on POLST. **Target Audience:** CAH Directors of Nursing, Social Services, providers and others as facility determines. **Partner(s):** Rev. Sara Schwartz **Total Participants:** 2021- 263 total attendees. **Communities Reached:** Offered to CAHs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Conduct First Time EMS Manager Training **Description:** The first-time manager training program introduces four (4) core conversations, and the coaching skills first-time managers need. **Target Audience:** First time EMS Managers **Partner(s):** North Dakota EMS Association. **Total Participants:** 2020- 6 attendees; 2021- 7 attendees **Communities Reached:** Offered to EMS agencies statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Hold EMS Management Meeting **Description:** The North Dakota EMS Association hosts EMS Management meetings geared specifically to leaders and managers of EMS agencies who want to learn specific components on how to successfully run an ambulance service. Session topics include: EMS funding sources, successful billing practices, preparation of a budget, documentation, management case studies, collaboration and system building with other public safety services, quality data reporting, and regional transport plan discussions. Facilitators include those specializing in financial preparation and audits, billing reimbursement, quality improvement/quality assurance measures, state education standards, strategic planning, organization structure, and mentorship of leaders. **Target Audience:** North Dakota EMS units. **Partner(s):** North Dakota EMS Association. **Total Participants:** 2020- 26 attendees; 2021- 32 attendees **Communities Reached:** Offered to EMS agencies statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Provide Emotional Wellbeing activities for EMS Providers. **Description:** Educational trainings offered on Emotional Wellbeing to EMS providers through activities such as Mental Health First Aid Courses (MHFA), Psychological Trauma in Emergency Patients Courses (PTEP), a mental health summit, wellness committee train-the-trainer session, and wellbeing in-service trainings. **Target Audience:** North Dakota EMS units. **Partner(s):** North Dakota EMS Association, Safe Tech Solutions. **Total Participants:** 2020- MHFA & PTEP course- 79 attendees; 2021- PTEP Course- 28 attendees, Wellness Committee training- 12 attendees, Mental Health Summit- 24 attendees, Wellbeing Inservice trainings- 36 attendees. **Communities Reached:** Offered to EMS agencies statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** Conduct EMS Safety and Prehospital Trauma Life Support (PHTLS) Courses. **Description:** The EMS safety course provides education on emergency vehicle safety, responsibility on scene, patient handling, practitioner and bystander

safety. The Pre-Hospital Trauma Life Support (PHTLS) courses provided continuing education to promote excellence in trauma patient management by all providers involved in the delivery of pre-hospital care. **Target Audience:** North Dakota EMS units. **Partner(s):** North Dakota EMS Association. **Total Participants:** 2020- EMS Safety Course- 17 attendees; 2021- EMS Safety Course- 7 attendees, PHTLS Course- 30 attendees. **Communities Reached:** Offered to EMS agencies statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** CoP Education provided for CAHs on compliance with Federal requirements set forth in the Medicare Conditions of Participation (CoP) **Description:** CoP Education aimed at CAHs for compliance with the Federal requirements set forth in the Medicare Conditions of Participation (CoP) in order to receive Medicare/Medicaid payment. **Target Audience:** CAH Directors of Nursing, Nurses, quality improvement coordinators, risk managers and others as facility determines. **Partner(s):** Laura Dixon and Nash Consulting. **Total Participants:** 2020- 32 CAHs represented; 2021- 170 total attendees **Communities Reached:** Offered to CAHs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** RHC Practice Manager Workshop. **Description:** Two-day virtual workshop provided for RHC managers to review basic RHC requirements, how to maintain compliance and complete a self-audit, documentation and reporting requirements and management skills. **Target Audience:** RHC Managers. **Partner(s):** Health Services Associates. **Total Participants:** April 12th- 28 attendees & April 19th- 14 attendees. **Communities Reached:** Offered to RHCs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

- **Activity:** RHC educational webinars **Description:** Educational webinars provided for RHCs that reviewed RHC policy development review and updates, managing an RHC, and the top 10 deficiencies in ND. **Target Audience:** RHC Managers, Nurses, Quality Improvement Coordinators, Risk Managers and others as facility determines. **Partner(s):** Health Services Associates. **Total Participants:** Dec 16th- 22 attendees; Feb 17th- 18 attendees; May 19th- 16 attendees. **Communities Reached:** Offered to RHCs statewide. **Lead SMHS Program/Funding Source:** Flex (HRSA)

Appendix B

Abbreviations and Acronyms

3RNet: National Rural Recruitment and Retention Network

AAMC: Association of American Medical College

AAPM: Advanced Alternative Payment Model

ACA: Affordable Care Act

ACCME: Accreditation Council for Continuing Medical Education

ACGME: Accreditation Council for Graduate Medical Education

AD: Alzheimer's Disease

ACO: Accountable Care Organization

ACOTE: Accreditation Council for Occupational Therapy Education

AED: Automated External Defibrillator

AEMT: Advanced Emergency Medical Technician

AGPCNP: Adult-Geriatric Primary Care Nurse Practitioner

AHA: American Hospital Association

AHCA: American Health Care Act

AHEC: Area Health Education Center

AHRF: HRSA Areas Health Resource File

AHRQ: Agency for Healthcare Research and Quality

AIDS: Acquired Immune Deficiency Syndrome

AIM: ACO Improvement Model

ALS: Advanced Life Support

APA: American Psychological Association

APM: Alternative/Advanced Payment Model

APP: Advanced Practice Provider

APRN: Advanced Practice Registered Nurse

ARC-PA: Accreditation Review Commission on Education for the Physician Assistant

ARRA: American Recovery and Reinvestment Act

ATV: All-Terrain Vehicle

BACB: Behavior Analyst Certification Board

BCBS: Blue Cross Blue Shield

BCBSND: Blue Cross Blue Shield of North Dakota

BCRA: Better Care Reconciliation Act

BFEPS: Benchmark for Excellence in Patient Safety

BH: Behavioral Health

BHW: Behavioral Health Workforce

BHWET: Behavioral Health Workforce Education and Training

BLS: Basic Life Support

BPCI: Bundled Payments for Care Improvement Initiative

BRFSS: Behavioral Risk Factor Surveillance System

BSN: Bachelor of Science in Nursing

CAATE: Commission on Accreditation of Athletic Training Education

CACREP: Council for Accreditation of Counseling and Related Educational Programs

CAH: Critical Access Hospital

CAPTE: Commission on Accreditation in Physical Therapy Education

CARES Act: Coronavirus Aid, Relief, and Economic Security Act

CPA: Canadian Psychological Association

CBO: Congressional Budget Office

CBOC: Community-Based Outpatient Clinic

CDC: Center for Disease Control and Prevention

CDM: Chronic Disease Management

CEO: Chief Executive Officer

CFO: Chief Financial Officer

CHA: Community Health Assessment

CHC: Community Health Center

CHF: Congestive Heart Failure

CHI: Catholic Health Initiatives

CHIP: Children's Health Insurance Program

CHNA: Community Health Needs Assessment

CHW: Community Health Workers

CISM: Critical Incident Stress Management

CLL: Chronic Lymphocytic Leukemia

CLS/MT: Clinical Laboratory Scientist/Medical Technologist

CMMI: Center for Medicare and Medicaid Innovation

CMS: Centers for Medicare and Medicaid Services

CMSI: Center for Medicare and Medicaid Services Innovation

CNA: Certified Nursing Assistant

CNM: Certified Nurse Midwife

CNS: Clinical Nurse Specialist

COH: Community Outpatient Hospital

COMAFTE: Commission on Accreditation for Marriage and Family Therapy Education

CoP: Conditions of Participation

COPD: Chronic Obstructive Pulmonary Disease

CPC: Comprehensive Primary Care Initiative

CPC+: Comprehensive Primary Care Plus

CPCP: Comprehensive Primary Care Payment

CPR: Cardiopulmonary Resuscitation

CQM: Clinical Quality Measures

CRC: Cardiac Ready Community

CRH: Center for Rural Health

CRNA: Certified Registered Nurse Anesthetist

CSR: Cost Sharing Reduction

CT: Computerized Tomography

DDS: Doctor of Dental Surgery

DEMS: Division of Emergency Medical Systems

DHS: Department of Human Services

DNP: Doctor of Nursing Practice

DO: Doctor of Osteopathy

DON: Director of Nursing

DPT: Doctor of Physical Therapy

DSM: Direct Secure Messaging

DSM-5: Diagnostic and Statistical Manual of Mental Disorder 5th Edition

DUI: Driving Under the Influence

ECHO: Extension for Community Healthcare Outcomes

eCQM: Electronic Clinical Quality Measure

ED: Emergency Department

EDTC: Emergency Department Transfer Communication

EHR: Electronic Health Records

EMR: Emergency Medical Responder

EMS: Emergency Medical Services

EMT: Emergency Medical Technician

EMT-B: Emergency Medical Technician-Basic

EMT-I: Emergency Medical Technician-Intermediary

EPCS: Electronic Prescribing of Controlled Substances

EVE: Escaping Violent Encounters

EVENT: EMS Voluntary Event Notification Tool

F&A: Facility and Administration

F-CHIP: Frontier Community Health Integration Project Demonstration

FFS: Fee-For-Service

FNP: Family Nurse Practitioner

FORHP: Federal Office of Rural Health Policy

FPL: Federal Poverty Level

FQHC: Federally Qualified Health Centers

FTE: Full Time Equivalent

FTR: Free Through Recovery Program

FY: Fiscal Year

GDP: Gross Domestic Product

GME: Graduate Medical Education

GPTRAC: Great Plains Telehealth Resource and Assistance Center

HAC: Hospital Acquired Condition

HB: House Bill

HCAHPS: Hospital Consumer Assessment of Healthcare Providers and Systems

HELP: Health, Education, Labor, & Pensions

HEN: Hospital Engagement Network

HIIN: Hospital Improvement and Innovation Network

HIM: Health Information Managers

HIPAA: Health Insurance Portability and Accountability Act

HIPE: Health in Partnership with Education

HIT: Health Information Technology

HITAC: Health Information Technology Advisory Committee

HITECH: Health Information Technology for Economic and Clinical Health

HMP: Health Management Program

HOSA: Health Occupations Students of America

HPSA: Health Professional Shortage Area

HRET: Health Research & Educational Trust

HRQOL: Health-Related Quality of Life

HRSA: Health Resources and Services Administration

HSC: Human Service Center

HWI: Health Workforce Initiative

IA: Improvement Activities

IA: Iowa

ICAHN: Illinois Critical Access Hospital Network

IHI: Institute for Healthcare Improvement

IHS: Indian Health Service

IMG: International Medical Graduate

INMED: Indians into Medicine

IOM: Institute of Medicine

IRIS: Intelligent Resources Informed Strategies

IT: Information Technology

JCREC: Joint Committee on Rural Emergency Care

JCT: Joint Committee on Taxation

LABA: Licensed Assistant Behavior Analyst

LAC: Licensed Addiction Counselor

LAMFT: Licensed Associate Marriage and Family Therapist

LAPC: Licensed Associate Professional Counselor

LBA: Licensed Behavior Analyst

LBSW: Licensed Baccalaureate Social Worker

LCME: Liaison Committee on Medial Education (LCME)

LCSW: Licensed Certified Social Worker

LGBTQ+: Lesbian, Gay, Bisexual, Transgender, Queer Plus

LICSW: Licensed Independent Clinical Social Worker

LMFT: Licensed Marriage and Family Therapists

LMSW: Licensed Master Social Worker

LPC: Licensed Professional Counselor

LPCC: Licensed Professional Clinical Counselor

LPHU: Local Public Health Unit

LPN: Licensed Practical Nurse

LSW: Licensed Social Worker

LTC: Long Term Care

LVN: Licensed Vocational Nurse

MA: Massachusetts

MACRA: Medicare Access and CHIP Reauthorization Act

MAPCP: Multi-payer Advanced Primary Care Practice

MAT: Medication Assisted Treatment

MBQIP: Medicare Beneficiary Quality Improvement Program

MCO: Managed Care Organization

MD: Doctor of Medicine/Medical Doctor

MIPS: Merit-based Incentive Payment System

MLT/CLT: Medical Laboratory Technician or Clinical Laboratory Technician

MMA: Medicare Modernization Act

MN: Minnesota

MT: Montana

MT/MLS: Medical Technologist or Medical Laboratory Scientist

NASAC: National Addiction Studies Accreditation Commission

NCLEX-PN: National Council Licensure Examination for Practical Nursing

NCLEX-RN: National Council Licensure Examination for Registered Nursing

NCQA: National Committee for Quality Assurance

ND: North Dakota

NDBON: North Dakota Board of Nursing

NDCC: North Dakota Century Code

NDDEMS: North Dakota Division of Emergency Medical Services NDDHS: North Dakota Department of Human Services*

NDDoH: North Dakota Department of Health*

NDEMSA: North Dakota EMS Association

NDHA: North Dakota Hospital Association

NDHIN: North Dakota Health Information Network

NDMA: North Dakota Medical Association

NDSPC: North Dakota Suicide Prevention Coalition

NDSU: North Dakota State University

NE: Nebraska

NHQR: National Healthcare Quality Report

NHSC: National Health Services Corps

NHSN: National Health Safety Network

NP: Nurse Practitioner

NPP: National Priorities Partnership

NQS: National Quality Strategy

NRHA: National Rural Health Association

NSLP: National School Lunch Program

OB-GYN: Obstetrician/Gynecologist

OECD: Organization of Economic Cooperation and Development

OIG: Office of the Inspector General

ONC: Office of the National Coordinator

OR: Oregon

ORRA: Obamacare Repeal Reconciliation Act

OT: Occupational Therapist

OTA: Occupational Therapist Assistant

OTD: Doctor of Occupational Therapy

PA: Physician's Assistant

PA-C: Physician's Assistant – Certified

PCCM: Primary Care Case Management

PCMH: Patient-Centered Medical Home

PCO: Primary Care Office

PfP: Partnership for Patients

PHAB: Public Health Accreditation Board

PHAC: Participating Hospital Advisory Council

PhD: Doctor of Philosophy

PMHNP: Psychiatric Mental Health Nurse Practitioner

PMPM: Per Member/Per Month

PPACA: Patient Protection and Affordable Care Act

PPCP: Priority Primary Care Provider

PPE: Personal Protective Equipment

PPS: Prospective Payment System

PQRS: Physician Quality Reporting System

PSA: Prostate-Specific Antigen

PsyD: Doctor of Psychology

PT: Physical Therapist

PTA: Physical Therapist Assistant

PTN: Practice Transformation Network

QHA: Quality Health Associates

QIN-QIO: Quality Innovation Network-Quality Improvement Organization

QIO: Quality Improvement Organization

QPP: Quality Payment Program

QRU: Quick Response Unit

REACH: Regional Extension Assistance Center for HIT

REC: Regional Extension Center

REMSA: Rural Emergency Medical Services Assistance

RHC: Rural Health Clinic

RHND: Rural Health Network Development

RN: Registered Nurse

ROME: Rural Opportunities in Medical Education

RUCA: Rural-Urban Commuting Area

RUPRI: Rural Policy Research Institute

SAMHSA: Substance Abuse and Mental Health Services Administration

SCIP: Surgical Care Improvement Project

SD: South Dakota

SDOH: Social Determinants of Health

SGR: Sustainable Growth Rate

SIM-ND: Simulation in Motion-North Dakota

SMHS: School of Medicine and Health Sciences

SNAP: Supplemental Nutrition Assistance Program

SOAR: Statewide Online Ambulance Reporting

STEMI: ST-Segment Elevation Myocardial Infarction

STRIVE: Strategies Targeting Reduction in Infections via Engagement

SUD: Substance Use Disorder

TA: Technical Assistance

TCPI: Transforming Clinical Practice Initiative

UND: University of North Dakota

USAC: Universal Service Administrative Company

USDA: United States Department of Agriculture

USMG: U.S. Medical Graduate

UT: Utah

VA: Veterans Affairs

VBP: Value-Based Purchasing

VBPM: Value-Based Payment Modifier

WA: Washington

WI: Wisconsin

WY: Wyoming

YRBS: Youth Risk Behavior Survey

*As of 2022, the North Dakota Department of Health has been merged into the Department of Human Services to form a new combined department (North Dakota Department of Health and Human Services).

Appendix C

Definition of Terms

Numeric

- 340B Drug Discount Program: U.S. federal government program created in 1992 that requires drug manufactures participating in Medicaid to provide outpatient drugs to covered entities at significantly reduced prices.

A

- Accountable Care Organization (ACO): a group of hospitals, doctors, and other health care providers, who come together voluntarily to give coordinated high-quality care to their Medicare patients. The goal is to ensure that patients get the right care at the right time, while avoiding unnecessary duplication of service and preventing medical errors.
- Accreditation (accredited): the action or process of officially recognizing someone as having a particular status or being qualified to perform a particular duty.
- Accreditation Council for Continuing Medical Education: sets and enforces standards in physician continuing education within the U.S. It acts as the overseeing body for institutions and organizations providing continuing medical education activities.
- Accreditation Council for Graduate Medical Education (ACGME): an independent, not-for-profit, physician-led organization that sets and monitors the professional educational standards essential in preparing physicians to deliver safe, high-quality medical care to all Americans.
- Accreditation Council for Occupational Therapy Education (ACOTE): Accrediting agency for occupational therapy education in over 600 occupational therapy and occupational therapist assistant educational programs.
- Accreditation Review Commission on Education for the Physician Assistant (ARC-PA): accrediting agency that protects the interests of the public and physician assistant profession by defining the standards for PA education and evaluating PA educational programs.
- Acquired Immune Deficiency Syndrome: a disease in which there is a severe loss of the body's cellular immunity, greatly lowering the resistance to infection and malignancy.
- Acuity: the measurement of the intensity of nursing care required by a patient.
- Acute Care: providing or concerned with short-term usually immediate medical care (as for serious illness or a traumatic injury).
- Acute Myocardial Infarction: a heart attack; when the heart is deprived of circulating blood due to blocked arteries.
- Addiction Counselor: a mental health professional who specializes in helping patients with addictions.

- Adult-Geriatric Primary Care Nurse Practitioner: an advanced practice nurse who has the education and training to assess and manage adult health and common acute and chronic illness. They emphasize prevention and wellness through patient education.
- Advanced life support: emergency medical care for sustaining life, including defibrillation, airway management, and drugs and medications.
- Advanced Practice Providers: medical providers (physician assistants or nurse practitioners) who are trained and educated similarly to physicians. They work in all areas of the hospital and clinic, and patients can be treated by them in the emergency room, operating room, or during routine visits.
- Advanced Practiced Registered Nurse: a nurse with a graduate-level degree such as a Master's of Science in Nursing or a Doctor of Nursing Practice, and has been specially trained in one of the four recognized APRN roles.
- Advocacy: public support for or recommendation of a particular cause or policy.
- Affordable Care Act: landmark health reform legislation passed by 111th Congress and signed into law by President Obama in 2010 that aimed to expand coverage, lower healthcare costs, hold insurance companies accountable, guarantee more choice, and enhance the quality of care for all Americans.
- Agency for Healthcare Research and Quality: one of twelve agencies within the Department of Health and Human Services that invests in research and evidence to make health care safer and improve quality.
- Aggregate: a whole formed by combining several elements.
- Agrarian: relating to cultivated land or the cultivation of land; any community whose economy is based on producing and maintaining crops and farmland
- Alleviate: make less severe
- Allopathic: adjective form of allopathy; refers to the treatment of disease by conventional means such as using drugs that have the opposite effects compared to the symptoms.
- Alzheimer's Disease: A progressive disease that destroys memory and other important mental functions.
- Amalgamate (amalgamation): combine or unite to form one organization or structure.
- Ambulatory care: also called outpatient care, it is medical care provided in an outpatient basis, including diagnosis, observation, consultation, treatment, intervention, and rehabilitation services.
- Ameliorate: to make, something bad or unsatisfactory, better.
- American Association of Nurse Practitioners: a national professional membership organization with a mission to empower all nurse practitioners to advance quality health care through practice, education, advocacy, research, and leadership.
- American Dental Association: the largest dental association in the U.S. that is the leading source of oral health related information for dentists and their patients.

- American Medical Association: an organization that helps physicians help patients by uniting physicians nationwide and medical students to work on the most important professional and public health issues.
- American Psychological Association: the leading scientific and professional organization that represents psychology in the United States that included researchers, educators, clinicians, consultants, and student members.
- American Recovery and Reinvestment Act: a bill signed into law by President Obama that was designed to give the economy a boost by reducing federal taxes, increasing unemployment benefits, and also increasing spending in certain areas
- Amid: surrounded by or in the middle of.
- Ancillary: providing necessary support to the primary activities or operations of an organization, institution, industry, or system.
- Anecdotal: not necessarily true or reliable, because based on personal accounts rather than facts or research.
- Anesthesiologist: a physician specializing in anesthesiology.
- Anesthesiology: the branch of medicine concerned with anesthesia and anesthetics.
- Anxiety: a nervous disorder characterized by a state of excessive uneasiness and apprehension, typically with compulsive behavior or panic attacks.
- Arthritis: painful inflammation and stiffness of the joints.
- Associate Degree: an undergraduate academic degree awarded by community colleges, junior colleges, technical colleges, and some bachelor-granting colleges and universities upon completion of a course of study lasting two years on average.
- Association of American Medical Colleges: a not-for-profit association dedicated to transforming health care through innovative medical education, cutting-edge patient care, and groundbreaking medical research.
- Asthma: a respiratory condition marked by spasms in the bronchi of the lungs, causing difficulty in breathing. It usually results from an allergic reaction or other forms of hypersensitivity.
- Autism: a developmental disorder of variable severity that is characterized by difficulty in social interaction and communication and by restricted or repetitive patterns of thought and behavior.
- Automated External Defibrillator: a portable electronic device that automatically diagnoses the life-threatening cardiac arrhythmias of ventricular fibrillation and pulseless ventricular tachycardia, and is able to treat them through defibrillation, the application of electricity which stops the arrhythmia.
- Axiomatic: self-evident or unquestionable.

B

- Bachelor's Degree: an undergraduate academic four-year degree awarded by colleges and universities upon completion of a course of study. Also called a Baccalaureate degree.
- Balanced Budget Act of 1997: an omnibus legislative package that was designed to balance the federal budget by 2002.
- Basic-Care Facility: a congregate residential setting with private rooms and semiprivate rooms, providing 24-hour supervision with a comprehensive care plan.
- Basic Life Support: the level of medical care which is used for patients with life-threatening illnesses or injuries until the patient can be given full medical care at a hospital.
- Behavior Analyst: professionals who use experimental and applied analysis of behavior, and use statistics, to develop techniques and treatments that facilitate the evaluation and modification of maladaptive behavior.
- Behavior Analysts Assistant: works closely under the supervision of an applied behavior analyst and assists in completing assessments, developing ABA therapy, collect and analyze data to make intervention changes as needed.
- Behavioral Health: the scientific study of the emotions, behaviors, and biology relating to a person's mental and physical well-being, their ability to function in everyday life, and their concept of self.
- Benchmark for Excellence in Patient Safety: a program within the Health Care SafetyZone Portal where critical access hospitals can elect to participate in benchmarking and data sharing with all critical access hospitals in the nation that use the event-reporting system.
- Beneficiary: a person or entity who receives money or other benefits
- Biennium (Biennial): a specified period of 2 years.
- Birth Center: a place for childbirth where care is provided in the midwifery and wellness model.
- Blue Cross Blue Shield of North Dakota: an independent licensee of the Blue Cross and Blue Shield Association, serving residents and businesses with insurance needs in North Dakota.
- Board of Occupational Therapy Practice: board that licenses occupational therapists and occupational therapy assistants, monitors professional conduct and regulate the profession to ensure the highest quality of occupational therapy services for the residents of the state.
- Bulwark: a person, institution, or principle that acts as a defense
- Bundled Payment Model: providers and/or healthcare facilities are paid a single payment for all the services performed to treat a patient undergoing a specific episode of care.
- Bundled Payments for Care Improvement Initiative: comprised of four broadly defined models of care, which link payments for the multiple services

beneficiaries receive during an episode of care. Organizations enter into payment arrangements that include financial and performance accountability for episodes of care.
- Bureau of Labor Statistics: measures labor market activity, working conditions, price changes, and productivity in the U.S. economy to support public and private decision making.
- Bush Foundation: a philanthropic foundation that invests in individuals and organizations in Minnesota, North Dakota, South Dakota, and the 23 Native Nations that share the same geographic area.

C

- Cadre: a small group of people specially trained for a particular purpose or profession.
- Canadian Psychological Association: the national association for science, practice, and education of psychology in Canada.
- Cancer: a disease caused by an uncontrolled division of abnormal cells in a part of the body causing malignant tumor(s) to grow.
- Cardiac Arrest: a sudden, sometimes temporary, cessation of function of the heart.
- Cardiac Arrhythmia: abnormal variation from the normal heartbeat. The abnormal rhythm can be too slow, too fast, too irregular, or too early.
- Cardiac Ready Community: a community that has public access to AED's, CPR instruction, blood pressure screenings, and transport plans for first responders, EMS, and the local hospital.
- Cardiology: the branch of medicine that deals with the diseases and abnormalities of the heart.
- Cardiopulmonary Resuscitation (CPR): a medical procedure involving repeated compression of a patient's chest, performed in an attempt to restore the blood circulation and breathing of a person who has suffered cardiac arrest.
- Cardiovascular Disease: a general name for a wide variety of diseases, disorders, and conditions that affect the heart and blood vessel.
- Care coordination: deliberately organizing patient care activities and sharing information among all of the participants concerned with a patient's care to achieve safer and more effective care
- Cartilage: firm, whitish, flexible connective tissue found in various forms in the larynx and respiratory tract, in structures such as the external ear, and in the articulating surfaces of joints.
- Case Aide: performs community contact work on simpler aspects of programs or cases and assists in providing services to clients and family members, under close supervision of caseworker.
- Catholic Health Initiatives: a national, nonprofit, faith-based health system in the U.S.

- Census: an official count or survey of a population, typically recording various details of individuals.
- Centers for Disease Control and Prevention: U.S. health protection agency that is a subdivision of the Department of Health and Human services.
- Centers for Medicare and Medicaid Services: is part of the U.S. Department of Health and Human Services that oversees many federal healthcare programs, including those that involve health information technology.
- Center for Rural Health: a federally designated State Office of Rural Health for North Dakota that connects resources and knowledge to strengthen the health of people in rural and tribal communities.
- Certified Application Counselor: an individual that is trained to help people with their insurance options through the Marketplace at no cost to the consumer.
- Certified Nurse Midwife: a registered nurse who graduated from a nurse midwifery education program accredited by the Accreditation Commission for Midwifery Education and have passed a national certification examination to receive the professional designation.
- Certified Nursing Assistant: helps patients or clients with healthcare needs under the supervision of a registered nurse or licensed practical nurse.
- Certified Registered Nurse Anesthetist: an advanced practice registered nurse who administers anesthesia and other medications. They also monitor patients who are receiving and later recovering from anesthesia.
- Chaplain: a member of the clergy attached to a private chapel, institution, ship, branch of the armed forces, etc.
- Chief Executive Officer: the person who has the most authority in an organization or business.
- Children's Health Insurance Program: a partnership between the federal and state governments that provides low-cost health coverage to children in families that earn too much money to qualify for Medicaid. In some states it can also cover pregnant women.
- Cholesterol: a compound of the sterol type found in most body tissue. It is an important constituent of cell membranes and precursor of other steroid compounds, but a high proportion in the blood of low-density lipoprotein (which transports cholesterol to the tissue) is associated with an increased is of coronary heart disease.
- Chronic Disease: a persistent of recurring disease usually affecting a person for three months or longer.
- Chronic Obstructive Pulmonary Disease: a lung disease that makes it hard to breath. It is caused by damage to the lungs over many years usually from smoking.
- Clinical Nurse Specialist: an advanced practice registered nurse who holds a master's or doctoral degree in a specialized are of nursing practice. They focus on diagnosing and treating patients, nurse management, and administration.

- Clinical Preceptor: a supervised clinical experience which allows students to apply knowledge gained in the classroom portion of a program to clinical practice.
- Clinical Quality Measures: tools that help measure and track the quality of health care services that eligible professional, eligible hospitals, and critical access hospitals provide.
- Coalition: an alliance for combined action
- Colloquial: (of language) used in ordinary or familiar conversation; not formal
- Colonoscopy: a procedure in which a flexible fiber-optic instrument is inserted through the anus in order to examine the colon.
- Commensurate: corresponding in size or degree; in proportion.
- Commission on Accreditation of Athletic Training Education (CAATE): non-profit organization serving the public and profession by establishing and ensuring compliance with accreditation standards that facilitate quality outcomes, continuous improvement, innovation and diversity to enhance athletic training education.
- Commission on Accreditation for Marriage and Family Therapy Education: establishment, review, and revision of accreditation standards and policies, and the accreditation of graduate and post-graduate educational programs.
- Commission on Accreditation in Physical Therapy Education (CAPTE): grants specialized accreditation status to qualified entry-level education programs for physical therapists and physical therapist assistants.
- Commonwealth Fund: a private U.S. foundation whose stated purpose is to promote a high performing health care system that achieves better access, improved quality, and greater efficient, particularly for society's most vulnerable.
- Community-Based Outpatient Clinics: clinics that provide the most common outpatient services, including health and wellness visits, so that individuals seeking care to do have to travel to larger medical centers.
- Community Health Center: private, nonprofit organizations that directly or indirectly (through contracts and cooperation agreements) provide primary health services to residents of a defined geographic area that is medically underserved.
- Community Health Needs Assessment: a state, tribal, local, or territorial health assessment that identifies key health needs and issues through systematic, comprehensive data collection and analysis.
- Community Health Worker: a frontline public health worker who is a trusted member of and/or has a usually close understanding of the community served. This trusting relationship enables the worker to serve as a liaison/link/intermediary between health/social services and the community to facilitate access to services and improve quality of service delivery.
- Comorbidity: the simultaneous presence of two chronic diseases or conditions in a patient.
- Concussion: a type of traumatic brain injury caused by a bump, blow, or jolt to the head or by a hit to the body that causes the mead and brain to move rapidly

back and forth. The sudden movement causes the brain to bounce around or twist in the skull, creating chemical changes in the brain and sometimes stretching and damaging brain cells.

- Conditions of Participation: a set of stringent health measures designed to regulate how hospitals and other medical establishments utilize Medicare aid.
- Congestive Heart Failure: a weakness of the heart that leads to a buildup of fluid in the lungs and surrounding body tissues.
- Contact tracing: the identification and monitoring of individuals known to be exposed to a highly contagious and infectious disease.
- Constituency: a body of voters in a specified area who elect a representative to a legislative body.
- Contract employees: an individual retained by a company for a predetermined time, for a predetermined price.
- Council for Accreditation of Counseling and Related Educational Programs (CACREP): accredits master's and doctoral degree programs in counseling and its specialties that are offered by colleges and universities.
- Council on Social Work Education: national association representing social work education in the United States.
- Counselor: a person trained to give guidance on personal, social, or psychological problems.
- COVID-19 Pandemic: an ongoing illness of coronavirus disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and was declared a pandemic in March 2020.
- Credence: belief in or acceptance of something as true
- Critical Access Hospital: a designation given to rural hospitals that is designed to reduce the financial vulnerability of rural hospitals and improve access to health care by keeping essential service in rural communities.
- Critical Incident Stress Management: an adaptive, short-term psychological helping-process that focuses solely on an immediate and identifiable problem. It can include pre-incident preparedness to acute crisis management to post-crisis follow-up.
- Curriculum: the subjects comprising a course of study in a school or college.

D

- Decennial: recurring every ten years.
- Deductible: a specified amount of money that the insured must pay before an insurance company will pay a claim.
- Deliverable: a report, a document, a software product, a server upgrade or any other building block of an overall project
- Dental Assistant: an individual qualified to work with a professional dentist and assist in various duties such as organizing appointments, sterilizing and arranging instruments, escorting patients, and taking x-rays.

- Dental Hygienist: an ancillary dental worker specializing in scaling and polishing teeth and in giving advice on cleaning the teeth.
- Dental Therapist: a member of a dental team who provides preventative and restorative dental care, usually for children and adolescents.
- Dentist: a person qualified to treat the diseases and conditions that affect the teeth and gums, especially the repair and extraction of teeth and the insertion of artificial ones.
- Dependency ratio: number of individuals who are economically inactive (less than 16 years of age or older than 65), divided by the number of individuals who are of working age (16 to 65 years old)
- Depopulation: a significant reduction in the population.
- Depression: formally known as Major Depressive Disorder; a mood disorder characterized by persistent feelings of sadness or hopelessness, lack of sleep, change in appetite, loss of interest in activities, and lack of energy every day for at least two weeks.
- Dermatology: the branch of medicine concerned with the diagnosis and treatment of skin disorders.
- Detriment: the state of being harmed or damaged.
- Diabetes: a disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood and urine.
- Diagnose: to identify the nature of, an illness or other problem, by examination of the symptoms.
- Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5): a handbook used by health care professionals that contains descriptions, symptoms, and other criteria for diagnosing mental disorders.
- Didactic: intended to teach, particularly in having moral instruction as an ulterior motive.
- Dietitian: an expert on diet and nutrition.
- Direct Care Associate: responsible for providing in-home personal care and daily living tasks to individuals who are suffering from illness, physically disabilities, or the elderly requiring long-term care.
- Direct Secure Messaging: a national encryption standard for securely exchanging clinical healthcare data via the internet.
- Disparity: difference
- Disseminate: spread or disperse (something, usually information) widely
- Division of Emergency Medical Service: serves as North Dakota's lead emergency medical services agency. It is responsible for licensing ambulance services and quick response units, training, testing, certification, and licensure of EMS personnel, coordinating the State Trauma System, administering the EMS for Children Program, coordinating the State CISM Team, coordinating, the State Stroke System, of Care, and coordinating the State Cardiac System of Care.

- Doctor of Medicine: a degree that is attained by attending and graduating from a conventional medical school and requires passing a licensing examination and completing residency training prior to treating people or prescribing medications.
- Doctor of Nursing Practice: a degree designed for nurses seeking a terminal degree in nursing practice and offers a general leadership or administration focus.
- Doctor of Occupational Therapy: a professional/clinical doctorate designating the highest level of academic preparation for an entry-level occupational therapist.
- Doctor of Osteopathy: a fully licensed physician who practices in every medical specialty. They provide a full range of services, from prescribing drugs to performing surgery.
- Doctor of Physical Therapy: the qualifying degree for physical therapy in the United States, considered a graduate-level clinical/professional degree for the practice of physical therapy.

E

- Early Intervention: system of services that helps babies and toddlers with developmental delays or disabilities in domains such as physical, cognitive, communication, social/emotional, and self-help.
- Electrocardiograph: a galvanometric device that detects and records the minute difference sin electric potential cause by heart action and occurring between different parts of the body and it is used to diagnose heart disease. The output it gives is called an electrocardiogram.
- Electronic health record: a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting.
- Emergency Department Transfer Communication: a National Quality Forum endorsed measure to evaluate communication for transitions of care during emergency department transfers.
- Emergency Medical Responder: a person who is specially trained to provide out-of-hospital care in medical emergencies.
- Emergency Medical Services: refers to the treatment and transport of people in crisis health situations that may be life threatening.
- Emergency Medical Technician: a person who is specially trained and certified to administer basic emergency services to victims of trauma or acute illness before and during transportation to a hospital or other healthcare facility.
- EMS Voluntary Event Notification Tool: a web-based EMS reporting of events such as near-misses, assaults on EMS, patient safety events, and other situations.
- Endodontics: the branch of dentistry concerned with diseases and injuries of the soft tissues inside a tooth (i.e., dental pulp).
- Enterprise: a project or undertaking, typically one that is difficult or requires effort; a business or company.

- Equity: the quality of being fair and impartial.
- Equivocal: open to more than one interpretation; ambiguous.
- Evidence based practice: any practice that relies on scientific and mathematical evidence to form strong inductive or deductive arguments for guidance and decision-making.
- Exit Interview: an interview held with an employee (or student) who is about to leave an organization, typically in order to discuss the employee's reasons for leaving and their experience of working for the organization.
- Expenditure: the action of spending funds.

F

- Family Medicine: the branch of medicine designed to provide basic health care to all the members of a family.
- Family Nurse Practitioner: a registered nurse with specialized educational and clinical training in family practice.
- Federal Office of Rural Health Policy: created to advise the Secretary of the U.S. Department of Health and Human Service on health care issues impacting rural communities including access to quality health care and health professionals, viability of rural hospitals, and effect of the department proposed rules and regulations, including Medicare and Medicaid, on access to and financing of health care in rural areas.
- Federal Poverty Level: a measure of income used by the U.S. government to determine who is eligible for subsidies, programs, and benefits.
- Federally Qualified Health Center: outpatient clinics that qualify for specific reimbursement systems under Medicare and Medicaid.
- Feeding Assistant: any individual employed by a facility, or under contract, to feed or assist with the feeding of nursing facility residents must either have successfully completed a department-approved paid feeding assist and training course or be a certified nurse aid.
- Fieldwork: practical work experience conducted by a student in a professional working environment, rather than in a classroom.
- First Aid: the first and immediate assistance given to any person suffering from either a minor or serious injury or illness until full medical treatment is available.
- Flex-time: a work policy that allows employees the flexibility to choose their work hours.
- Forensic Odontology: a dentist who uses their training and knowledge of the teeth and uses that within the criminal justice field and legal system. Also called forensic dentistry.
- Frontier: a county with a population density of six or fewer people per square mile.
- Frontier Community Health Integration Project Demonstration: a federal 3-year initiative that 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.
- Full time equivalent (FTE): the hours worked by one employee on a full-time basis. The concept is used to convert the hours worked by several part-time employees into the hours worked by full-time employees.

G

- Gamut: the complete range or scope of something
- Gastroenterology: the branch of medicine which deals with disorder of the stomach and intestines.
- Generalist: an internist, family physician, or pediatrician who performs general medicine; one who treats most diseases that do not require surgery, sometime including those related to obstetrics.
- General Surgery: a surgical specialty that focuses on abdominal contents, alimentary tract, breast, skin, soft tissues, and the endocrine system.
- Geriatrics: a branch of medicine that deals with the problems and disease of old age and the medical care and treatment of aging people.
- Governor's Nursing Shortage Taskforce: Governor Burgum of North Dakota convened a taskforce comprised of a diverse group of stakeholders to examine the issue, identify causes, possible solutions, and to make recommendations to address the critical shortage of nurses and other healthcare workers in North Dakota.
- Graduate degree: an advanced academic degree (usually a master or doctorate degree) awarded by colleges and universities to individuals who have completed a bachelor degree and additional course work for the advanced degree.
- Grant: a sum of money given by an organization, especially a government, for a particular purpose.
- Great Depression: a severe worldwide economic depression in the 1930's.
- Great Plains Telehealth Resource and Assistance Center: an organization with the mission to build telehealth awareness, promote education, provide individualized consultation, and provide data specific to telehealth services in the Great Plains Region.
- Gross Domestic Product (GDP): a standard of measurement of the total value of all goods and services produced in either the nation or at a state level.

H

- Health Information Manager: responsible for obtaining, analyzing, and securing the digital and traditional health records of patients.
- Health Information Technology: information technology applied to health and health care that supports health information management across computerized

systems and the secure exchange of health information between consumers, providers, payers, and quality monitors.

- Health Information Technology for Economic and Clinical Health Act: part of the American Recovery and Reinvestment Act deals with privacy and security issues in relation to electronic storage of medical Files. The standards in this act are meant to improve the protection of medical information.
- Health Insurance: insurance that compensates the insured for expenses or loss incurred for medical reasons, as through illness or hospitalization.
- Health Insurance Portability and Accountability Act (HIPPA): U.S. legislation that provides data privacy and security provisions for safeguarding medical information and protects America's workers with improvement to portability and continuity of health insurance coverage.
- Health Professional Shortage Area: an area designated by the Health Resources and Services Administration that indicates health care provider shortages in primary care, dental health, or mental health. These shortages can be geographic, population, or facility-based.
- Health Research and Education Trust: founded in 1944 it is a not-for-profit research and education affiliate of the American Hospital Association (AHA) with a mission to transform health care through research and education.
- Health Resources and Services Administration: part of the U.S. Department of Health and Human Services which is tasked with improving access to health care services for people who are geographically isolated, economically and medically vulnerable.
- Health System: the people, institutions, organizations, healthcare professionals, and resources needed to deliver health care to a target population within a geographical area.
- Healthcare SafetyZone Portal: a comprehensive web-based system that transforms any reporting, education, or safety procedure into easy and meaningful electronic processes.
- Health Workforce Initiative: a plan created to identify specific steps to reduce disease burden and increase the provider workforce through programs designed to increase provider retention for practice within the state of North Dakota as well as expand the provider network through class size increases
- Healthy North Dakota: a statewide partnership of more than 400 committee members and organizations working to determine solution for more healthful living.
- Healthy People: an agenda that provides science-based, national goals and objectives with 10-year targets designed to guide national health promotion and disease prevention efforts to improve the health of all people in the United States.
- High Blood Pressure: a common disease in which blood flows through blood vessels, or arteries, at higher than normal pressure. Complications form high

blood pressure include chronic kidney disease, heart attack, heart failure, stroke, and possibly vascular dementia.

- High cholesterol: High Cholesterol: a condition that causes the levels of certain bad fats, or lipids, to be too high in the blood. High cholesterol can lead to a buildup of plaque in the blood vessels which can increase the risk of heart attack, stroke, and peripheral artery disease.
- Holistic Medicine: characterized by the treatment of the whole person, taking into account mental and social factors, rather than just the physical symptoms of a disease.
- Home health: medical care provided in a patient's home and is provided by skilled medical professionals.
- Homestead Act: a series of U.S. federal laws that gave an applicant ownership of land, typically called a "homestead," at little or no cost.
- Hospice Care: care that focuses on the quality of life rather than its length. It provides humane and compassionate care for people in the last phase of incurable disease so that they may live as fully and comfortably as possible.
- Hospital-Acquired Condition Reduction Program: a program that provides incentive for hospitals to reduce hospital-acquired conditions. This is done through reducing payments to applicable hospitals that rank in the worst performing 25 percent of all subsection hospitals with respect to risk-adjusted hospital-acquired condition quality measures.
- Hospital Consumer Assessment of Healthcare Providers and Systems: a government survey for measuring patient satisfaction at hospitals across the country.
- Hospital Medicine: the discipline concerned with the medical care of acutely ill hospitalized patients.
- Hospital Readmission Reduction Program: a payment penalty program designed to reduce Medicare fee-for-service hospital readmission rates for conditions that account for expensive, high-volume admissions and frequent readmissions.
- Human Resource Counselor: a professional who provides counseling in different aspects of managing human resources such as career planning or development, performance management, stress management, and other areas which may affect employees emotionally.
- Human Services: a field that centers on meeting human needs through an interdisciplinary knowledge base, focusing on prevention as well as remediation of problems, and maintain a commitment to improving the overall quality of life of service populations.
- Huntington's Disease: An inherited condition in which nerve cells in the brain break down over time.
- Hypertension: abnormally high blood pressure.

I

- Immunization: the action of making a person or animal immune to infection, typically through an injection or series of injections.
- Impetus: the force that makes something happen or happen more quickly
- Incentive: a thing that motivates or encourages one to do something.
- Incidence: a measure of the probability of occurrence of a given medical condition in a population within a specified period of time
- Incrementalism: a method of working by adding to a project using many small incremental changes instead of a few large jumps.
- Indian Health Services: an agency within the U.S. Department of Health and Human Services that is responsible for providing federal health services to American Indians and Alaska Natives.
- Indians into Medicine: a comprehensive program designed to assist American Indian students who aspire to be health professionals to meet the needs of tribal communities.
- Infectious disease: a disease resulting from the presence and activity of a pathogenic microbial agent such as bacteria, viruses, fungi, or parasites.
- Influenza: a highly contagious viral infection of the respiratory passages causing fever, severe aching, and catarrh, and often occurring in epidemics. It is also called flu.
- Infrastructure: the basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise.
- Inpatient Care: health care delivered in a hospital or other facility where the patient usually stays overnight and receives lodging and food as well as treatment.
- Institute for Healthcare Improvement: an independent not-for-profit organization leading the improvement of health care throughout the world.
- Institute of Medicine: a nonprofit organization with the mission to advance and disseminate scientific knowledge to improve human health.
- Internal Medicine: the medical specialty dealing with prevention, diagnosis, and treatment of adult disease not requiring surgery.
- International Medical Graduates (IMG): medical school graduates from any country outside of the United States and Canada.
- Internship: the position of a student or trainee who works in an organization, sometimes without pay, in order to gain work experience or satisfy requirement for a qualification.
- Interoperability: ability of different information systems, devices and applications (‘systems’) to access, exchange, integrate and cooperatively use data in a coordinated manner
- Interprofessional: a group of individuals from different disciplines working and communicating with each other.

- Isolation: In the context of infectious disease management, the separation of people who are known to be infected from those who are not infected.

J

- Joint Committee on Rural Emergency Care: a committee dedicated to advancing policy and practice to ensure access to timely, affordable, and high-quality emergency services in rural America.

K

- Kaiser Family Foundation: a non-profit organization focusing on national health issues. It develops and runs its own policy analysis, journalism, and communications programs, sometimes in partnership with major news organizations.
- Kidney Disease: also called chronic kidney disease, means your kidneys are damaged and cannot filter blood the way they should resulting in a buildup of waste in the body.

L

- Labor Market: the availability of employment and lab, in terms of supply and demand
- Liability: the state of being responsible for something, especially by law
- Liaison Committee on Medical Education (LCME): the nationally recognized accrediting authority for medical education programs leading to the M.D. degree in the U.S. and Canadian medical schools.
- Licensed Associate Professional Counselor: a two-year license that allows an individual to have the rights and privileges of a Licensed Professional Counselor but they work under continual supervision. They must attain the necessary supervised experience and meet the criteria to become an LPC within two years.
- Licensed Baccalaureate Social Worker: a license to provide individuals with support and guidance when seeking out services or supports within their community. LBSW is the first level of licensure recognized for social workers and requires a Bachelor of Social Work degree from a accredited institution.
- Licensed Behavior Analyst: a license that requires applied behavior analysis training and provides services to individuals with behavioral problems.
- Licensed Clinical Social Worker: a license that allows an individual to provide clinical treatment for mental illnesses to clients independent of supervision. They must attain a Master's degree in social work and two years of supervised field experience to become a LCSW.
- Licensed Master Social Worker: a license that requires an individual to operate under the supervision of a licensed psychologist, psychiatrist, or LCSW to

provide mental health services. They must attain a Master's degree in Social work and meet the criteria to become a LMSW.

- Licensed Nutritionist: an individual that has earned credentials from a nationally recognized nutrition licensing body and may legally provide nutrition counselling, nutrition services, and advice.
- Licensed Practical Nurse: a nurse who works under the direction of a physician or a registered nurse and cares for people who are sick, injured, convalescent, or disabled.
- Licensed Professional Clinical Counselor: a license that allows an individual to provide mental health and substance abuse treatment to individuals, families, or groups. They must attain a Master's degree in clinical mental health counseling and 3,000 hours of supervised fieldwork to become a LPCC.
- Licensed Registered Dietitian: a professional license to assess, diagnose, and treat nutrition and regulation of diet. It requires a baccalaureate degree and experience requirements as approved by the Commission on Dietetic Registration.
- Licensed Vocational Nurse: the term used for Licensed Practical Nurse in Texas and California.
- Life expectancy: measure of the average time an organism is expected to live, based on the year of its birth, its current age and other demographic factors
- Liquidity measure: measure a firm's ability to pay operating expenses and other short-term, or current, liabilities.
- Locum Tenens: one filling an office for a time or temporarily taking the place of another-used especially of a doctor or clergyman.
- Long-Term Care Facility: a facility that provides rehabilitative, restorative, and/or ongoing skilled nursing care to patients or residents in need of assistance with activities of daily living.

M

- Maldistribution: uneven distribution of something, especially when disadvantageous or unfair.
- Malpractice: improper, illegal, or negligent professional activity or treatment
- Mammogram: an x-ray picture of a breast.
- Marriage and Family Therapist: a mental health professional; trained in psychotherapy and family systems, and licensed to diagnose and treat mental and emotional disorder within the context of marriage, couples, and family systems.
- Matriculated: enrolled at a college or university.
- Maxillofacial Surgery: a type of surgery that deals with any disease, disorders, injuries, or defects that affect either the jaw or facial regions of a person.

- Median: denoting or relating to a value or quantity lying at the midpoint of a frequency distribution of observed values or quantities, such that there is an equal probability of falling above or below it.
- Medicaid: a health care program that assists low-income families or individuals in paying for doctors' visits, hospital stays. Long-term medical, custodial care costs and more.
- Medicaid Health Management Program: a disease management program that focuses on asthma, diabetes, chronic obstructive pulmonary disease, and congestive heart failure. The program allowed providers to provide additional care coordination services in the form of a health management program for the previously listed health conditions.
- Medicaid Primary Care Case Management Program: a model of health care delivery that generally requires a Medicaid enrollee to choose and primary care provider who is responsible for coordinating the enrollee's care and is paid a monthly fee for doing so, on top of payment for providing medical services.
- Medical Director: an individual responsible for overall coordination of care and for implementation of policies related to care of residents in a nursing home.
- Medical Records Staff: responsible for a variety of tasks including collecting patient information, issuing medical files, filing medical records, and processing patient admissions/discharge papers.
- Medical Technologist: also called a medical laboratory scientist, clinical laboratory scientist, or medical laboratory technologist is an allied health professional that analyzes and tests body fluids and tissues.
- Medically underserved areas: areas having too few primary care providers, high infant mortality, high poverty or a high elderly population.
- Medicare: the federal health insurance program for people who are 65 or older, certain younger people with disabilities, and those with end-stage renal disease (permanent kidney failure requiring dialysis or a transplant).
- Medicare Access and CHIP Reauthorization Act: a law signed by President Obama in 2015 that repeals the substantial growth rate methodology for determining updates to the Medicare physician fee schedule, established annual positive or flat fee updates for 10 years, and institutes a two-track fee update beginning in 2019.
- Medicare Beneficiary Quality Improvement Program: a quality improvement activity under the Medicare Rural Hospital Flexibility (FLEX) grant program with a goal of improving the quality of care provided in small, rural Critical Access Hospitals.
- Medicare Part A: hospital insurance provided by Medicare through the Centers for Medicare and Medicaid services. It covers inpatient care in hospitals, nursing homes, skilled nursing facilities, and critical access hospitals.
- Medicare Part B: medical insurance that covers services and supplies that are medically necessary to treat health conditions of Medicare beneficiaries.

- Medicare Part D: U.S. federal-government program to subsidize the cost of prescription drugs and prescription drug insurance premiums for Medicare beneficiaries.
- Medicare Quality Innovation Network-Quality Improvement Organization: under the direction of the Centers for Medicare and Medicaid Services, it is one of the largest federal programs dedicated to helping improve the nations quality of care.
- Medicare Rural Hospital Flexibility Program: allows small hospitals to be certified as Critical Access Hospitals and offers grants to states to help implement initiatives to strengthen the rural hospital health care infrastructure.
- Mental Health: a person's condition with regard to their psychological and emotional well-being.
- Mental Health Technician: observes and assists assigned mental health patients with daily living activities, therapeutic activities, and socialization.
- Mental Illness: any of a broad range of medical conditions (such as major depression or schizophrenia) that are marked primarily by sufficient disorganization of personality, mind, or emotions to impair normal psychological functioning and cause marked distress or disability and that are typically associated with a disruption in normal thinking, feeling, mood, behavior, interpersonal interactions, or daily functioning.
- Metropolitan: denote areas with a core population of 50,000 or more
- Micropolitan: denote areas with core populations of 10,000 to 49,999
- Morbidity: the condition of being diseased.
- Mortality: the condition of being dead.
- Multi-Payer Advanced Primary Care Initiative: in this demonstration, CMA participated in multi-payer reform initiatives that were conducted by states to make advanced primary care practices more broadly available. It evaluated whether advanced primary care practice reduced unjustified utilization and expenditures, and improved the safety, effectiveness, timeliness, and efficiency of health care.

N

- National Academy of Medicine: formerly known as the Institute of Medicine, it is an independent organization of eminent professional from diverse fields including health and medicine, and the natural and social sciences, that works to address critical issues in health, medicine, and related policy in the U.S. and globally.
- National Addiction Studies Accreditation Commission (NASAC): an academic accreditation organization for higher education in addiction studies programs.
- National Health Service Corps: an organization that connects primary health care providers to area of the U.S. with limited access to care.
- National Priorities Partnership: a partnership of 52 major national organizations with a shared vision to achieve better health, and a safe, equitable, and value-driven healthcare system.

- National Quality Strategy: a nationwide effort in the U.S. to provide direction for improving the quality of health and healthcare in the United States with three guided aims: better care, healthy people and communities, and affordable care.
- National Rural Health Association: a national nonprofit membership organization with more than 21,000 members. Their mission is to provide leadership on rural health issues through advocacy, communications, education, and research.
- National School Lunch Program: a federally assisted meal program operating in public and nonprofit private schools and residential child-care institutions. It provides nutritionally balanced, low-cost or free lunches to children each school day.
- Nephrology: specialty of medicine focused on the kidneys, specifically normal kidney function and kidney disease, the preservation of kidney health, and the treatment of kidney disease.
- Neurosurgery: surgery performed on the nervous system, especially the brain and spinal cord.
- Next Generation ACO: this model builds upon a provider's experience in the Pioneer ACO Model and the Shared Savings Program by offering a new opportunity in accountable care that sets predictable financial targets, enables providers and beneficiaries' greater opportunities to coordinate care, and aims to attain the highest quality standards of care.
- North Dakota Board of Medicine: a board that protects the citizens of the state by regulating the practice of medicine by physicians, physician assistants, and fluoroscopy technicians and disciplines them if they violate the state's medical practice act.
- North Dakota Board of Nursing: a board that strives to proactively regulate the practice of nursing by providing timely information that gives registered nurses, licensed practical nurses, advanced practice nurses, QAP/Technicians, and medication assistant the knowledge they need to remain compliant with the laws and rules.
- North Dakota State Board of Occupational Therapy Practice: a board responsible for licensing qualified applicants to practice occupational therapy and to ensure that licensees comply with the state laws and regulations covering that practice.
- North Dakota State Board of Physical Therapy: a board responsible for licensing qualified applicants to practice physical therapy and to ensure that licensees comply with the state laws and regulations covering that practice.
- North Dakota Board of Social Work Examiners: a board responsible for licensing qualified applicants to practice social work and to ensure that licensees comply with the state laws and regulations governing that practice.
- North Dakota Century Code: the collection of all the statutes passed by the North Dakota Legislative Assembly since the state's admission to the Union. It also includes the North Dakota Constitution.

- North Dakota Dental Association: a constituent organization chartered by the American Dental Association that is organized into five component districts representing 87% of North Dakota dentists.
- North Dakota Health Information Network: a network focused on improving healthcare by creating a secure medical record sharing network for providers and consumers. They aim to empower patients by ensuring their medical data remains safe and private.
- North Dakota Hospital Association: a voluntary trade organization of North Dakota's licensed hospitals committed to advancing public policy and fostering excellence in medical and health service.
- North Dakota Long Term Care Association: a professional association of community and long-term care providers, whose goal is to enhance the lives of the people they serve through collaboration, education, and advocacy.
- North Dakota Nurse Practices Act: the state law that governs the practice of nursing and scope of practice, specifically protects those who need nursing care
- Nuclear medicine: a medical specialty involving the application of radioactive substances in the diagnosis and treatment of disease.
- Nurse Manager: a nurse who manages the nursing staff at a particular facility. They are responsible for recruitment and retention of nursing staff and overseeing them. They also occasionally collaborate with doctors on patient care and help assist patients and their families when needed.
- Nurse Practitioner: a nurse who is qualified to treat certain medical conditions without the direct supervision of a doctor.
- Nursing Home: a private institution providing residential accommodations with health care, especially for elderly people. They provide 24-hour nursing care and supervision.

O

- Obesity: the condition of being overweight with a BMI (body mass index) greater than 25.
- Obstetrics-Gynecology: the branch of medical science concerned with childbirth, caring for women in connection with childbirth, and women's reproductive health.
- Occupational Therapist: a licensed health professional who is trained to assist people to overcome the limitations caused by injury or illness, emotional or psychological difficulties, developmental delay or the effects of aging. It requires a Master's degree.
- Occupational Therapist Assistant: helps patients develop, recover, and improve, as well as maintain the sills needed for daily living and working. It requires an Associate's degree.
- Occupational Therapy: a form of therapy for those recuperating from physical or mental illness that encourages rehabilitation through the performance of activities required in daily life.

- Occupational Therapy Assistant: individuals that are directly involved in providing therapy to patients under the direction of an occupational therapist. They are involved in helping patients develop, recover, improve, as well as maintain the skills needed for daily living and working.
- Oil Patch: refers to western counties (Divide, Burke, Renville, Bottineau, McHenry, Ward, Mountrail, Williams, McKenzie, Dunn, McLean, Golden Valley, Billings, Stark, Slope, and Bowman) in North Dakota that occupy a portion of the Bakken Formation where oil is extracted.
- Ombudsman: an official appointed to investigate individual's complaints against maladministration, especially that of public authorities.
- Oncology: the study and treatment of tumors and cancer.
- Oral and Maxillofacial Surgery: the specialty of dentistry which includes the diagnosis, surgical and adjunctive treatment of diseases, injuries, and defects involving both the functional and aesthetic aspects of the hard and soft tissues.
- Oral Health: the health of the mouth (oral cavity) and includes hard tissue (teeth and bone) as well as the soft tissue (gums, cheeks, tongue, floor of the mouth, lips, palate, and throat.
- Organization for Economic Cooperation and Development: an intergovernmental economic organization with 35 member countries, founded in 1961 to stimulate economic progress and world trade.
- Orthodontist: a licensed dentistry professional qualified to treat irregularities of the teeth, especially alignment and occlusion, and jaws, including the use of braces.
- Orthopedic Medicine: the branch of medicine concerned with the diagnosis and treatment of problems related to the bones, joints, and ligaments.
- Outpatient Care: medical care or treatment that does not require an overnight stay in a hospital or medical facility. It may be administered in a medical office or a hospital, but most commonly, it is provided in a medical office or outpatient surgery center (also called ambulatory care).

P

- Palliative care: specialized medical care for people living with a serious illness focused on providing relief from the symptoms and stress of the illness. The goal is to improve quality of life for both the patient and the family.
- Pap Smear Test: a test carried out on a sample of cells from the cervix to check for abnormalities that may be indicative of cervical cancer.
- Paramedic: a person trained to give emergency medical care to people who are seriously ill with the aim of stabilizing them before they are taken to the hospital.
- Parkinson's disease: A disorder of the central nervous system that affects movement, often including tremors.
- Part-Time Employment: working less than full-time, typically less than 30 hours per week.

- Patient-Centered Medical Home: a care delivery model whereby patient treatment is coordinated through their primary care physician to ensure they receive the necessary care when and where they need it, in a manner they can understand.
- Patient-Centered Primary Care Collaborative: a not-for-profit multi-stakeholder membership organization dedicated to advancing an effective and efficient health system built on a strong foundation of primary care and the patient-centered medical home.
- Payer-mix: the percentage of revenue coming from private insurance versus government insurance versus self-paying individuals
- Pediatric Medicine: a branch of medicine dealing with the development, care, and diseases of children.
- Pediatric Dentistry: branch of dentistry provides both primary and comprehensive preventive and therapeutic oral health care for children from birth through adolescence, including those with special health care needs.
- Peer Support Specialist: a person with “lived experience” who has been trained to support those who struggle with mental health, psychological trauma, or substance use.
- Per-Capita: for each person, or in relation to people taken individually.
- Percutaneous Coronary Intervention: a nonsurgical procedure that improves blood flow to the heart by opening narrowed arteries that supply blood to the heart.
- Per Diem: for each day. Often used in financial contexts. Also called flex time, referring to a flexible schedule where an individual picks and chooses which days they work based on open shifts.
- Perinatal: relating to the time, usually a number of weeks, immediately before and after birth.
- Periodontics: the branch of dentistry concerned with the structures surrounding and supporting the teeth as well as the disease and disorder that affect them.
- Pew Charitable Trusts: an independent nonprofit organization that invests in evidence-based, non-partisan analysis to solve current societal challenges.
- Pharmacist: an individual licensed to prepare, compound, and dispense drugs upon written order (prescription) from a licensed practitioner such as a physician, dentist, or advanced practice nurse.
- Pharmacy: a store where medicinal drugs are dispensed and sold.
- Pharmacy Technician: a health care provider who performs pharmacy-related functions, generally working under the direct supervision of a licensed pharmacist.
- Physical Therapy: the treatment of disease, injury, or deformity by physical methods such as massage, heat treatment, and exercises rather than by drugs or surgery.
- Physician: a person qualified to practice medicine.

- Physician Assistant: a medical professional who can diagnose illness, develop and manage treatment plans, prescribe medications, and often serve as a patient's primary healthcare provider usually under the supervision of a licensed physician.
- Pioneer ACO: designed for health care organizations and providers that were already experienced in coordinating care for patients across care setting. It allows these provider groups to move more rapidly from a shared savings payment model to a population-based payment model on a track consistent with, but separate from, the Medicare Shared Savings Program.
- Pneumonia: lung inflammation caused by bacterial or viral infection, in which the air sacs fill with pus and may become solid.
- Postulate: suggest or assume the existence, fact, or truth of (something) as a basis for reasoning, discussion, or belief.
- Practica: a supervised placement in a variety of settings (i.e., community mental health, hospitals, inpatient) that provides students the opportunity to apply knowledge and clinical skills gained in coursework to develop and practice the professional competencies that are an essential part of the training program.
- Practice Transformation Networks: a program designed to help participants develop the tools, skills, and knowledge necessary to successfully participate in shared shavings programs and other alternative payment models.
- Preceptor: a skilled practitioner or faculty member who supervises students in a clinical setting to allow practical experience with patients.
- Premium: an amount to be paid for an insurance policy.
- Prescribe: to advise and authorize the use of a medicine or treatment for someone, usually put into writing (prescription) for documentation purposes.
- Prevalence: the proportion of a particular population found to be affected by a medical condition.
- Primary Care: health care provided by a medical professional (such as a general practitioner, pediatrician, or nurse) with whom a patient has initial contact and by whom the patient may be referred to a specialist.
- PrimeCare Select ACO: an ACO made up of a team of health care providers working together to coordinate care. It combines the entire range of patient care in an effort to realize greater efficiencies and lower the out-of-pocket costs for patients.
- Privacy Officer/Security Officer: both have a role in developing the facilities policies and procedures, training the staff in HIPPA's requirements, and working to establish and maintain compliance of PHI within the practice.
- Projection: an estimate or forecast of a future situation or trend based on a study of present ones.
- Prospective Payment System: several payment methodologies for which means of determining insurance reimbursement is based on a predetermined payment regardless of the intensity of the actual service provided.

- Prosthodontics: the branch of dentistry concerned with the design, manufacture and fitting of artificial replacements for teeth and other parts of the mouth.
- Prudent: acting with or showing care and thought for the future.
- Psychiatric Mental Health Nurse Practitioner: an advanced practice nurse who has the education and training to provide a wide range of mental health services to patients and families in a variety to settings. They can diagnose, conduct therapy, and prescribe medication for patients with psychiatric disorders, organic brain disorders, or substance abuse problems.
- Psychiatrist: a medical practitioner specializing in the diagnosis and treatment of mental illness.
- Psychiatry: the study and treatment of mental illness, emotional disturbance, and abnormal behavior.
- Psychologist: an expert or specialist in psychology.
- Psychology: the scientific study of the human mind and its functions, especially those affecting behavior in a given context.
- Psychometric test: a standard and scientific method used to measure individuals' mental capabilities and behavioral style
- Public Health: promotes and protects the health of people and the communities where they live, learn, work, and play through scientific research, education, and policy.
- Public Health Accreditation Board: a nonprofit organization dedicated to improving and protecting the health of the public by advancing and ultimately transforming the quality and performance of state, local, tribal, and territorial public health departments.
- Public Policy: government policies that affect the whole population.
- Pulmonology: the branch of medicine concerned with the diagnosis and treatment of disease involving the respiratory tract.

Q

- Quality Health Associates of North Dakota: collaborates with healthcare professionals, organizations, and communities across the state to improve the quality of care provided to the people of North Dakota by successfully balancing the needs of providers, consumers, stakeholders, and payers.
- Quality Improvement Organization: a group of health quality experts, clinicians, and consumers organized to improve the quality of care delivered to people with Medicare.
- Quarantine: In the context of infectious disease management, the separation of contacts from others after exposure to a probable or confirmed case of infection.
- Quartile: each of four equal groups into which a population can be divided according to the distribution of values of a particular variable.
- Quick response units: also known as first responders

R

- Radiation Therapy: a type of cancer treatment that uses external beams of intense energy to kill cancer cells
- Radiation Therapy Technologist: allied health professionals who work in medical and clinical settings administering radiation treatments to patients in highly targeted ways.
- Radiographer: also referred to as radiology technologists are allied health professionals who take x-rays and other medical images to assist clinical radiologists and other doctors to diagnose, monitor, or treat a patient's injury or illness.
- Radiology: the science dealing with x-rays and other high-energy radiation, especially the use of such radiation for the diagnosis and treatment of diseases.
- Regional Extension Center: an organization that has received funding under the Health Information Technology for Economic and Clinical Health Act to assist health care providers with the selection and implementation of electronic health record technology
- Regional Extension Assistance Center for HIT: formed as a program of an alliance of nonprofit organizations dedicated to helping clinics, small hospitals, and other settings in Minnesota and North Dakota improve care by implementing and effectively using electronic health record systems.
- Registered Behavior Technician: paraprofessional certification in behavior analysis and a person who assists in delivering behavior analysis services and practice under supervision.
- Registered Nurse: a graduate trained nurse who has been licensed by a state authority after qualifying for registration.
- Rehabilitation: treatment or treatments designed to facilitate the process of recovery from injury, illness or disease to as normal a condition as possible.
- Reimburse: to repay a person who has spent or lost money.
- Renal Disease: kidney failure, also called end-stage kidney disease which means the kidneys no longer work well enough to filter waste out of the blood.
- Residency: a period of specialized medical training in a hospital under the direct or indirect supervision of an attending physician.
- Respiratory Disease: a group of disease that damage the airways and lungs, and affect one's ability to breath properly.
- Respiratory Therapist: a licensed individual in the medical field that cares for patients who have trouble breathing due to various causes such as asthma, emphysema, or premature infants with underdeveloped lungs.
- Retention: the ability of an organization to retain its employees.
- Robert Graham Center: aims to improve individual and population healthcare delivery through the generation or synthesis of evidence that brings a family medicine and primary care perspective to health policy deliberations from the local to international levels.

- Rural: areas with a core population of less than 10,000.
- Rural Health Clinic: a clinic located in a rural, medically under-served that has a separate reimbursement structure from the standard medical office under the Medicare and Medicaid programs. They can be public, non-profit, or for-profit healthcare facilities.
- Rural Health Network Development Grant Program: the purpose of the program is to support rural integrated health care networks that have combined the functions of the entities participating in the network.
- Rural Opportunities in Medical Education (ROME) Program: a 24-48-week interdisciplinary experience in a rural primary care setting, open to third-year students at the University of North Dakota School of Medicine and Health Sciences. Students live and train in non-metropolitan communities under the supervision of physician preceptors.
- Rural-Urban Commuting Area (RUCA) codes: classify U.S. census tracts using measures of urbanization, population density, and daily commuting from the decennial census.

S

- Salient: most noticeable or important
- Satellite Clinic: a facility owned by a hospital but operated at a distant site.
- School Psychologist: an expert who intervenes at the individual and school system level to provide support for various developmental and mental health issues.
- SARS-CoV-2: severe acute respiratory syndrome coronavirus 2, the infection that causes the illness named COVID-19.
- Scoliosis: abnormal lateral curvature of the spine.
- Scope of Practice: describes the procedures, actions, and processes that a healthcare practitioner is permitted to undertake in keeping with the terms of their professional license.
- Sequestration: the action of taking legal possession of assets until a debt has been paid or other claims have been met.
- Shared Savings ACO: facilitates coordination and cooperation among providers to improve the quality of care for Medicare fee-for-service beneficiaries and reduce unnecessary costs.
- Sigmoidoscopy: an examination of the sigmoid colon by means of a flexible tube inserted through the anus
- Simulation in Motion-North Dakota: a statewide, mobile education system using high fidelity human patient simulators to train pre-hospital and hospital personnel.
- Skilled Nursing Facility: a facility, very similar to a nursing home, that provides skilled nursing care and/or rehabilitative services to help injured, sick, or disabled individuals. These facilities typically offer more skilled medical expertise and services than a nursing home.

- Sliding fee: variable prices for products, services, or taxes based on a customer's ability to pay.
- Social Determinants of Health: the economic and social conditions that influence individual and group differences in health status.
- Social Services: services provided (usually through a government) for the benefit of the community, such as education, medical care, and housing.
- Social Worker: a trained person who works to alleviate the conditions of those in need of help or welfare.
- Socioeconomic Status: the social standing or class of an individual or group. It is often measured by a combination of education, income, and occupation.
- Specialty Care: specialized medical service provided by a physician specialist such as dermatology, mental health, oncology, or cardiology.
- Speech Therapy: training to help people with speech and language problems to speak more clearly.
- State Stroke System of Care Program: guidelines that were developed to assist healthcare providers in the care of stroke patients with a goal to reduce death and disability due to heart disease.
- Statewide Online Ambulance Reporting System: an online system that allows hospitals to log on and download patient-care reports in instances where that facility is listed as the destination.
- Stroke: when blood flow to a part of the brain stops usually caused by a clot in the blood vessels of the brain.
- ST-Segment Elevation Myocardial Infarction: a term used to describe a classic heart attack. It is one type of myocardial infarction in which a part of the heart muscle has died die to the obstruction of blood supply to the area.
- Subsidy: a form of financial aid or support extended to an economic sector generally with the aim of promoting economic and social policy.
- Substance Abuse: an overindulgence in or dependence on an addictive substance, especially alcohol or drugs.
- Substance Abuse and Mental Health Services Administration: a branch of the U.S. Department of Health and Human Services that is charged with improving the quality and availability of treatment and rehabilitative services in order to reduce illness, death, disability, and the cost to society resulting from substance abuse and mental illness.
- Sudden Infant Death Syndrome: the death of a seemingly healthy baby in its sleep, due to an apparent spontaneous cessation of breathing.
- Suicide: the action of killing oneself intentionally.
- Surgical Care Improvement Project: a multi-year national campaign to substantially reduce surgical mortality and morbidity through collaborative efforts between healthcare organizations.
- Surgical Technologist: work under the supervision and delegatory authority of a surgeon to facilitate the safe and effective conduct of invasive and non-invasive surgical procedures, ensuring that the operating room environment is safe, that

equipment functions properly, and that the operative procedure is conducted under conditions that maximize patient safety.

- Susceptibility: the state or fact of being likely or liable to be influenced or harmed by a particular thing.
- Synergistic: relating to the interaction or cooperation of two or more organizations, substances, or other agents to produce a combined effect greater than the sum of their separate effects.

T

- Team-Based Care: the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively with patients and their caregivers—to the extent preferred by each patient - to accomplish shared goals within and across settings to achieve coordinated, high-quality care
- Telehealth: the use of electronic information and telecommunication technologies to support long-distance clinical health care professional health-related education, public health, and health administration.
- Telemedicine: the use of electronic technology and telecommunication technologies to support long-distance patient and healthcare provider interactions for the purpose of diagnosis and treatment.
- Telepsychiatry: the application of telemedicine to the specialty field of psychiatry. The term describes the delivery of psychiatric assessment and care through telecommunications technology, usually videoconferencing.
- Tertiary Hospital: a hospital that provides tertiary care, which is health care from specialists in a large hospital after referral from primary care and secondary care.
- Transforming Clinical Practice Initiative: a large federal investment uniquely designed to support clinician practices through nationwide, collaborative, and peer-based learning networks that facilitate large-scale practice transformation.
- Trauma: tissue damage caused by the transfer of thermal, mechanical, electrical, or chemical energy, or by the absences of heat or oxygen; physical injury or a distressing or disturbing experience.
- Trauma Center: a hospital equipped and staffed to provide care for patients suffering from major traumatic injuries such as falls, motor vehicle collisions, or gunshot wounds.
- Tuberculosis: an infectious bacterial disease characterized by the growth of nodules (tubercles) in the tissues, especially the lungs.
- Turnover rate: the percentage of employees leaving a company within a certain period of time.

U

- Ulcer: an open sore on an external or internal surface of the body, caused by a break in the skin or mucous membrane that fails to heal.
- Ultrasound Technician: also referred to as a sonographer or diagnostic medical sonographer, operates special equipment that uses high-frequency sound waves to record images of internal organs.
- Urban areas: those with a core city population of 50,000 or greater.
- Urbanization: the process of making an area more urban Urgent Care: walk-in clinics that provide health care for individuals who are unable to see their primary care provider (either due to unavailability or care being needed outside of usual clinic hours) but need immediate care to treat and injury or illness that is not serious enough to require going to an emergency room. These clinics fill the gap between a doctor's office and emergency room care.
- Urology: the branch of medicine and physiology concerned with the function and disorders of the urinary system.
- U.S. Department of Agriculture: a department within the U.S. federal government responsible for developing and executing federal laws related to farming, forestry, rural economic development, and food.
- U.S. Department of Health and Human Services: a cabinet-level agency in the executive branch of the federal government tasked with enhancing and protecting the well-being of all Americans by providing effective health and human services and fostering advances in medicine, public health, and social services.
- U.S. Department of Veterans Affairs: a department within the U.S. federal government tasked with providing patient care and federal benefits to veterans and their dependents.

V

- Vacancy rate: number of vacant job-specific positions (or positions within the whole organization), divided by the total number of job-specific positions (or within the whole organization), multiplied by 100
- Vaccination: treatment with a vaccine to produce immunity against a disease.
- Value-Based Purchasing Program: an initiative of the Centers for Medicare and Medicaid that rewards acute-care hospitals with incentive payments for the quality of care they provide to Medicare beneficiaries.
- Vocational Rehabilitation Counselor: a professional who works with people with physical, mental, developmental, or emotional disabilities to overcome or manage the effects of disabilities on employment or independent living.
- Volunteer: a person who freely offers to take part in an enterprise or undertake a task.

W

- Webinar: a seminar conducted over the internet.
- World Health Organization: a specialized agency of the United Nations that is concerned with international public health. The primary role is to direct international health within the United Nations' system and to lead partners in global health responses.

XYZ