



## 2010 Snapshot of North Dakota's Health Care Workforce

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**TABLE OF CONTENTS**

EXECUTIVE SUMMARY AND OVERALL FINDINGS..... 4

INTRODUCTION ..... 7

FUTURE HEALTH WORKFORCE PROVIDERS ..... 12

MEDICINE..... 17

    PHYSICIAN, ALL ..... 17

    ANESTHESIOLOGIST..... 23

    FAMILY AND GENERAL PRACTITIONER ..... 25

    GENERAL INTERNIST ..... 28

    OBSTETRICIAN AND GYNECOLOGIST ..... 30

    PEDIATRICIAN..... 32

    PSYCHIATRIST ..... 34

    SURGEON..... 3635

    PHYSICIAN AND SURGEON, ALL OTHER..... 38

DENTISTRY ..... 40

    DENTIST ..... 40

    DENTAL HYGIENIST ..... 43

NON-PHYSICIAN CLINICIAN ..... 47

    PHYSICIAN ASSISTANT..... 47

    ADVANCED PRACTICE REGISTERED NURSE ..... 50

    CHIROPRACTOR..... 55

    OPTOMETRIST ..... 57

NURSING..... 58

    REGISTERED NURSE ..... 59

    LICENSED PRACTICAL NURSE..... 63

BEHAVIORAL AND ALLIED HEALTH..... 67

    PSYCHOLOGIST..... 68

    SOCIAL WORK..... 71

    PHYSICAL THERAPIST ..... 74

    PHYSICAL THERAPY ASSISTANT ..... 78

OCCUPATIONAL THERAPIST .....	81
OCCUPATIONAL THERAPY ASSISTANT.....	84
DIETICIAN .....	87
RESPIRATORY THERAPIST.....	90
PARAMEDIC/ EMERGENCY MEDICAL TECHNICIAN.....	93
MEDICAL AND CLINICAL LABORATORY TECHNOLOGISTS .....	97
MEDICAL AND CLINICAL LABORATORY TECHNICIAN .....	99
PHARMACY .....	102
PHARMACIST.....	102
PHARMACY TECHNICIAN .....	105
REFERENCES .....	108
APPENDIX A: Data Summary .....	114

## EXECUTIVE SUMMARY AND OVERALL FINDINGS

Nationally, it is projected that over 4.0 million jobs will be generated in health care by 2018 due to an aging population and advances in medical technology (Woods, 2009). Within North Dakota, health care and social assistance is the second largest industry with an estimated 48,427 workers (Job Service North Dakota, 2009). Healthcare facilities are economic drivers in our communities and are a vital part of North Dakota's future growth. Ensuring that each North Dakotan has access to high quality care will be even more important as health care reform is implemented. This report provides a snapshot of our current health care workforce. It provides information about future health care providers that are in high school and current health profession students. The report also includes information about the supply and demand of providers throughout the state. This report was prepared in response to and with funding from the North Dakota State Legislature to assist with statewide health workforce planning. This report will also be utilized within the new North Dakota Area Health Education Center program as it grows its regionally based academic-community partnerships and works to provide access to health care providers through health care awareness, student and provider support programs and recruitment/retention activities. See appendix A for a summary table of findings.

### *Overall Findings*

Several professions have more providers statewide than the national average (family and general practitioners, general internists, obstetricians and gynecologists, pediatricians, psychiatrists, surgeons, dental hygienists, physician assistants, advanced practice registered nurses, registered nursing, licensed practical nurses, psychologists, occupational therapists, occupational therapy assistants, respiratory therapists, medical and clinical laboratory technologists and pharmacists). However, maldistribution of providers has resulted in many rural counties without adequate access to health care services. In some cases, more providers are needed in North Dakota as compared to the nation due to an aging population and provision of care across rural areas. Programs designed to increase awareness about rural practice for students and graduating providers to increase recruitment along with supportive programs for providers located in the rural areas can help recruit and retain providers in these areas. Research has shown, for example, family medicine providers that graduate from rural residency programs are three times more likely to practice in rural areas (Chen, Andrilla, Doescher & Morris, 2009).

Other providers, (chiropractors, optometrists, social workers, dieticians, and emergency medical technicians), that have more than the national average are mostly distributed throughout the state with only a few counties with an inadequate supply of providers and low vacancy rates. These professions could be examined more closely to determine what strategies have been utilized to ensure this supply. For example, North Dakota has recently focused efforts on

providing support to emergency medical services by providing financial support to rural hospitals to hire paramedics.

For many health professions, several counties have zero providers. Future studies should examine the regionalization of services including determining secondary and outreach sites in order to determine where gaps exist at the community level. Once gaps are determined, efforts for network organizations to share providers or services could ensure access to these services. In addition, telehealth could be expanded to provide these services to very rural communities.

Many professions are dominated by particular gender (male dominated: anesthesiology, family and general practitioners, general internists, surgeons, other physicians/surgeons, dentists and chiropractors, female dominated: dental hygienist, physician assistant, advanced practice registered nurses, registered nurses, licensed practical nurses, social worker, physical therapy assistants, occupational therapists, occupational therapy assistants, respiratory therapists). To increase the potential workforce and greater provider diversity, efforts should be increased to encourage males and females into the wide array of health care occupations in North Dakota.

Several professions include many providers (over 20%) who will potentially retire within the next 10 years (anesthesiologists, family and general practitioners, general internists, obstetrics/gynecology, pediatricians, psychiatrists, surgeons, other physicians and surgeons, dentists, advanced practice registered nurses, registered nurses, licensed practical nurses and social workers). Efforts to encourage more providers into these fields retain them in North Dakota and provide support throughout their career should be increased. In addition, providers nearing retirement age could become engaged in mentoring, teaching, planning and other alternative roles which may help retain them in the workforce longer.

Several professions have salaries which are below the national average (anesthesiologists, pediatricians, psychiatrists, dental hygienists, physician assistants, advanced practice registered nurses, registered nurses, licensed practical nurses, physical therapists, physical therapist assistants, occupational therapists/assistants, dieticians, respiratory therapists, emergency medical technicians/paramedics, clinical laboratory technologists/technicians and pharmacists). In order to increase North Dakota's ability to recruit and retain these providers, mechanisms to potentially increase salaries should be explored including reimbursement rates and tax incentives.

## *Data Findings*

Although supply data is available for all provider groups, a comprehensive assessment of service area for each provider has not been conducted. For example, although psychiatrists are regionally distributed, are they available for patients throughout each region? Are there barriers that patients encounter such as distance and availability of appointments? Are distance models of care such as telemedicine being used to reach patients from rural areas?

Little data exists on race at the state board level. Few boards collect this information and/or include this information in their electronic database. Due to this limitation, it is difficult to provide a recommendation regarding health care workforce cultural diversity.

Several licensure boards only have mailing lists available electronically. Support is needed to include other information in databases including age, gender, race, practice sites, training program and annual salary.

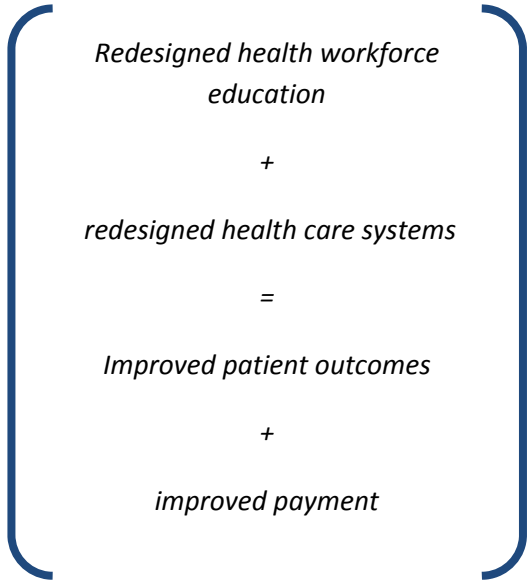
Several professions were excluded from this report due to difficulty matching licensure data with Bureau of Labor Statistics Data. This included professional counselors and x-ray technicians. In addition, several providers were not included that did not have formal training programs through education institutions such as certified nursing assistants and medication assistants or that are newly emerging in North Dakota such as health information technologists and marriage and family therapists. Future studies should examine these professions in more detail including collecting primary data from providers.

## INTRODUCTION

### National Context

The United States is confronting a set of contemporary health and healthcare challenges with numerous and complex elements. Multilayered health professions education and health care delivery systems face an array of demands including expectations for responsiveness in meeting current and emerging health care access and quality needs. For example, demands placed on the nation's healthcare infrastructure include caring for culturally diverse populations with different language and health care customs and markedly increased numbers of individuals seeking care for chronic conditions (Greer, 2008; Medicare Payment Advisory Commission, 2008). An aging population also adds expectations for training and deploying the health workforce to deliver care specific to this population that is accessible, efficient and of high quality. The current health care system, while reflecting high performing components in both rural and urban areas, overall is underperforming (Cantor, Schoen, Belloff, How, and McCarthy, 2007). Deficiencies in the health care sector result in millions of uninsured, poor care quality, escalating costs, and inadequate value for the amount of resources invested. Frequently cited work by McGlynn shows that only about half the time, for a set of common conditions, Americans receive the care that evidence indicates they should. Geographic variation in care quality also exists. Emerging approaches to solving this set of thorny challenges, including driving performance improvement through structural changes in payment policy, have major implications for both the delivery of health care services and the preparation of the workforce providing these services (Wakefield & Moulton, 2008).

Beyond public policymakers, the business community, health care providers, foundations, and others are also advancing solutions with direct and indirect implications for the health care workforce. For example, in their series of reports on quality, the Institute of Medicine (IOM) documented fundamental problems with the U.S. health system. The report *Crossing the Quality Chasm*, (2001) called for major changes in applying evidence, improving care quality, using technology, and preparing the health care workforce. The report cited the health care workforce as an essential element in needed health system transformation and asserted that meeting six priority national aims (safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity) requires much more of health providers. New demands on workforce education programs include ensuring the acquisition of competencies in the areas of interprofessional teamwork, quality improvement, evidence-based practice, patient-centered care, and informatics (IOM, 2003). As policymakers and others advance new performance expectations for health care delivery systems by requiring expanded public reporting of this performance and titrated





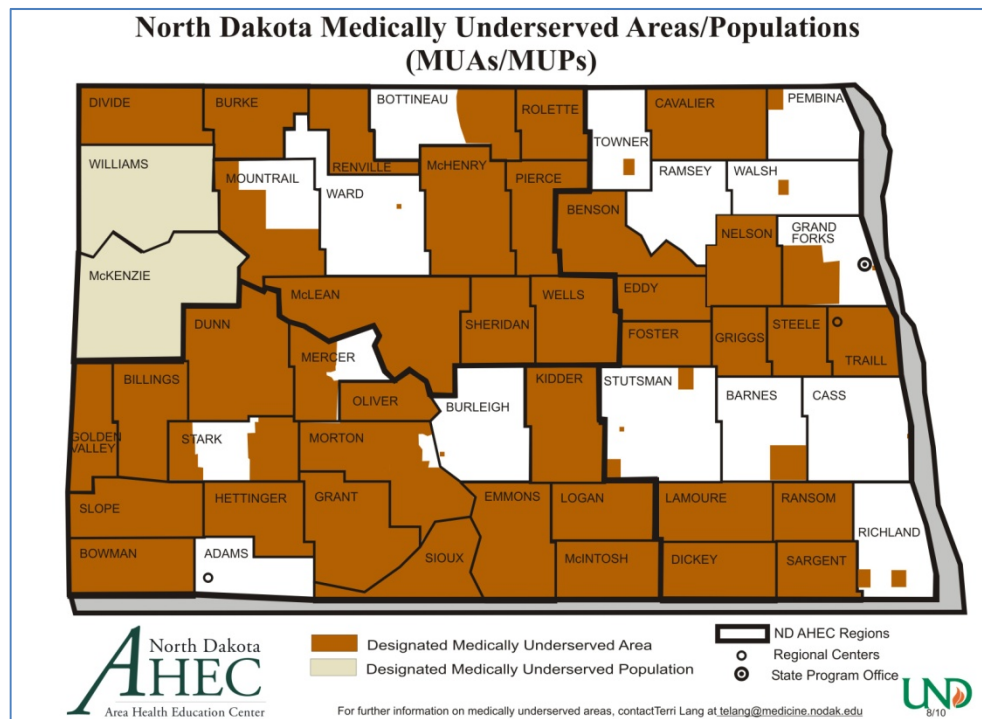
associated reimbursement, the competencies the health care workforce acquires are even more important.

State-of-the-art health professions education that produces clinicians well prepared to contribute to high performing health care organizations is increasingly relevant not only to the health of populations, but also to the financial health of the organizations delivering that care, and to the stakeholders paying for care. Consequently, helping key stakeholders to understand the link between health care quality and the preparation and practice of the healthcare workforce is important. It is against this backdrop of highly complex and far reaching issues, that rural health care and the rural workforce are considered (Wakefield & Moulton, 2008).

### North Dakota Context

Health professional shortages impact all facets of life in North Dakota. 92% of North Dakota counties have full or partial designations as medically underserved areas or populations

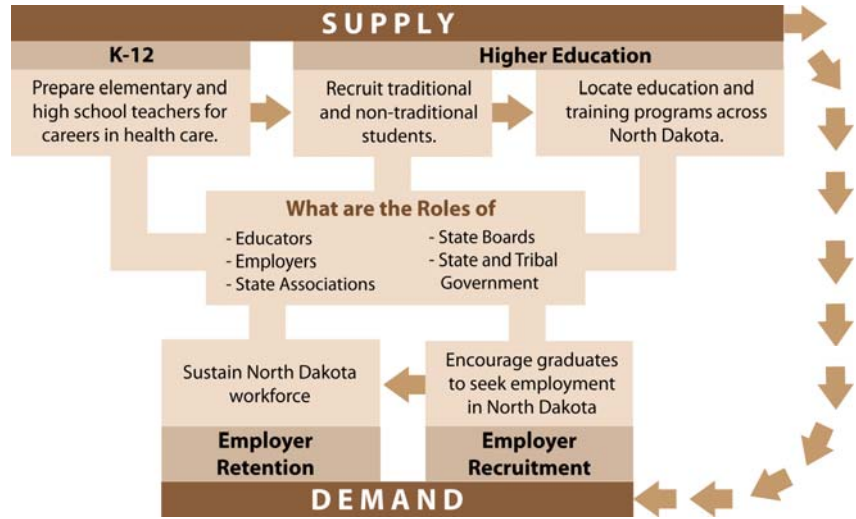
Health care and social assistance is the second largest industry in North Dakota (Government is #1) with an estimated



48,427 workers (Job Service North Dakota, 2008). The Bureau of Labor statistics lists health care as one of the fastest growing industries (Woods, 2009). Health professions are frequently listed in top-ten lists at the state level for high-wages and as high-demand occupations. Abundant data exists in North Dakota regarding workforce. Multiple state agencies collect workforce information including the Job Service ND, Department of Career and Technical Education and the Department of Commerce. In 2007, the North Dakota State Legislature in HB 1018 created the ND Workforce Intelligence Council to increase the effectiveness, credibility and responsiveness of workforce intelligence and to provide a mechanism for a coordinated workforce intelligence effort. This council has been a key partner in accumulating the data in this report. In addition to the Workforce Intelligence Council, licensure boards collect information about health care providers, some health care associations also collect information about their



members and long running studies such as the North Dakota Nursing Needs Study (mandated by the 2001 legislative session) have collected a vast array of health workforce data. To date, a comprehensive compilation of all of this information regarding the health profession workforce has not been available in order for policy makers to effectively plan for the future. This report, funded by the ND State Legislature to provide information for workforce planning, presents a detailed snapshot of a number of health professions in relation to the workforce pipeline. Each section of this report is organized along the health workforce pipeline with available data presented regarding students enrolled in health profession programs and the number and distribution of health professionals in our state.



(Wakefield, Amundson, Moulton, 2006)

The workforce pipeline also indicates that ensuring an adequate health care workforce for North Dakota citizens requires creating a shared statewide agenda. There are roles for many groups to play including educators, employers, state associations and boards and state and tribal government. Given the demographic trajectory of North Dakota as well as anecdotal and quantifiable information about our health care workforce, the state clearly faces emerging challenges to ensure access to an adequate workforce.

### Health Workforce Supply Overview and Data Context

According to the Health Resources and Services Administration, supply is the number of providers working or available to work. Supply can also measure whether there is the right number and mix of health providers. Supply measurements can vary from simply counting the number of providers, to determining provider/population ratios, to determining characteristics of health providers (such as gender, age, race, labor force participation etc) in a particular area (Lewin Group, 2010). Future supply can be extrapolated by looking at projected retirement rates.

Future provider supply data was gathered from ACT test data, information from the North Dakota Department of Career and Technical Education and a survey of high school students by the North Dakota Nursing Needs Study funded by the North Dakota Board of Nursing. Data on current health occupation students was provided by Follow-up Information on North Dakota Education and Training (FINDET) from the North Dakota University System. This information includes the number of students and graduates from all health professions programs in North

Dakota as of fall, 2009. Survey information from studies of medical, nursing and social work students is also included.

Current provider supply data in this report was gathered from ND Licensure Boards, the US Census Bureau (2009 data) and existing survey information from studies examining nursing, medicine and dentistry. This information includes distribution, age, gender, race, employment setting and training program attended if available. The licensure board data is very current; the databases were gathered in April-June of 2010. The licensure board data is restricted to what was available in an electronic database. Many licensure boards only have mailing lists available. Also, the data is self-report, in many cases it is not possible to determine the exact location of providers as they might have provided either their home or work address. Also, many providers work in multiple locations and this is not reflected in the maps. For example, some dentists may work one day a week in a rural site even though their home location is in another county. In addition, providers at military and Indian Health Service facilities are not necessarily included in state licensure database, so may be undercounted in this report. Future studies should more closely examine these facilities.

In addition, the report includes several national data references. Many of these studies are from national professional associations such as the American Medical Association and American Dental Association, studies conducted by the National Center for Health Workforce Information and Analysis and research conducted by individual researchers.

### *Health Workforce Demand Overview and Data Context*

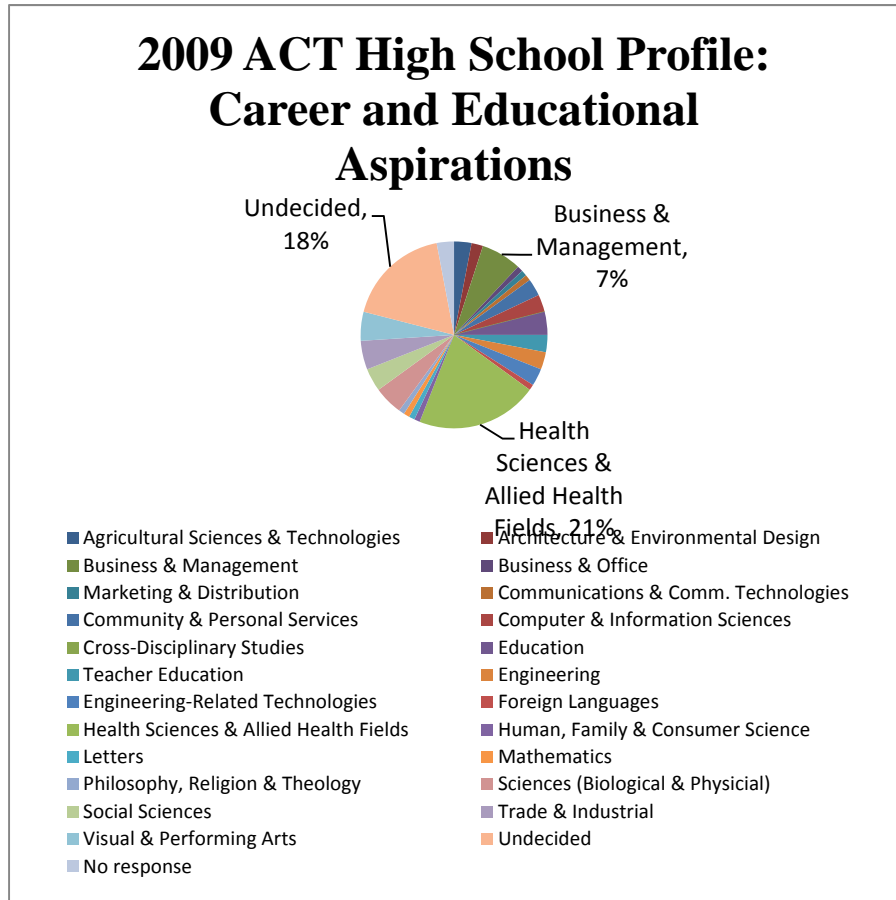
The Health Resources and Services Administration define demand as the willingness of employers to hire workers at a particular salary. Demand represents economic realities and is a primary focus of many health workforce research studies (Lewin Group, 2010). Several estimates of demand are provided in this report:

- The first is industry information available from the North Dakota Workforce Information Network which provides overall employment information. This data is collected on a three year rotating cycle, so estimates are not always current. Employment projections are conducted using standardized Bureau of Labor Statistics methodology and software and include many assumptions that are detailed in *North Dakota Employment Projections 2008-2018 Edition* produced by Job Service of North Dakota. This publication also includes descriptions of growth. This is based on the occupation's long term growth outlook and how rapidly new jobs will be created over the next 10 years as compared to the size of that particular occupation and the average growth rate for all occupations. Growth is rated from declining growth through exceptional growth. Occupations are also rated as high demand occupations when they have positive growth rates and are ranked in the top quartile for total openings in all occupations.

- ND Job Service website information is located at ndjobs.com. This website is populated by employers posting job advertisements and by spider technology which lifts job information from individual employer websites. This data is limited by the accuracy of the job postings and in many cases it is impossible to determine how many employees each employer intends to hire for a particular posting. The spider also only collects information from businesses that include more than 25 employees and will miss many small health care facilities and sole-provider practices. In some cases, the posted jobs are also floating and flex positions; the number of FTE is not available. This data was gathered in May, 2010 when 706 jobs were posted across all health care fields.
- The third demand data is survey data gathered through a statewide health facility survey funded by the North Dakota Area Health Education Center and the North Dakota Nursing Needs Study. This survey was sent to all health care facilities (hospitals, clinics, nursing homes, basic care facilities, adult foster care facilities, skilled care facilities, home health organizations, hospice organizations, human services centers, pharmacies, public health agencies, chiropractor offices, dentist offices, ambulatory surgery facilities and ambulance service agencies) by the North Dakota Area Health Education Center. 663 were returned out of an estimated 1,500 distributed for an estimated response rate of 44%. A standardized formula was used to calculate vacancy rates (Reiner et al., 2005). According to economists, a full workforce in most industries exists when vacancy rates do not exceed five to six percent (Prescott, 2000). A shortage is considered to be present at a sustained vacancy rate above this level.
- Where available, recruitment survey data is also included. Information on position openings has been collected for many years in order to help recruit providers. These surveys have been sent to human resource offices by the Primary Care Office (PCO) on a quarterly basis to determine vacant health care positions for recruitment purposes.

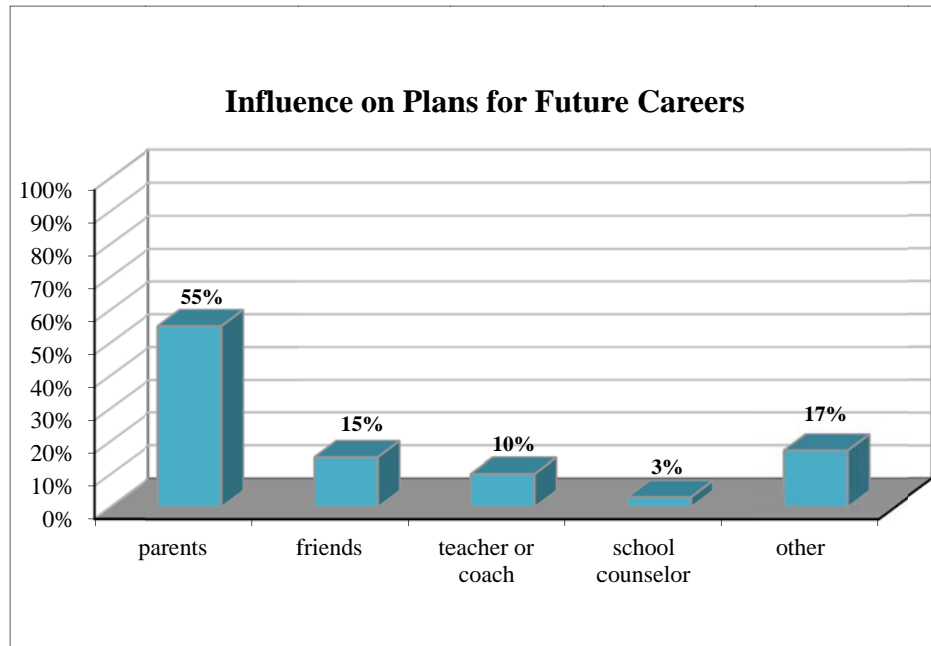
## FUTURE HEALTH WORKFORCE PROVIDERS

The largest percentage of 2009 ND high school students taking the ACT test (Total N= 5,791) indicated an interest in health sciences and allied health fields (21%). Twenty-one percent of ND high school students either indicated no response or were undecided. Nationally, 19% of high school students indicate an interest in a health science or allied health field and 19% indicate undecided or no response. North Dakota has a significant pool of high school students that have not yet decided on their future career (or may have more than one career in mind) that may be recruited into a health care occupation. (ACT Profile Report, 2009). Over the last four years, interest in health professions has been between 16% and 21% (ACT Profile Reports 2006, 2007, 2008, 2009).

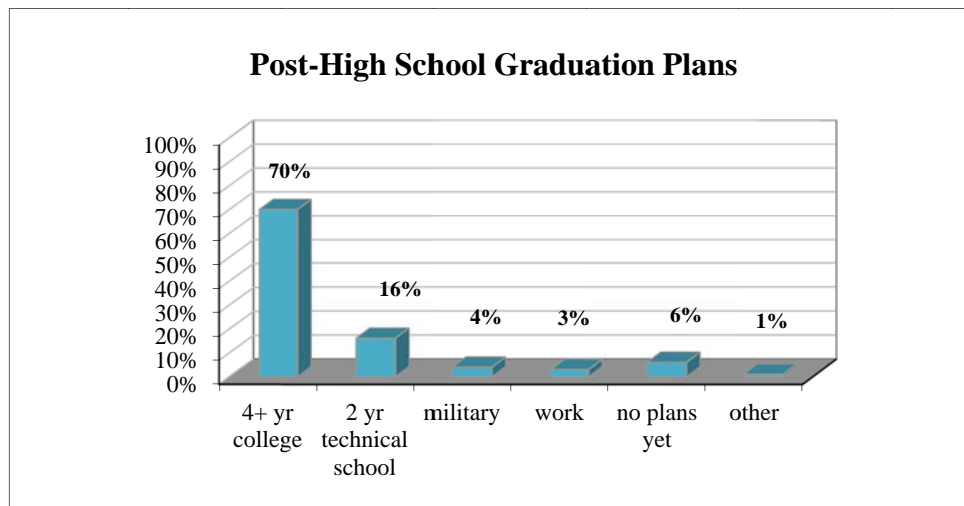


In 2009, of the 5,952 ND high school students which have taken 2 or more credits in a particular Career and Technical discipline, 22% have taken classes in health sciences or human services. Of the 5,250 post-secondary students enrolled in Career and Technical Education, 26% have taken classes in Health Sciences or Human Services (Career and Technical Education, 2009).

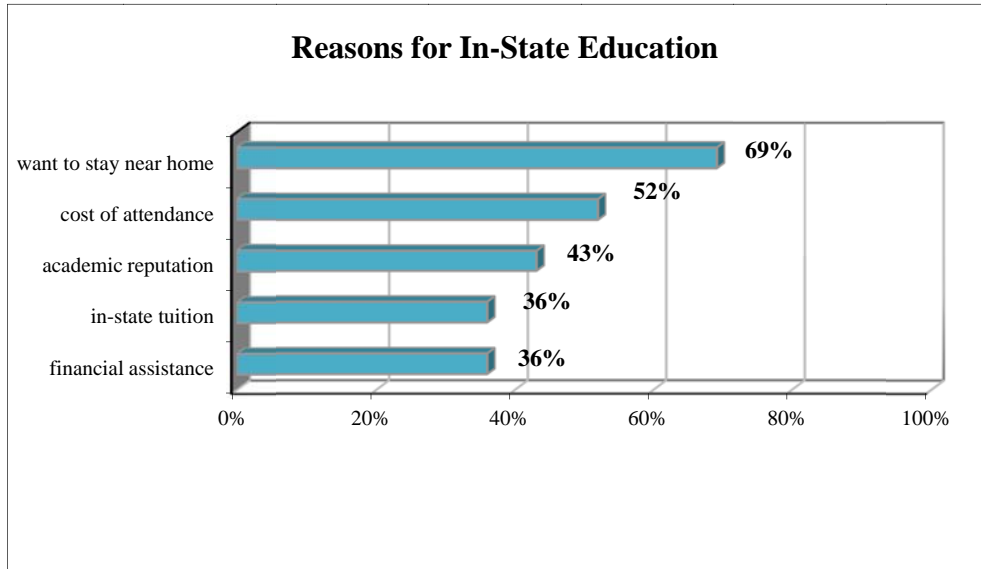
In a 2006 survey of 568 ND high school students, students who were asked who has had the most influence on their decisions about future career plans, over half of students (55%) indicated that their parents were the most influential (Moulton, 2006). These results are comparable with findings from the North Dakota Healthcare Association (2002) study, where students rated their parents as most influential, followed by friends. Teachers and counselors were rated as least influential.



According to the 2006 high school student survey, the majority (70%) plan to pursue a four-year college education. Of ND students with a GPA of at least 3.00, 78% plan to pursue a college education. These findings are comparable to results from a North Dakota Healthcare Association (2002) study that found approximately two-thirds of North Dakota high school students plan to pursue higher education at a four-year college. Numbers of students interested in a technical education at a two-year college are also comparable (16%), with the North Dakota Healthcare Association which reported approximately 15% of respondents interested.



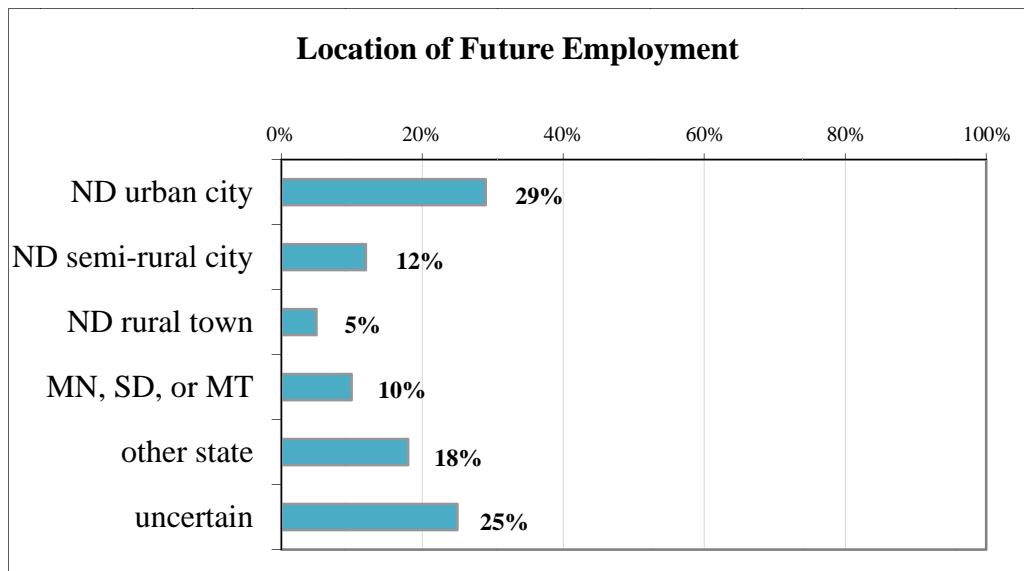
In the same 2006 high school student survey, most ND students (73%) plan to continue their education in North Dakota. This number represents an increase over the 62 percent reported by



the North Dakota Healthcare Association's (2002) study. Students were also asked why they did or did not plan to go to college in North Dakota. The most commonly cited reason for planning to stay in North Dakota was a desire to stay near home (69%).

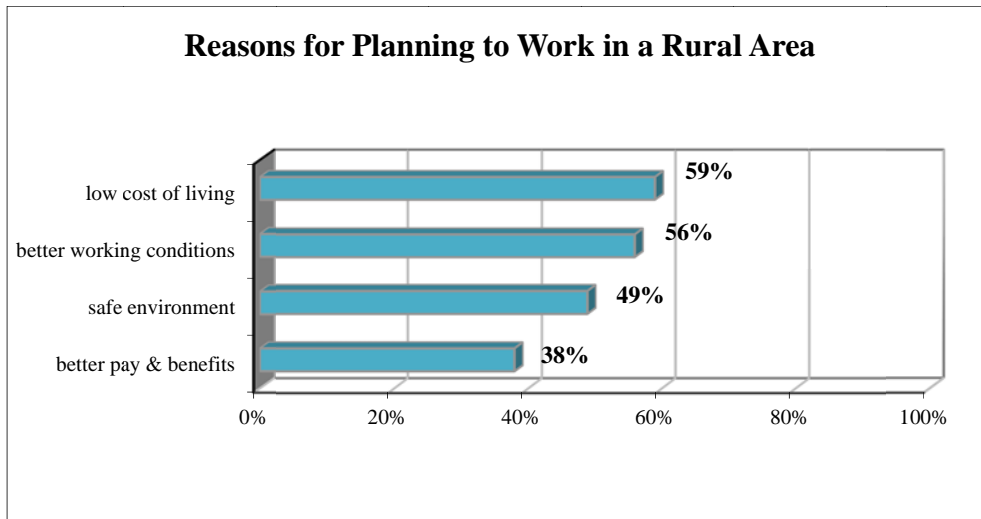
In the 2006 ND high school student survey, some students (29%) plan to seek employment in an urban area of North Dakota after completing their education. One-quarter of students (25%) are uncertain as to the geographic location in which they wish to work, thereby creating a potential for recruitment of these students to jobs in North Dakota. The North Dakota Healthcare Association (2002) reported that 48 percent of students planned to seek employment in North

Dakota after obtaining their desired education. This number is comparable with the sum of the three North Dakota categories shown (46%). Of those high school students who plan to work in North Dakota, most



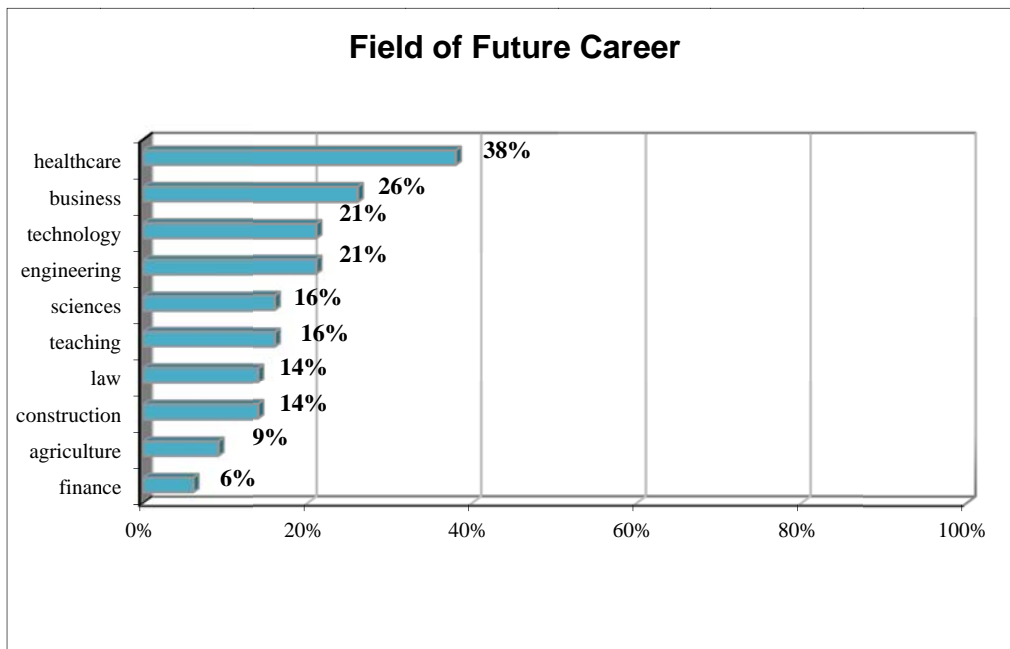
(79%) plan to do so because their family lives in North Dakota. Additionally, many believe it is a safe place to live (68%) and a safe place to raise a family (56%).

Many ND high school students (41%) responded that they plan to work in a rural area. Students



stated a low cost of living (59%) and better working conditions (56%) as the main reasons they plan to work in a rural area (Moulton, 2006).

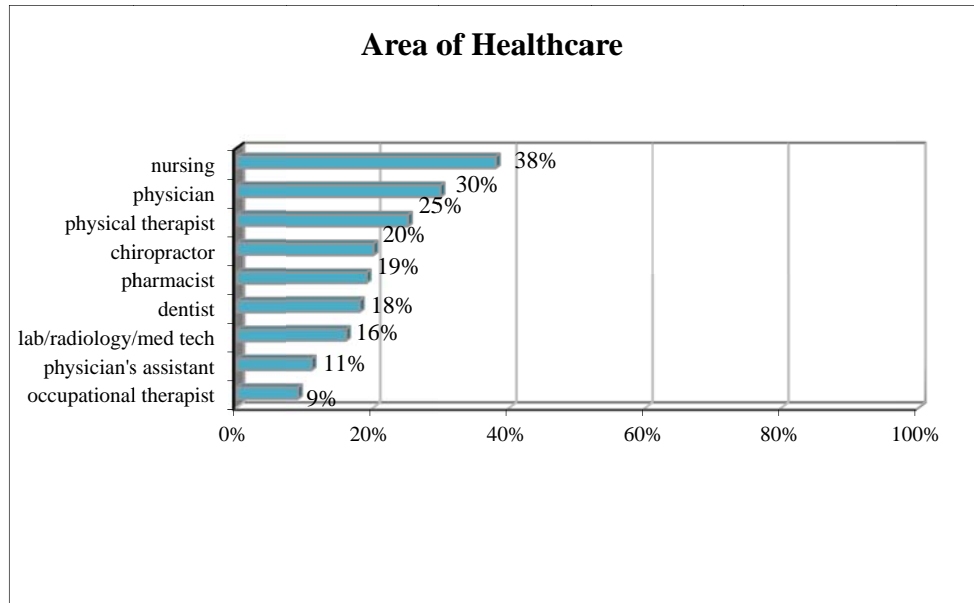
When asked about the field of their future career plans, 38% of ND high school students indicated healthcare and 26% chose business in 2006. The least chosen areas were finance (6%) and agriculture (9%) (Moulton, 2006). The North Dakota Healthcare Association (2002) found



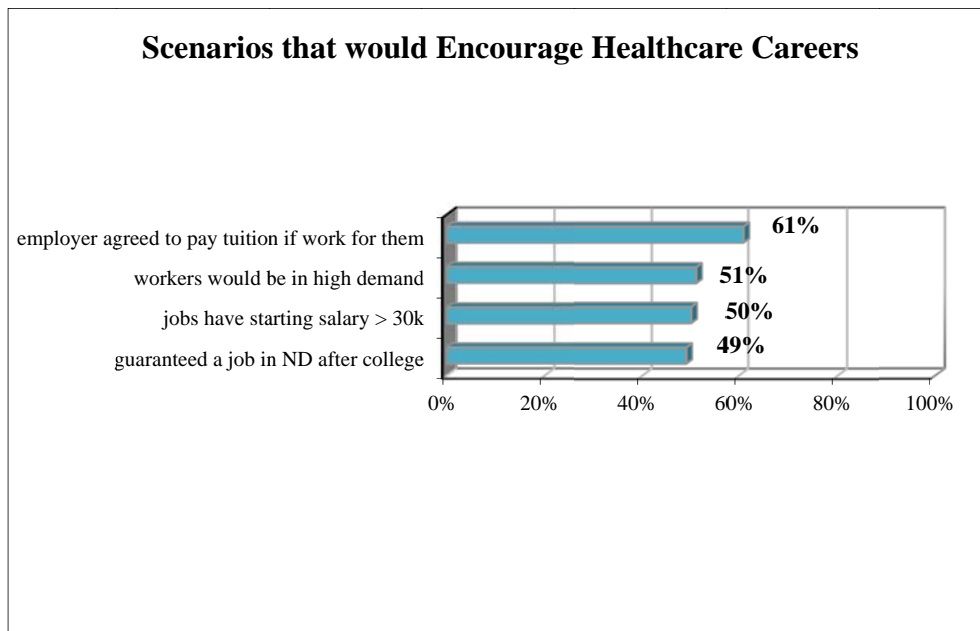
similar trends but lower numbers in the most popular categories, with reports of 23% of students interested in healthcare and 13% of students interested in business.



Of those that chose healthcare as a field, many (38%) indicated plans to become a nurse, followed by an interest in becoming a physician (30%) (Moulton, 2006). Similarly, the North Dakota Healthcare Association's 2002 study revealed that students interested in healthcare were most likely to express interest in careers as a doctor, physical therapist, and nurse.



ND high school students (Moulton, 2006) were also asked if certain scenarios would encourage them to choose a career in healthcare. Students responded the most to “if a local healthcare employer agreed to pay your college tuition in exchange for a guarantee that you would work for them after college, you would be more likely to choose a career in healthcare” (61%).



The North Dakota Healthcare Association (2002) study found that students were most likely to agree that having college tuition paid in exchange for work would increase the likelihood of choosing a healthcare career.

# MEDICINE

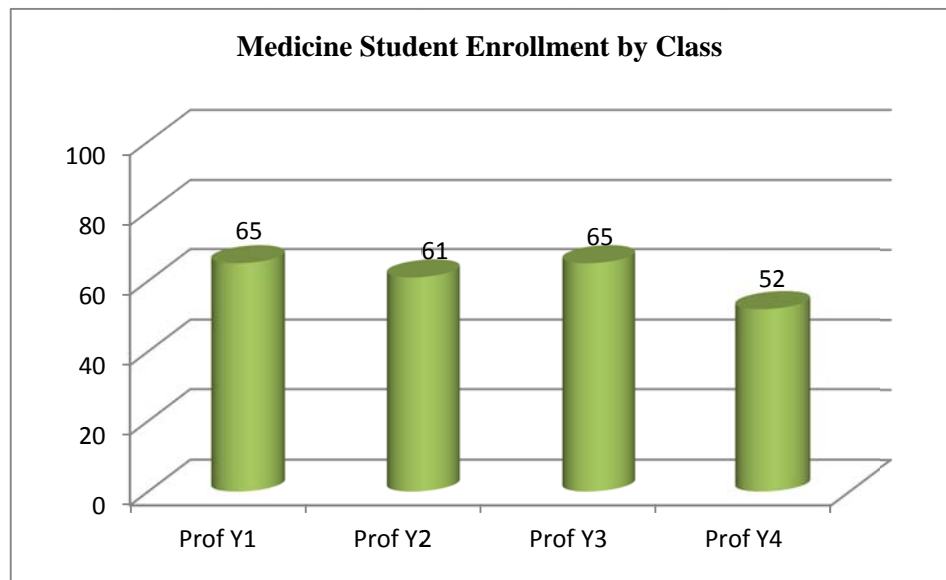
## PHYSICIANS, ALL

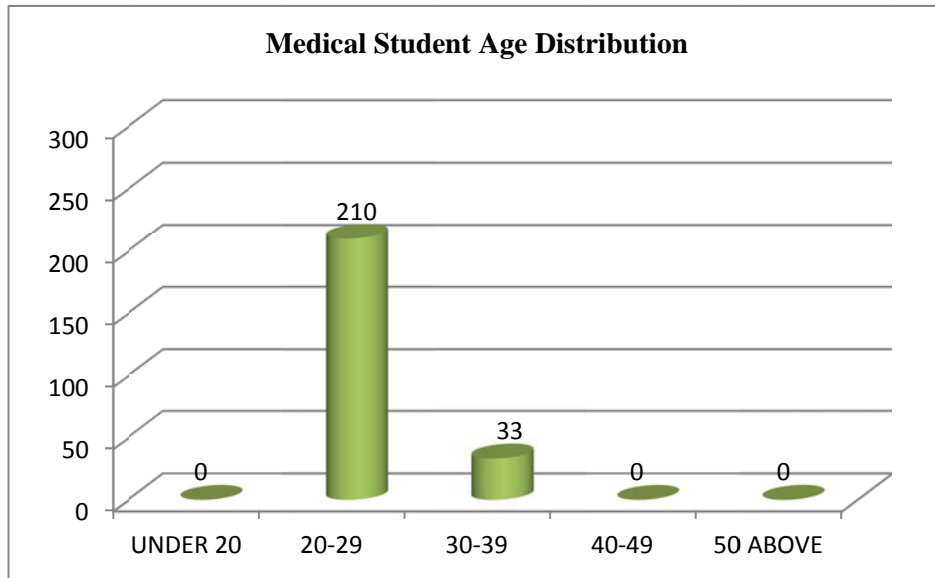
*Physicians and surgeons diagnose illnesses and prescribe and administer treatment for people suffering from injury or disease. They examine patients, obtain medical histories, and order, perform, and interpret diagnostic tests. They also counsel patients on diet, hygiene, and preventive health care. There are two types of licensed physicians: Doctors of Medicine (M.D.s), and Doctors of Osteopathic Medicine (D.O.s). M.D.s are also known as allopathic physicians. The Bureau of Labor Statistics reports that both M.D.s and D.O.s work in one or more of several specialties: anesthesiology, family and general medicine, general internal medicine, general pediatrics, obstetrics and gynecology, psychiatry, and surgery are a few examples. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 243 students are enrolled. In the past 12 months there have been 59 graduates (FINDET, 2009).

52% of current medical students are male (FINDET, 2009).



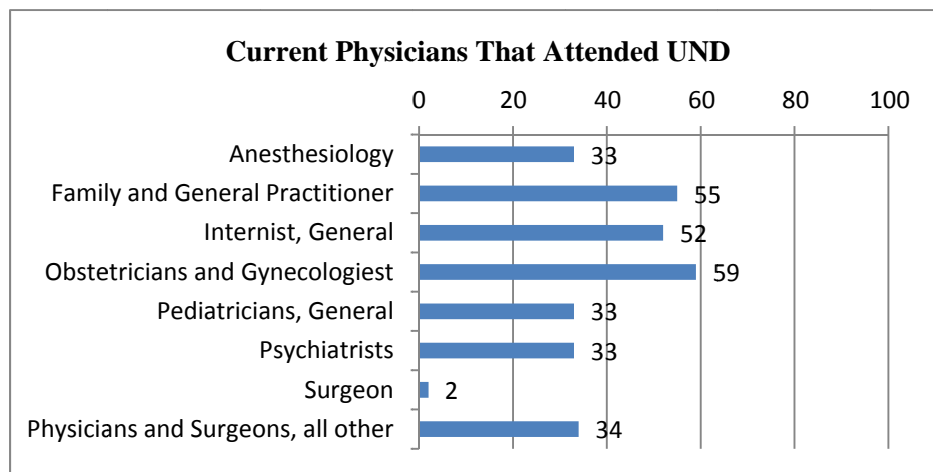


Most medical students are between 20 and 29 years old (FINDET, 2009).

40% of current ND Physicians attended the University of North Dakota Medical School, 8% attended the University of Minnesota, 2% attended the University of South Dakota and 2% attended the University of Iowa, the other 52% attended other medical schools (ND Medical Database, 2010). Nationally, 39% of physicians are practicing in the state where they attended medical school (AAMC, 2009).

In 2005, 34% of ND physicians had attended medical school in North Dakota, 8% in Minnesota, 3% in South Dakota and 55% in other locations. (Amundson et al., 2005).

Divided by specialty, over 50% of obstetricians/gynecologists, family and general practitioner and general internists attended the University of North Dakota School of Medicine and Health Sciences.



In 2005, 26% of ND Physicians had completed their residency training in North Dakota, 13% in Minnesota, 1% in South Dakota and 60% in other states (Amundson et al., 2005).

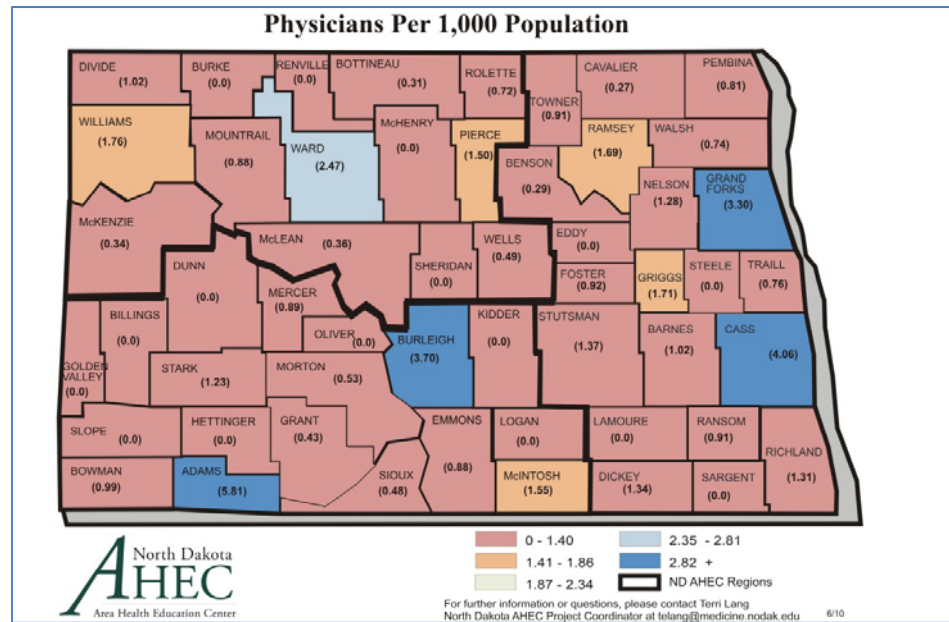
In 2005, 46% of medical students and 45% of residents indicated that they plan to work in North Dakota upon graduation. They indicated that their family lives in ND, that it is a safe place to live, a safe place to raise a family and that there is a low cost of living. Those students and residents that indicated plans to work outside of North Dakota indicated that their family lives outside of North Dakota and that their spouse/significant other is unable to find employment in ND. (Moulton & Amundson, 2005).

25% of ND physicians are International Medical Graduates compared to 24% nationally (AAMC, 2009).

72% of medical students were from North Dakota compared to 62% nationally that matriculated to their home state in the 2008-2009 academic years (AAMC, 2009).

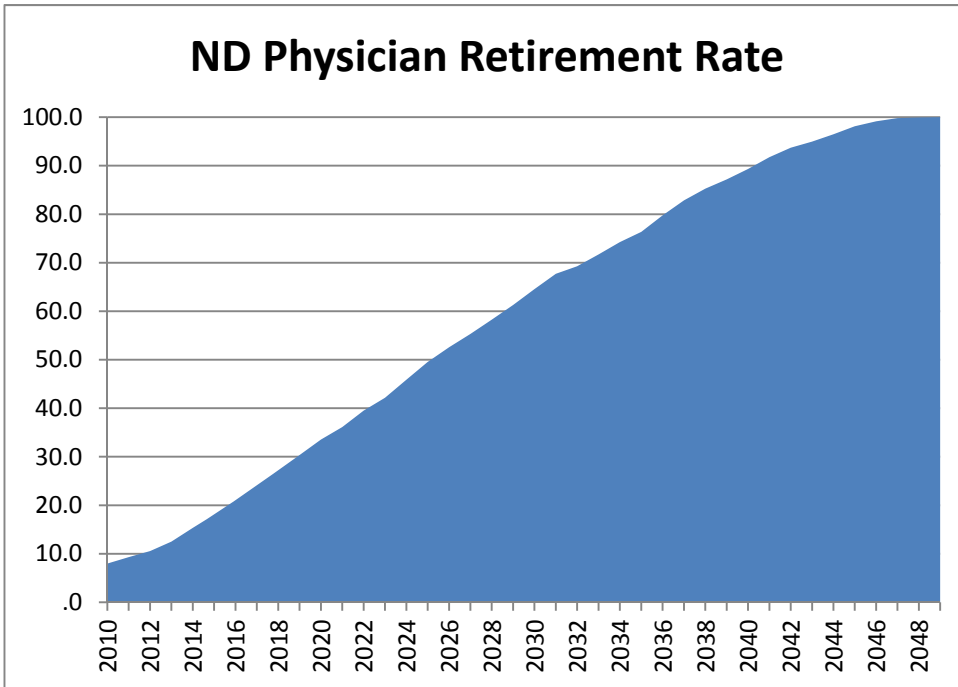
### Current Supply Characteristics of Providers

There are 1,508 physicians in North Dakota. 1,452 are MDs, 54 are DOs and 2 are MD JDs. There are 2.33 physicians per 1,000 people in ND compared to 1.87 physicians nationally (ND Medical Database, 2010). 48 counties have less than the national average.



Currently, 77% of ND physicians are male (ND Board Data). In 2005, 79% of ND physicians were male (Amundson et al., 2005). Nationally, 71% of physicians are male (AMA, Physicians Professional Data, 2008, AAMC, 2009). Nationally, the greatest percentage (31%) of female physicians are between 35- 44 years of age (Physician Characteristics & Distribution, 2008, AMA).

Currently, the average age of physicians is 51 years (ND Medical Database, 2010). In 2005, the average age of ND physicians was 51 years (Amundson et al., 2005). In 2005, 26% of ND



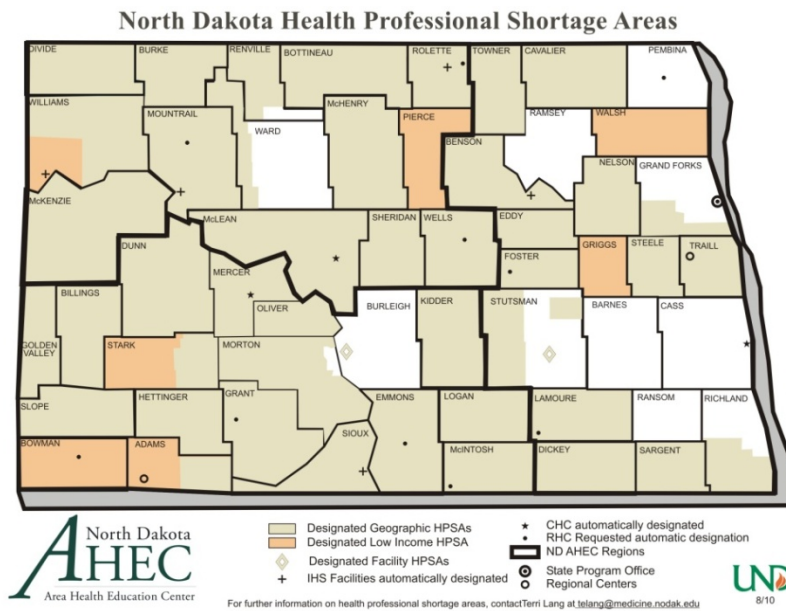
physicians planned to retire in the next 10 years (by 2015) (Amundson et al., 2005). Assuming retirement by age 67, 34% of ND physicians will retire by 2020 (ND Medical Database, 2010).

In 2005, 80% of ND physicians were non-Hispanic white, 5% Asian-Indian, 2% American-Indian and 13% other race (Amundson et al., 2005). According to the AMA, 82% of ND physicians are non-Hispanic White, 9% are Asian, and 1% is American Indian. Nationally, 75% of physicians that indicated race are non-Hispanic white, 13% are Asian, and less than 1% are American Indian (AMA, 2008)

## Current Demand of Providers

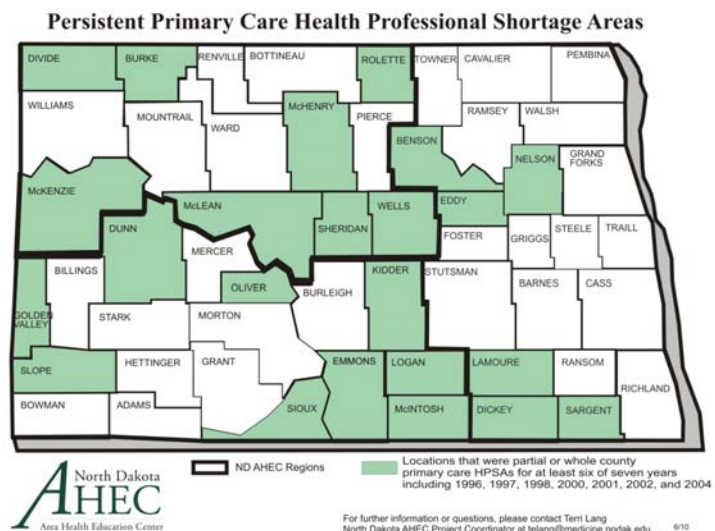
In 2005, 26% of ND physicians worked in a free-standing clinic, 25% in a hospital based clinic, 19% in a hospital, 18% in an office and 12% in other alternative arrangements. (Amundson et al., 2005)

The average vacancy rate for physicians at 65 responding health care facilities is 16.37% (SD=22.87) (ND AHEC Health Professions Survey, 2010). Nationally, the vacancy rate for physicians in hospitals is 11% (AMN Healthcare, 2009).



Using federal designation methodology, 89% of North Dakota's counties are partially or fully designated as Primary Care Health Professional Shortage Areas (HPSA) - family medicine, general medicine, general internal medicine, general pediatrics, and general obstetrics/gynecology are included in HPSA designations.

23 counties have been classified as persistent whole county primary care HPSAs that have retained the HPSA designation for at least seven years. Nationally, counties with this designation have the lowest primary care physician supply, the lowest percentage of rural adults with a regular primary care provider and are the most likely to forego needed health care due to cost (Doescher et al., 2009).



### **Physician Summary**

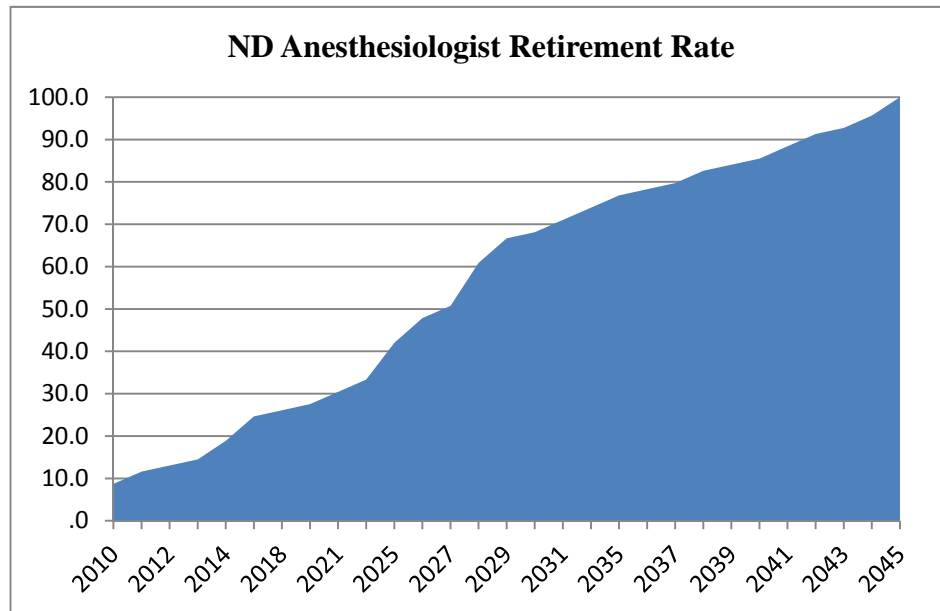
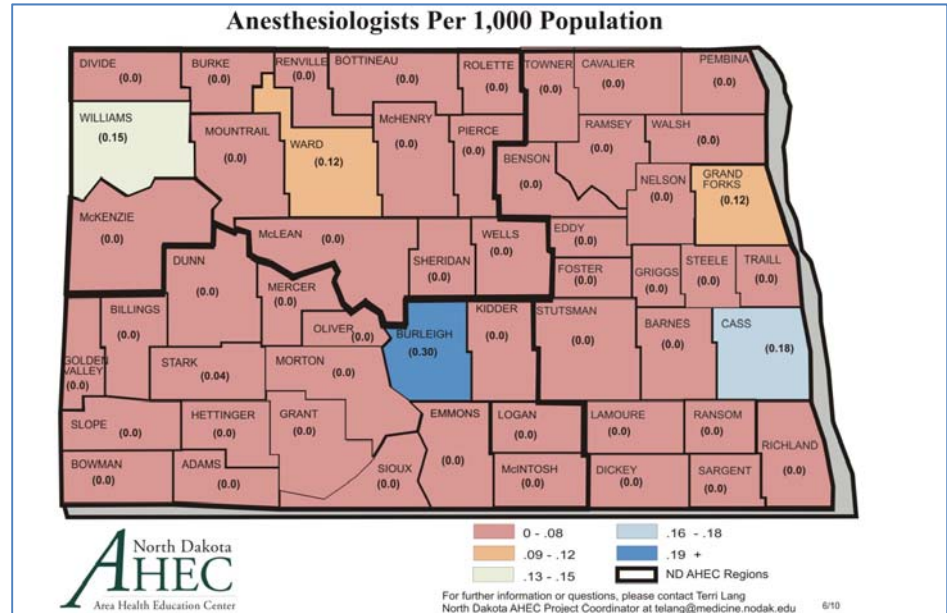
Of currently practicing providers, over half of family and general practitioners, general internists and obstetricians /gynecologists attended the University of North Dakota School of Medicine and Health Sciences. More than one-third of all physicians will have reached retirement age in 10 years. 89% of North Dakota's counties are designated as Primary Care Health Professional Shortage Area and 23 of these counties have been classified as persistent shortage areas.



# ANESTHESIOLOGIST

## Current Supply Characteristics of Providers

There are 69 anesthesiologists in ND. There are .11 anesthesiologists per 1,000 people in ND compared to .12 nationally. 50 counties are below the national average.

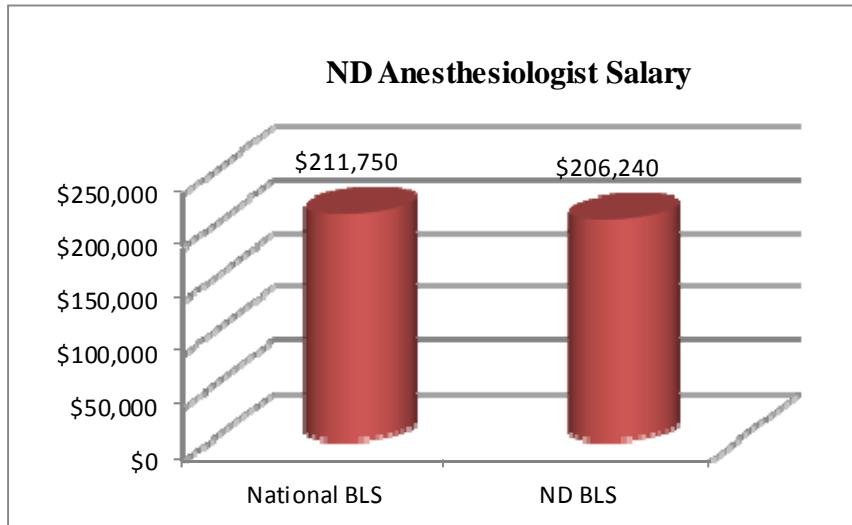


The average age of ND anesthesiologists is 50 years old. Assuming retirement by age 67, 29% will retire by 2020. (ND Medical Database, 2010)

80% of ND anesthesiologists are male (ND Medical Database, 2010).

## Current Demand of Providers

In 2008 there were an estimated 39 jobs for ND anesthesiologists which was projected to increase by 13% by 2018 to 44 jobs and is classified as a high growth occupation (ND Job Service, 2010).



Average ND anesthesiologist salary is lower than the national average (US Bureau of Labor Statistics, 2010).

### Anesthesiologist Summary

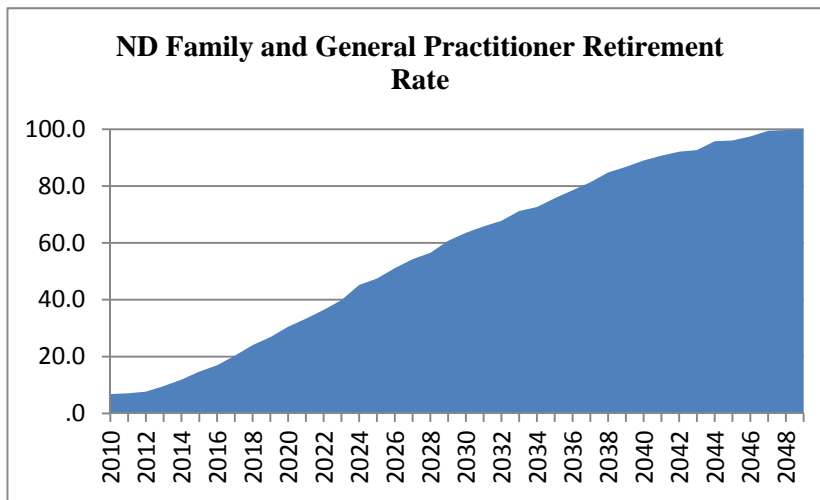
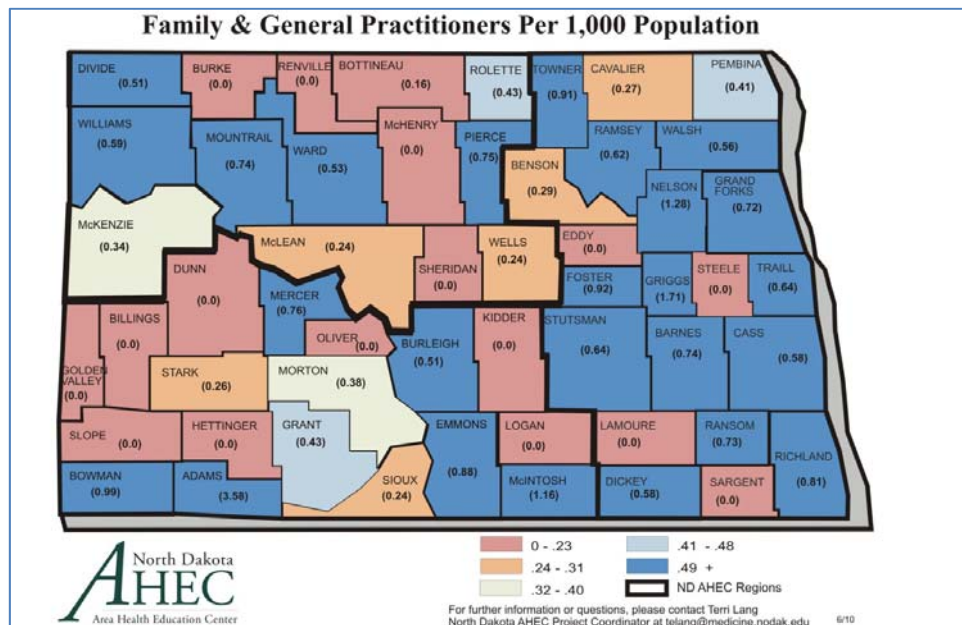
Most counties have less than the national average of anesthesiologists. These providers also tend to be regionally based. However, regional centers also have fewer anesthesiologists including Grand Forks, Ward County, Ramsey, Stark and Stutsman counties. Some of these counties are covered by certified nurse anesthetists for which, although there is state level data, no national comparative data exists.

## FAMILY AND GENERAL PRACTITIONER

Family medicine physicians are usually the first doctors people see for medical care; they act as the traditional family doctor. Their patients are all ages. Family physicians assess and treat a wide variety of conditions involving all the organ systems and every disease. Family medicine physicians foster long-term relationships with their patients. They refer patients with more serious conditions to specialists or other health-care facilities for more intensive care (Health Workforce Information Center, 2010)

### Current Supply Characteristics of Providers

There are 354 Family and General Practitioners in ND. There are .55 Family and General Practitioners per 1,000 people in ND compared to .32 nationally. 25 counties in ND have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).



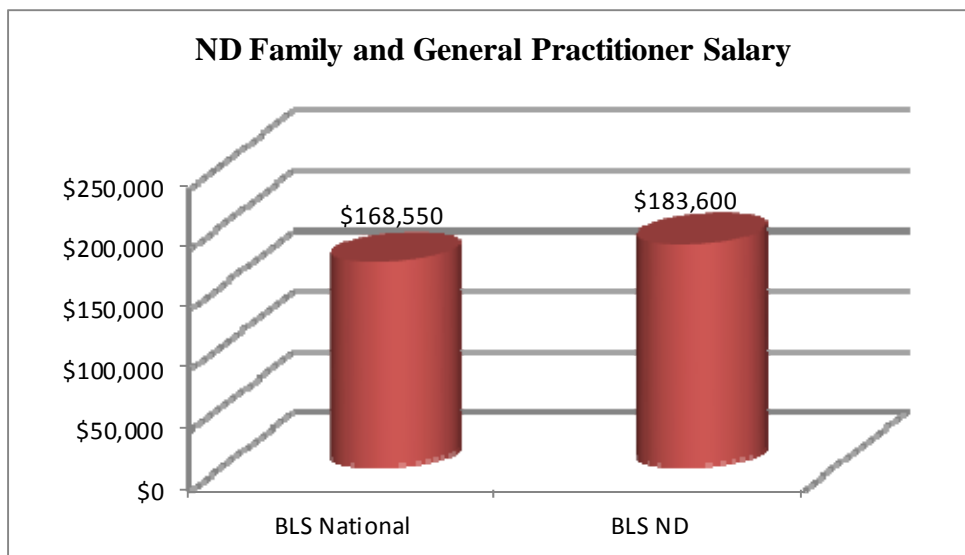
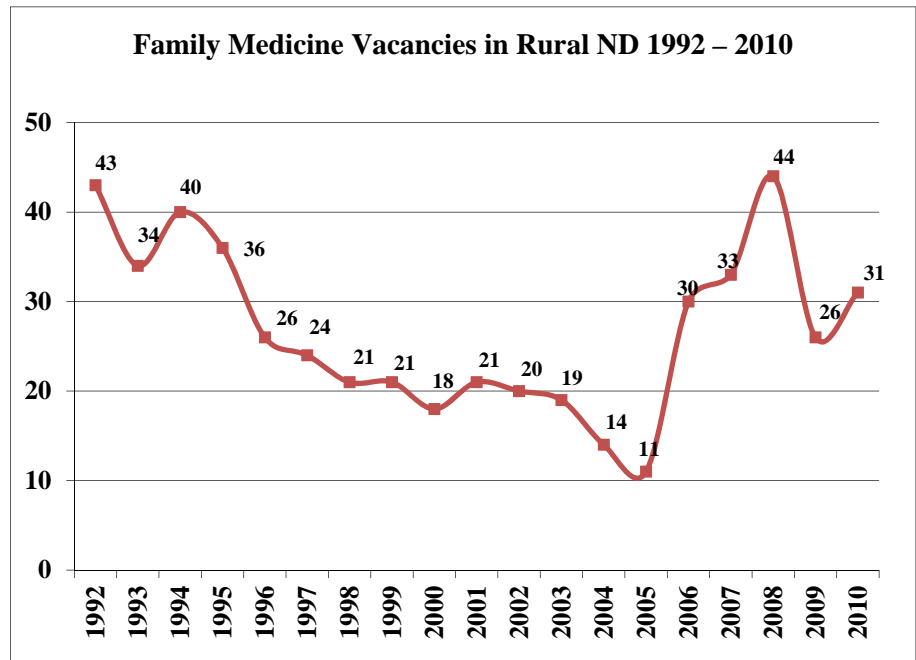
The average age of ND Family and General Practitioners is 50 years old. Assuming retirement by age 67, 31% will retire by 2020. (ND Medical Database, 2010)  
 71% of ND Family and General Practitioners are male (ND Medical Database, 2010).

## Current Demand of Providers

In 2008 there were an estimated 443 jobs for ND Family and General Practitioners which was projected to increase by 15% to 509 jobs in 2018 and is classified as a very high growth occupation. (ND Job Service, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 9 Job Openings for Family and General Practitioners in North Dakota (ND Job Service, 2010)

Long-term tracking of ND family medicine vacancies in rural facilities indicates large variability in vacant jobs across the years with a recent upswing. (Primary Care Office, 2010)



Average ND family and general practitioner salary is greater than the national average (US Bureau of Labor Statistics, 2010).

### **Family and General Practitioner Summary**

North Dakota has more Family and General Practitioners than the national average. These providers are the main point of contact for patients and 25 counties have less than the national average. Thirty-one percent will have reached retirement age in the next 10 years. There are also several vacancies throughout the state. Average salary is greater than the national average. Some vacant counties may include Nurse Practitioners or Physician Assistants.

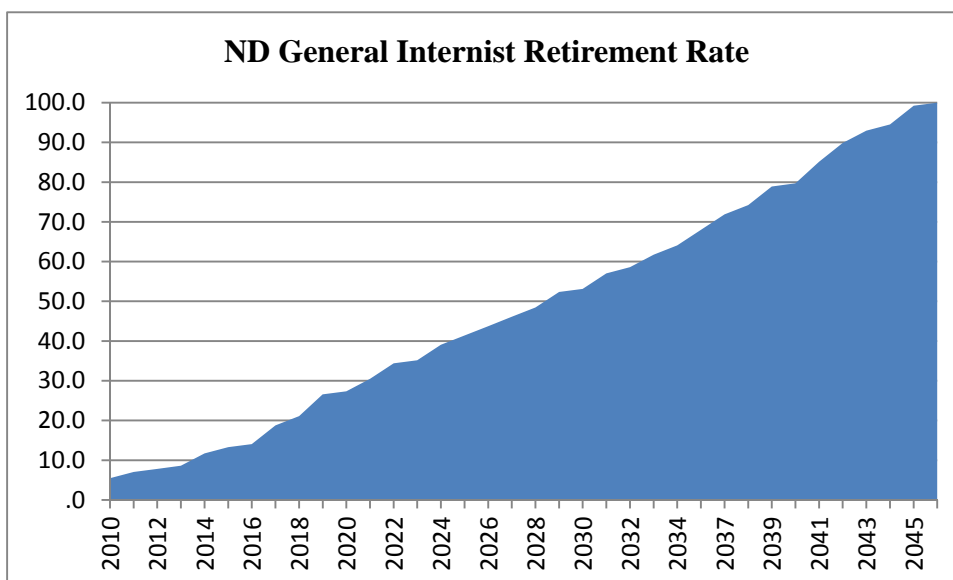
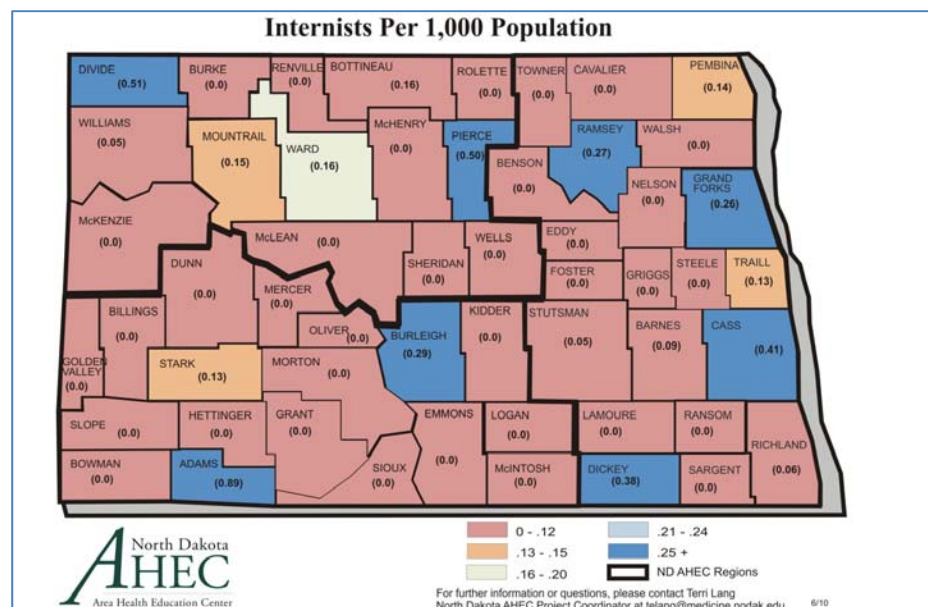
We need physicians willing to do family practice in rural areas. *(Rural Hospital Director of Nursing)*

## GENERAL INTERNIST

General internal medicine physicians or general internists diagnose and provide nonsurgical treatment mainly for adults who may have a wide range of problems that affect internal organ systems, such as the stomach, kidneys, liver, and digestive tract. Internists use a variety of diagnostic techniques to treat patients through medication or hospitalization. Like family medicine physicians, general internists commonly act as primary care specialists. They treat patients referred from other specialists, and, in turn, they refer patients to other specialists when more complex care is required (Health Workforce Information Center, 2010)

### Current Supply Characteristics of Providers

There are 129 general internists in ND. There are .20 general internists per 1,000 people in ND compared to .16 nationally. 45 counties have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).



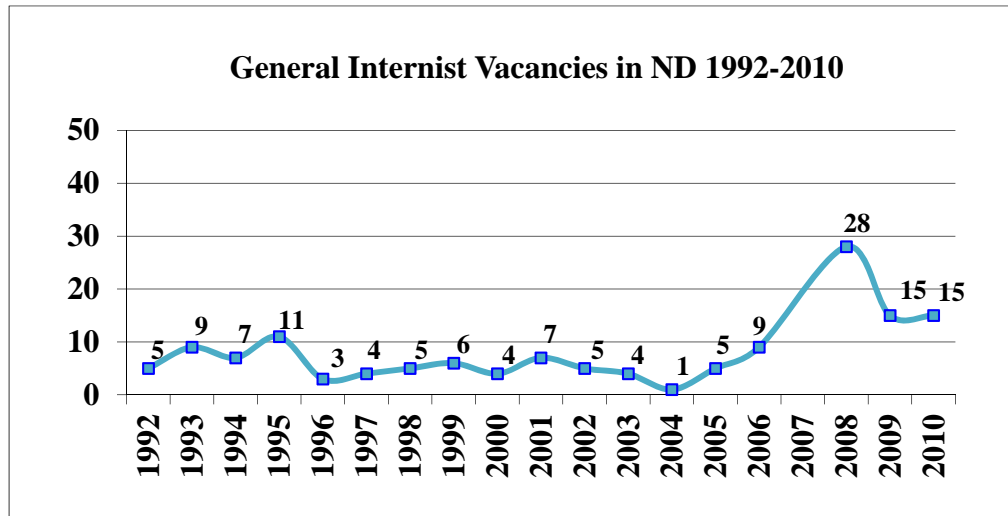
The average age of ND general internists is 49 years old. Assuming retirement by age 67, 27% will retire by 2020. (ND Medical Database, 2010)

75% of ND general internists are male (ND Medical Database, 2010).

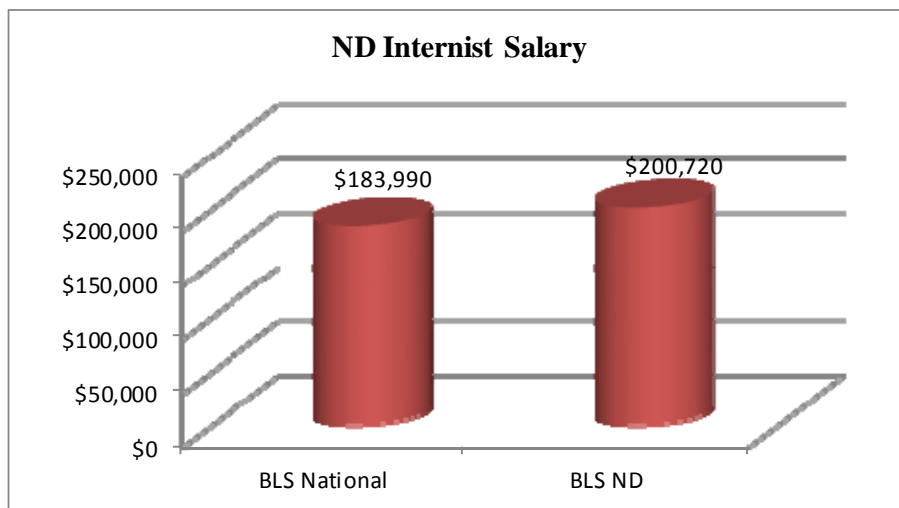
## Current Demand of Providers

In 2008 there were an estimated 111 jobs for ND general internists which was projected to increase by 14% to 127 jobs in 2018 and is classified as a very high growth occupation (ND Job Service, 2010).

Long-term tracking of ND general internist vacancies in rural facilities indicates large variability in vacant jobs across the years with a recent downswing (Primary Care Office, 2010).



Data from the ND Job Service jobs website indicates that as of May, 2010 there are 3 job openings for internists in North Dakota (ND Job Service, 2010).



Average ND general internist salary is greater than the national average (US Bureau of Labor Statistics, 2010).

## General Internist Summary

North Dakota has more general internists than the national average and they are also regionally distributed with a few of the larger counties with few providers (Stutsman and Stark). Twenty-seven percent will have reached retirement age in the next 10 years.

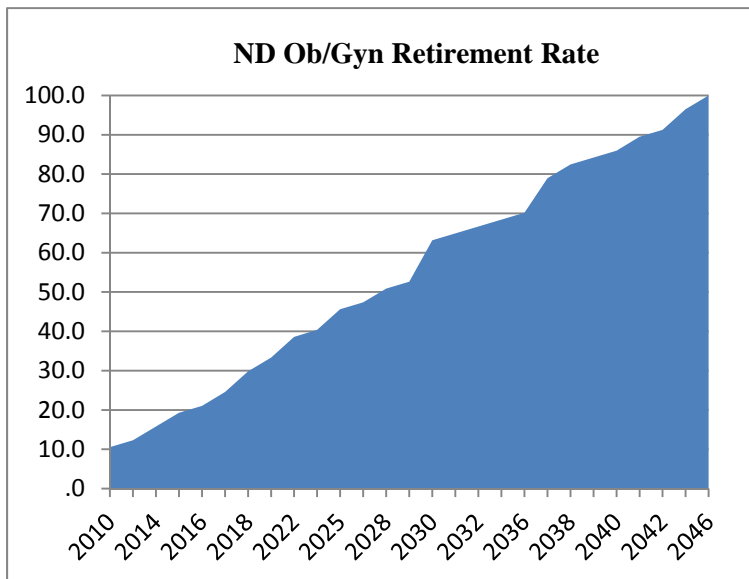
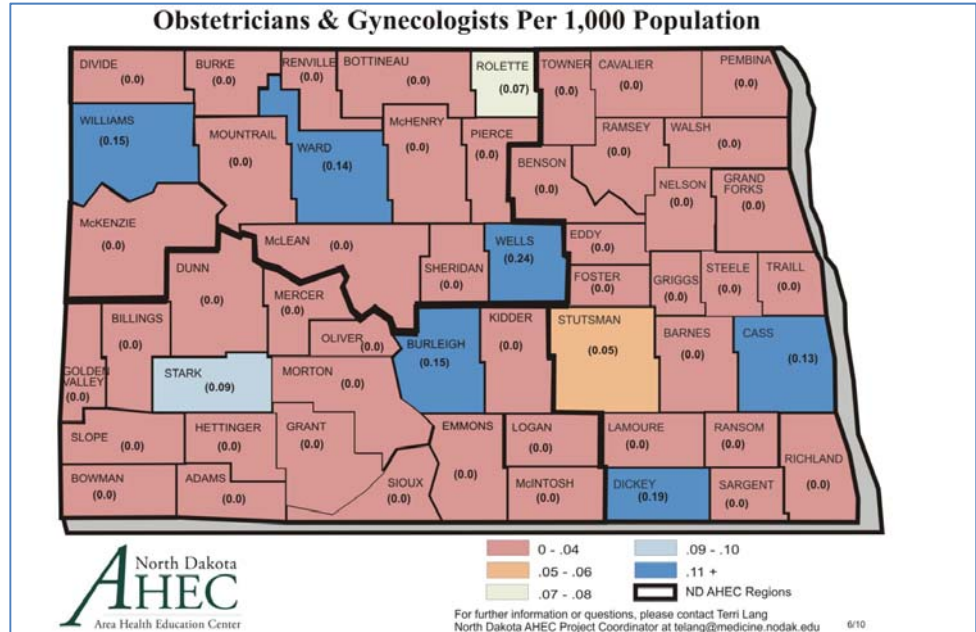


## OBSTETRICIAN AND GYNECOLOGIST

Obstetricians and gynecologists are doctors who specialize in women's health. They are responsible for everything from general medical to pregnancy to reproductive care. (Health Workforce Information Center, 2010)

### Current Supply Characteristics of Providers

There are 57 obstetrician and gynecologists in ND. There are .09 obstetricians and gynecologists per 1,000 people in ND and .07 nationally. 45 counties have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).



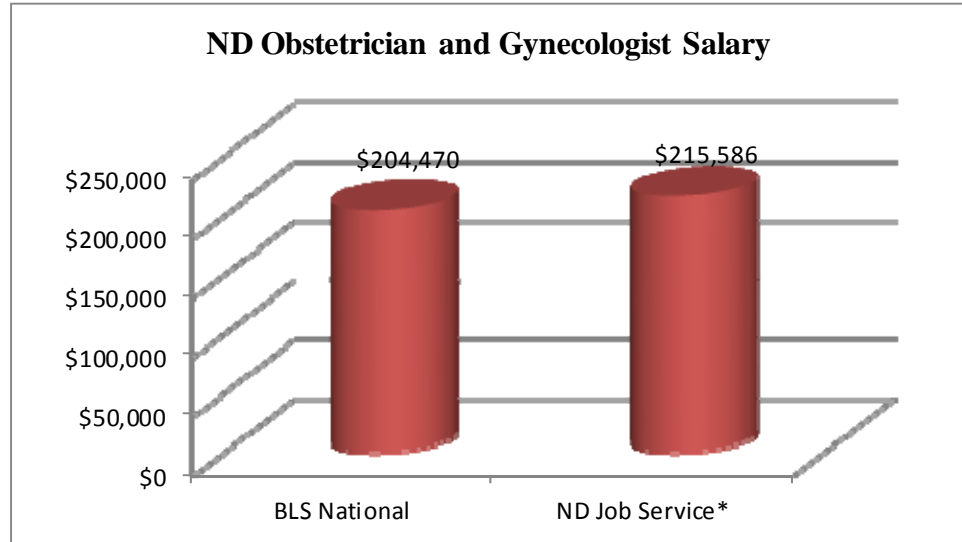
The average age of ND obstetricians and gynecologists is 50 years old. Assuming retirement by age 67, 33% will retire by 2020. (ND Medical Database, 2010)

51% of ND obstetricians and gynecologists are female (ND Medical Database, 2010).

### Current Demand of Providers

In 2008, there were an estimated 26 jobs for ND obstetricians and gynecologists which is projected to increase by 15% to 30 jobs in 2018 and is classified as a very high growth occupation. (ND Job Service, 2010).

Average ND obstetrician and gynecologist salary is greater than the national average (US Bureau of Labor Statistics, 2010; ND Job Service, 2010).



\*ND BLS information was not available

### **Obstetrician/Gynecologist Summary**

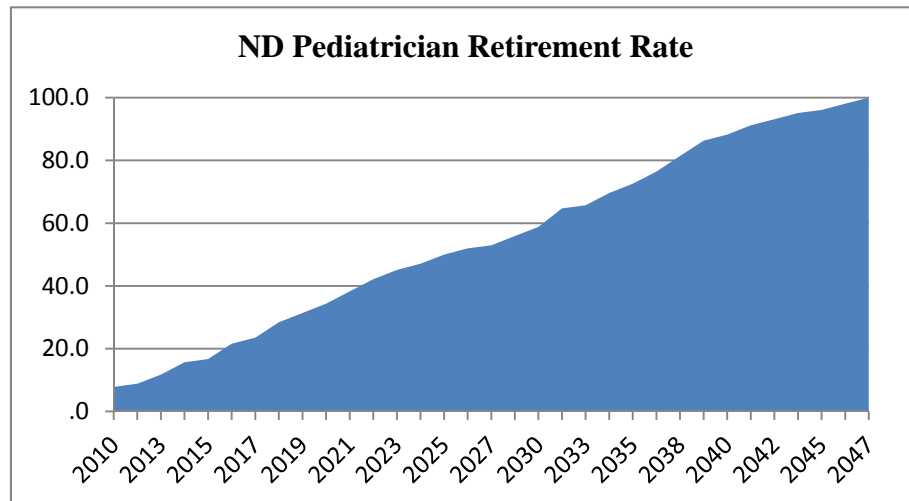
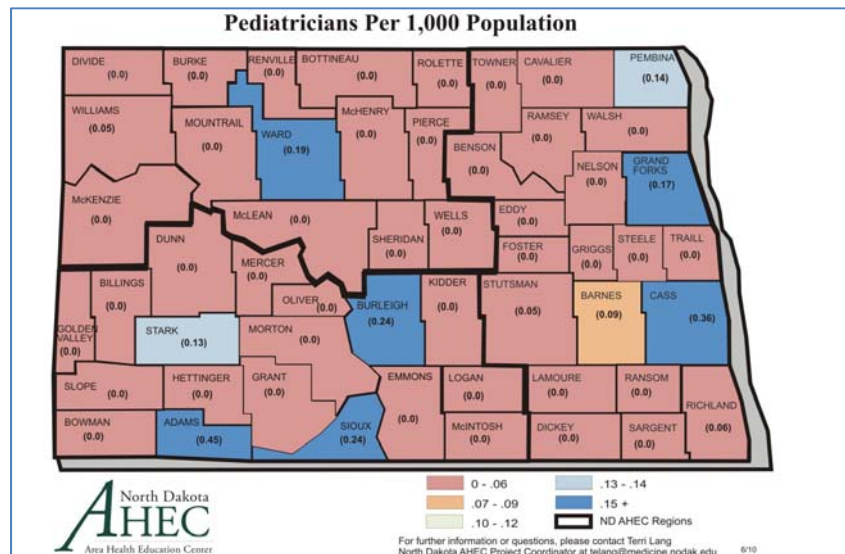
North Dakota has more obstetrician and gynecologists than the national average. Although, OB/GYNs tend to be located in larger health care centers, some do not have an adequate number such as Grand Forks and Stutsman counties, especially since these serve patients regionally. One-third of OB/GYNs will have reached retirement age in the next 10 years.

## PEDIATRICIAN

General pediatricians provide for the physical, emotional, and social health of infants, children, teenagers, and young adults. Pediatricians diagnose, treat, and help to prevent diseases and injuries to young people. Most of the work of pediatricians involves treating common infectious diseases, minor injuries, and immunizations. Pediatricians follow and administer care to the same patients from infancy through young adulthood. (Health Workforce Information Center, 2010)

### Current Supply Characteristics of Providers

There are 102 pediatricians in ND. There are .16 pediatricians per 1,000 people in ND and .10 nationally. 45 counties have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).

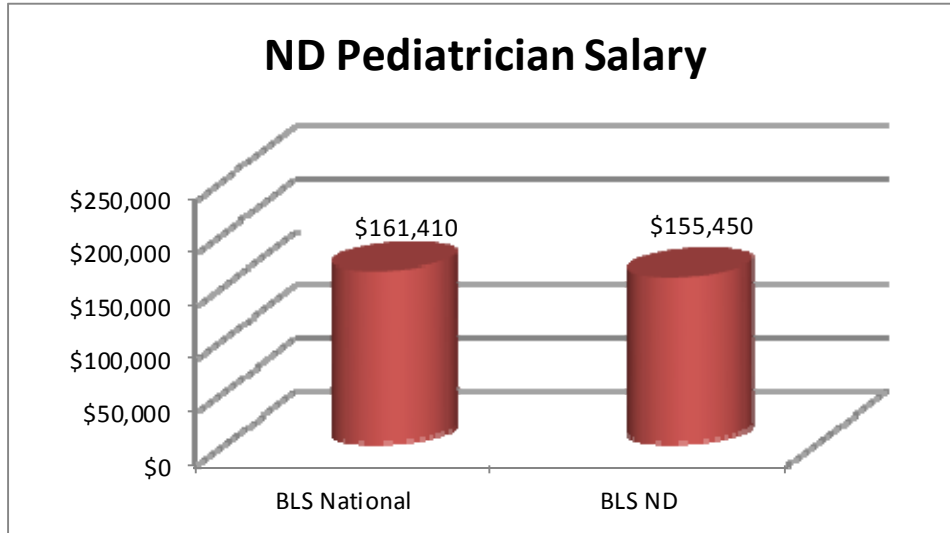


The average age of ND pediatricians is 51 years old. Assuming retirement by age 67, 34% will retire by 2020. (ND Medical Database, 2010)

57% of ND pediatricians are male (ND Medical Database, 2010).

## Current Demand of Providers

In 2008 there were an estimated 48 jobs for ND pediatricians which were projected to increase by 17% to 56 jobs in 2018 and are classified as a very high growth occupation. (ND Job Service, 2010).



Average ND pediatrician salary is slightly lower than the national average (US Bureau of Labor Statistics, 2010).

### Pediatrician Summary

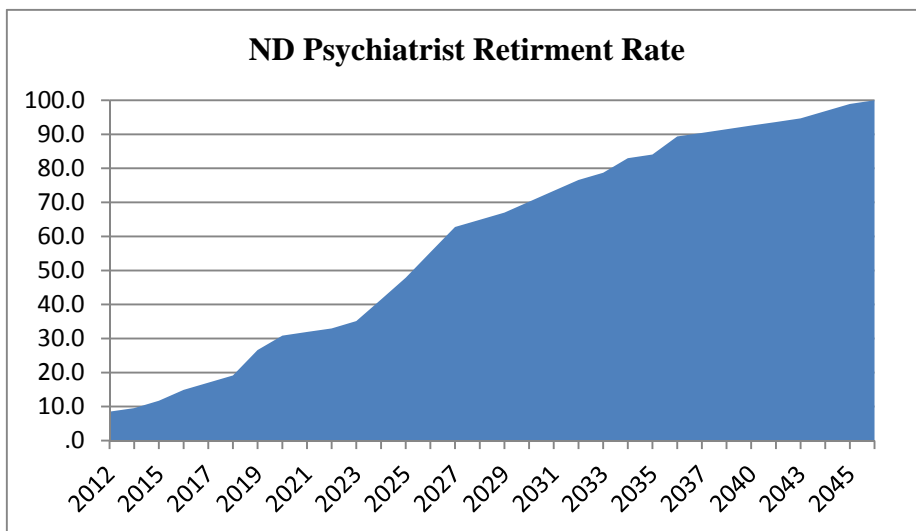
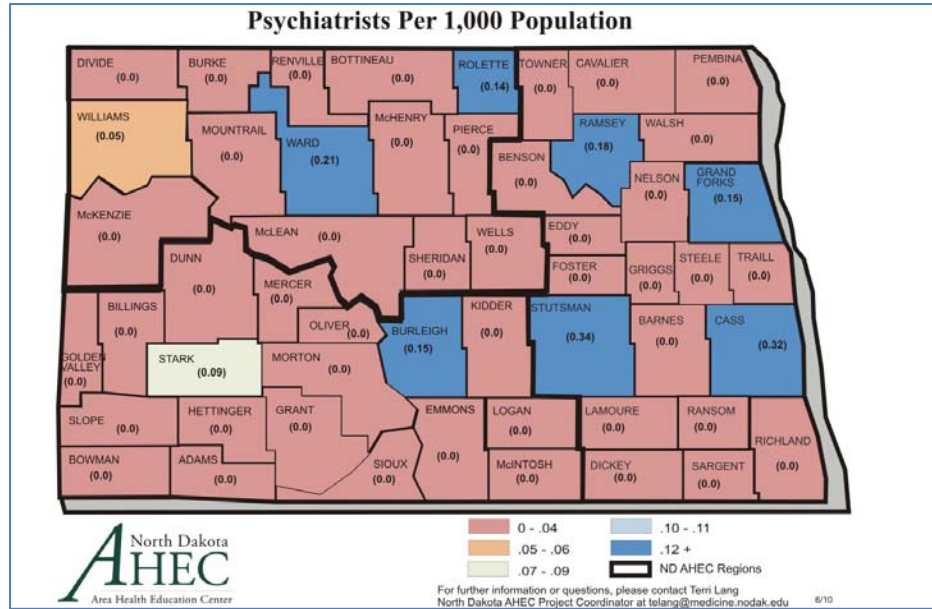
North Dakota has more pediatricians than the national average and are also regionally distributed. One-third will reach retirement age in 10 years and average salary is lower than the national average.

# PSYCHIATRIST

Psychiatrists are physicians who assess and treat mental illnesses through a combination of psychotherapy (regular discussions with patients about their problems), psychoanalysis (long-term psychotherapy and counseling), medication (to correct chemical imbalances that cause emotional problems), and hospitalization. (Health Workforce Information Center, 2010)

## Current Supply Characteristics of Providers

There are 94 psychiatrists in ND. There are .15 psychiatrists per 1,000 people in ND and .07 nationally. 45 counties have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).



The average age of ND psychiatrists is 51 years old. Assuming retirement by age 67, 31% will retire by 2020. (ND Medical Database, 2010)

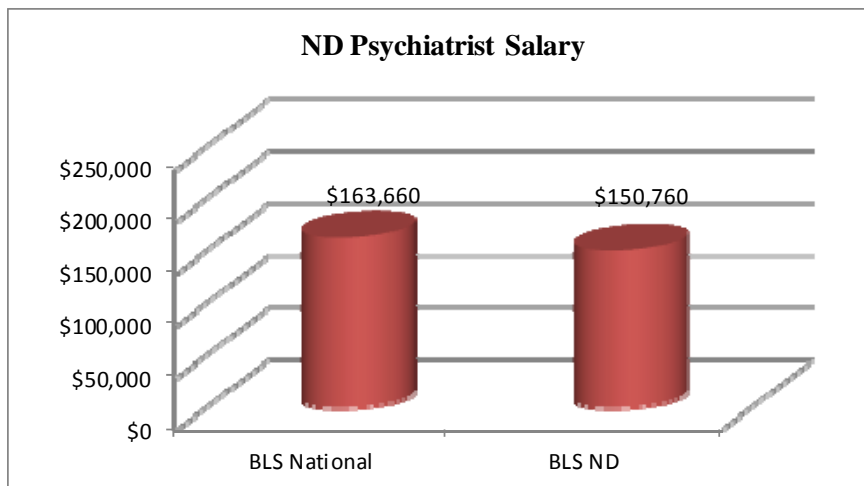
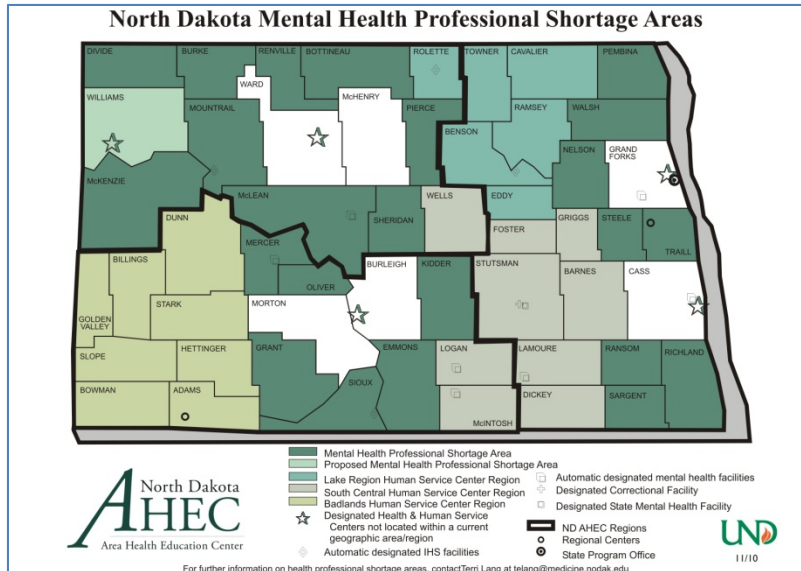
64% of ND psychiatrists are male (ND Medical Database, 2010).

## Current Demand of Providers

In 2008 there were an estimated 86 jobs for ND psychiatrists which were projected to increase by 14% to 98 jobs in 2018 and are classified as a very high growth occupation. (ND Job Service, 2010)

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 3 Job Openings for psychiatrists in North Dakota (ND Job Service, 2010)

Using federal designation methodology, 89% of counties are partially or fully designated as Mental Health Professional Shortage Areas. These are calculated using psychiatrist to population ratios. If four of the six counties not designated, the Human Service Center has a facility designation (Primary Care Office, 2010).



Average ND psychiatrist salary is lower than the national average. (US Bureau of Labor Statistics, 2010).

## Psychiatrist Summary

North Dakota has more psychiatrists than the national average and are distributed regionally throughout the state. However, 96% of the counties have been designated as Mental Health Shortage areas. 31% will have reached retirement age in 10 years and salary is below the national average which will make recruitment difficult.

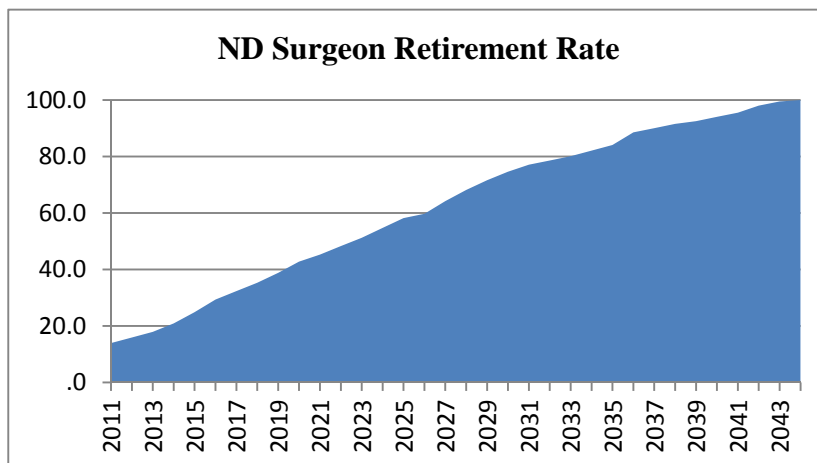
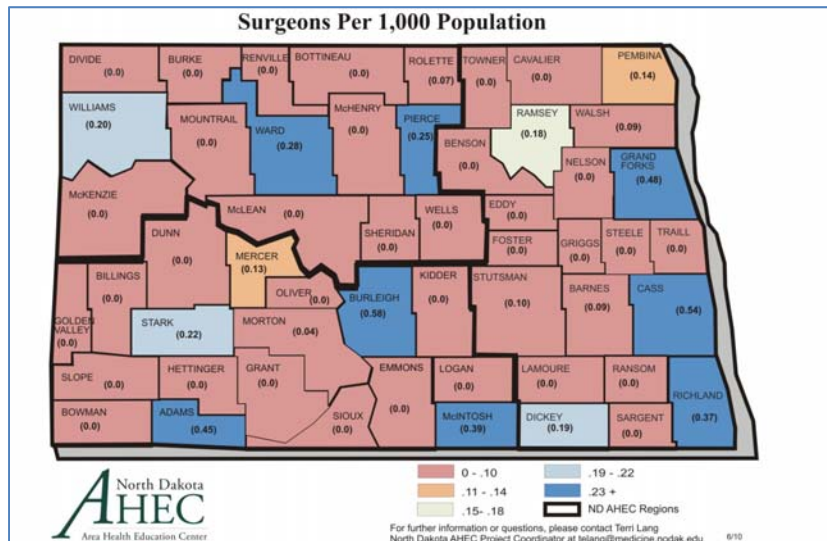


## SURGEON

General surgeons diagnose and surgically treat patients of all ages with a wide variety of medical problems such as injuries, diseases, and deformities. General surgery includes vascular surgery (arteries and veins), surgical critical care, trauma/burns and acute care surgery, surgical oncology (cancer), pediatric surgery, organ transplantation, head and neck surgery, the digestive tract, the endocrine system (hormones and glands), all soft tissues including skin, and the abdomen and its contents. They most commonly treat colon cancer, hernias, breast tumors, bowel obstructions, pancreatitis, appendicitis, gallstones, and colon inflammation (Health Workforce Information Center, 2010). In rural areas, general surgeons perform emergency operations, back up primary care providers, reduce drive time for rural residents and contribute to financial viability of rural hospitals (WWAMI, 2009).

### Current Supply Characteristics of Providers

There are 201 surgeons in ND. There are .31 surgeons per 1,000 people in ND compared to .15 nationally. 41 counties have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).



The average age of ND surgeons is 54 years old. Assuming retirement by age 67, 43% will retire by 2020. (ND Medical Database, 2010)

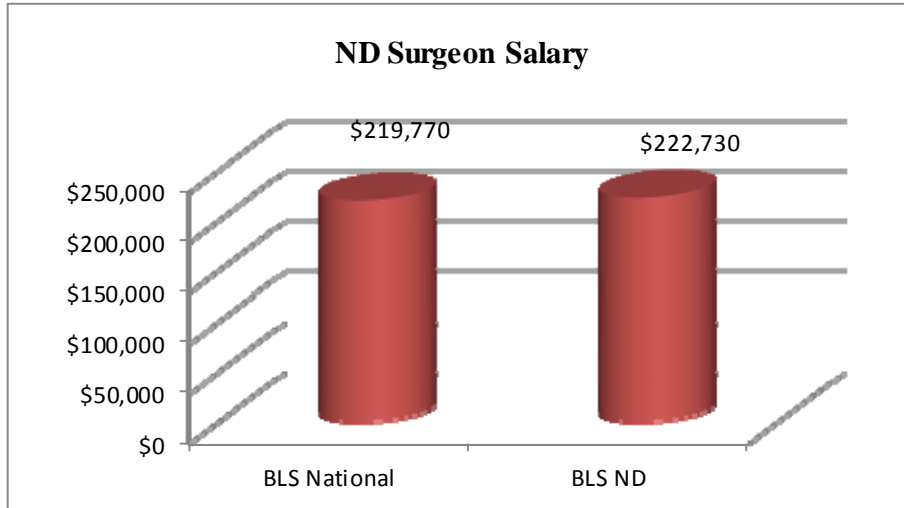
96% of ND surgeons are male (ND). Nationally, 8.9% of rural general surgeons are female (WWAMI, 2009)



## Current Demand of Providers

Employment projection data from Job Service is unavailable for surgeons.

Data from the ND Job Service jobs website indicates that as of May, 2010 there is 1 Job Opening for Surgeons in North Dakota (ND Job Service, 2010)



Average ND surgeon salary is slightly higher than the national average (US Bureau of Labor Statistics, 2010).

### Surgeon Summary

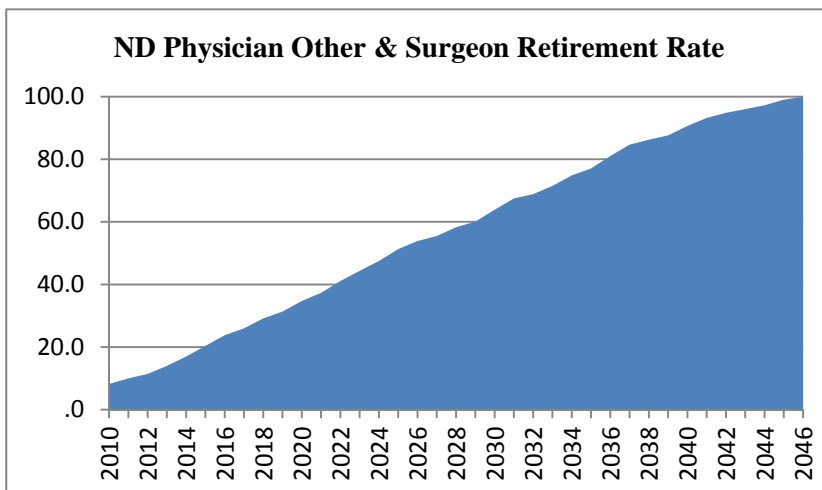
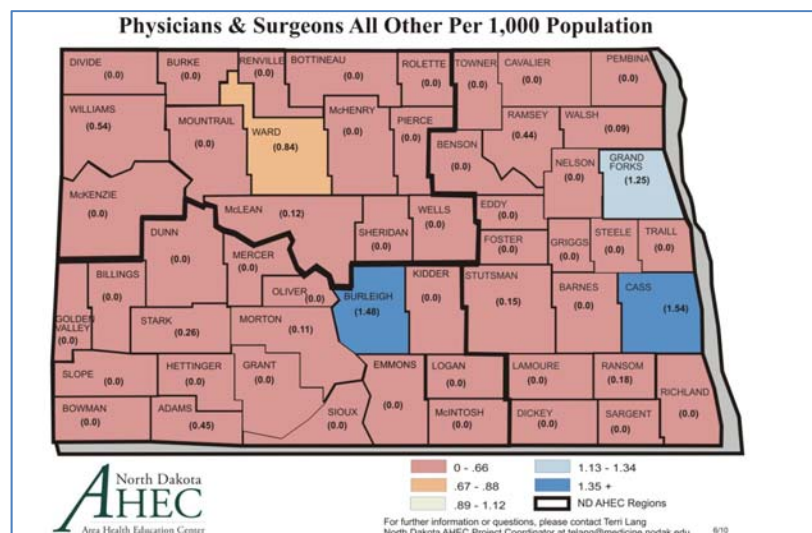
North Dakota has more than the national average of surgeons. Surgeons provide services regionally and are relatively distributed throughout the state. However, 43% of surgeons will have reached retirement age in 10 years.

## PHYSICIANS AND SURGEON, ALL OTHER

*This includes a number of specialists not included in the above sections including: aerospace medicine, allergy and immunology, anatomic pathology, cardiovascular diseases, critical care medicine, dermatology, diagnostic radiology, emergency medicine, endocrinology, hospitalist, infectious diseases, interventional cardiology, legal medicine, medical genetics, neonatal/perinatal medicine, nephrology, neurology, neuroradiology, oncology, ophthalmology, gastroenterology, geriatrics, hematology, otolaryngology, palliative medicine, pathology, pediatric rehabilitation medicine, phlebology, physical medicine and rehab, preventive medicine, public health, pulmonary diseases, radiation oncology, radiology, reconstructive, rheumatology. (Health Workforce Information Center, 2010)*

### Current Supply Characteristics of Providers

There are 502 other physicians and surgeons in ND. There are .78 other physicians and surgeons per 1,000 people in ND and .89 nationally. 50 counties have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).



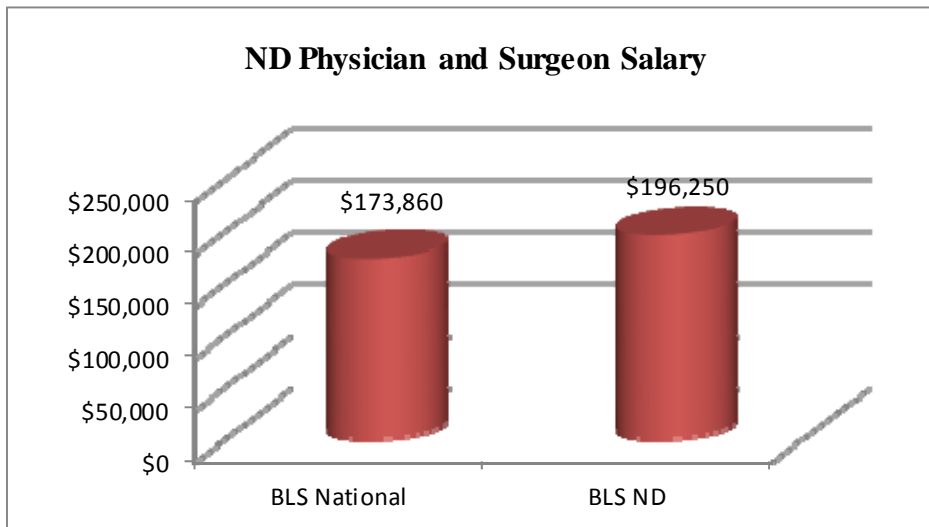
The average age of ND other physicians and surgeons is 51 years old. Assuming retirement by age 67, 35% will retire by 2020. (ND Medical Database, 2010).

84% of ND Other physicians and surgeons are male (ND Medical Database, 2010).

## Current Demand of Providers

In 2008 there were an estimated 413 jobs for other ND Other Physicians and Surgeons which is projected to increase by 10% to 456 jobs in 2018 and is classified as a an average to above average growth occupation. (ND Job Service, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 7 Job Openings for Other Physicians and Surgeons in North Dakota (ND Job Service, 2010)



Average ND Other physician and surgeons salary is higher than the national average (US Bureau of Labor Statistics, 2010)

### Other Physician/Surgeon Summary

North Dakota has less than the national average of specialists and even though specialists tend to provide care regionally, the major population centers do not have a large enough supply for outreach to each of the four quadrants of the state. By 2020, 25% of these specialists will have reached retirement age. Salary for this group is higher than the national average.

# DENTISTRY

## DENTIST

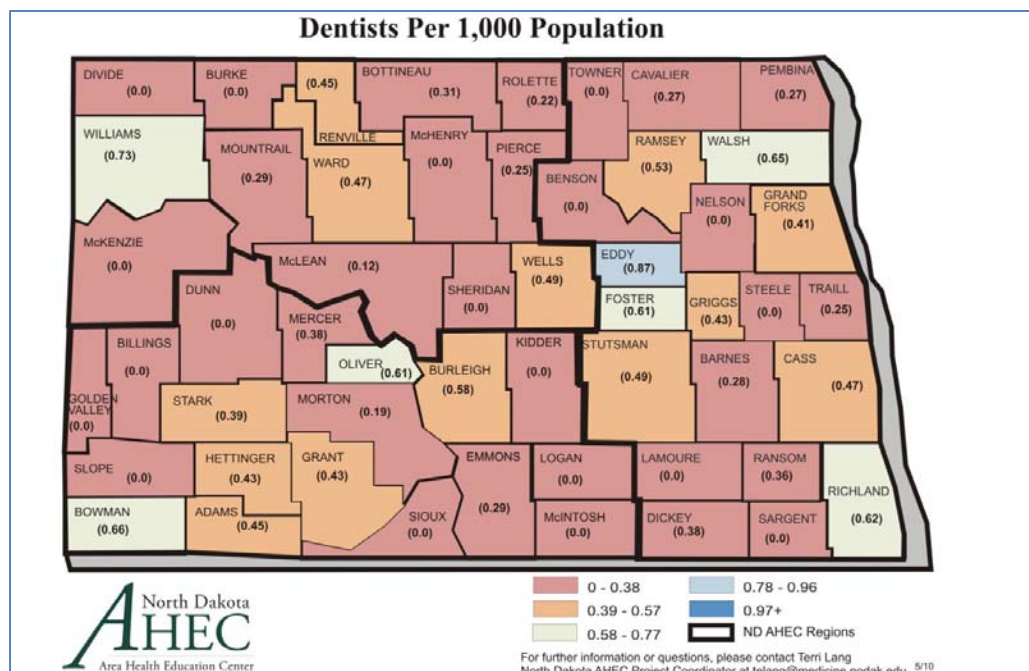
*Dentists primarily diagnose and treat diseases, injuries, and malformations of the teeth and mouth. Additionally, they improve patients' appearances by using a variety of cosmetic dental procedures, perform oral surgical procedures, educate patients on how to better care for their teeth and prevent oral disease, teach future dentists and dental hygienists, and perform research directed to improving oral health and developing new treatment methods. (Health Workforce Information Center, 2010)*

### Student Enrollment

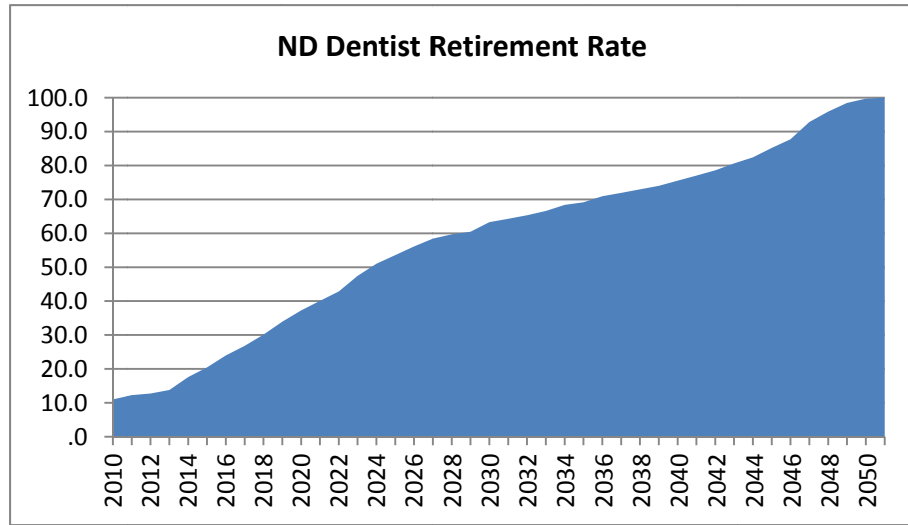
47% of current ND dentists attended University of Minnesota, 12% Creighton University, 5% University of Nebraska, 4% Marquette University and 32% other institutions (ND Dental Database, 2010). In 2005, 55% of ND dentists had attended the University of Minnesota (51% in 2008), 9% Creighton University, 6% University of Nebraska, 6% Marquette University, and 24% other institutions (Amundson et al., 2005; Lang et al., 2008).

### Current Supply Characteristics of Providers

There are 392 dentists in ND. There are .61 dentists per 1,000 people in ND compared to .76 nationally. 52 counties have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).



Average age of dentists in 2010 is 50 years old. Assuming retirement by age 67, 37% of ND dentists will have retired by 2020 (ND Dental Database, 2010). In 2008, 72% of dentists were 46-65 years old and 51% indicated that they were planning to retire in the next 15 years (by 2023) (Lang et al., 2008). In 2005, the average age of ND dentists was 52 years and 60% indicated that they planned to retire in the next 15 years (by 2020) (Amundson et al., 2005).



82% of ND dentists are male (ND Dental Database, 2010). In 2008, 86% of ND dentists were male (Lang et al., 2008) and in 2005, 90% of ND dentists were male (Amundson et al., 2005). Nationally, in 1997, 87% of dentists were male (Brown & Lazar, 1999).

In 2005 and in 2008, 97% of ND dentists were non-Hispanic white (Amundson et al., 2005; Lang et al., 2008). Nationally in 1997, 89% of dentists were non-Hispanic White (Brown & Lazar, 1999).

Our workforce challenge is replacing our people on leave due to illness or vacation (Rural Dentist)

## Current Demand of Providers

In 2008, there were an estimated 271 jobs for ND dentists which was projected to increase by 6% by 2018 to 288 jobs and is considered a below average growth occupation. (ND Job Service, 2010)

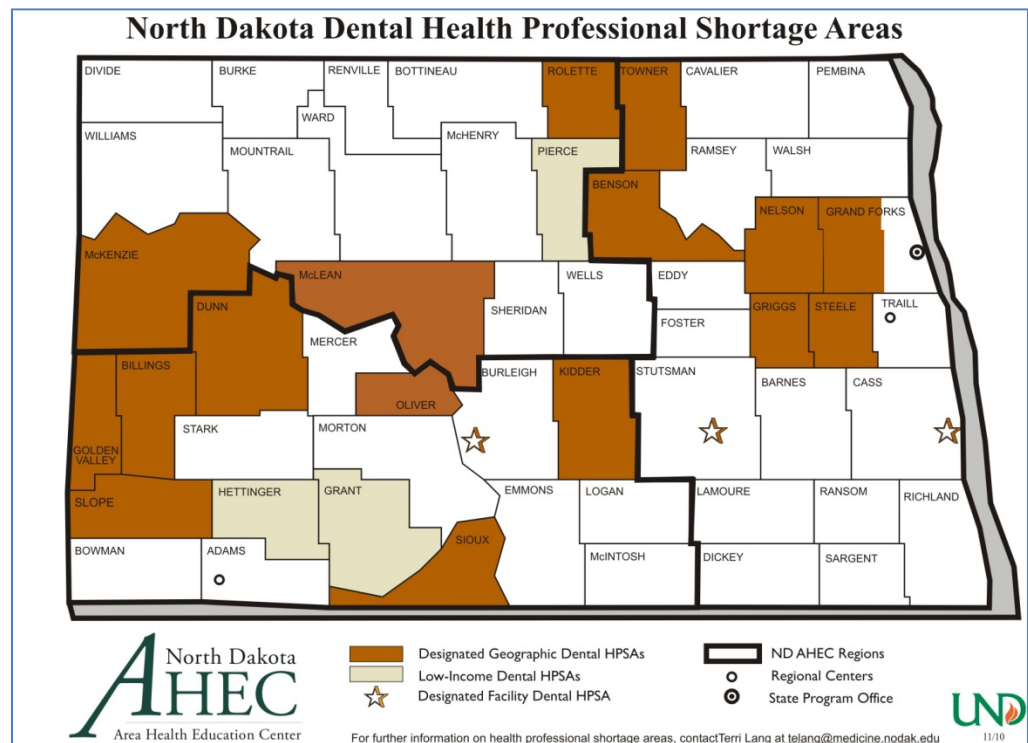
In 2005 and in 2008, 86% of ND dentists were employed full-time (Amundson et al., 2005; Lang et al., 2008).

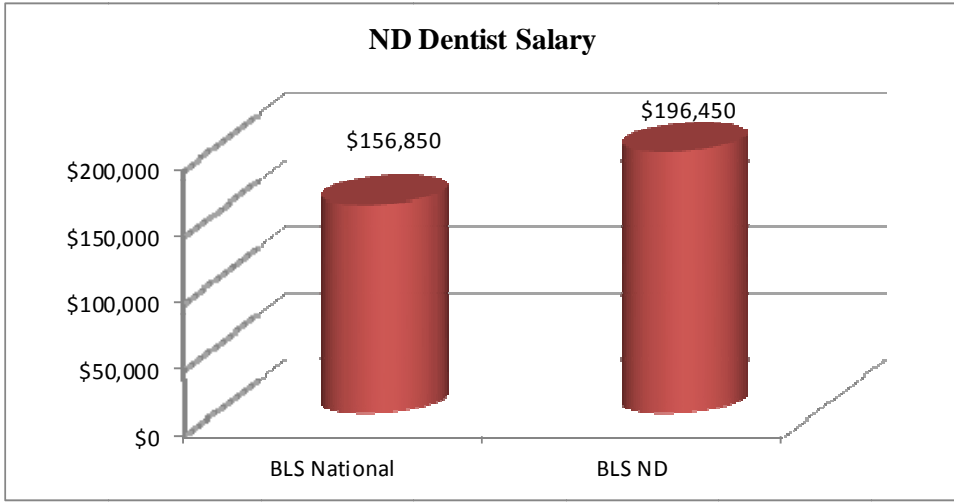
In 2005, 61% of ND dentists were self-employed and 25% were self-employed in a solo-practice (Amundson et al., 2005). In 2008, 53% of dentists indicated that they were self-employed and 27% were in a self-employed solo practice (Lang et al., 2008).

The average vacancy rate for dentists at 87 responding health care facilities is 3.41% (SD=14.16) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 4 Job Openings for Dentists in North Dakota (ND Job Service, 2010)

Using federal designation methodology, 36% of ND counties are fully or partially designated as dental health professional shortage areas which include only dentists practicing general dentistry (Primary Care Office, 2010).





ND dentist's average salary is higher than the national average. (US Bureau of Labor Statistics, 2010)

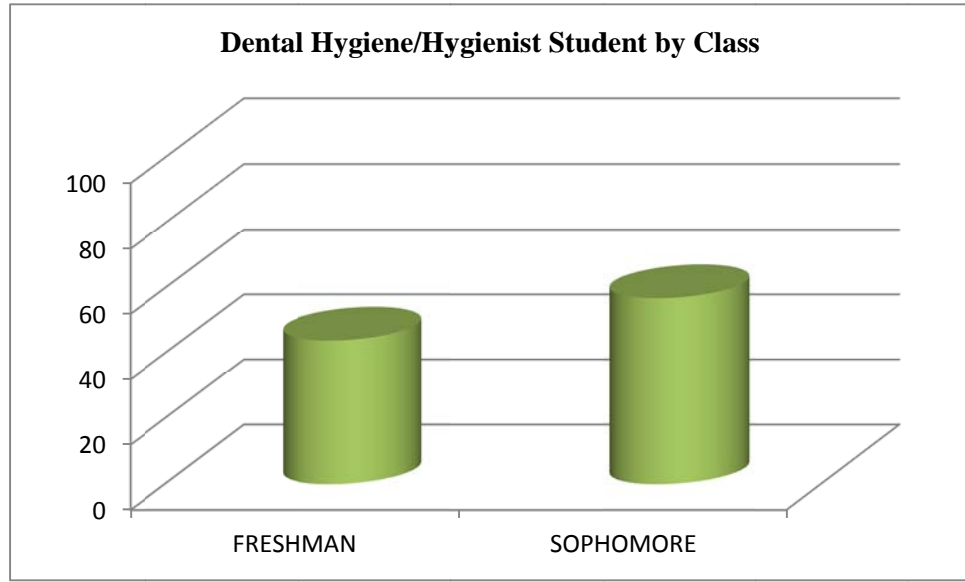
**DENTAL HYGIENIST**

*The dental hygienist works together with the dentist to meet the oral health needs of patients. Each state has its own specific regulations regarding the responsibilities of the dental hygienist; therefore, the range of services performed by hygienists varies. Some of the services provided may include: performing patient screening procedures, taking and developing x-rays, removing plaque from all surfaces of the teeth, applying preventive materials to the teeth, providing patient education on appropriate oral hygiene, counseling patients about good nutrition and its impact on oral health, making impressions of teeth for study casts, and performing documentation and office management activities. (Health Workforce Information Center, 2010)*

**Student Enrollment**

As of fall 2009, there was a total of 101 enrolled students statewide. In the past 12 months there have been 16 graduates (FINDET, 2009).

100% of current Dental Hygiene students are female (FINDET, 2009).

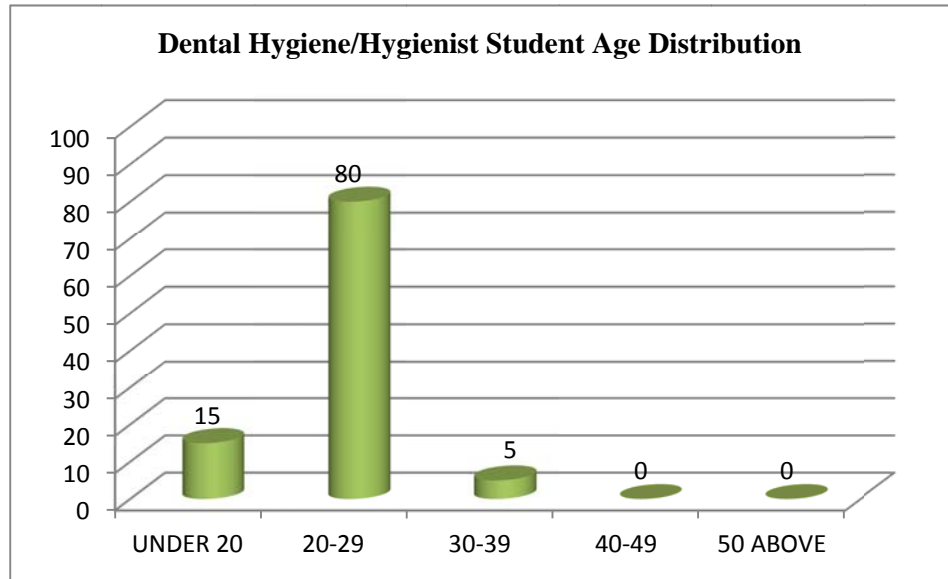




Most dental hygiene students are between 20 and 29 years old (FINDET, 2009)

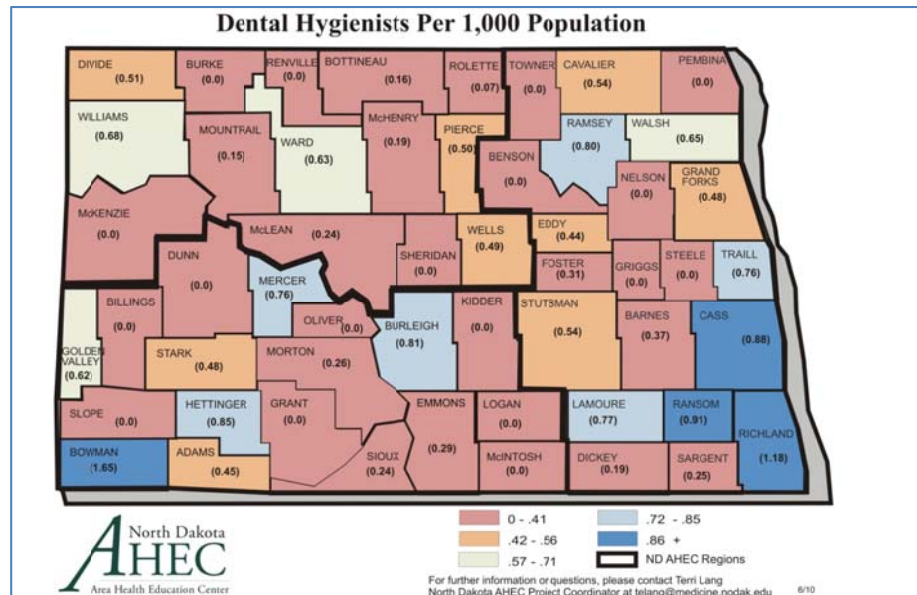
Of current ND dental hygienists, 67% attended North Dakota State College of Science, 8% attended Minnesota State Community and Technical College, 7% attended Northwest, 3% attended the

University of Minnesota and 15% attended other programs (ND Dental Database, 2010).



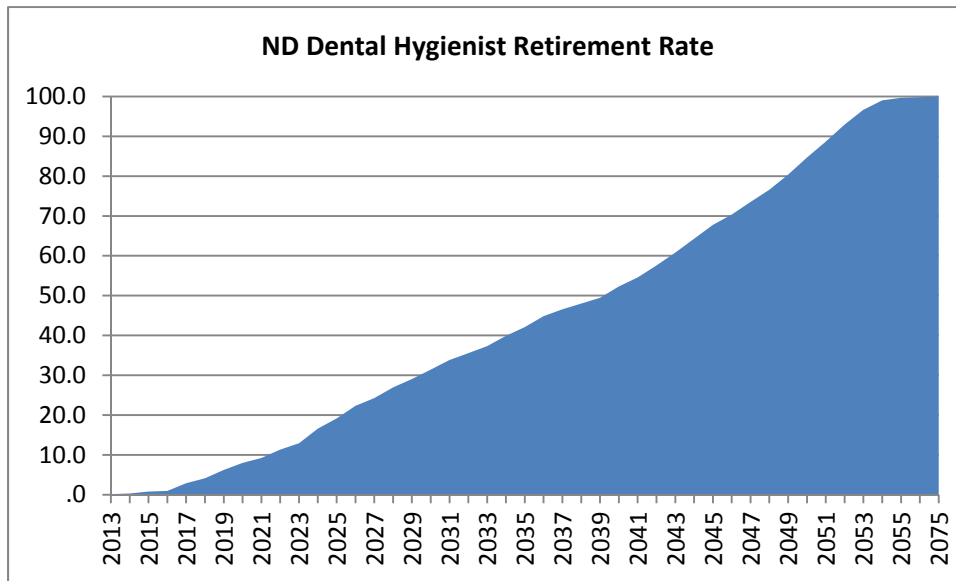
### Current Supply Characteristics of Providers

With 633 dental hygienists in ND, there is .98 per 1,000 people compared to the national average of .57 per 1,000 people (ND Dental Database, 2010; U.S. Census Bureau, 2009). 39 counties have less than the national average.



Note: County level data was not available for a large number of providers.





The average age of dental hygienists is 39 years old. Assuming retirement by age 67, 8% will retire by 2020. (ND Dental Database, 2010)

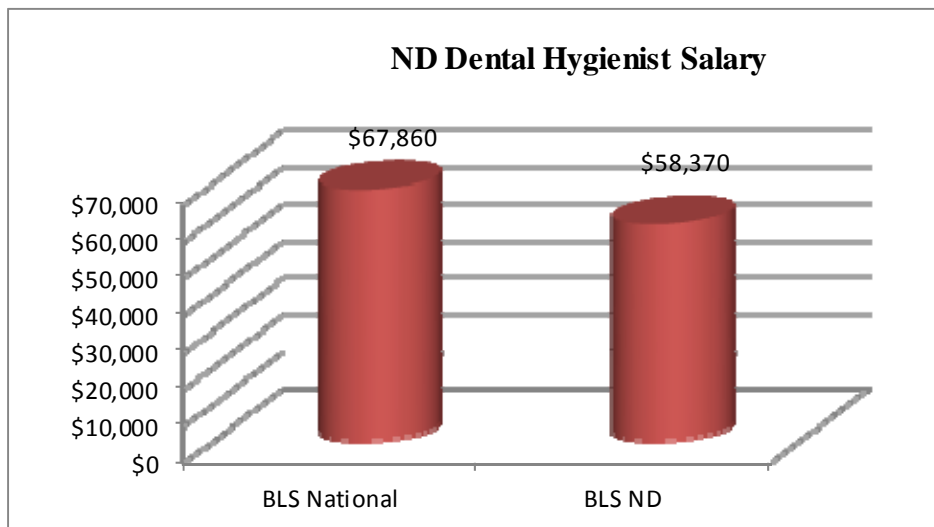
99% of ND dental hygienists are female (ND Dental Database, 2010).

### Current Demand of Providers

In 2008 there were an estimated 553 jobs for ND dental hygienists which was projected to increase by 23% to 678 jobs in 2018 and is classified as an exceptional growth and high demand occupation (ND Job Service, 2010).

The average vacancy rate for dental hygienists at 78 responding health care facilities is 4.48% (SD=16.26) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 2 Job Openings for dental hygienists in North Dakota.



Average ND dental hygienist salary is below the national average. (US Bureau of Labor Statistics, 2010)

## Dentistry Summary

There are many counties with less than the national average of dentists and dental hygienists. One-third of North Dakota counties are designated as federal dental health profession shortage areas. Vacancy rate and job opening information indicate a slight shortage of providers. In addition, over one-third of dentists will have retired by 2020. There is no training program for dentists in North Dakota.

We have a shortage of registered dental assistants. A large percentage of dental assistant graduates go on to dental hygiene school. The schools offer preference to graduates of the assistants program. Those interested in hygiene should go directly into hygiene without occupying a seat in the assisting class. (Urban Dentist)

# NON-PHYSICIAN CLINICIAN

## PHYSICIAN ASSISTANT

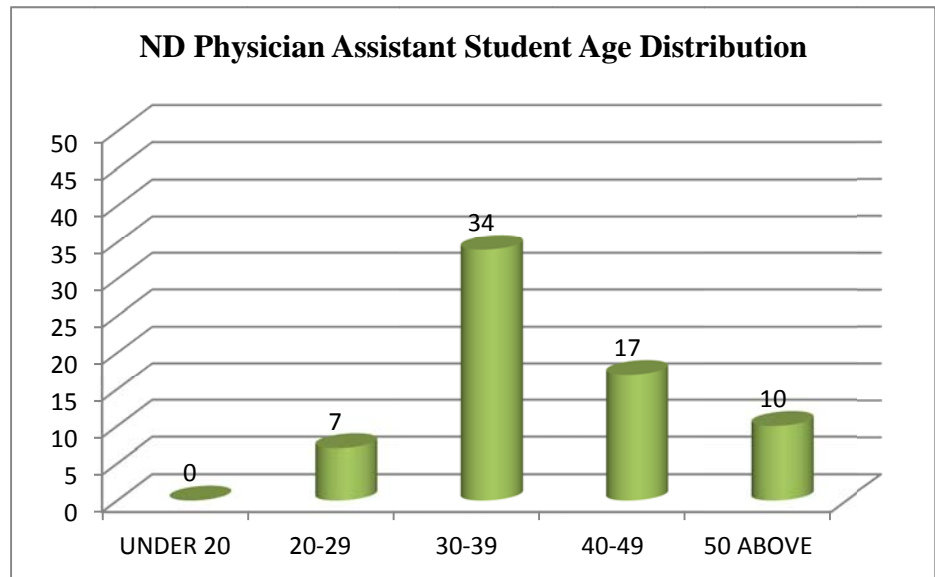
*Physician assistants (PAs) are health care professionals who practice medicine with physician supervision. They may be the principal care providers in rural or inner city clinics where physicians only practice one or two days per week. Many PAs practice primary care medicine. Each PA's scope of practice is defined by their education and experience, state law, facility policy and physician delegation. PAs can conduct physicals, provide preventative health care counseling, order and interpret tests, assist in surgery, treat and diagnose illnesses and minor injuries, and prescribe medications. (Health Workforce Information Center, 2010).*

### Student Enrollment

As of fall 2009, a total of 68 students were enrolled statewide. There were less than 5 graduates during the last 12 months. (FINDET, 2009).

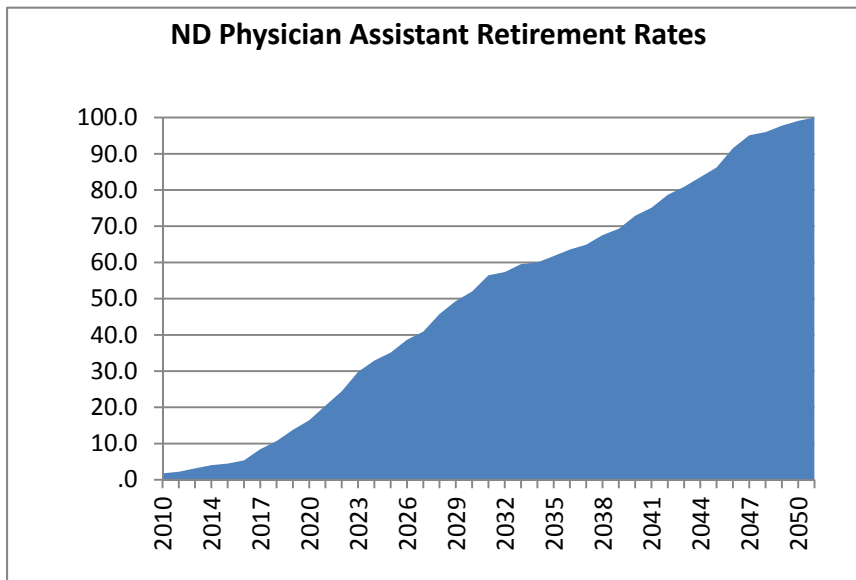
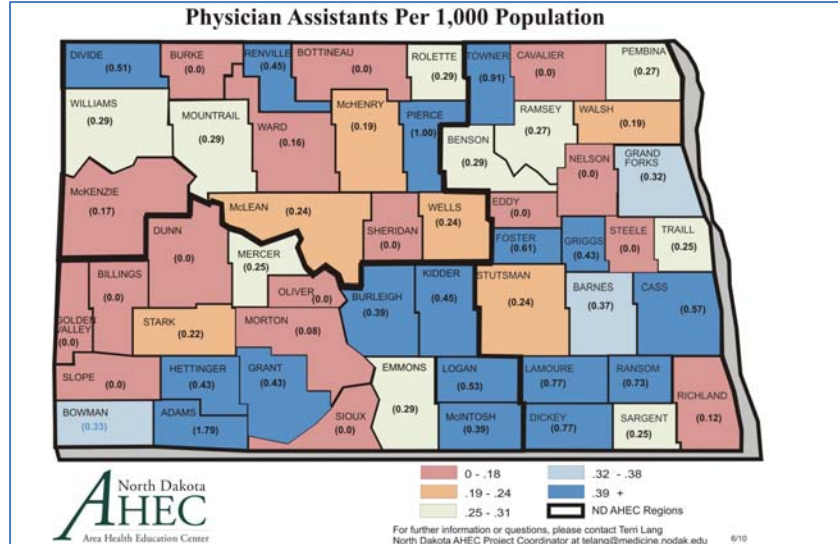
50% of current physician assistant students are female (FINDET, 2009).

Most physician assistant students are between 30 and 39 years old (FINDET, 2009)



## Current Supply Characteristics of Providers

There are 225 ND physician assistants. There is .35 physician assistants per 1,000 people compared to .25 per 1,000 people nationally. 23 counties have less than the national average (ND Medical Database, 2010, US Census Bureau, 2009).



The average age of ND physician assistants is 46 years. Assuming retirement by age 67, 16% of ND physician assistants will have retired by 2020. Nationally, the average age is 42 years (AAPA, 2010).

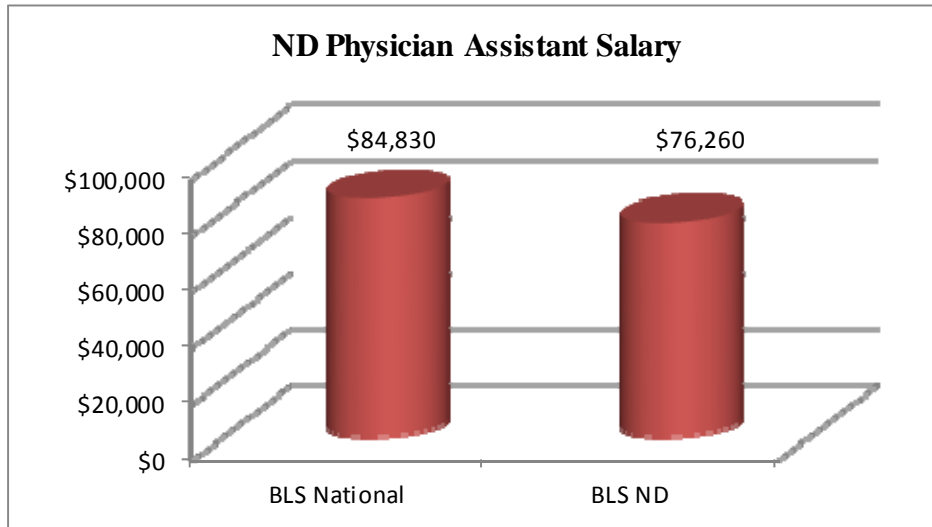
78% of ND physician assistants are female (ND Physician Assistants Database) compared to 65% nationally (AAPA, 2010)

## Current Demand of Providers

Demand data from Job Service is unavailable.

The average vacancy rate for physician assistants at 37 responding health care facilities is 6.5% (SD=16.12) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 7 job openings for physician assistants in North Dakota (ND Job Service, 2010)



ND physician assistant average salary is below the national average (US Bureau of Labor Statistics, 2010)

### Physician Assistant Summary

Several counties have less than the national average of physician assistants and vacancy rate/ job opening information indicates a slight shortage. Salaries are below the national average which will make recruitment difficult.

## ADVANCED PRACTICE REGISTERED NURSE

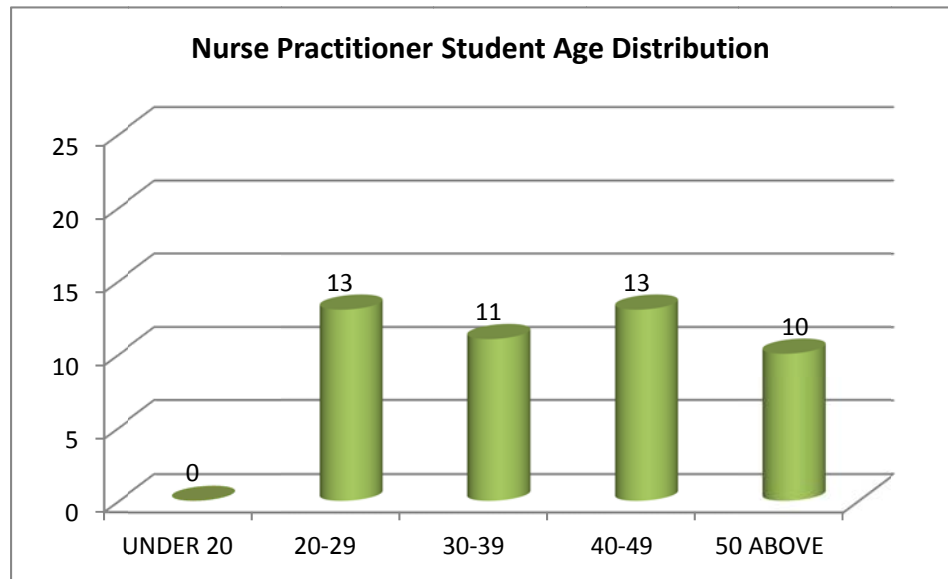
*Some RNs may also choose to become advanced practice registered nurses, who work independently or in collaboration with physicians and may provide primary care services. Clinical nurse specialists provide direct patient care and expert consultations in one of many nursing specialties. Nurse anesthetists provide anesthesia and related care before and after surgical, therapeutic, diagnostic and obstetrical procedures. Nurse midwives provide primary care to women, including gynecological exams, family planning advice, prenatal care, assistance in labor and delivery, and neonatal care. Nurse practitioners serve as primary and specialty care providers, providing a blend of nursing and health care services to patients and families. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, there were a total of 47 nurse practitioner students statewide and in the past 12 months there have been 6 graduates (FINDET, 2009). Information regarding other advanced practice registered nurse students was unavailable.

96% of current nurse practitioner students are female (FINDET, 2009).

Most nurse practitioner students are either 20-29 or between 30 and 39 years old (FINDET, 2009)

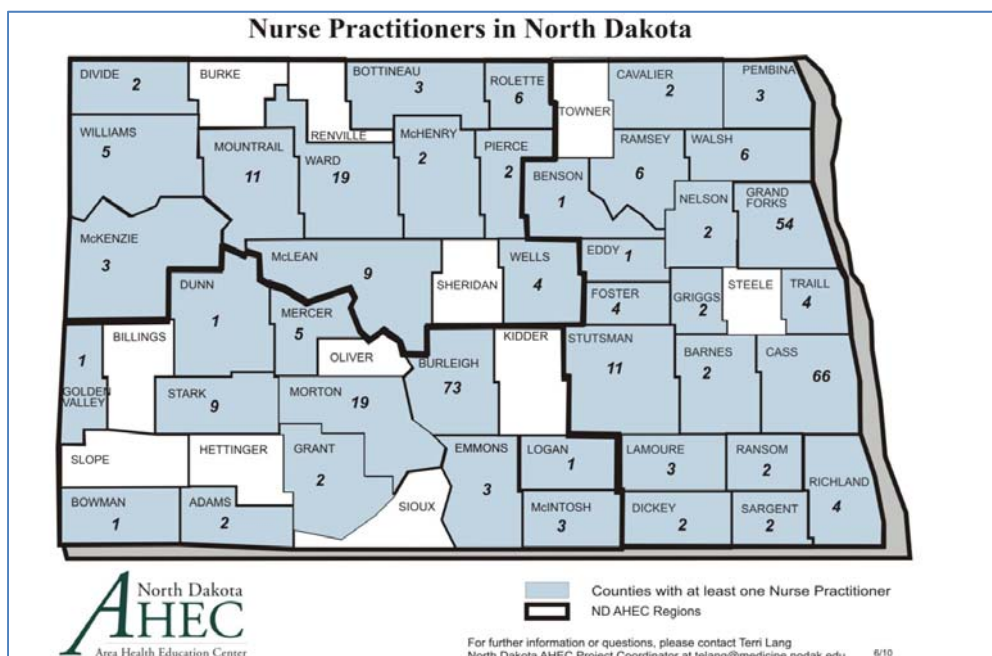
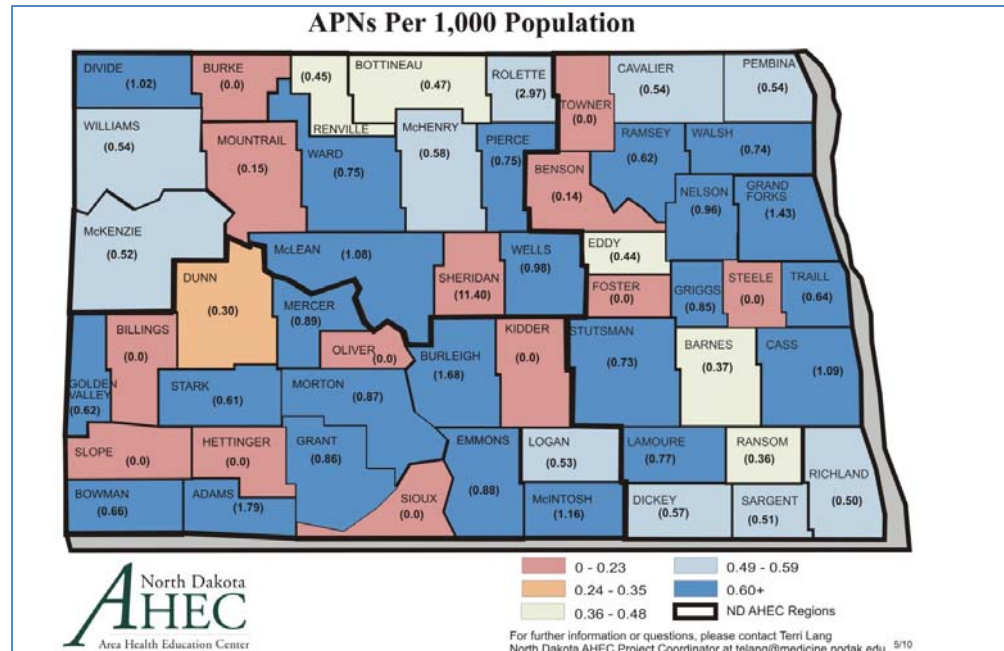


## Current Supply Characteristics of Providers

There are a total of 607 advanced practice registered nurses (APRN) in North Dakota. This includes 350 nurse practitioners (NP) (2 NPs are also either a certified Registered Nurse Anesthetist (CRNA) or certified nurse specialist (CNS), 204 CRNAs, 40 CNSs, 9 certified nurse midwives and 4 nurse clinicians.

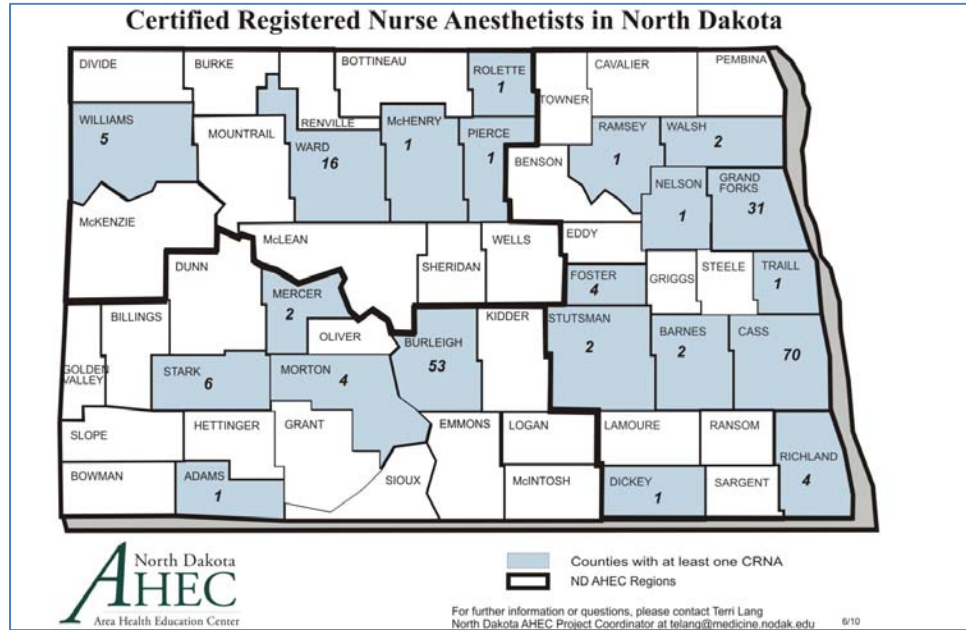
There are .94 APNs per 1,000 people in ND compared to .48 nationally. Although, ND has more than the

national average of APNs, 19 counties have less than the national average of APNs (North Dakota Nurse Licensure Database, 2010; U.S Census Bureau, 2009).

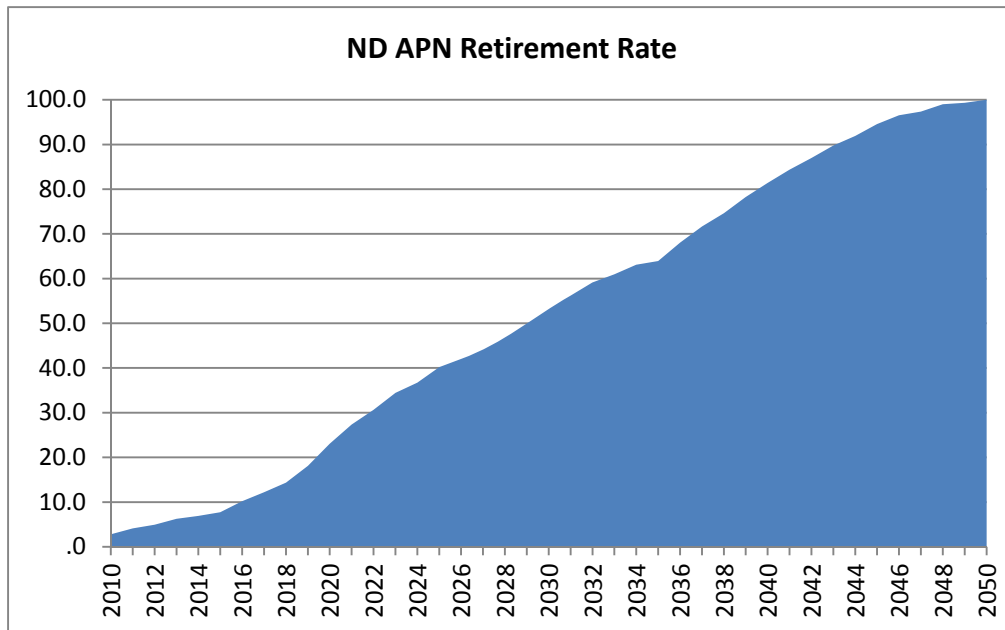


Although national comparative data is not available for NPs, data is available on county-level supply. 11 counties have no Nurse Practitioners (ND Nurse Licensure Database, 2010).

Although national comparative data is not available for CRNAs, data is available on county-level supply. 32 counties have no CRNAs (ND Nurse Licensure Database, 2010).



The average age for ND APNs is 47 years. Assuming retirement by age 67, 23% of APNs will have retired by 2020 (ND Nurse Licensure Database, 2010). North Dakota Nursing Needs Study



survey results indicate that APNs would consider delaying retirement if they were able to work part-time, have flexible scheduling and retain benefits (Lang & Moulton, 2009)



81% of ND APNs are female (ND Nurse Licensure Database, 2010)

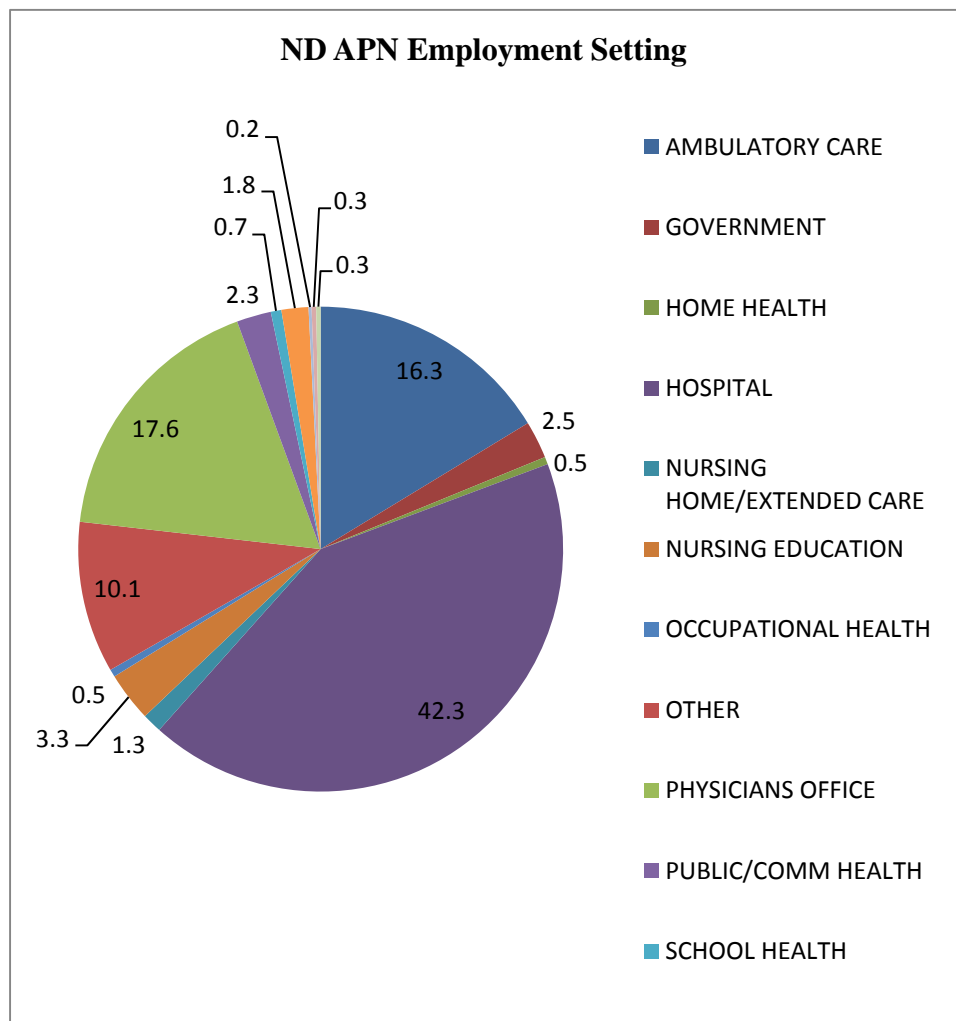
98% of ND APNs are White, 1.2% are Asian, .2% are Native American and .6% are other races (ND Nurse Licensure Database, 2010).

76% of ND APNs have a masters/doctorate degree, 12% have post-bachelor's degree training, 9% have a bachelor's degree and 3% have other degrees (ND Nurse Licensure Database, 2010).

### Current Demand of Providers

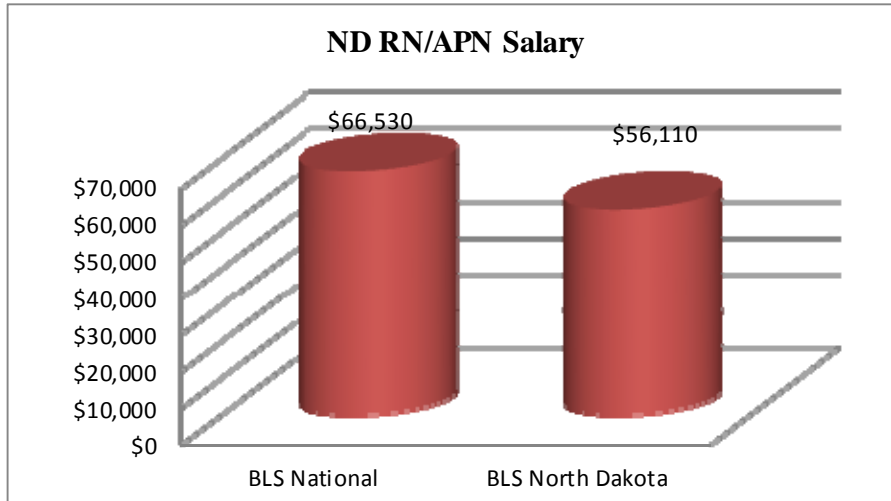
76% of ND APNs are employed full time, 19% are employed part-time and 5% other (ND Nurse Licensure Database, 2010)

The largest percentage (42%) of ND APNs work in public and community health with the rest distributed across 10 different employment settings (ND Nurse Licensure Database, 2010).



The average vacancy rate for ND APNs at 40 responding health care facilities is 12.20% (SD=23.29) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there is one Job Opening for Nurse Practitioners in North Dakota (ND Job Service, 2010)



ND RN/APN salary is lower than the national average (Note- BLS RN salary also includes Nurse Practitioners, Clinical Nurse Specialists, Certified Nurse Midwives and Certified Registered Nurse Anesthetists) (US Bureau of Labor Statistics, 2010).

### Advanced Practice Registered Nurse Summary

Several counties have less than the national average of APNs and vacancy rate information indicate a shortage. More than twenty percent of APNs will also have retired by 2020. Limited information from the Bureau of Labor information is available for different types of advanced practice registered nurses including distribution and salary.

## CHIROPRACTOR

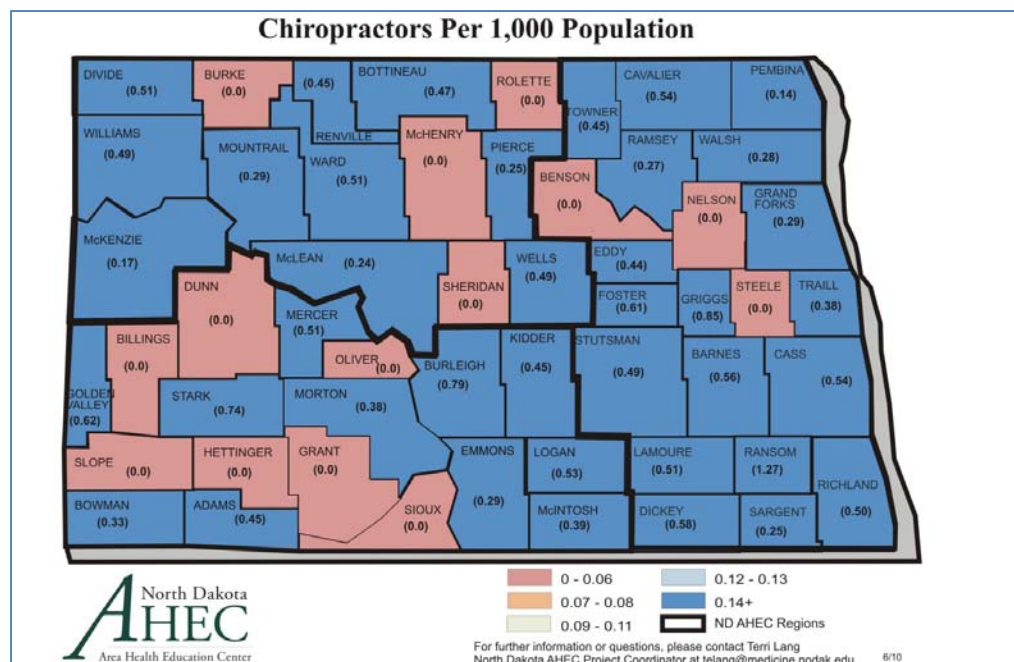
According to the American Chiropractic Association, chiropractors “focus on disorders of the musculoskeletal system and the nervous system, and the effects of these disorders on general health” utilizing “a drug-free, hands-on approach to health care that includes patient examination, diagnosis and treatment. Chiropractors have broad diagnostic skills and are also trained to recommend therapeutic and rehabilitative exercises, as well as to provide nutritional, dietary, and lifestyle counseling.” The US Occupational Outlook Handbook reports that “chiropractic medicine is based on the principle that spinal joint misalignments interfere with the nervous system and can result in lower resistance to disease and many different conditions of diminished health.” (Health Workforce Information Center, 2010)

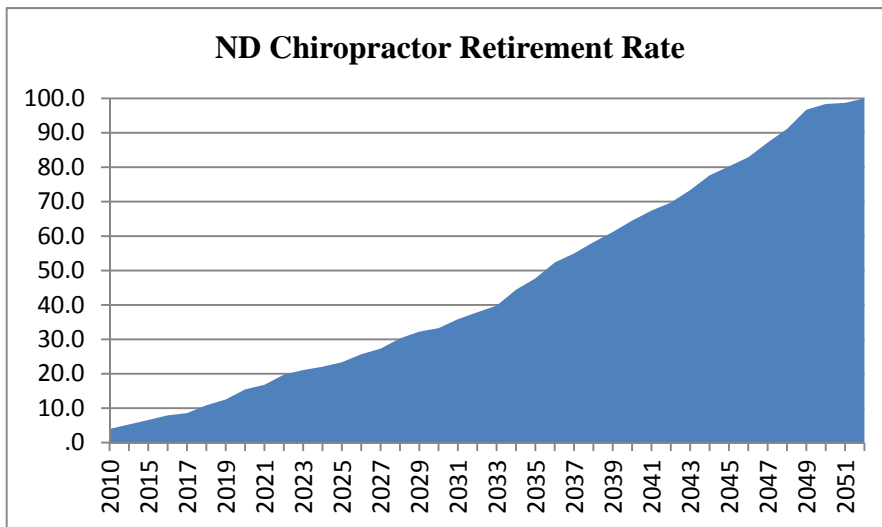
### Student Enrollment

62% of current ND chiropractors attended Northwestern College, 28% attended Palmer and 10% from other programs including National, Logan, Parker, Los Angeles College, Life, Cleveland and Life West (ND Chiropractor Licensure Database, 2010).

### Current Supply Characteristics of Providers

There are 308 chiropractors in ND. There are .48 chiropractors per 1,000 people in ND compared to .09 nationally. Even though, ND has more chiropractors than the national average, 14 counties have no chiropractors (ND Chiropractor Licensure Database, 2010; U.S. Census Bureau, 2009).



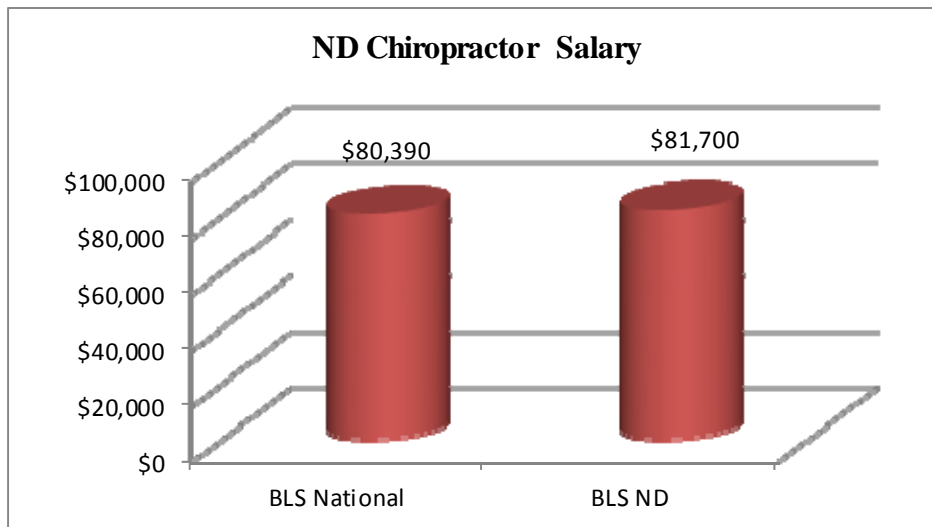


The average age of ND chiropractors is 43 years. Assuming retirement at age 67, 16% of ND chiropractors will have retired at 2020. 75% of ND chiropractors are Male and 25% are female (ND chiropractor Licensure Database, 2010).

### Current Demand of Providers

In 2008 there was an estimated 160 jobs for ND chiropractors which is projected to increase by 14% by 2018 to 183 jobs and is characterized as a very high growth occupation (ND Job Service, 2010).

The average vacancy rate for ND chiropractors at 74 responding health care facilities is 1.84% (SD=9.20) (ND AHEC Health Professions Survey, 2010).



Average salary for chiropractors in ND is greater than the national average (US Bureau of Labor Statistics, 2010).

### Chiropractor Summary

North Dakota has a good supply of chiropractors with a low vacancy rate and salaries that are higher than the national average. However, a few counties do not have any chiropractors.

## OPTOMETRIST

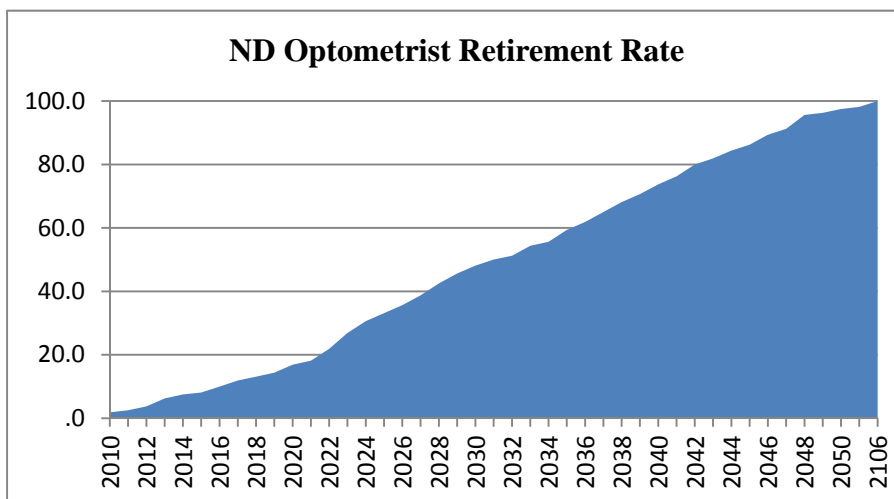
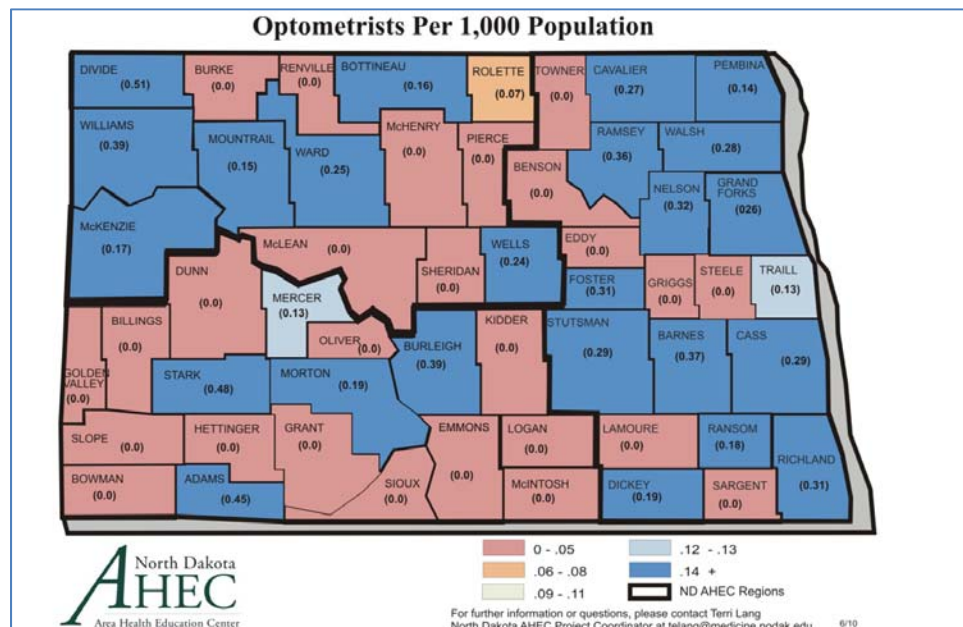
*Optometrists (doctors of optometry or ODs) are the main providers of vision care. They diagnose vision problems by testing depth and color perception, ability to focus, and coordination, test for glaucoma and other eye diseases, and screen for vision conditions caused by diseases such as diabetes and high blood pressure. Additionally, optometrists refer patients to other health practitioners as needed, administer drugs to patients to aid in the diagnosis and treatment of vision problems and eye diseases, and provide care to patients with eye surgeries. (Health Workforce Information Center, 2010)*

### Student Enrollment

There are no programs in North Dakota that offer training for optometrists.

### Current Supply Characteristics of Providers

There are 162 optometrists in North Dakota. There are .25 optometrists per 1,000 people compared to the national average of .09 per 1,000 people. 27 counties have less than the national average (ND Optometrist Licensure Database, 2010; U.S. Census Bureau, 2009).

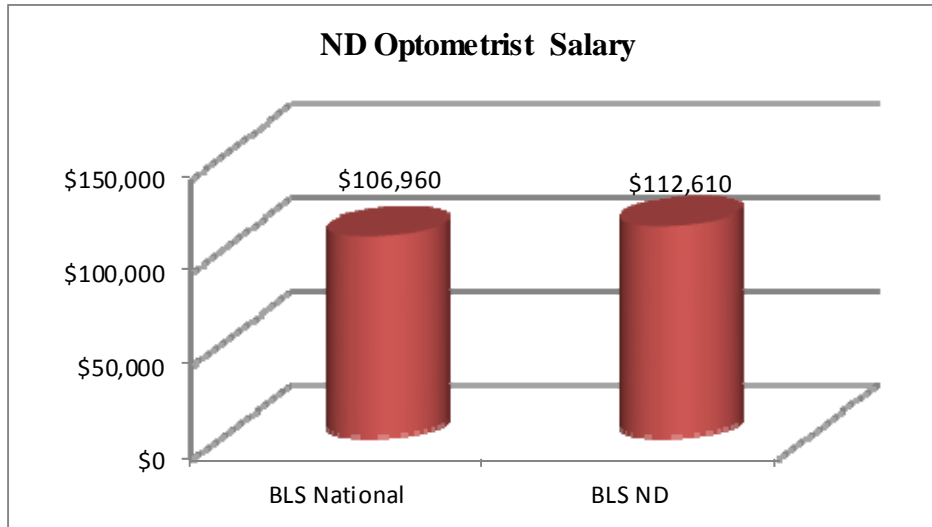


The average age of ND optometrists is 44 years. Assuming retirement by age 67, 17% of optometrists will have retired by 2020 (ND Optometrist Licensure Database, 2010).

## Current Demand of Providers

In 2008 there were an estimated 119 jobs for ND optometrists which was projected to increase by 18% by 2018 to 140 jobs and is classified a very high growth occupation (ND Job Service, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 5 job openings for optometrists in North Dakota (ND Job Service, 2010)



The average salary for ND optometrists is above the national average (US Bureau of Labor Statistics, 2010).

## Optometrist Summary

Although North Dakota has a good supply of optometrists, there are several counties that do not have an optometrist. In addition, there is no training program for optometrists in North Dakota.

# NURSING

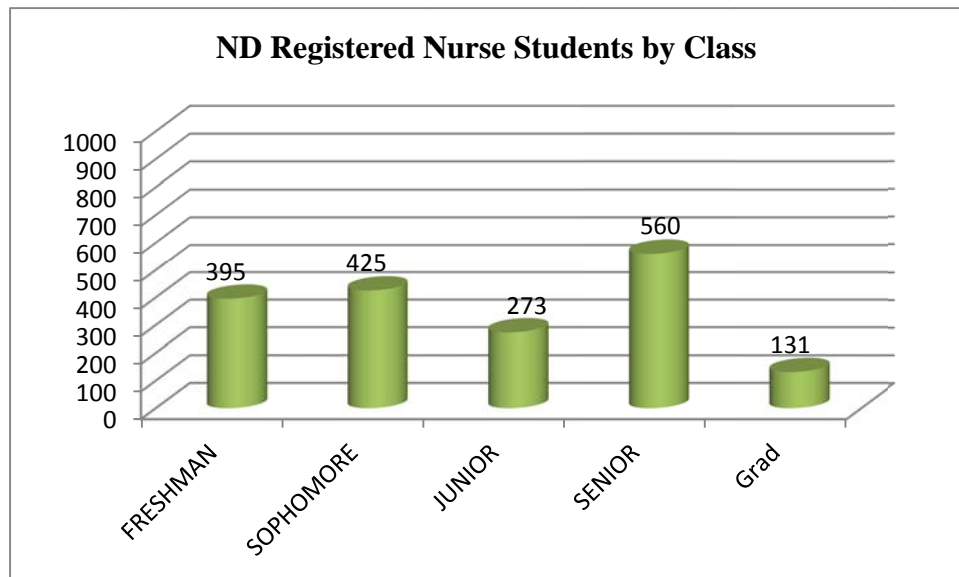
## REGISTERED NURSE

Regardless of specialty or work setting, “registered nurses (RNs) treat patients, educate patients and the public about medical conditions, and provide advice and emotional support to patients’ family members,” according to the Occupational Outlook Handbook published by the Bureau of Labor Statistics. RNs “record medical histories and symptoms, help perform diagnostic tests and analyze results, operate medical machinery, administer treatment and medications, and help with patient follow-up and rehabilitation.” RNs typically specialize according to a particular work setting, a specific type of treatment, a specific health condition, organ or body system type, or population type (Health Workforce Information Center, 2010)

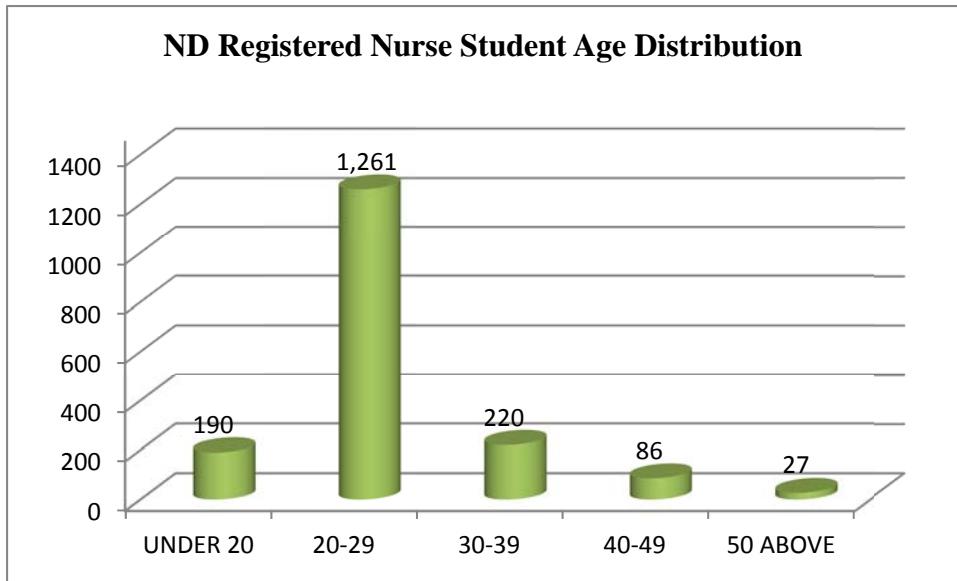
### Student Enrollment

As of fall 2009, a total of 1,784 students were enrolled statewide. In the past 12 months there have been 342 graduates (FINDET, 2009).

89% of current Registered Nurse students are female (FINDET, 2009).



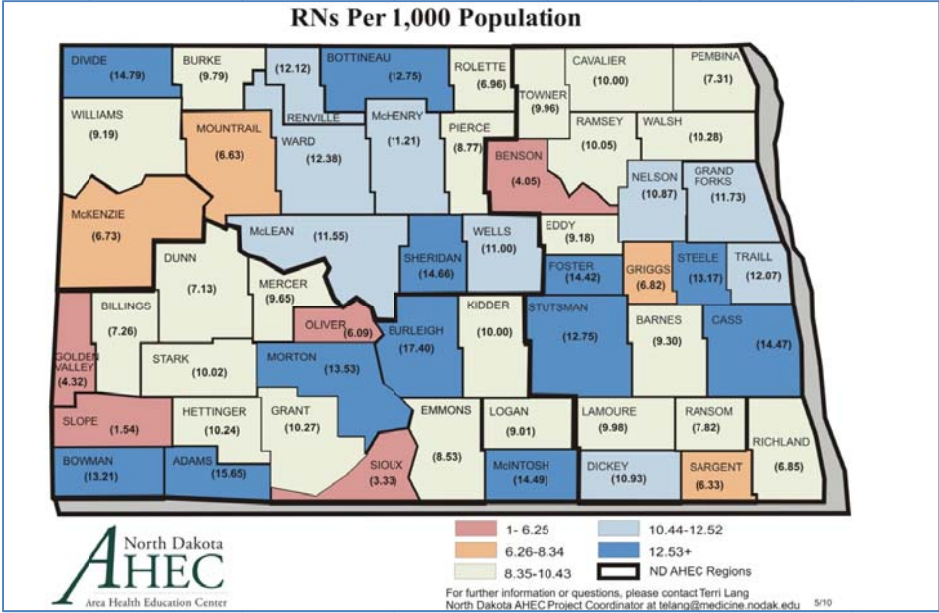




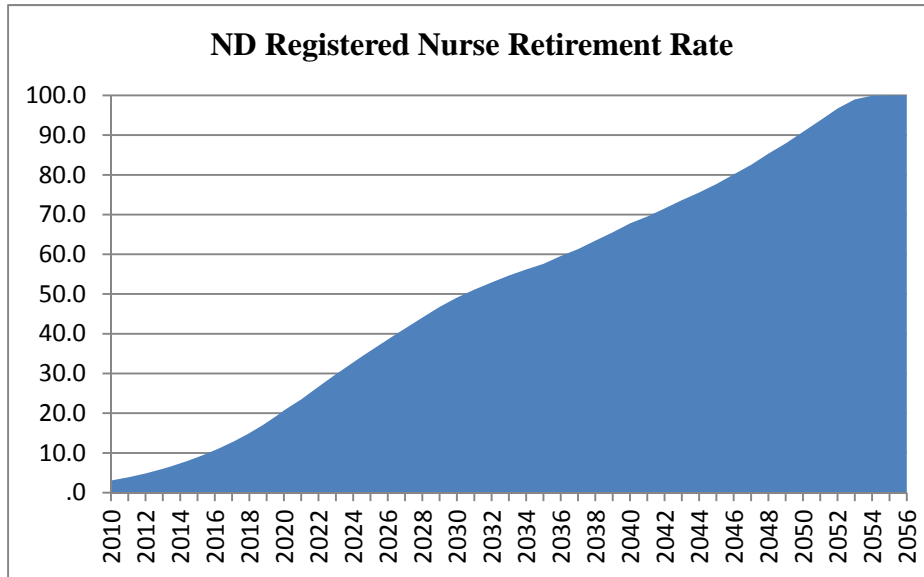
Most RN students are between 20 and 29 years old (FINDET, 2009)

### Current Supply Characteristics of Providers

There are currently 7,915 RNs in North Dakota. There are 9.88 RNs per 1,000 people compared to 8.35 nationally. Nine counties have less than the national average (ND Nurse Licensure Database, 2010; U.S. Census Bureau, 2009). In 2008, 17 counties had less than the national average of RNs (Moulton & Lang, 2008)



The average age for RNs is 46 years. This is lower than the national RN age of 47 years. By 2020, 21% of ND RNs will have reached retirement age (67 years) (ND Nurse Licensure



Database, 2010). North Dakota Nursing Survey results indicate that RNs would consider delaying retirement if they were able to increase pay, have flexible scheduling and retain benefits while working part-time (Lang & Moulton, 2009)

95% of ND RNs are female (ND Nurse Licensure Database, 2010). Nationally 93% of RNs are female (National RN Sample Survey, 2010).

97% of RNs are White, 1% Native American and 2% other races (ND Nurse Licensure Database, 2010). Nationally, 83.2% of RNs are non-Hispanic White (National RN Sample Survey, 2010).

7% of ND RNS have earned a masters/doctorate degree, 62% have earned a bachelor’s degree, 17% an associate’s degree and 13% a diploma (ND Nurse Licensure Database, 2010).

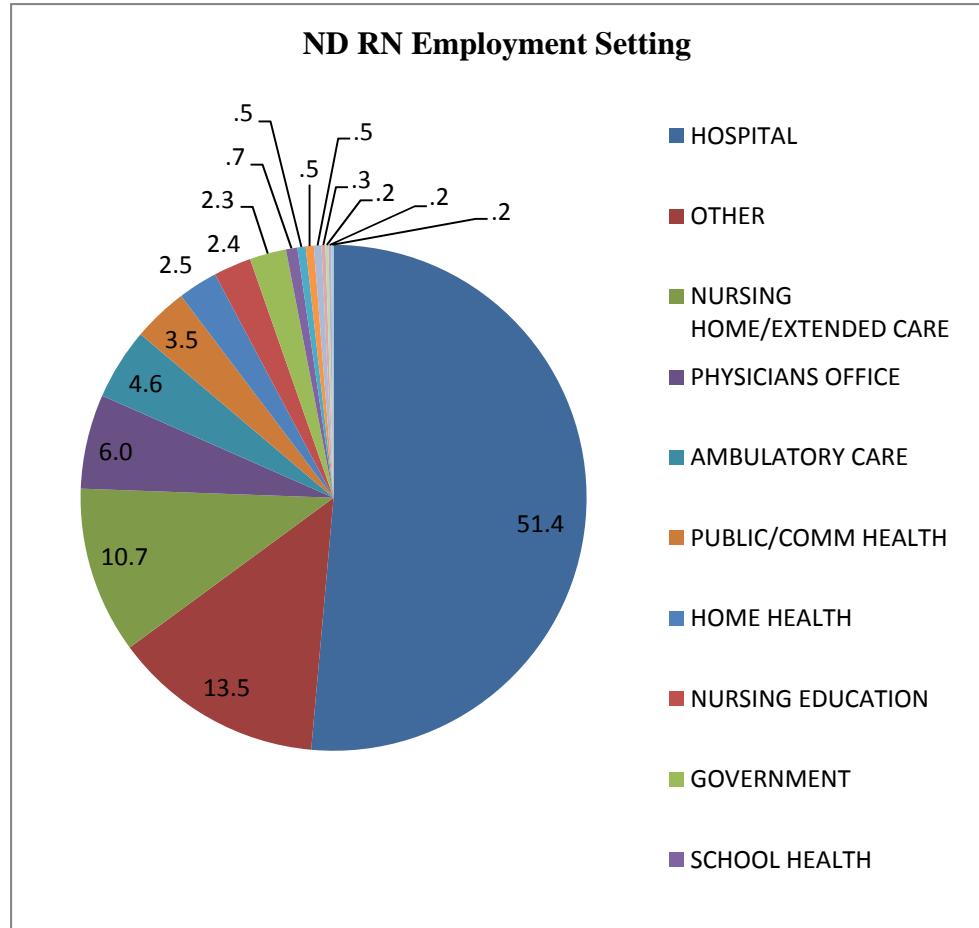
Nationally, 13.2% of RNs have advanced degrees (National RN Sample Survey, 2010).

### Current Demand of Providers

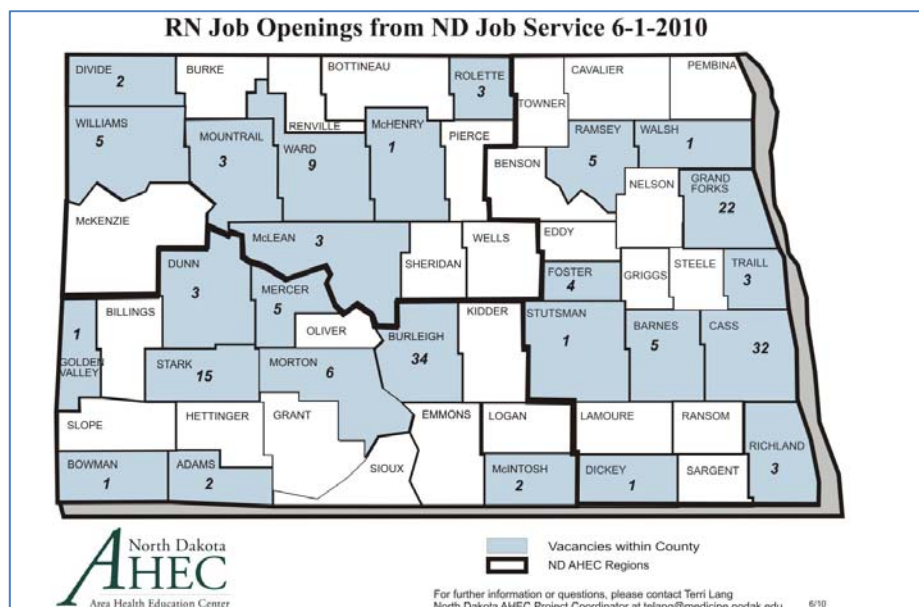
In 2008 there were an estimated 6,363 jobs for ND RNs which was projected to increase by 22% to 7,737 jobs in 2018 and is classified as a high demand occupation with exceptional growth (ND Job Service, 2010).

68% of ND RNs are employed full-time, 23% are employed part-time and 6% are not employed (ND Nurse Licensure Database, 2010).

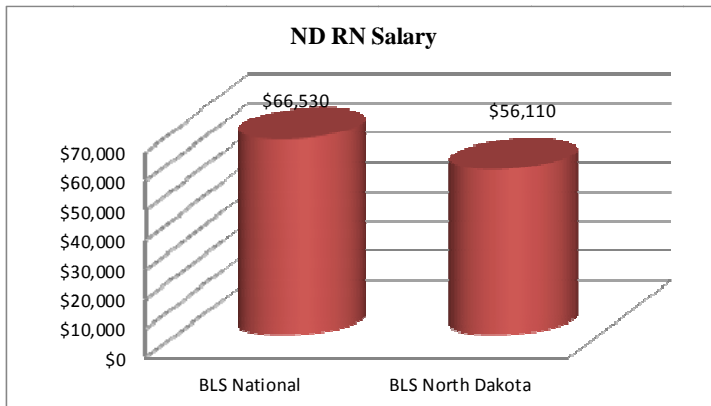
The largest percentage (51%) of RNs work in a hospital setting with the rest distributed across 16 different employment settings (ND Nurse Licensure Database, 2010). Nationally, 62% of RNs work in hospitals (National RN Sample Survey, 2010).



The average vacancy rate for RNs at 125 responding health care facilities is 3.71% (SD=11.81) (ND AHEC Health Professions Survey, 2010).



Data from the ND Job Service jobs website indicates that there are 172 job openings for RNs in North Dakota (ND Job Service, 2010)



ND RN salary is lower than the national average (Note- RN salary also includes nurse practitioners, clinical nurse specialists, certified nurse midwives and certified registered nurse anesthetists) (US Bureau of Labor Statistics, 2010).

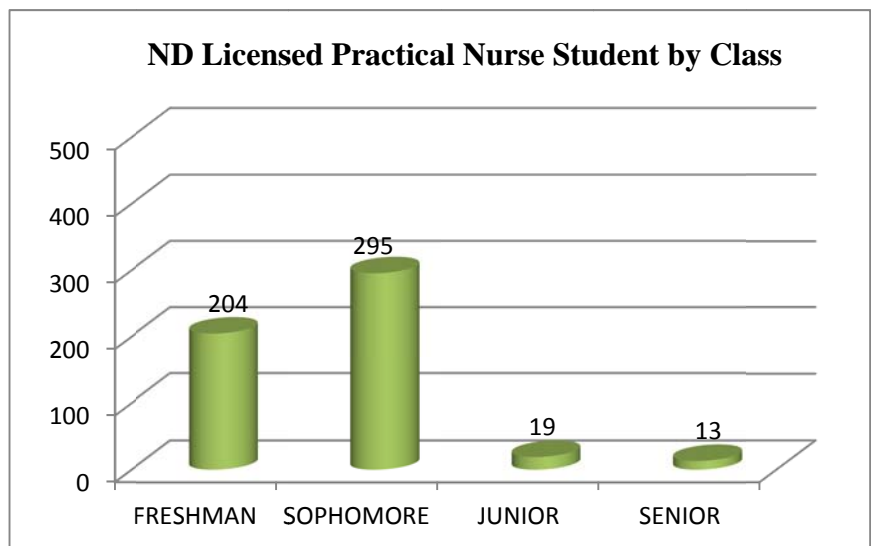
## LICENSED PRACTICAL NURSE

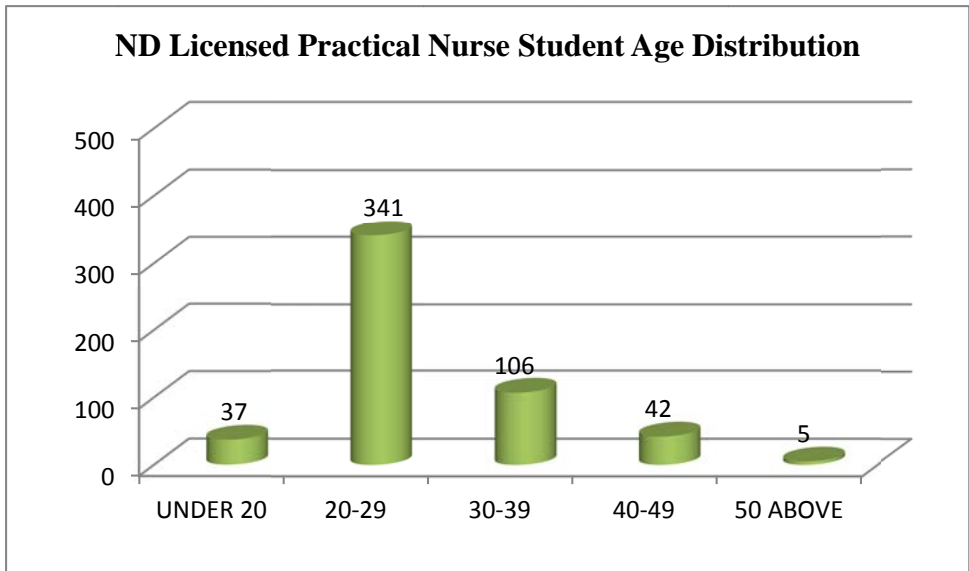
*Licensed practical nurses (LPNs) care for ill, injured, convalescent, or disabled people in hospitals, nursing homes, clinics, group homes, and in patients' homes. LPNs and LVNs provide basic bedside care. They take vital signs (temperature, blood pressure, pulse rate, and respiration rate); treat bedsores; apply dressings; apply icepacks and hot water bottles; give injections and enemas; collect samples for medical testing; monitor catheters; record fluid and food intake and output; help patients with bathing, dressing, and personal hygiene; and feed patients. They provide for their patients' general comfort and emotional well-being as well as monitor them for adverse reactions to injections and medications (Health Workforce Information Center, 2010)*

### Student Enrollment

As of Fall 2009, a total of 531 students were enrolled statewide. In the past 12 months there have been 89 graduates (FINDET, 2009).

93% of current LPN students are female (FINDET, 2009).

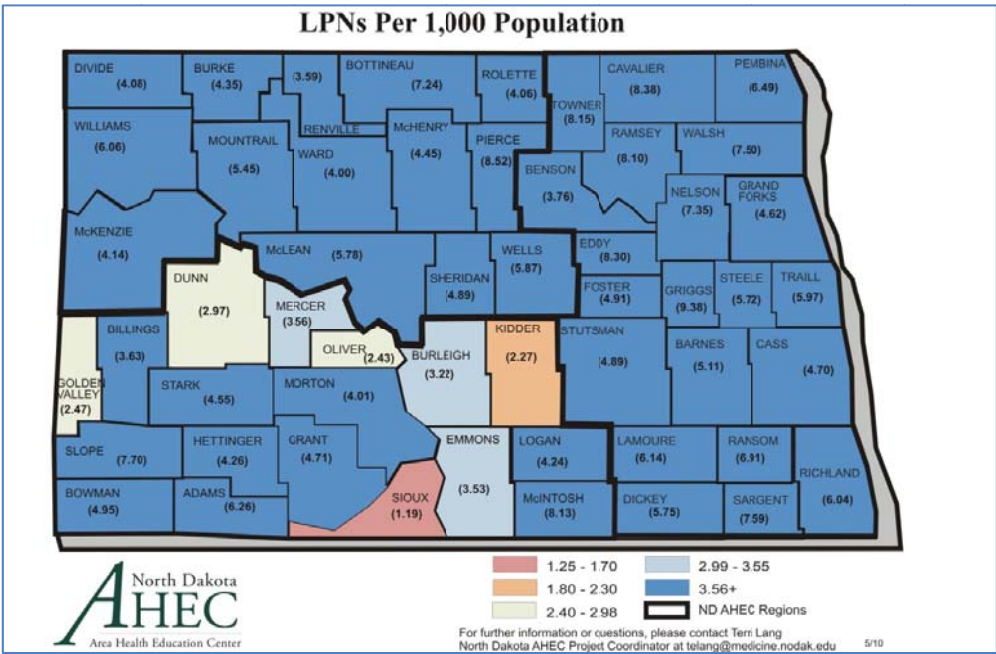




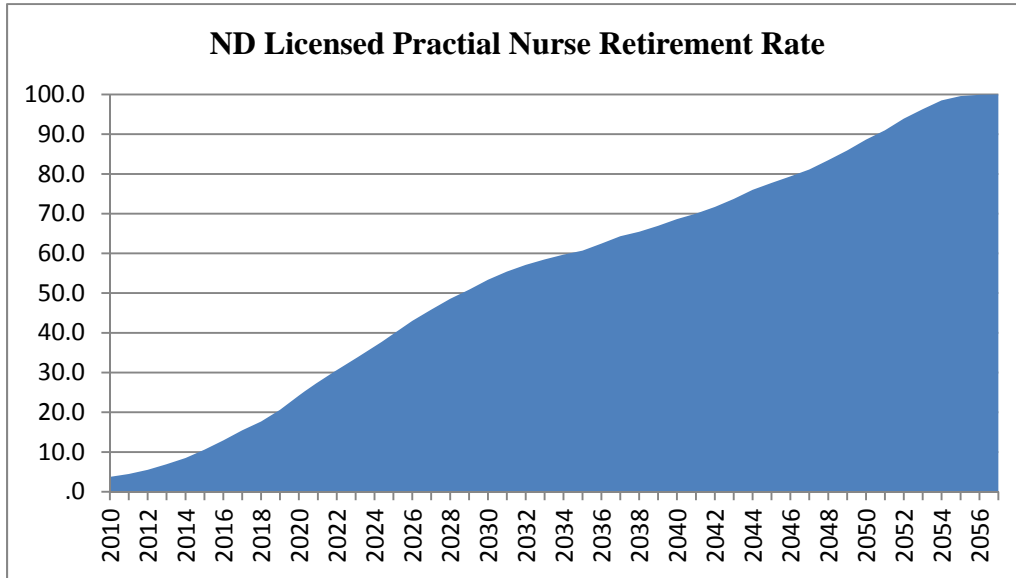
Most LPN students are between 20 and 29 years old (FINDET, 2009)

### Current Supply Characteristics of Providers

There are a total of 3,083 LPNs in North Dakota. There are 4.80 LPNs per 1,000 people compared to 2.40 nationally. Five counties have less than the national average (ND Nurse Licensure Database, 2010; U.S. Census Bureau, 2009).



The average age for ND LPNs is 48 years 24% of LPNs will have reached retirement age (67 years) by 2020 (ND Nurse Licensure Database, 2010). North Dakota Nursing Survey results



indicate that LPNs would consider delaying retirement if they were able to increase pay, have flexible scheduling and retain benefits while working part-time (Lang & Moulton, 2009)

97% of ND LPNs are female (North Dakota Nurse Licensure Database, 2010).

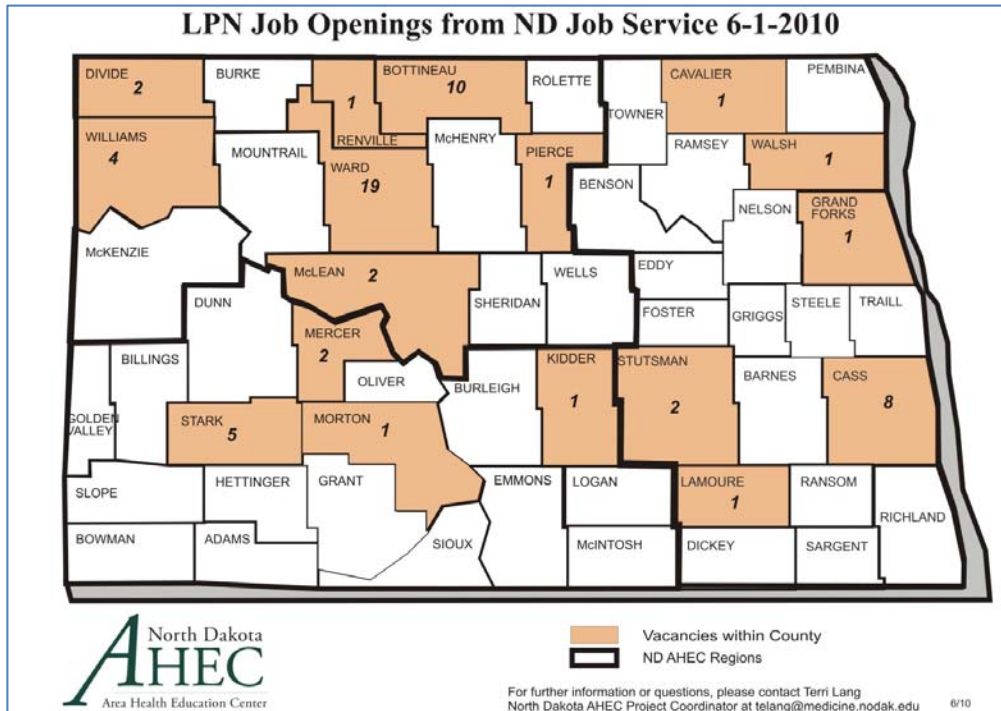
95% of ND LPNs are White, 3% Native American and 2% other races. (North Dakota Nurse Licensure Database, 2010).

0.1% of ND LPNs have earned a master’s degree or higher, 2% a bachelor’s degree, 55% an associate’s degree and 43% a vocational certificate or diploma (North Dakota Nurse Licensure Database, 2010)

### Current Demand of Providers

In 2008 there were an estimated 3,268 jobs for ND LPNs which was projected to increase by 15% to 3,765 jobs in 2018 and is classified as a very high growth, high demand occupation (ND Job Service, 2010).

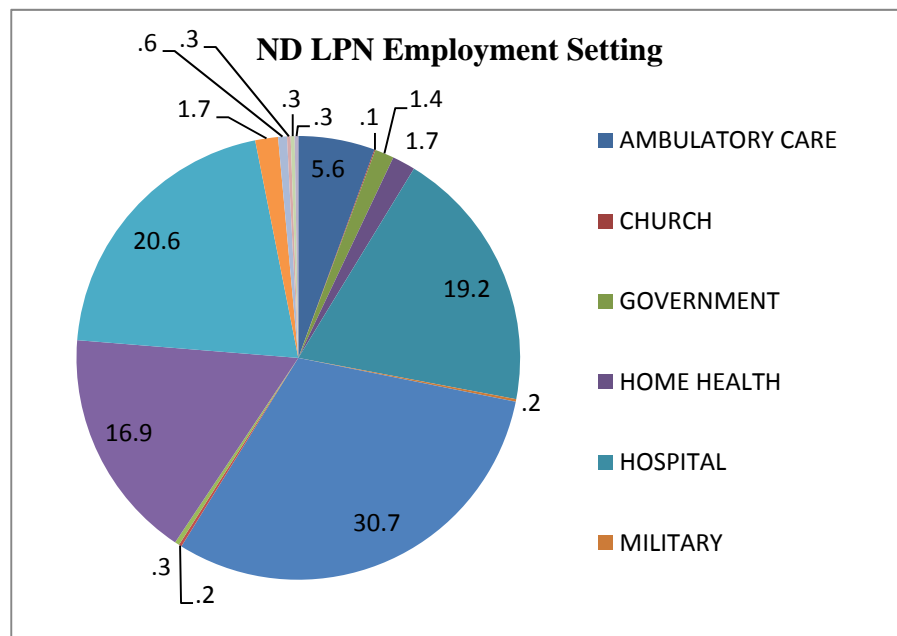
The average vacancy rate for LPNs at 103 responding health care facilities is 6.25% (SD=15.69) (ND AHEC Health Professions Survey, 2010).



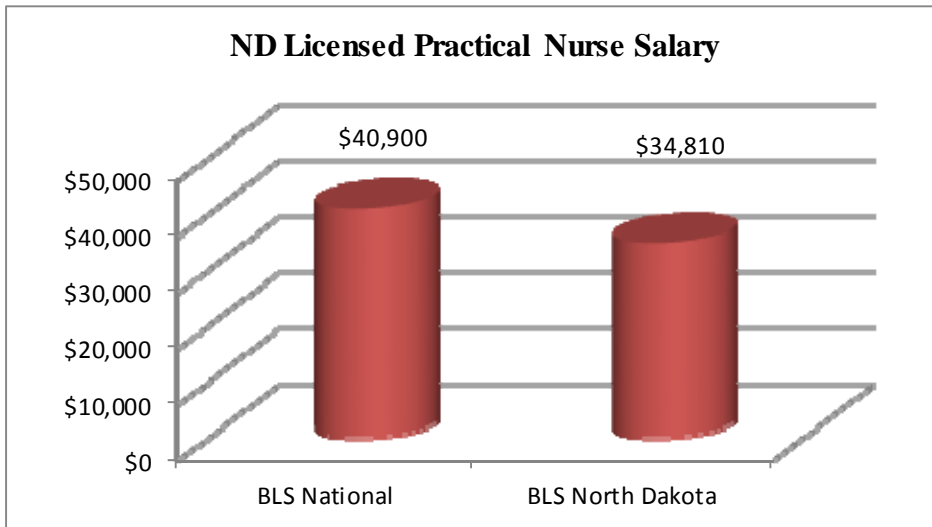
Data from the ND Job Service jobs website indicates that as of May, 2010 there are 62 job openings for LPNs in North Dakota.

62% of ND LPNs are employed full-time, 24% part-time and 10% are not employed (ND Nurse Licensure Database, 2010).

The greatest percentage of ND LPNs work in a nursing home or in an extended care facility (31%) (ND Nurse Licensure Database, 2010).







ND LPN salary is lower than the national average (US Bureau of Labor Statistics, 2010).

### **Nursing Summary**

Several counties have less than the national average of RNs. Although statewide vacancy rates are low, several job openings are listed on ndjobs.com, some of which are potentially floating/flex position which may not be reflected in the vacancy rates. For LPNs, few counties have less than the national average of LPNs, although the vacancy rate and ND job information indicate that there is small shortage of providers. With ND's older population, the demand for nursing services is likely to be higher and will potentially result in the need for more nursing services than the national average. More than twenty percent of RNs and LPNs will have retired in the next 10 years and average salaries are low which will make recruitment difficult.

# BEHAVIORAL AND ALLIED HEALTH

## PSYCHOLOGIST

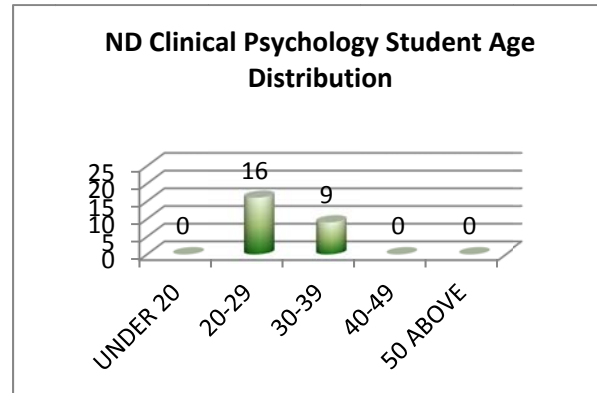
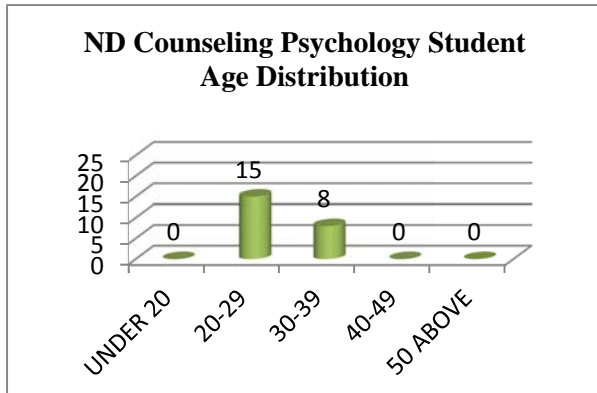
*Psychologists study the human mind and human behavior and their biological and physiological underpinnings. Psychologists in the health care arena work most often in counseling centers, independent or group practices, hospitals, or clinics. Clinical psychologists evaluate patients through interviews, observation, and psychological tests, and they apply current research findings and methodologies in making diagnoses and prescribing treatments. Counseling psychologists help mentally and emotionally distressed clients adjust to life and may assist medical and surgical patients in dealing with illnesses or injuries. In addition to counseling and clinical practice, psychologists may specialize in a number of other areas, each of which changes with the working environment and nature of the job. Psychologists may specialize in clinical health psychology, neuropsychology, and rehabilitation psychology to name a few. Clinical psychologists with specialized training in clinical psychopharmacology may be licensed to prescribe medications for the treatment of mental illness. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 27 students were enrolled in counseling psychology programs and 25 students in clinical psychology programs. In the past 12 months there have been less than 5 graduates from counseling psychology and 5 graduates from the clinical psychology programs (FINDET, 2009).

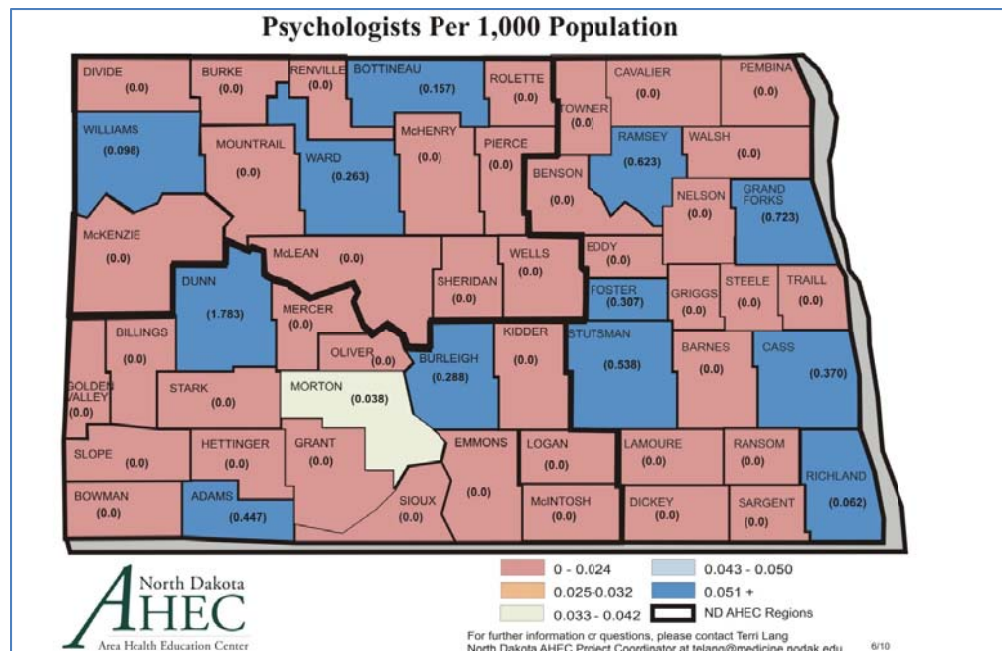
87% of current counseling psychology and 76% of clinical psychology students are female (FINDET, 2009).

Most counseling and clinical psychology students are between 20 and 29 years old (FINDET, 2009)



### Current Supply Characteristics of Providers

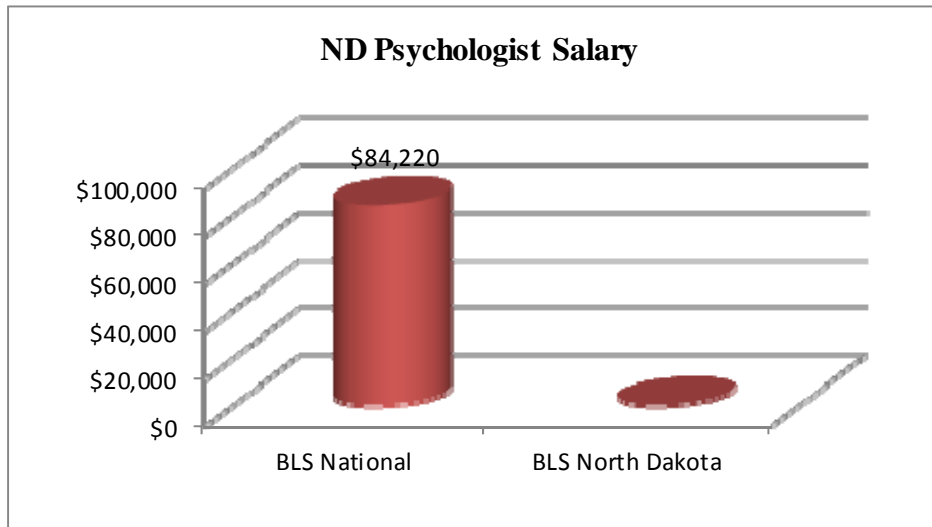
There are 172 psychologists in ND. There are .27 ND psychologists per 1,000 people compared to .03 psychologists per 1,000 people nationally. 40 counties have less than the national average (ND Psychology Licensure Database, 2010; U.S. Census Bureau, 2009).



### Current Demand of Providers

In 2008 there were an estimated 280 jobs for ND clinical, counseling and school psychologists which was projected to increase by 8% to 302 jobs in 2018 and is classified as below average growth occupation (ND Job Service, 2010).

The average vacancy rate for psychologists at 15 responding health care facilities is 7.12% (SD=14.37) (ND AHEC Health Professions Survey, 2010).



The national average salary for psychologists is \$84,220. No state information was available (US Bureau of Labor Statistics, 2010).

### Psychology Summary

Psychologists are distributed regionally throughout North Dakota, although many counties do not have a psychologist. For responding health care facilities there are vacancy rates indicating a slight shortage. Little information exists on practice characteristics, age and salary of psychologists in North Dakota.

## SOCIAL WORK

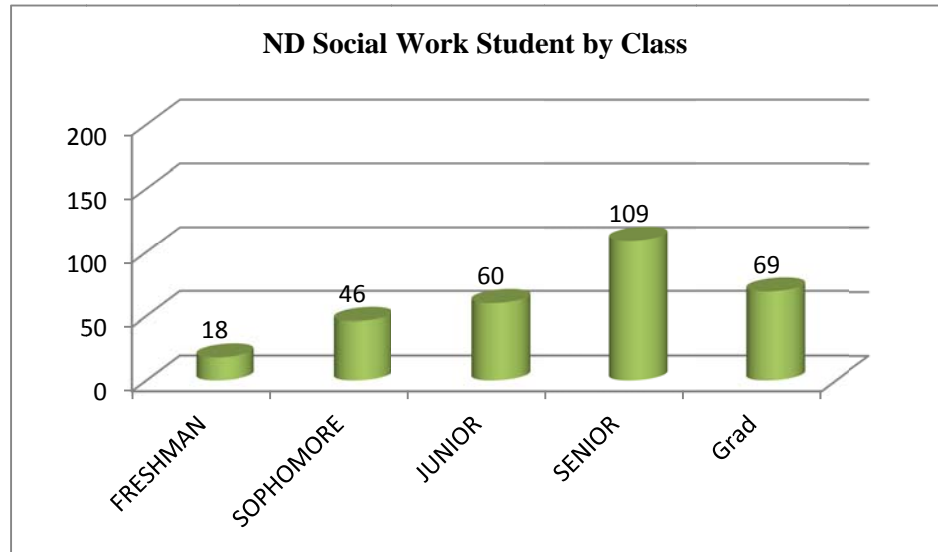
*Social workers help people cope with issues in their everyday lives, manage interpersonal relationships, and solve personal and family problems. There are a number of ways to specialize within this field, according to the nature of one's clientele and/or employing institution. The Bureau of Labor Statistics focuses on three in particular:*

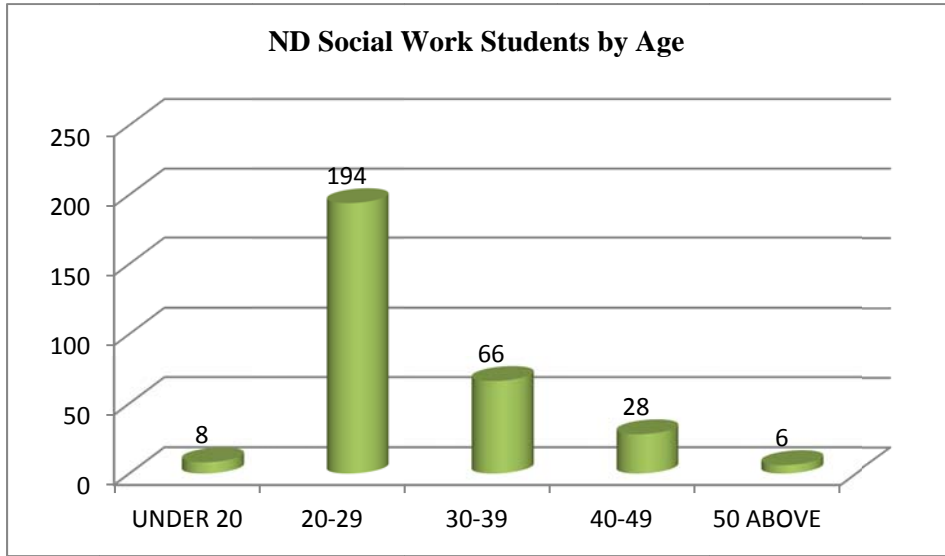
- *Child, family, and school social workers provide social services and assistance to improve the social and psychological functioning of children and their families to maximize the well-being of families and the academic functioning of children.*
- *Medical and public health social workers provide psychosocial support to people, families or vulnerable populations so they can cope with chronic, acute, or terminal illnesses. They also advise family caregivers, counsel patients, and help plan for patients' needs after discharge from hospitals.*
- *Mental health and substance abuse social workers (also called clinical social workers) assess and treat individuals with mental illnesses or substance abuse problems. Such services include individual and group therapy, outreach, crisis intervention, social rehabilitation, and teaching skills for everyday living. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 302 students were enrolled statewide. In the past 12 months there have been 132 graduates (FINDET, 2009).

87% of current social work students are female (FINDET, 2009).



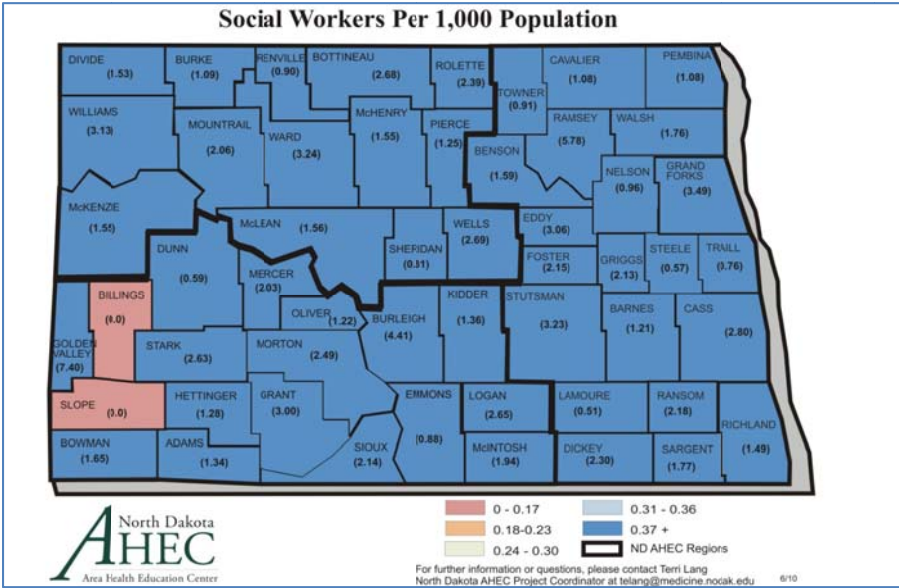


Most social work students are between 20 and 29 years old (FINDET, 2009)

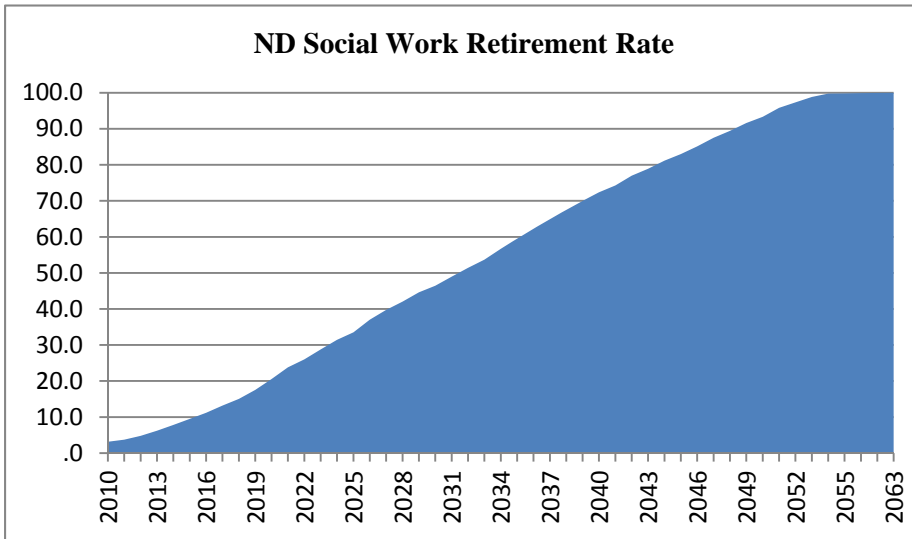
In a study including survey and focus group data from 115 ND social work students, 95.6% of BSW and 93.8% of MSW students plan to obtain licensure in ND and/or MN after graduation. 67% of BSW and 83% of MSW students plan to work in a city of less than 50,000 people (Phillips, Quinn & Heitkamp, 2010).

**Current Supply Characteristics of Providers**

There are 1,998 social workers in ND. Of this, 1,562 are licensed social workers, 231 are licensed certified social workers and 205 are licensed independent clinical social workers. There are 3.1 ND Social Workers per 1,000 people compared to .24 nationally. Two counties have less than the national average (ND Social Work Licensure Database, 2010, U.S. Census Bureau, 2009).



Note: County level data was unavailable for a substantial number of providers.



The average age of ND social workers is 45 years. Assuming retirement by age 67, 21% will have retired by 2020 (ND Social Work Licensure Database, 2010)

87% of ND social workers are female (ND Social Work Licensure Database, 2010).

78% of ND social workers have a bachelor’s degree and 22% have a master’s degree (ND Social Work Licensure Database, 2010).

In a study of rural licensed social workers, 59% indicated that they were mostly satisfied with their rural social work practice. Benefits of a rural practice included that the work is meaningful; they have good relationships with other professionals and are familiar with the community and regional resources. Rural social workers indicated that there was not enough services for clients, that they experienced burnout/stress, they had low salary and that there were no opportunities for job mobility or job change (Quinn et al., 2010).

### Current Demand of Providers

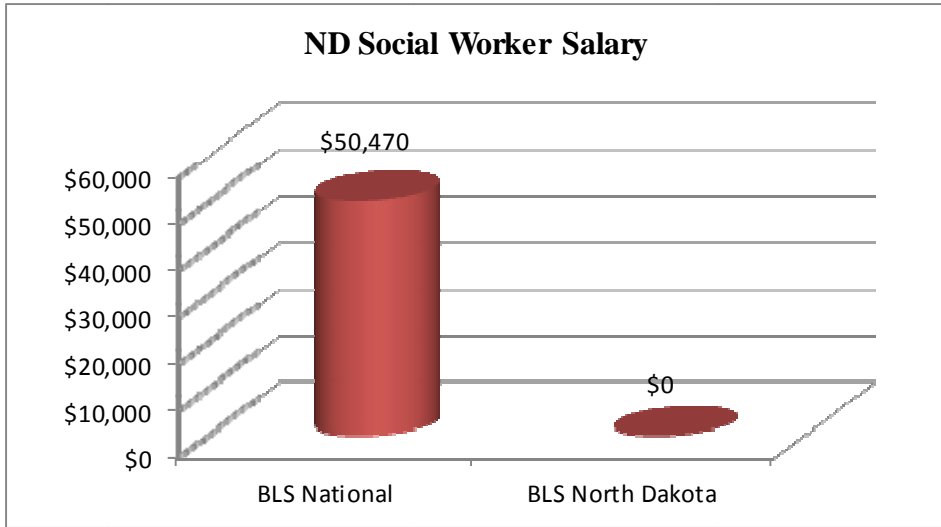
In 2008 there were an estimated 597 jobs for ND child, family and school social workers which is projected to increase by 11% to 663 jobs in 2018 and is classified as an average to above average growth, high demand occupation (ND Job Service, 2010).

In 2008 there were an estimated 408 jobs for ND medical and public health social workers which is projected to increase by 16% to 475 jobs in 2018 and is classified as a very high growth, high demand occupation (ND Job Service, 2010).

In 2008 there were an estimated 403 jobs for ND mental health and substance abuse social workers which are projected to increase by 10% to 444 jobs in 2018 and is classified as an average to above average growth occupation (ND Job Service, 2010).

The average vacancy rate for social workers at 67 responding health care facilities is 3.04% (SD=10.63) (ND AHEC Health Professions Survey, 2010).





The national average salary for social workers is \$50,470. No data was available for North Dakota (Bureau of Labor Statistics, 2010).

### Social Work Summary

There is currently a good supply of social workers in North Dakota with low vacancy rates. However, more than twenty percent of the current workforce will retire by 2020. Studies with North Dakota social workers have indicated that rural social workers do have concerns such as burnout, stress and low salary. Little information exists on salaries.

“I spent 10 years working and living in [a city], so I have the urban experience. The lack of resources, more conservative communities, lack of diversity were the biggest difference in practice [in North Dakota]. I felt safer working in the roughest urban areas than I do going out to an isolated farmstead. There are fewer law enforcement officers, longer response times, more (different) weapons available---in the urban area, it is handguns that families have put away in the drawer when the social worker comes; in the rural area, it is a loaded hunting rifle at the door.” ND Social Worker (Quinn et al., 2010)

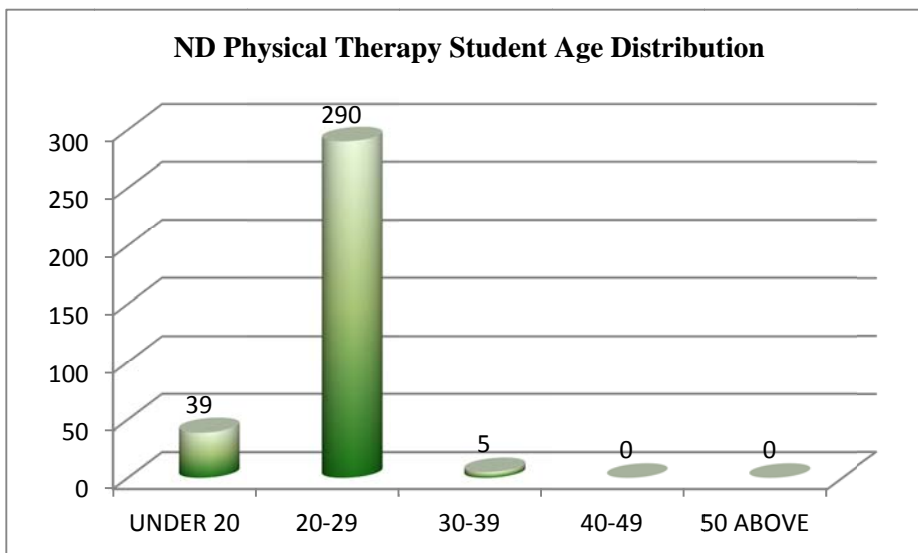
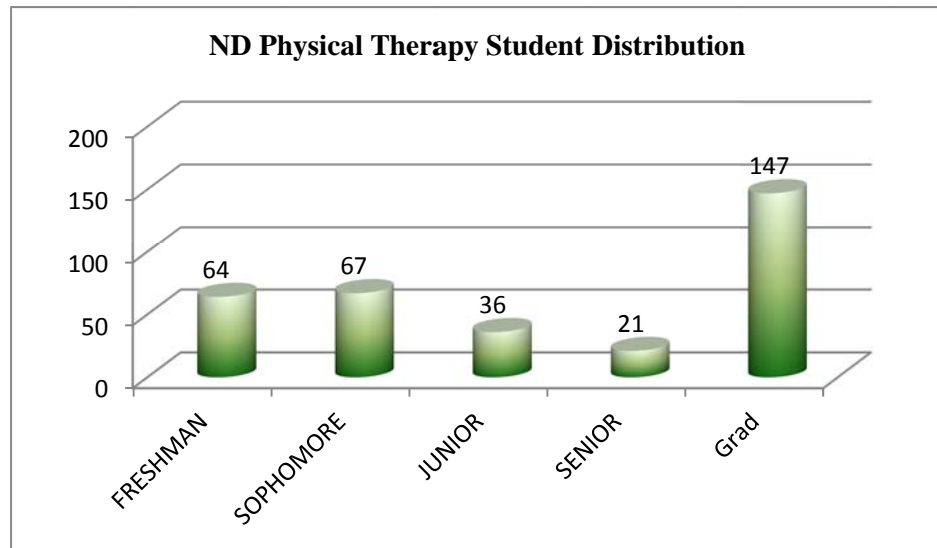
## PHYSICAL THERAPIST

*Physical therapists provide services which help improve mobility and function, relieve pain, and prevent or limit permanent physical disabilities in patients suffering from injuries or disease. Physical therapists examine each patient's medical history and then test and measure the degree of disability or impairment to develop a specialized treatment plan. Physical therapists often consult and practice with a variety of other professionals, such as physicians, dentists, nurses, educators, social workers, occupational therapists, speech-language pathologists, and audiologists (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 335 students were enrolled statewide. In the past 12 months there have been 49 graduates (FINDET, 2009).

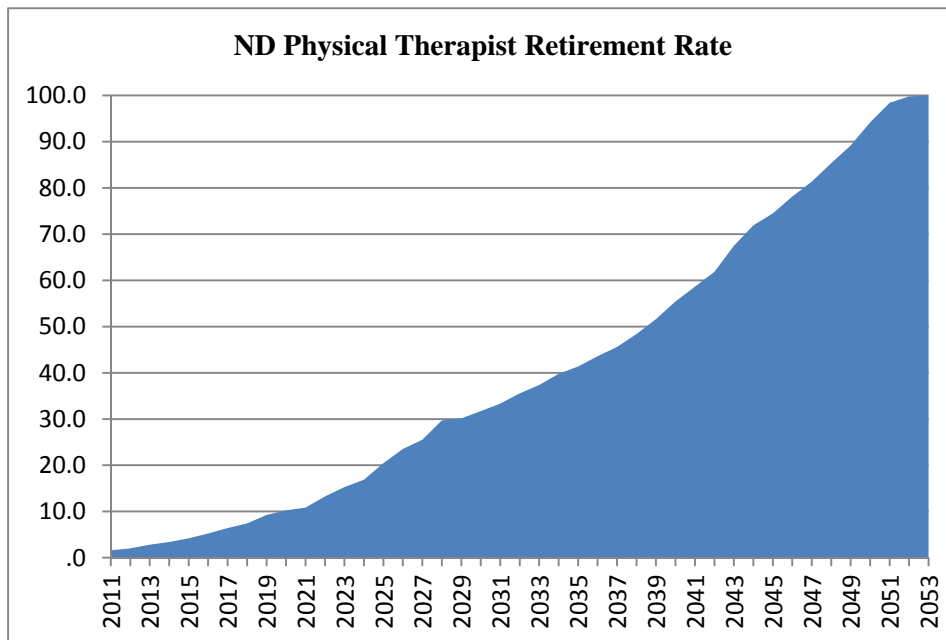
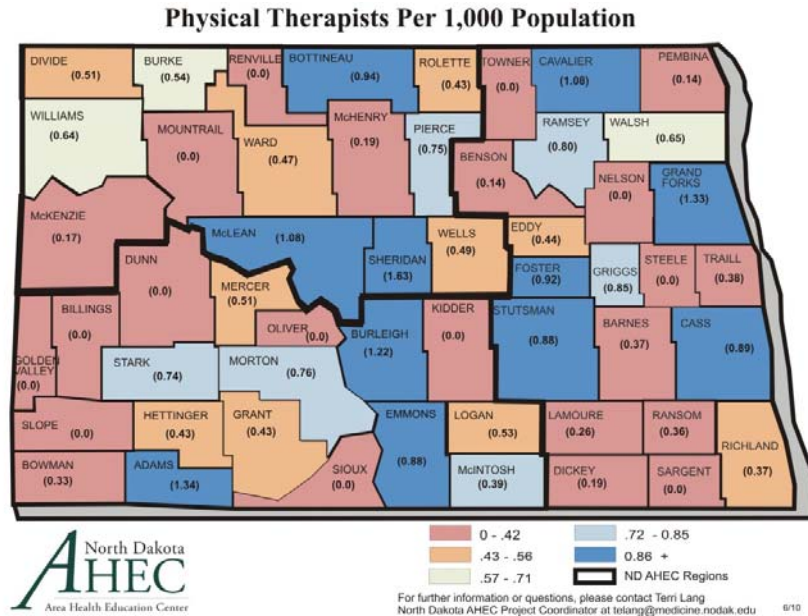
70% of current PT students are female (FINDET, 2009).



Most PT students are between 20 and 29 years old (FINDET, 2009)

## Current Supply Characteristics of Providers

There are 500 PTs in ND. There are .77 PTs per 1,000 people compared to .57 nationally. 33 counties have less than the national average (ND Physical Therapy Licensure Database, 2010; U.S. Census Bureau, 2009).



The average age of ND PTs is 41 years. Assuming retirement by age 67, 10% will have retired by 2020 (ND Physical Therapy Licensure Database, 2010)

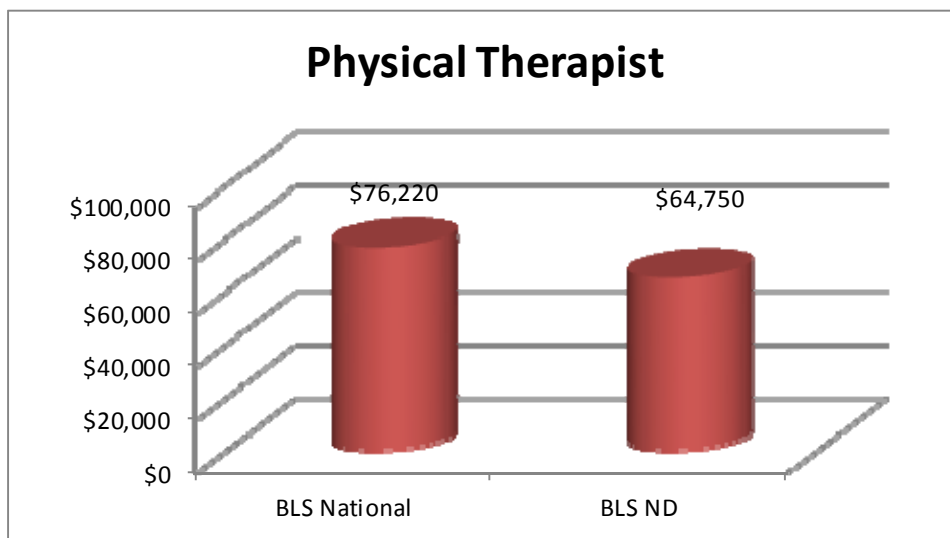
69% of ND PTs are female (ND Physical Therapy Licensure Database, 2010)

## Current Demand of Providers

In 2008 there were an estimated 431 jobs for ND PTs which was projected to increase by 19% to 513 jobs in 2018 and is classified as an exceptional growth occupation. (ND Job Service, 2010).

The average vacancy rate for PTs at 32 responding health care facilities is 7.51% (SD=17.06) (ND AHEC Health Professions Survey, 2010). Nationally, the average vacancy rate for PTs working in Acute Care Hospitals is 13.8% (APTA, 2008).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 15 Job Openings for Physical Therapists in North Dakota (ND Job Service, 2010)



ND PT average salary is below the national average (US Bureau of Labor Statistics, 2010).

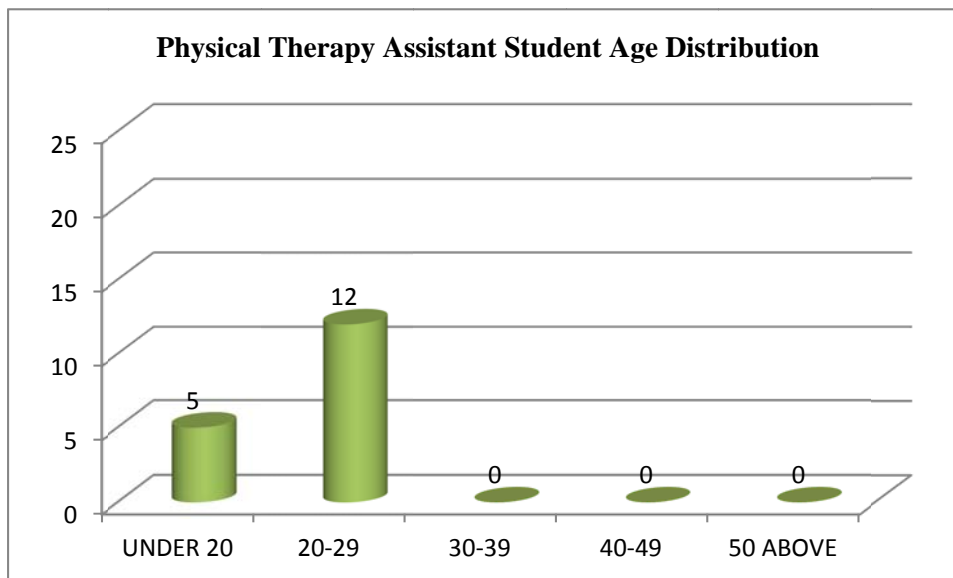
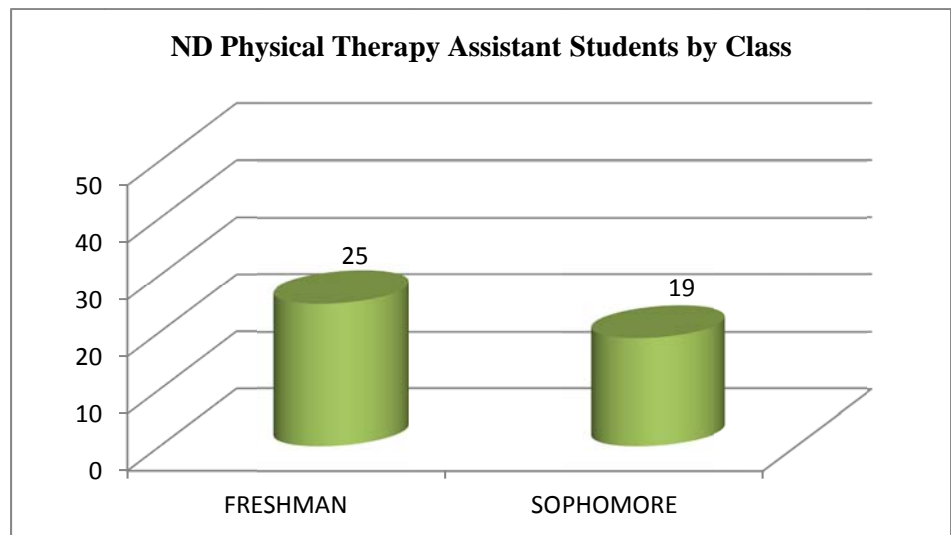
## PHYSICAL THERAPY ASSISTANT

*Physical therapist assistants help physical therapists provide treatment that improves patient mobility and function, relieves pain, and prevents or lessens physical disabilities and/or their effects. Specifically, a physical therapist assistant might help patients exercise or learn to use crutches, for example, or gather and prepare therapy equipment. Assistants generally engage in tasks requiring more training or experience, actually providing part of a patient's care or treatment plan than an aide. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 19 students were enrolled statewide. In the past 12 months there have been 7 graduates (FINDET, 2009).

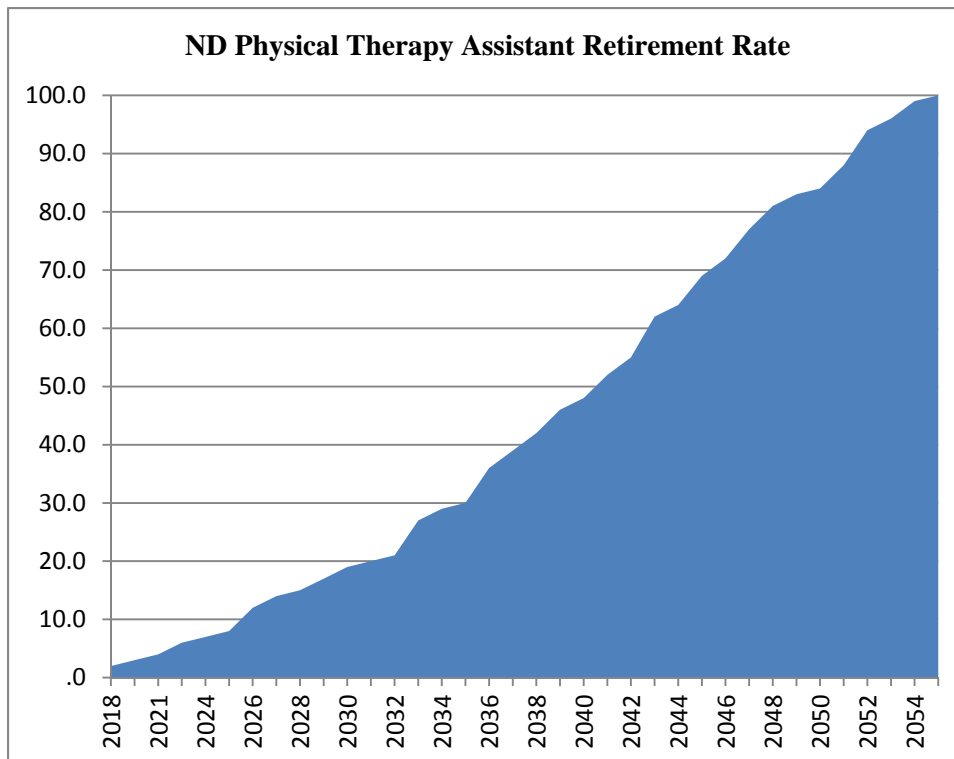
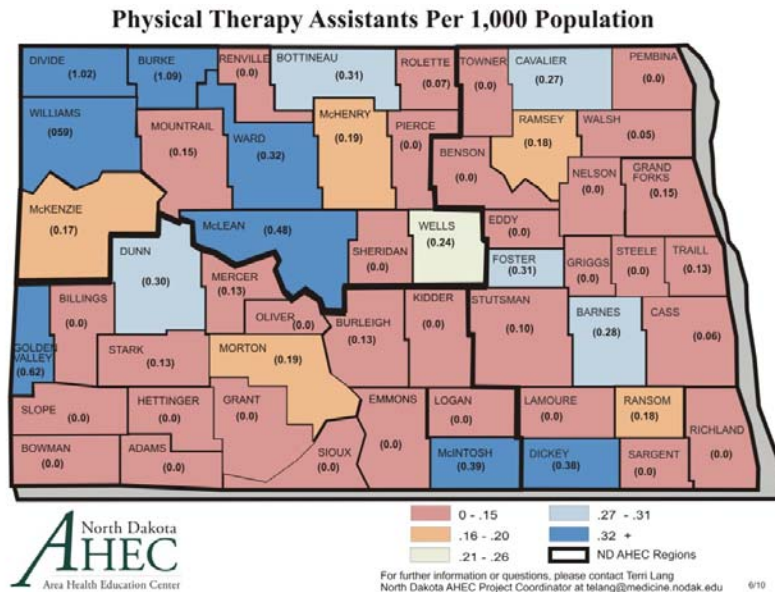
79% of current PTA students are female (FINDET, 2009).



Most PTA students are between 20 and 29 years old (FINDET, 2009)

## Current Supply Characteristics of Providers

There are 100 PTAs in ND. There are .15 PTAs per 1,000 people compared to .21 nationally (ND Physical Therapy Licensure Database, 2010; U.S. Census Bureau, 2009). 39 counties have less than the national average.



The average age of ND PTAs is 37 years. Assuming retirement by age 67, 3% will have retired by 2020 (ND Physical Therapy Licensure Database, 2010)

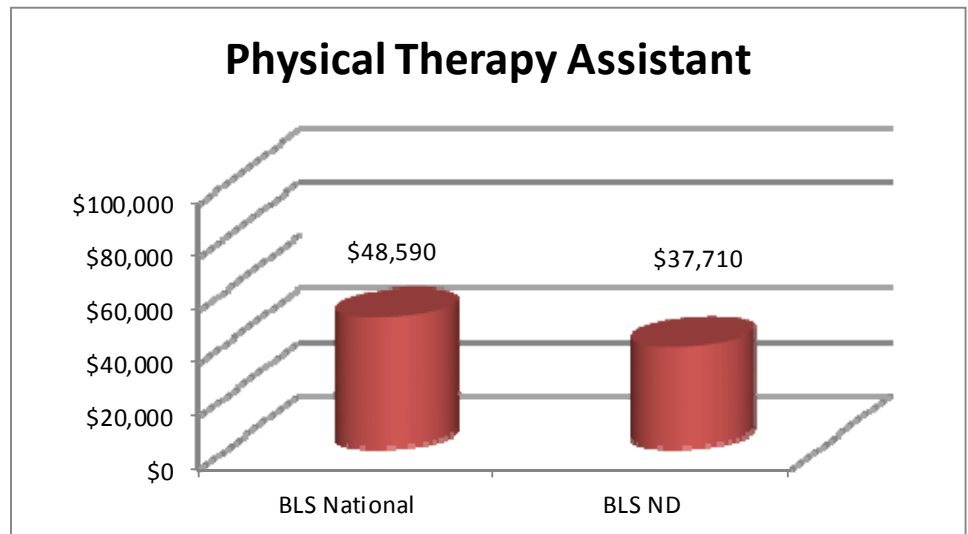
80% of ND PTAs are female (ND Physical Therapy Licensure Database, 2010)

## Current Demand of Providers

The average vacancy rate for PTAs at 27 responding health care facilities is 11.99% (SD=29.19) (ND AHEC Health Professions Survey, 2010). Nationally, the average vacancy rate for PTAs working in acute care hospitals is 12% (APTA, 2008).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 4 job openings for physical therapy assistants in North Dakota (ND Job Service, 2010)

ND PTA average salary is below the national average (ND Job Service, 2010; US Bureau of Labor Statistics, 2010).



### Physical Therapy Summary

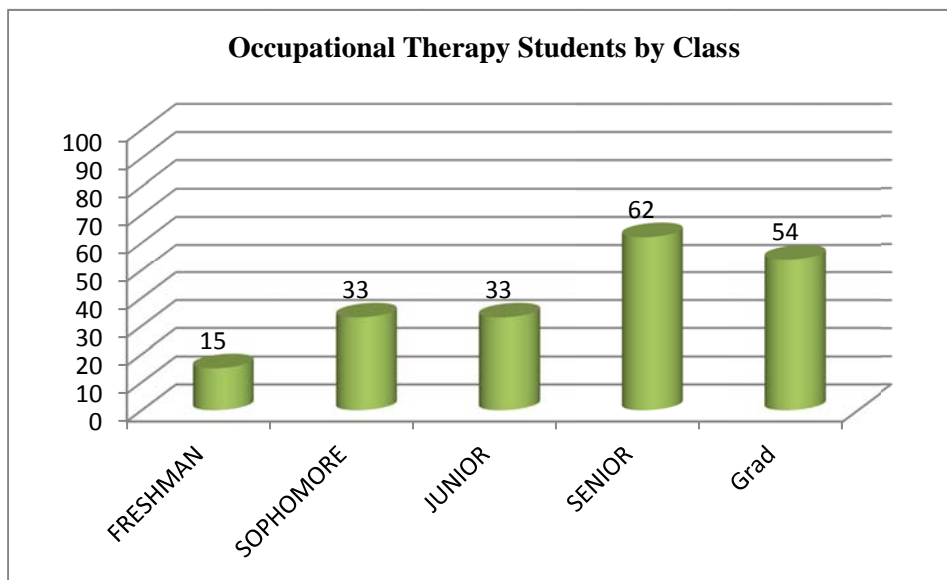
Many counties have a low number of PTs/PTAs and vacancy numbers indicate a slight shortage of providers. In addition, salary is lower than the national average which will make recruiting new providers difficult.



## OCCUPATIONAL THERAPIST

*Occupational therapists help patients suffering from disabling conditions to perform daily living skills and achieve maximum independence. Through activities ranging from physical movement and exercises in the case of a physical disability to cognitive development tasks in the case of a mental or emotional disability, occupational therapists helps clients not only “improve their basic motor functions and reasoning abilities, but also to compensate for permanent loss of function,” according to the Bureau of Labor Statistics. (Health Workforce Information Center, 2010)*

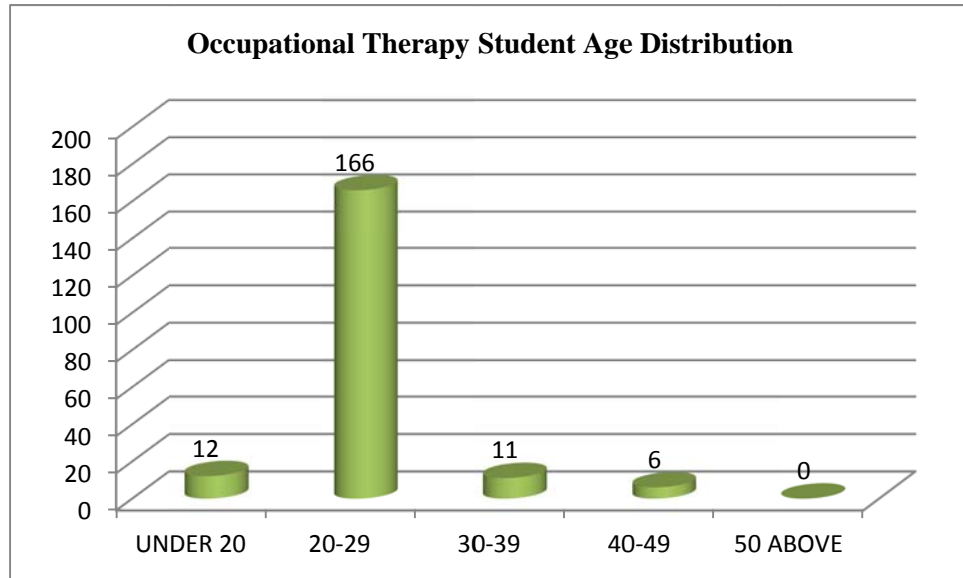
### Student Enrollment



As of fall 2009, a total of 197 students were enrolled statewide. In the past 12 months there have been 46 graduates (FINDET, 2009).

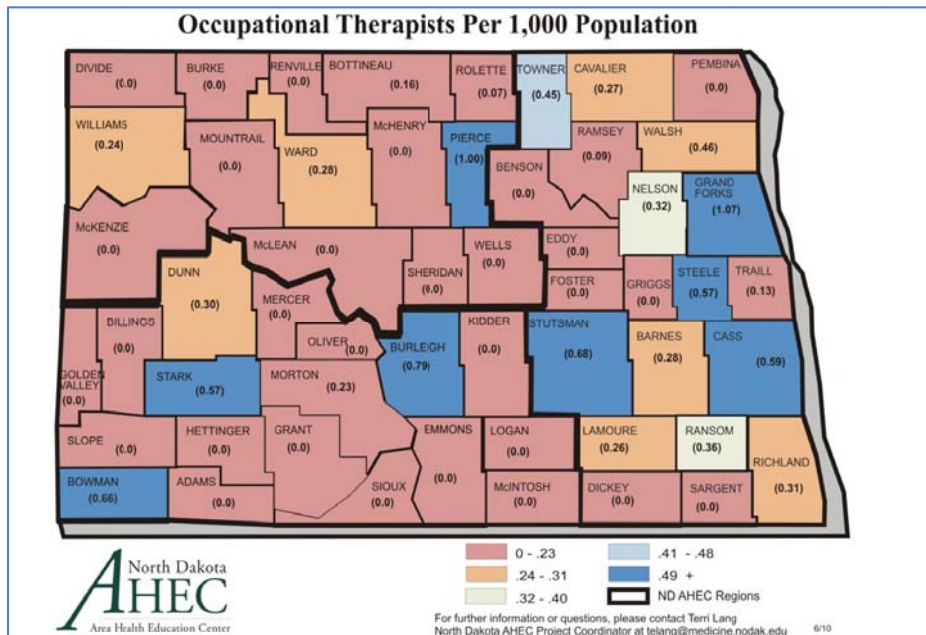
89% of current occupational therapy (OT) students are female (FINDET, 2009).

Most OT students are between 20 and 29 years old (FINDET, 2009)



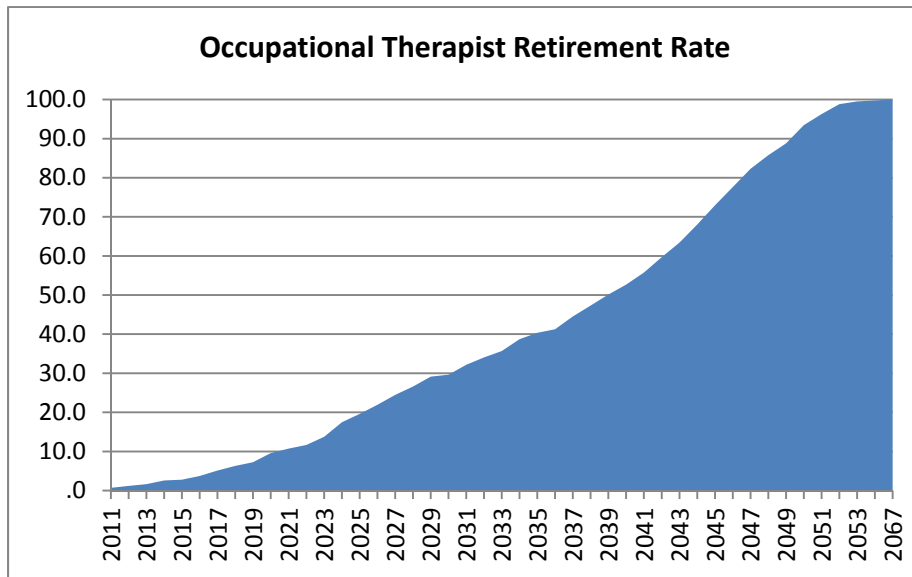
Of those currently practicing, 56% attended the University of North Dakota, 25% University of Mary, 5% College of St. Catherine and 15% other college (ND Occupational Therapy Licensure Database, 2010)

### Current Supply Characteristics of Providers



There are 431 OTs in ND. There are .67 OTs per 1,000 people in ND compared to .32 per 1,000 people nationally. 42 counties have less than the national average (ND Occupational Therapy Licensure Database, 2010; U.S. Census Bureau, 2009).

Note: County level data was unavailable for a substantial number of OTs



The average age of ND OTs is 40 years. Assuming retirement at age 67, 10% of ND OTs will have retired by 2020 (ND Occupational Therapy Licensure Database, 2010).

94% of ND OTs are female (ND Occupational Therapy Licensure Database, 2010)

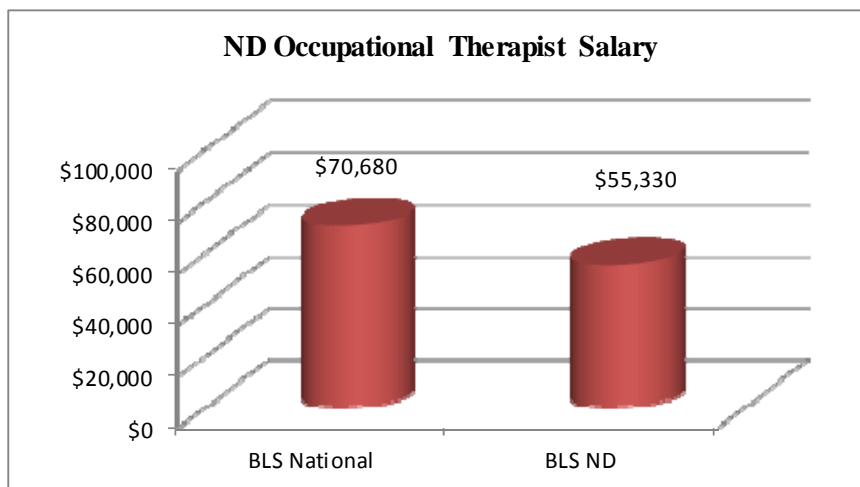
65% of current ND OTs have a BS/BA degree, 35% have a MS/MA degree and less than 1% have another degree (ND Occupational Therapy Licensure Database, 2010)

**Current Demand of Providers**

In 2008 there were an estimated 230 jobs for ND OTs which was projected to increase by 17% to 268 jobs in 2018 and is classified as a very high growth occupation. (ND Job Service, 2010).

The average vacancy rate for ND OTs at 24 responding health care facilities is 6.82% (SD=22.43) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 11 job openings for OTs in North Dakota (ND Job Service, 2010)



Average ND OT salary is below the national average. (Bureau of Labor Statistics, 2010).

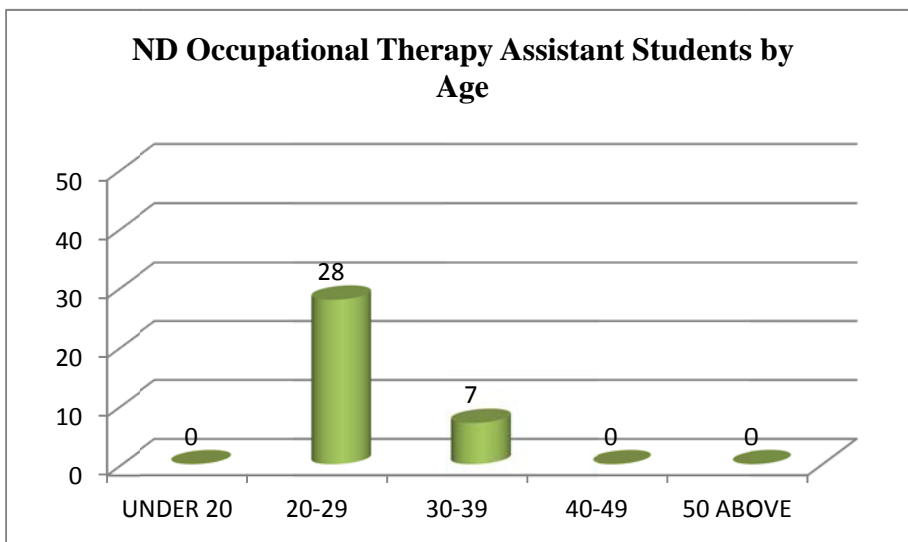
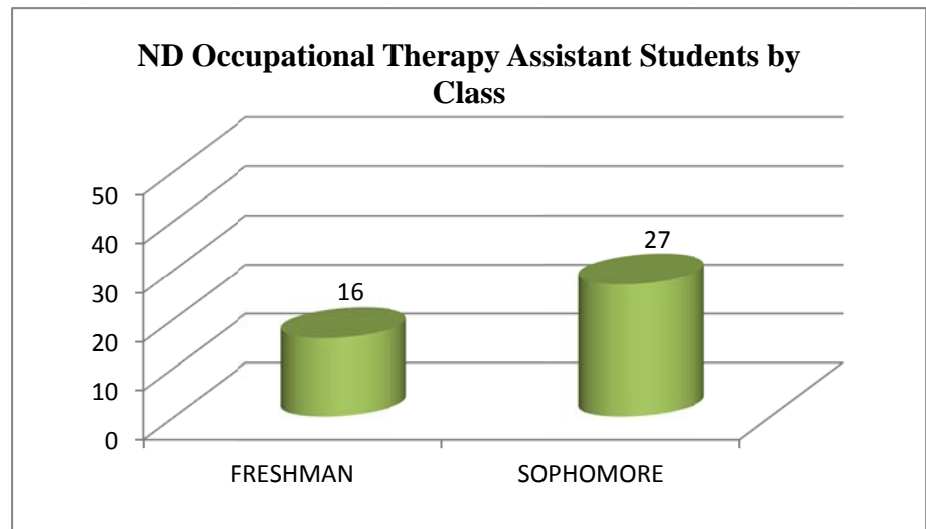
## OCCUPATIONAL THERAPY ASSISTANT

*Occupational therapist assistants and aides (also referred to as “occupational therapy assistants”) work under the direction of occupational therapists to help people with rehabilitative activities and exercises outlined in a treatment plan developed by, or in collaboration with, the occupational therapist. They also record the client’s progress for the occupational therapist, and document billing of the client’s health insurance provider. In addition to providing a range of clerical services, occupational therapist assistants and aides typically prepare materials and assemble equipment used during treatment. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 43 students were enrolled statewide. In the past 12 months there have been 14 graduates (FINDET, 2009).

88% of current Occupational Therapy Assistant (OTA) students are female (FINDET, 2009).

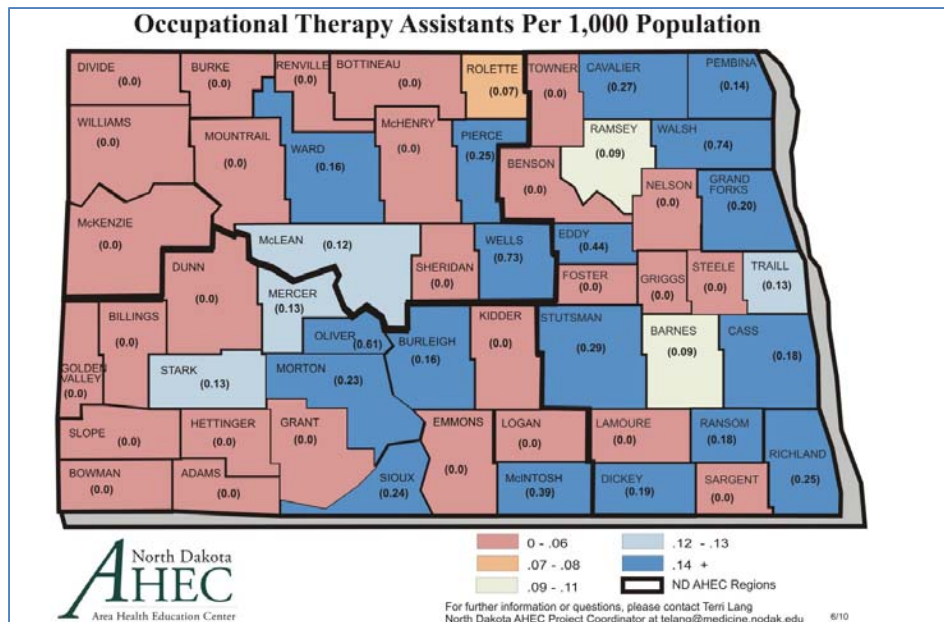


Most OTA students are between 20 and 29 years old (FINDET, 2009)

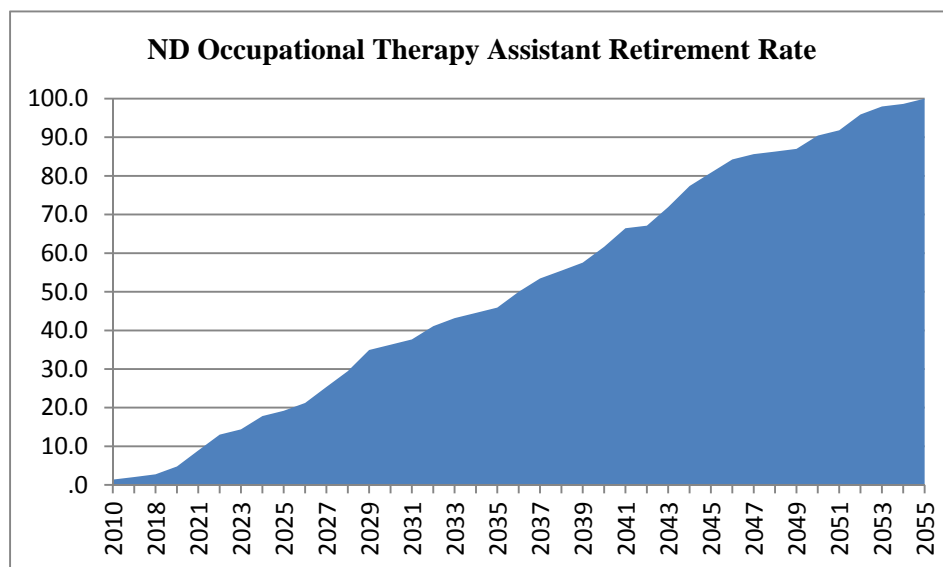
Of currently practicing OTAs, 74% attended North Dakota State College of Science, 13% Northland Community College/Northwest Technical College and 13% other college (ND Occupational Therapy Licensure Database, 2010).

### Current Supply Characteristics of Providers

There are 150 OTAs in ND. There are .23 OTAs per 1,000 people in ND compared to .09 per 1,000 people nationally. 29 counties have less than the national average (ND Occupational Therapy Licensure Database, 2010; U.S. Census Bureau, 2009).



Note: County level data was unavailable for a substantial number of OTAs.



The average age of ND OTAs is 41 years. Assuming retirement at age 67, 7% of ND OTAs will have retired by 2020 (ND Occupational Therapy Licensure Database, 2010).

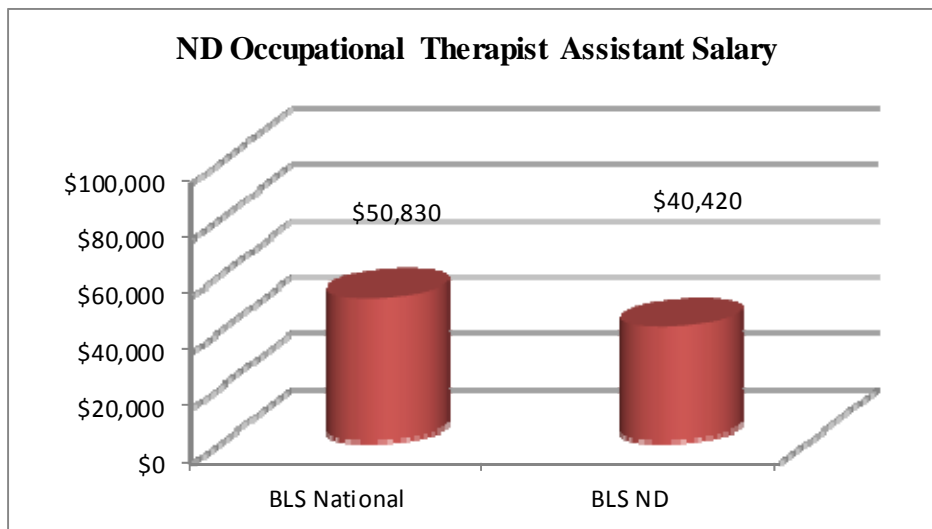
95% of ND OTAs are female (ND Occupational Therapy Licensure Database, 2010).

94% of ND OTAs have an associate's degree, less than 1% has a bachelor's degree and 5% have other degree (ND Occupational Therapy Licensure Database, 2010)

### Current Demand of Providers

In 2008 there were an estimated 62 jobs for ND OTAs which was projected to increase by 19% to 74 jobs in 2018 and is classified as an exceptional growth occupation (ND Job Service, 2010).

The average vacancy rate for OTAs at 14 responding health care facilities is 7.14% (SD=26.73) (ND AHEC Health Professions Survey, 2010).



ND OTA average salary is below the national average. (US Bureau of Labor Statistics, 2010).

### Occupational Therapy Summary

Many counties have a low number of OTs/OTAs and vacancy numbers indicate a slight shortage of providers. In addition, salary is substantially lower than the national average which will make it difficult to recruit new providers.

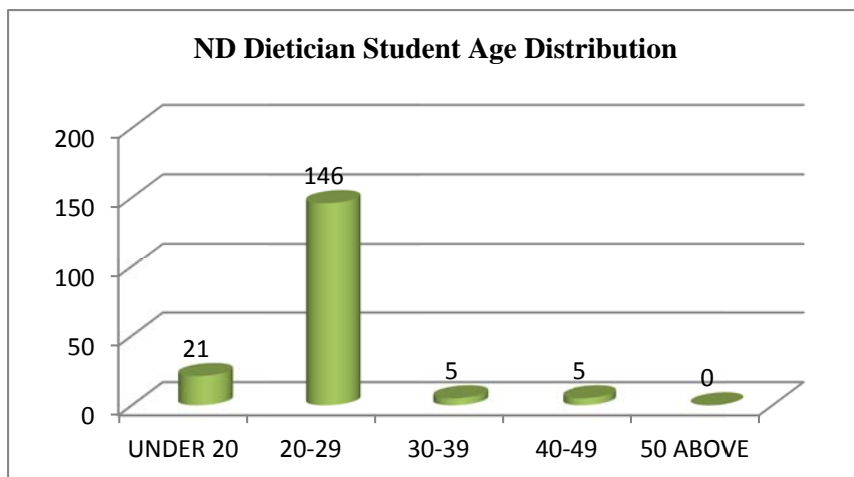
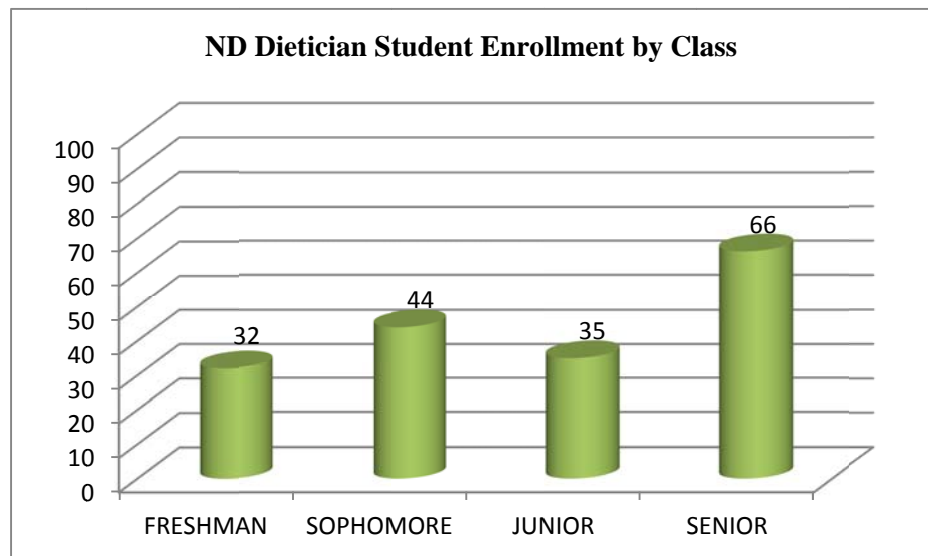
## DIETICIAN

*Dieticians and nutritionists plan food and nutrition programs, supervise meal preparation and oversee the serving of meals. By promoting healthy eating habits and recommending dietary modifications, they prevent and treat illnesses. Dieticians may specialize and become clinical dietitians, providing nutritional services to patients in hospitals, nursing homes or other institutions; community dietitians, counseling individuals and groups on nutritional practices designed to promote health and prevent disease; management dietitians, overseeing large-scale meal planning and preparation; and consultant dietitians, performing nutrition screenings for their clients and offering advice on diet-related concerns. Dietary managers work with dietitians. They oversee the purchasing, distribution, and production of meals generally in hospitals and nursing homes. Besides managing the food budget and staff, dietary managers evaluate clients' diets, implement food plans, and make sure their department meets food preparation standards. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 177 students were enrolled statewide. In the past 12 months there have been 27 graduates (FINDET, 2009).

90% of current dietician students are female (FINDET, 2009).

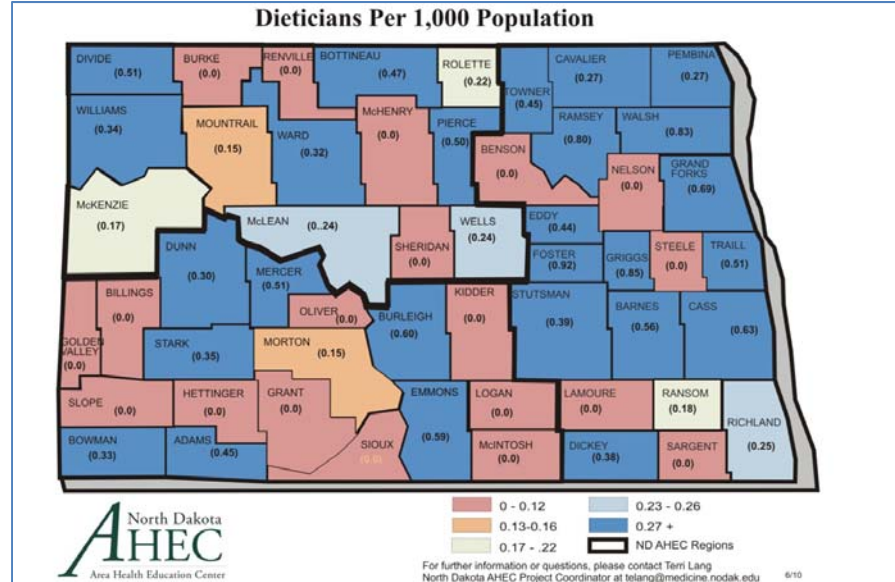


Most dietician students are between 20 and 29 years old (FINDET, 2009)



## Current Supply Characteristics of Providers

There are 298 ND dietitians. There are .46 ND dietitians per 1,000 people compared to the national average of .17 per 1,000 people. 24 ND counties have less than the national average (ND Dietician Licensure Database, 2010).

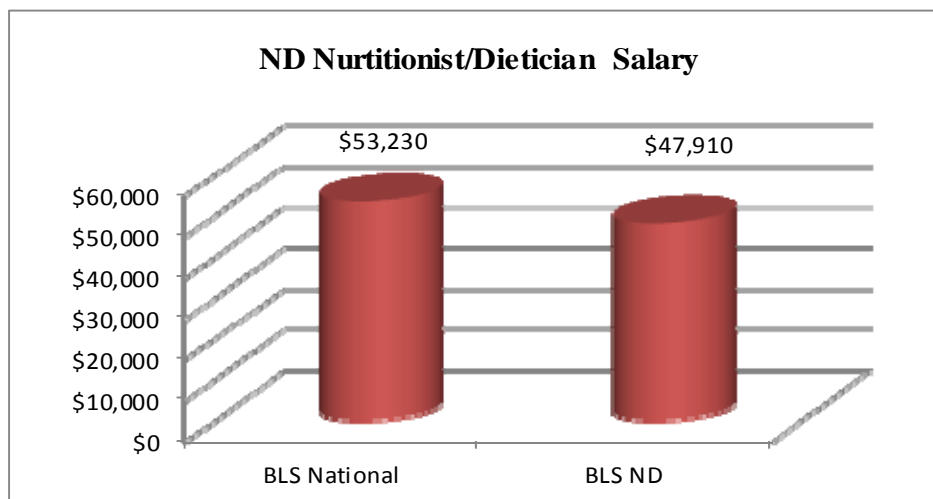


## Current Demand of Providers

In 2008, there were an estimated 226 jobs for ND dietitians which was projected to increase by 5% to 237 jobs in 2018 and is classified as a below average growth occupation (ND Job Service, 2010).

The average vacancy rate for dietitians at 48 responding health care facilities is 2.43% (SD=11.90) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 5 job openings for dietitians in North Dakota (ND Job Service, 2010).



Average ND dietitian salary is lower than the national average (US Bureau of Labor Statistics, 2010).

## **Dietician Summary**

Although several counties have low numbers of dietitians, vacancy information indicates that there is not a critical shortage of dietitians in North Dakota.



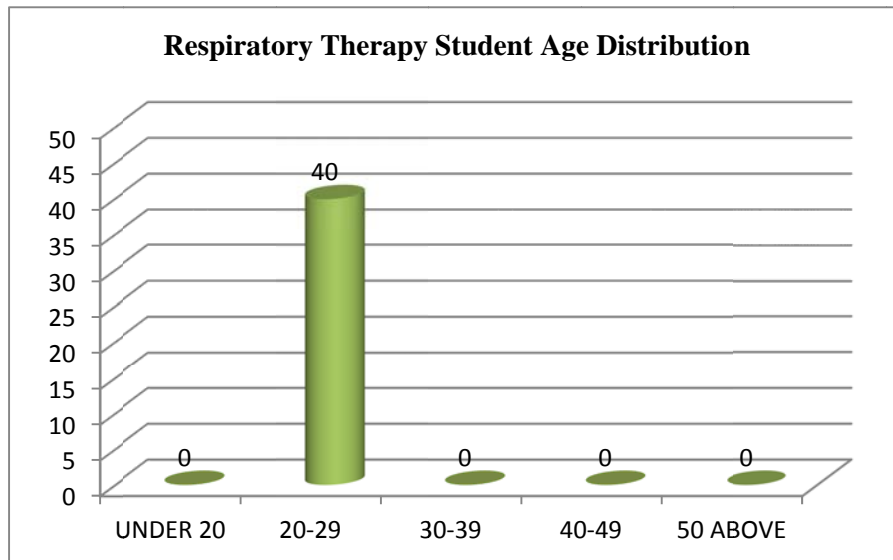
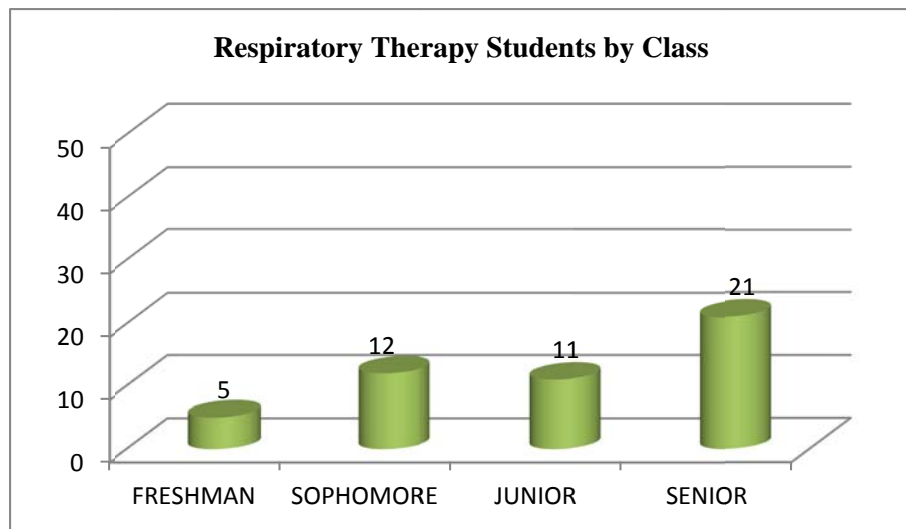
## RESPIRATORY THERAPIST

*Respiratory therapists (also known as respiratory care practitioners) evaluate, treat, and care for patients with breathing or other cardiopulmonary disorders under the direction of a physician. Respiratory therapists assume primary responsibility for all respiratory care therapeutic treatments and diagnostic procedures, and evaluate and treat patients ranging from premature infants whose lungs are not fully developed to people whose lungs are diseased (Health Workforce Information Center, 2010).*

### Student Enrollment

As of fall 2009, a total of 49 students were enrolled statewide. In the past 12 months there have been 10 graduates (FINDET, 2009).

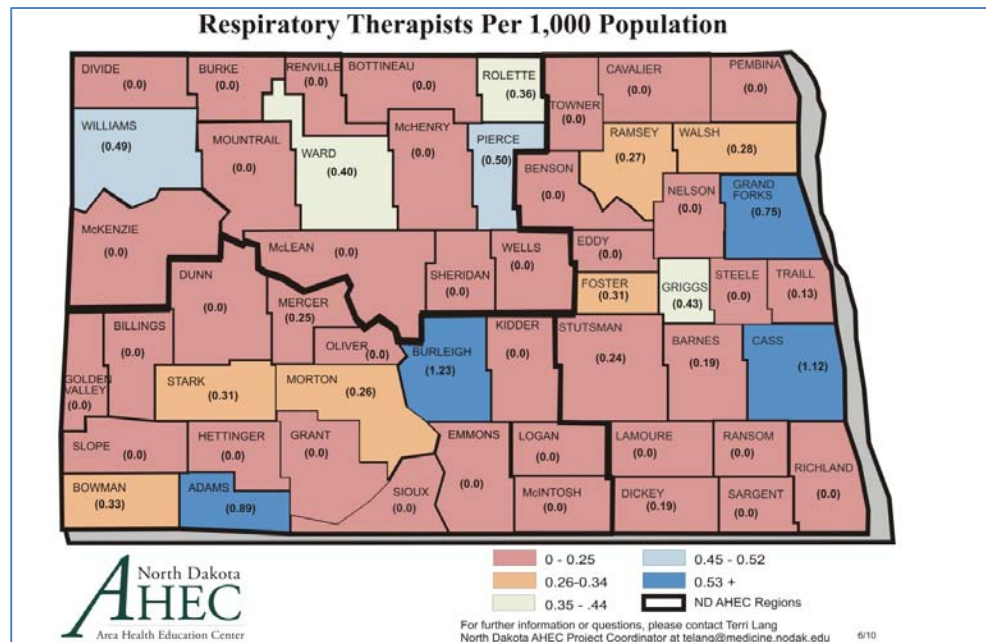
76% of current respiratory therapy students are female (FINDET, 2009).



Most respiratory therapy students are between 20 and 29 years old (FINDET, 2009)

## Current Supply Characteristics of Providers

There are 448 ND respiratory therapists. There are .69 ND respiratory therapists per 1,000 people in North Dakota compared to .35 nationally. 44 counties have less than the national average (ND Respiratory Therapy Licensure Database, 2010, U.S. Census Bureau, 2009).



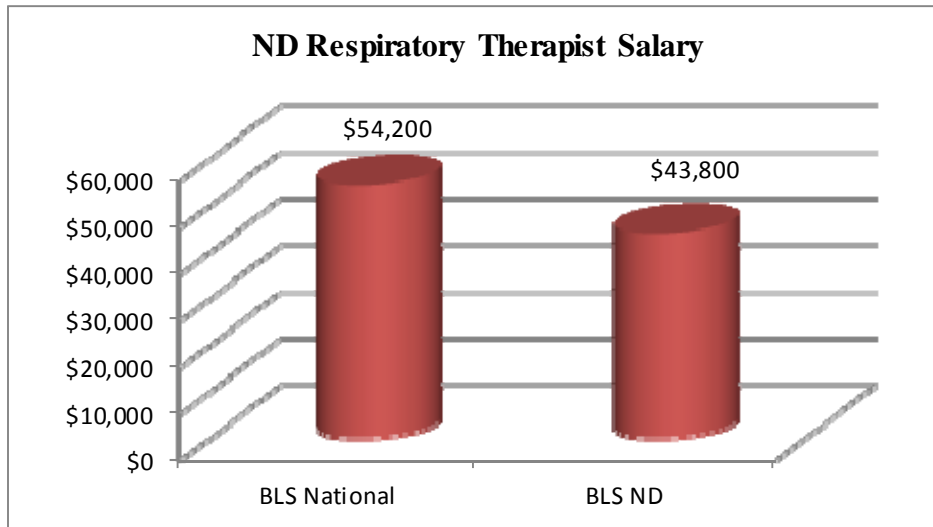
76% of ND respiratory therapists are female (ND Respiratory Therapy Licensure Database, 2010).

## Current Demand of Providers

In 2008, there were an estimated 206 jobs for ND respiratory therapists which were projected to increase by 25% to 258 jobs in 2018 and are classified as an exceptional growth occupation (ND Job Service, 2010).

The average vacancy rate for respiratory therapists at 16 responding health care facilities is 3.75% (SD=10.32) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are nine Job Openings for Respiratory Therapists in North Dakota (ND Job Service, 2010).



ND respiratory therapist average salary is slightly below the national average (US Bureau of Labor Statistics, 2010).

### Respiratory Therapy Summary

Although most counties have low numbers of respiratory therapy providers, there are also low vacancy rates indicating that there is not a critical shortage of respiratory therapists. Average salaries are also close to the national average.

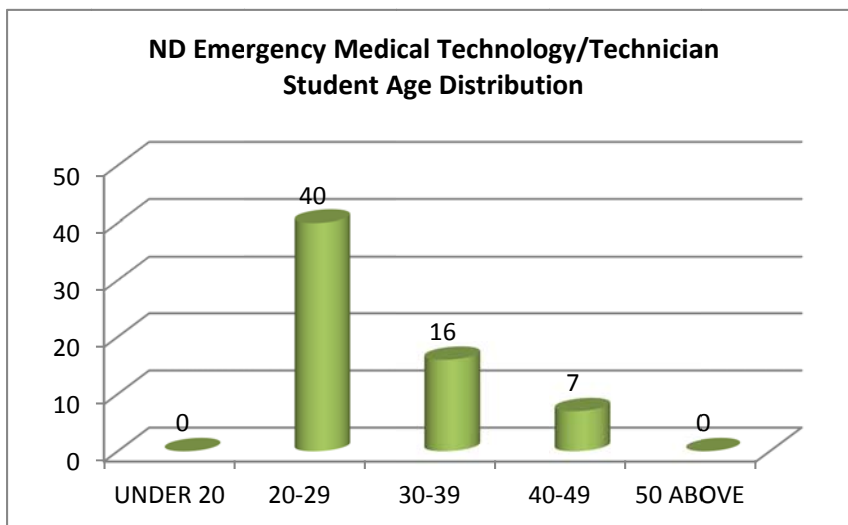
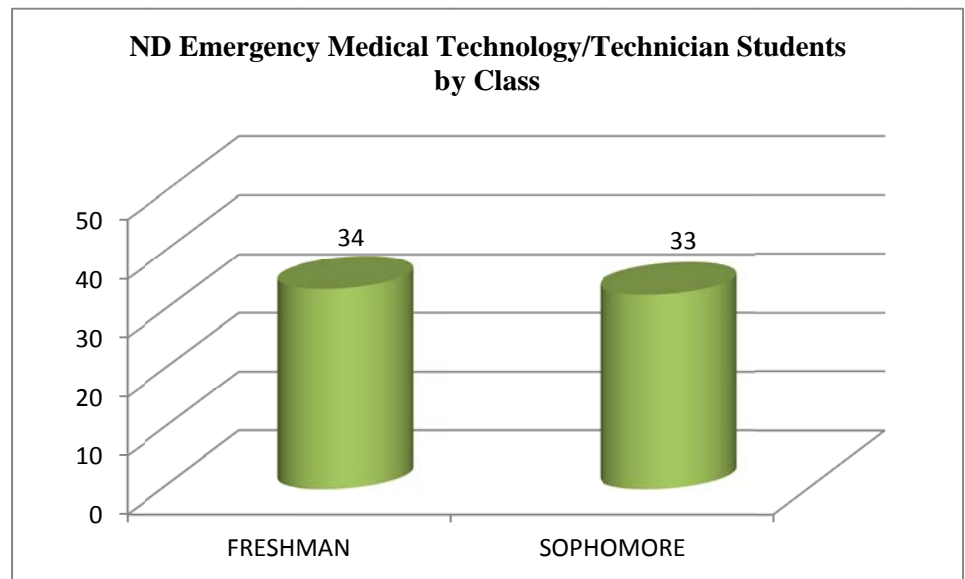
## PARAMEDIC/ EMERGENCY MEDICAL TECHNICIAN

*Emergency Medical Technicians (EMTs) and paramedics provide care to those requiring immediate medical attention. Typically, EMTs and paramedics are dispatched by a 911 operator, often working with police and firefighters. Upon arrival, they assess the nature of the patient's condition while determining whether the patient has any preexisting conditions. Following medical protocols and guidelines, they provide emergency care and, when necessary, provide transport to a medical facility. Some paramedics are trained to provide treatment to patients with minor injuries without transporting them to a medical facility. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of Fall 2009, a total of 67 students were enrolled. In the past 12 months there have been 50 graduates (FINDET, 2009).

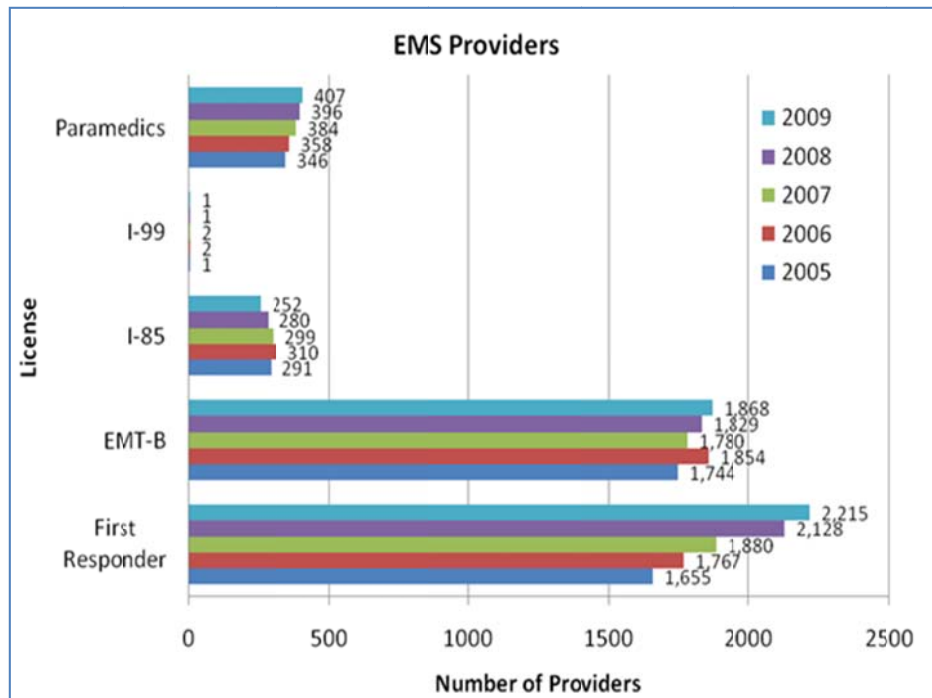
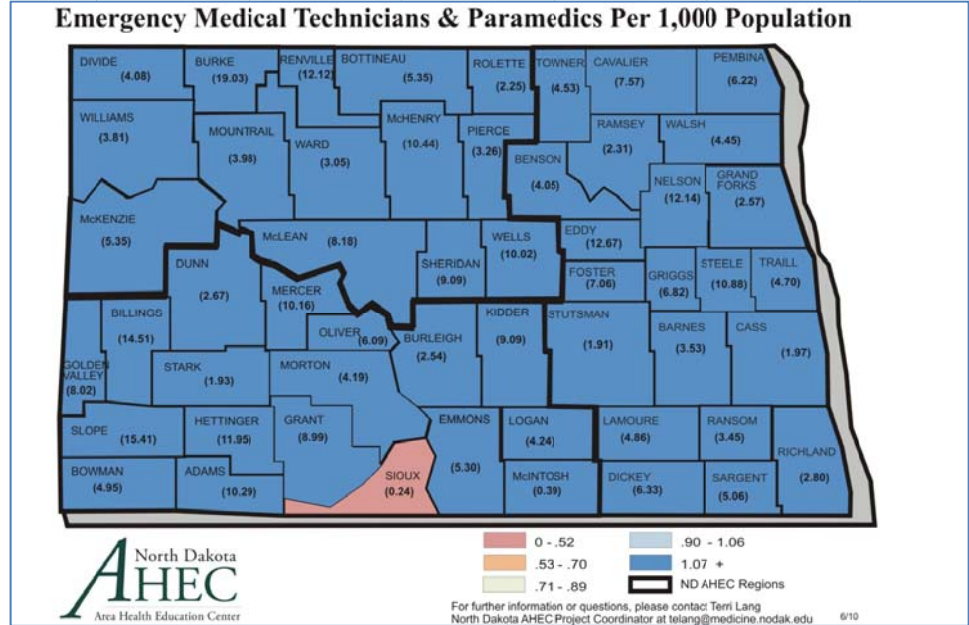
57% of current EMT/paramedic students are male (FINDET, 2009).



Most EMT/paramedic students are between 20 and 29 years old (FINDET, 2009)

## Current Supply Characteristics of Providers

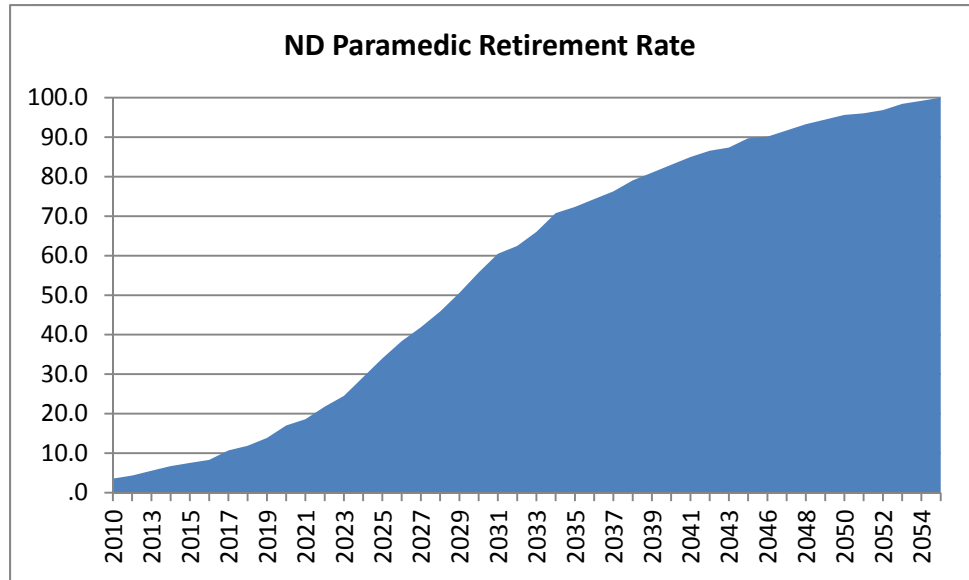
There are 411 paramedics in North Dakota. There are 1,898 Basic EMTs and 254 Intermediate EMTs in North Dakota (ND EMS Database, 2010). There are 3.55 paramedics and EMTS (Basic/Intermediate) per 1,000 people compared to .71 nationally. One county has less than the national average.



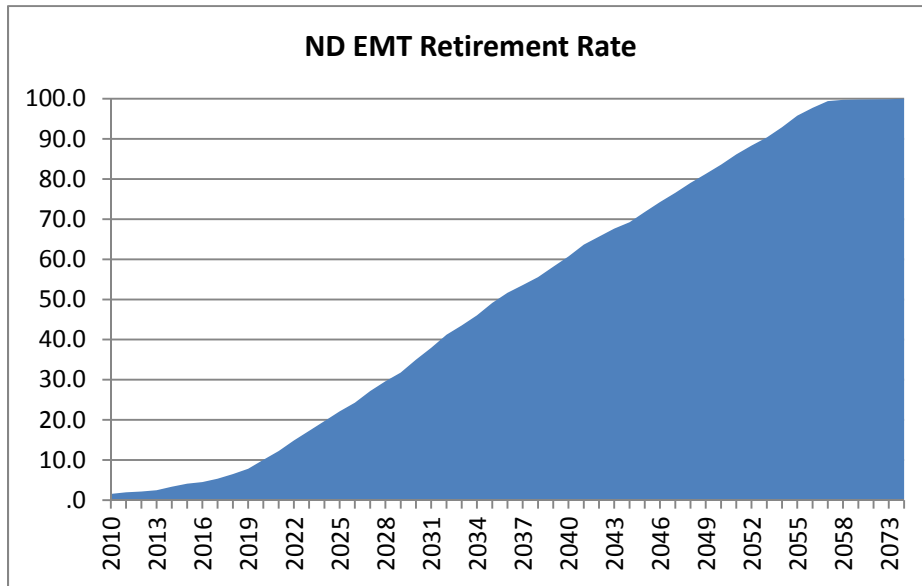
The number of first responders, EMT-Basic (EMT-B) and paramedics have increased over the last five years.

Source: Graph provided by Lindsey Narloch, Research Analyst, Division of EMS and Trauma, North Dakota Department of Health.

The average age of ND paramedic is 39 years. Assuming retirement by age 67, 7% of paramedics will have retired by 2020.



The average age of ND Basic EMTs is 41 years and Intermediate EMTs is 47 years. Assuming retirement by age 67,



10% of Basic EMTs and 17% of Intermediate EMTs will have retired by 2020. According to a study conducted in 2000, the average age of EMS providers was 41 years (Muus, 2000).

65% of ND paramedics are male (ND EMS Database, 2010). 52% of ND Basic EMTs are male and 58% of Intermediate EMTs are female (ND EMS Database, 2010). In 2000, 56% of EMS personnel were male (Muus, 2000).



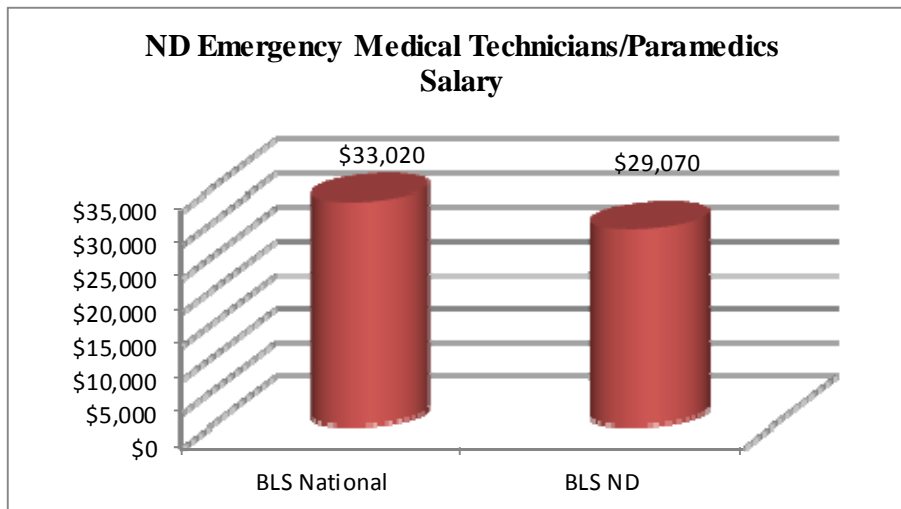
## Current Demand of Providers

In 2008 there were an estimated 611 jobs for ND EMTs and paramedics which was projected to increase by 4% to 636 jobs in 2018 and is classified as a high demand, below average growth occupation (ND Job Service, 2010).

The average vacancy rate for paramedics at 17 responding health care facilities is 16.36% (SD=26.29) (ND AHEC Health Professions Survey, 2010). The average vacancy rate for EMTs at 15 responding health care facilities is 24.62% (SD=29.30) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 16 job openings for paramedics and EMTs in North Dakota (ND Job Service, 2010)

93% of paramedics indicate that they receive compensation for their work. 76% of paramedics indicate that the compensation is more than \$10,000 per year. (ND EMS Database, 2010) 53% of Basic EMTs and 60% of Intermediate EMTs indicate that they receive compensation for their work. 72% of Basic EMTs and 75% of Intermediate EMTs indicate that the compensation is more than \$10,000 per year. (ND EMS Database, 2010) In 2000, 45% of EMS providers were compensated in some way including payment by EMS run, an hourly wage, continuing education assistance or salary (Muus, 2000).



ND EMTs and paramedic salary is below the national average (US Bureau of Labor Statistics, 2010).

### Paramedic/ Emergency Medical Technician Summary

The state has a good supply of paramedics and emergency medical technicians. However, this is largely a volunteer workforce and support is needed to encourage retention of these providers including compensation and continuing education assistance.

## MEDICAL AND CLINICAL LABORATORY TECHNOLOGISTS

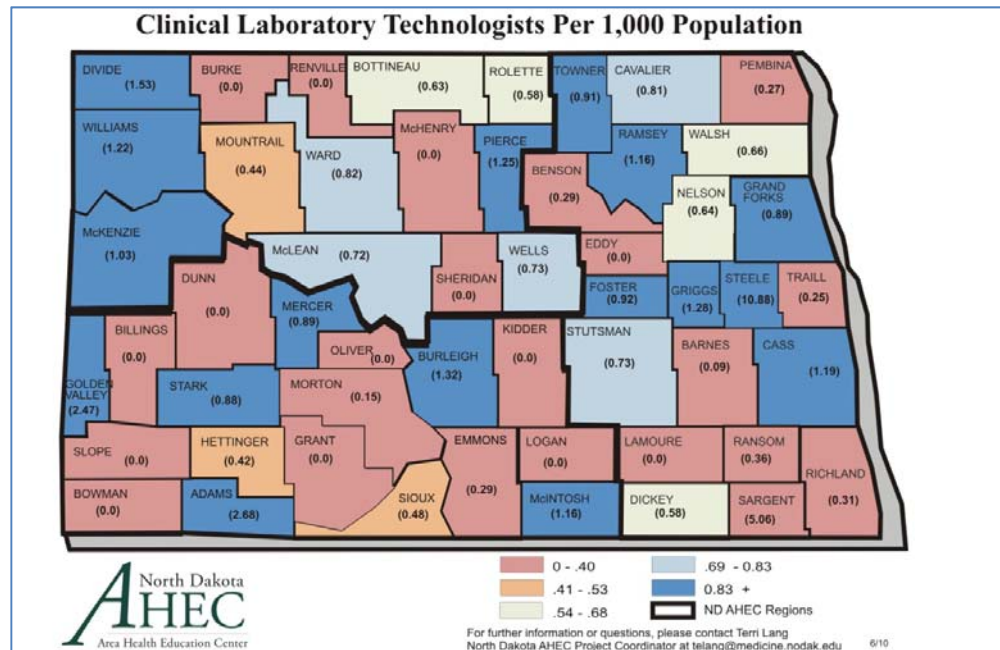
*Clinical laboratory technologists may also be referred to as medical laboratory technologists or medical laboratory scientists. They perform complex chemical, biological, hematological, immunologic, microscopic, and bacteriological tests. Technologists microscopically examine blood and other body fluids. They make cultures of body fluid and tissue samples to determine the presence of bacteria, fungi, parasites, or other microorganisms. Additionally, they analyze samples for chemical content to determine concentrations of compounds such as blood glucose and cholesterol levels, and match blood samples according to type for transfusions. They also evaluate test results, develop and modify laboratory procedures, and establish and monitor programs to ensure the accuracy of tests. Some technologists supervise clinical laboratory technicians (Health Workforce Information Center, 2010)*

### Student Enrollment

Of current providers with available data, 51% attended the University of North Dakota, 6% Velez or Sillman University in the Philippines, 5% University of Mary, 5% Minot State University, 4% Meritcare and 29% other training program (ND Clinical Laboratory Database, 2010)

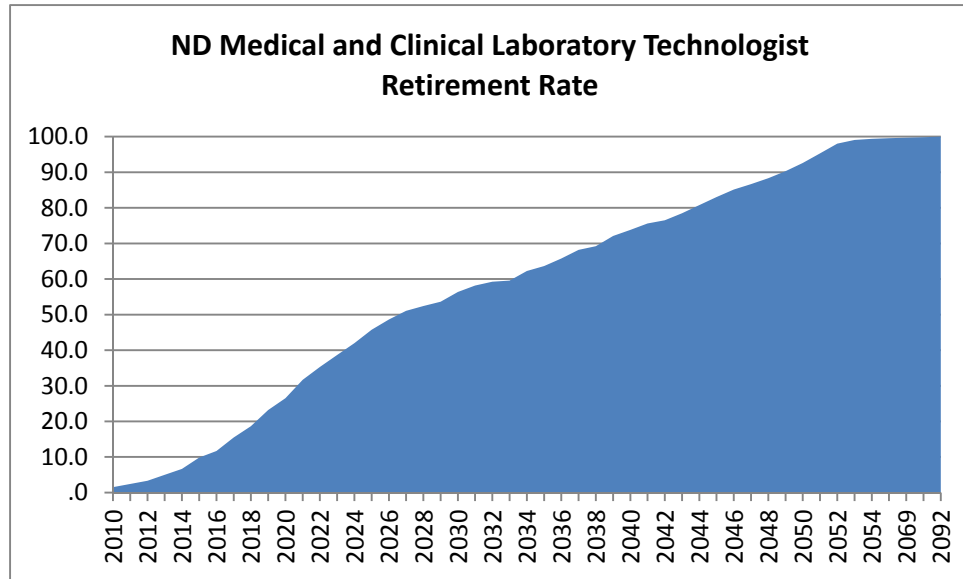
### Current Supply Characteristics of Providers

There are 654 medical and clinical laboratory technologists in ND. There are 1.01 medical and clinical laboratory technologists per 1,000 people compared to .54 nationally. 26 counties have less than the national average.



Note. County level data was not available on a substantial number of providers.

Average age of ND medical and clinical laboratory technologists is 47 years. Assuming retirement at age 67, 19% of medical and clinical laboratory technologists will have retired by 2020.



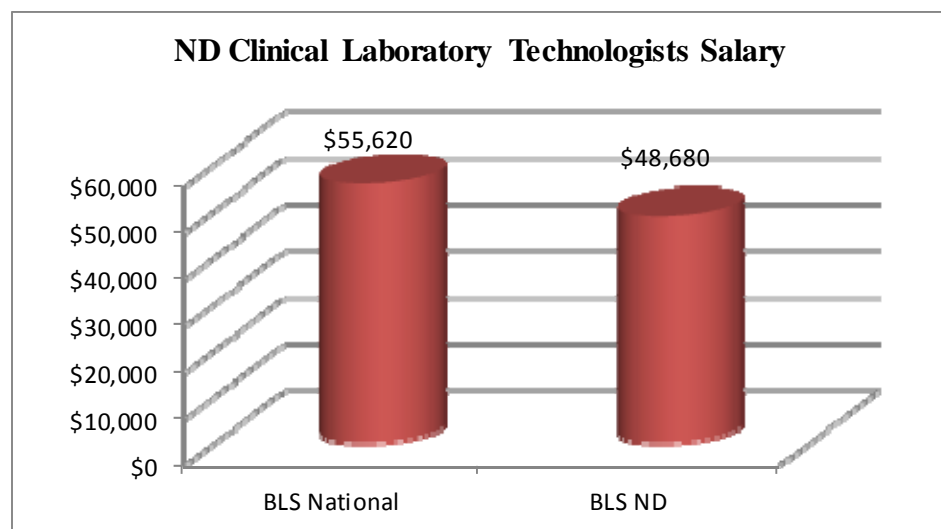
**Current Demand of Providers**

In 2008 there were an estimated 539 jobs for ND medical and clinical laboratory technologists which was projected to increase by 12% to 601 jobs in 2018 and is classified as a high growth, high demand occupation (ND Job Service, 2010).

The average vacancy rate for clinical laboratory technologists/technicians at 24 responding health care facilities is 7.01% (SD=14.92) (ND AHEC Health Professions Survey, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 5 job openings for medical and clinical laboratory technologists in North Dakota (ND Job Service, 2010).

Average ND clinical laboratory technologist salary is lower than the national average (US Bureau of Labor Statistics, 2010).



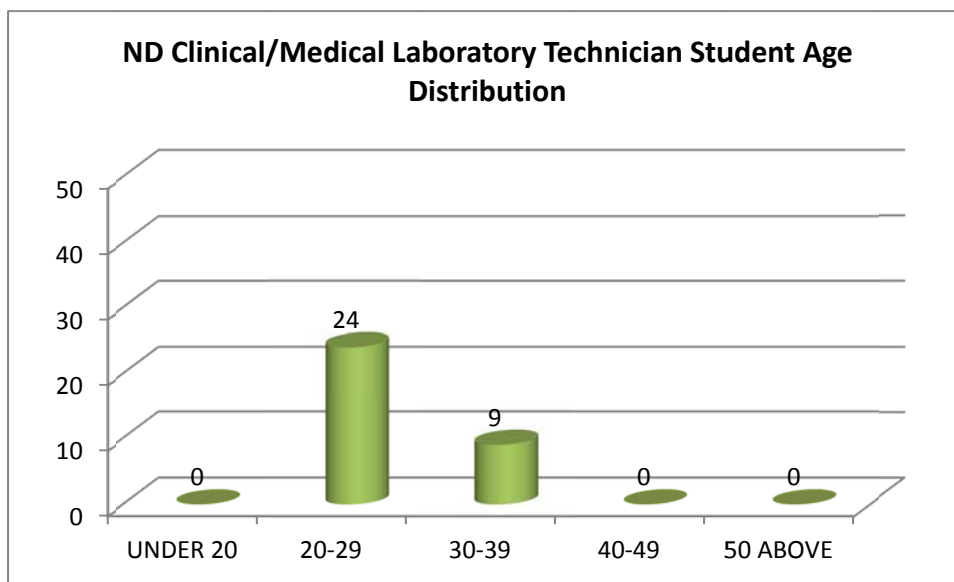
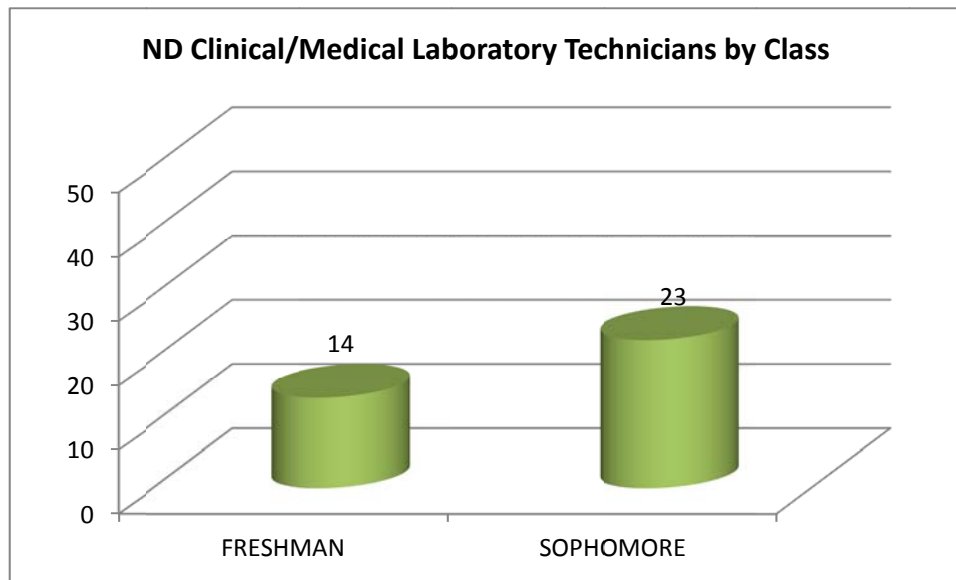
## MEDICAL AND CLINICAL LABORATORY TECHNICIAN

*Clinical laboratory technicians, otherwise known as medical laboratory technicians, perform less complex tests and laboratory procedures than technologists do. Technicians may prepare specimens and tend automated equipment, for example, or they may perform manual tests in accordance with detailed instructions. They usually work under the supervision of medical and clinical laboratory technologists or laboratory managers. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 37 students were enrolled statewide. In the past 12 months there have been 6 graduates (FINDET, 2009).

97% of current Clinical Laboratory Technician students are female (FINDET, 2009).

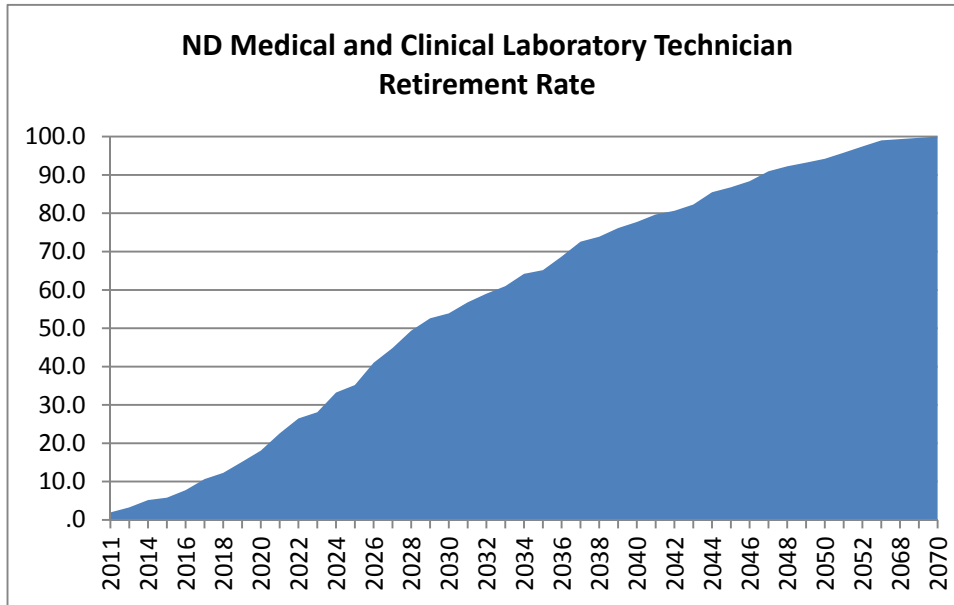
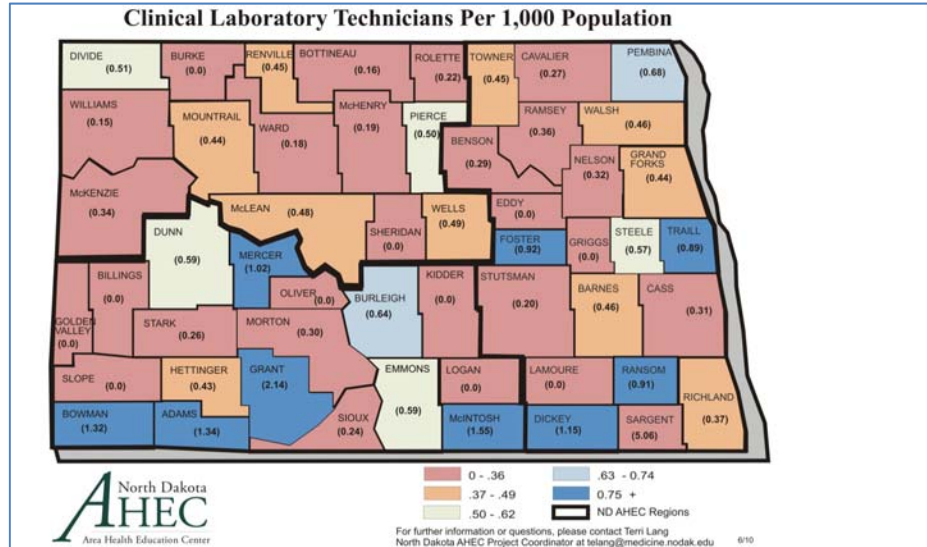


Most clinical laboratory technician students are between 20 and 29 years old (FINDET, 2009)

Of current providers with available data 27% attended Bismarck State College, 16% Minnesota State Community and Technical College, 11% Alexandria Technical College, 11% Northwest Technical College/Northland Community and Technical College and 35% other training program. (ND Clinical Laboratory Database, 2010)

### Current Supply Characteristics of Providers

There are 304 medical and clinical laboratory technicians in ND. There are .47 medical and clinical laboratory technicians per 1,000 people compared to .50 nationally. 37 counties have less than the national average (ND Clinical Laboratory Database, 2010, US Census Bureau, 2009).



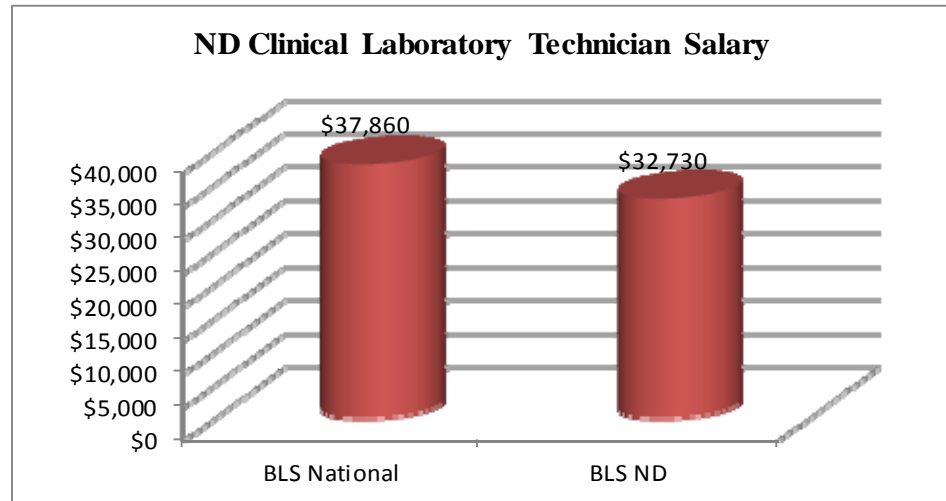
Average age of ND medical and clinical laboratory technicians is 46 years. Assuming retirement at age 67, 18% of medical and clinical laboratory technicians will have retired by 2020 (ND Clinical Laboratory Database, 2010).

## Current Demand of Providers

In 2008 there were an estimated 497 jobs for ND a medical and clinical laboratory technician which were projected to increase by 11% to 550 jobs in 2018 and is classified as an average to above average growth, high demand occupation (ND Job Service, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 3 job openings for medical and clinical laboratory technicians in North Dakota (ND Job Service, 2010)

ND clinical laboratory technicians have a lower annual salary than national averages (US Bureau of Labor Statistics, 2010).



### Clinical Laboratory Summary

Although there is a large number of medical and clinical laboratory technologists/technicians in the state, several counties have few providers. In addition, vacancy rate information indicates that there is a slight shortage of providers overall. Average ND clinical laboratory technician salary is lower than the national average.

# PHARMACY

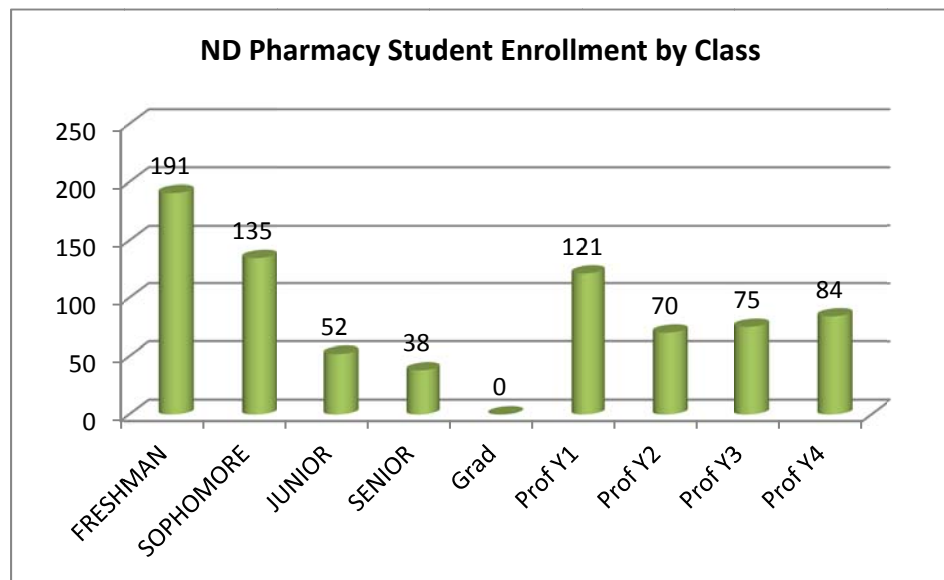
## PHARMACIST

*Pharmacists work with other members of the primary care team to care for patients' health and work with the patient towards improving the overall best use of their medications. They order drug products from trusted suppliers, review prescriptions to ensure patient safety, prepare medications, educate patients about their medications, manage pharmacy operations, and develop medication policies and procedures. Most pharmacists work in a retail setting or a health care facility as inpatient practitioners and in clinics and ambulatory settings. In hospital and clinic settings many pharmacists also manage patient medication therapy such as drugs used to manage diabetes, high blood pressure, high cholesterol and other chronic diseases. Pharmacists may also work in pharmaceutical research developing new drugs, academic institutions, nuclear pharmacy, military bases, and other settings. All states require pharmacists to obtain licensure, necessitating a Doctor of Pharmacy (Pharm.D.) degree from an accredited college of pharmacy and successful completion of a series of professional examinations. (Health Workforce Information Center, 2010)*

### Student Enrollment

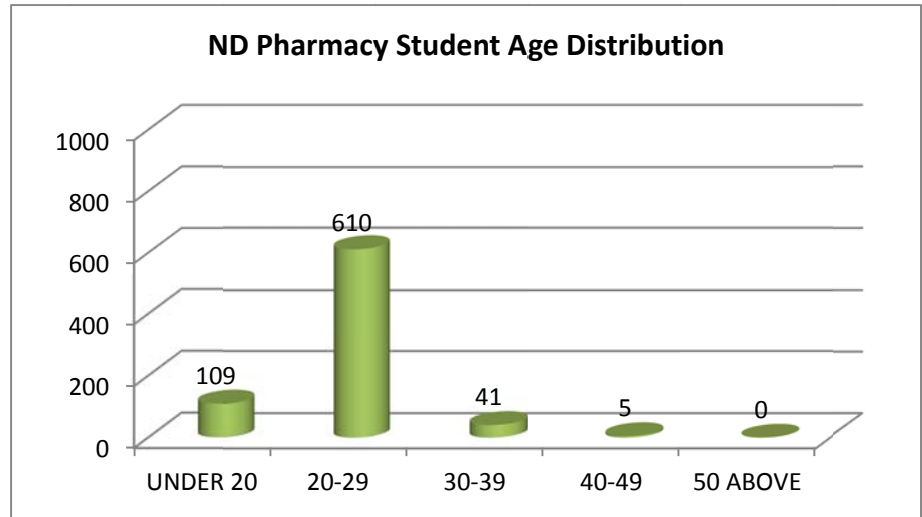
As of Fall 2009, a total of 766 students were enrolled statewide. In the past 12 months there have been 84 graduates (FINDET, 2009).

58% of current pharmacy students are female (FINDET, 2009).



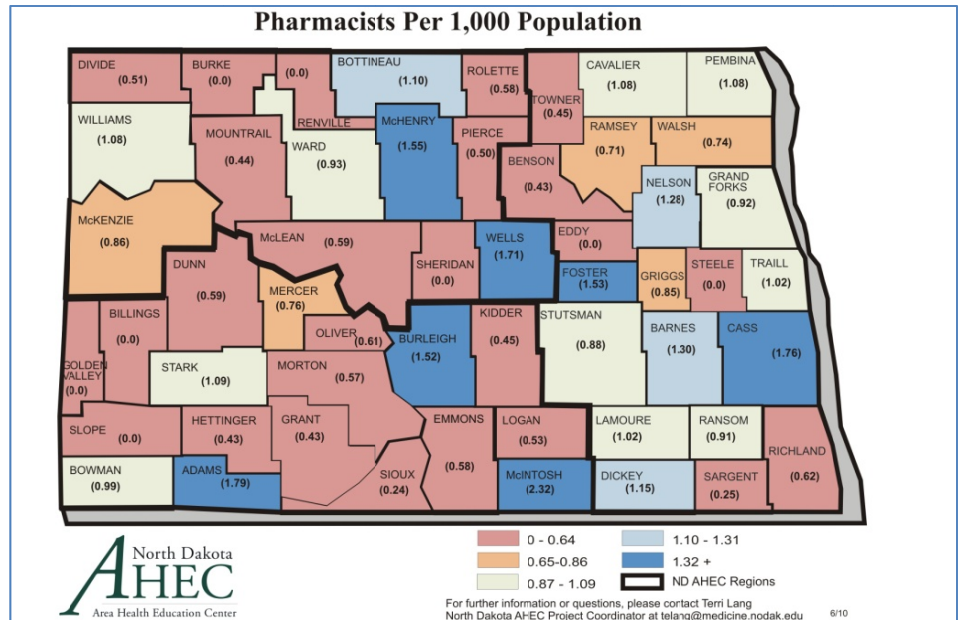


Most pharmacy students are between 20 and 29 years old (FINDET, 2009)



### Current Supply Characteristics of Providers

There are a total of 855 pharmacists in North Dakota ND has 1.1 pharmacists per 1,000 people compared to the national average of .87 per 1,000 people. 31 counties have less than the national average (ND Board of Pharmacy Licensure Database, 2010; U.S. Census Bureau, 2009).



Nationally, 37% of pharmacists are over age 55 (Midwest Pharmacy Workforce Research Consortium, 2010). Nationally, 30% of pharmacists that own community pharmacies would like to retire by 2014 (Klepser et al., 2009). Pharmacist owners indicate the lack relief pharmacists in their community, especially those pharmacists with only one pharmacist on staff (Klepser et al., 2009).

Nationally, 46% of pharmacists are female (Midwest Pharmacy Workforce Research Consortium, 2010).

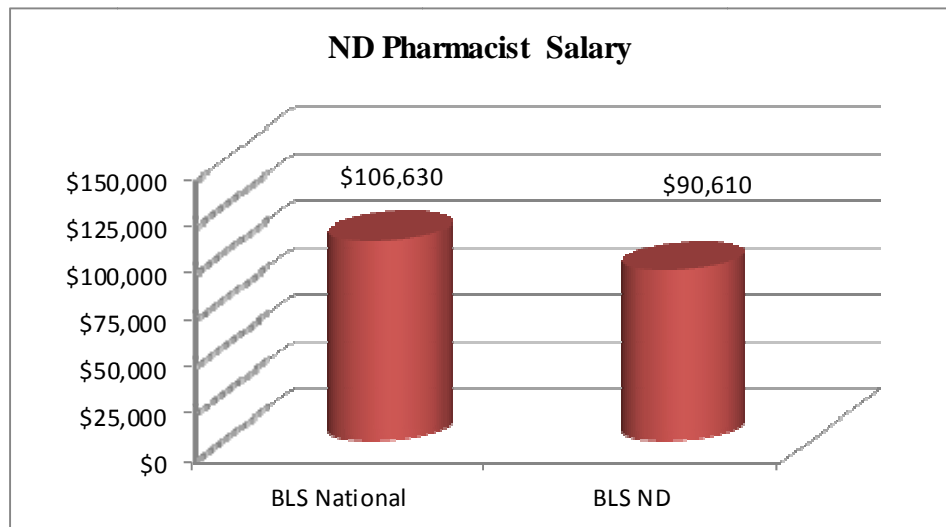


## Current Demand of Providers

In 2008 there was an estimated 876 jobs for ND pharmacists which is expected to increase by 18% in 2018 to 1,038 and is a high demand occupation with exceptional growth outlook (ND Job Service, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 9 job openings for pharmacists in North Dakota (ND Job Service, 2010)

ND pharmacists have a lower annual salary than national averages (US Bureau of Labor Statistics, 2010).



We need continuing education opportunities in the Western Part of ND. We always have trouble finding a relief pharmacist (Rural Pharmacist)

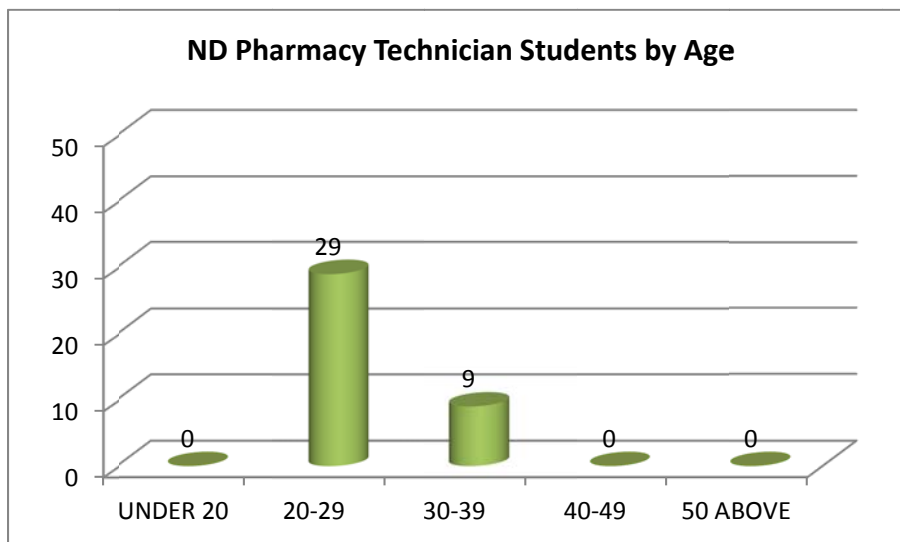
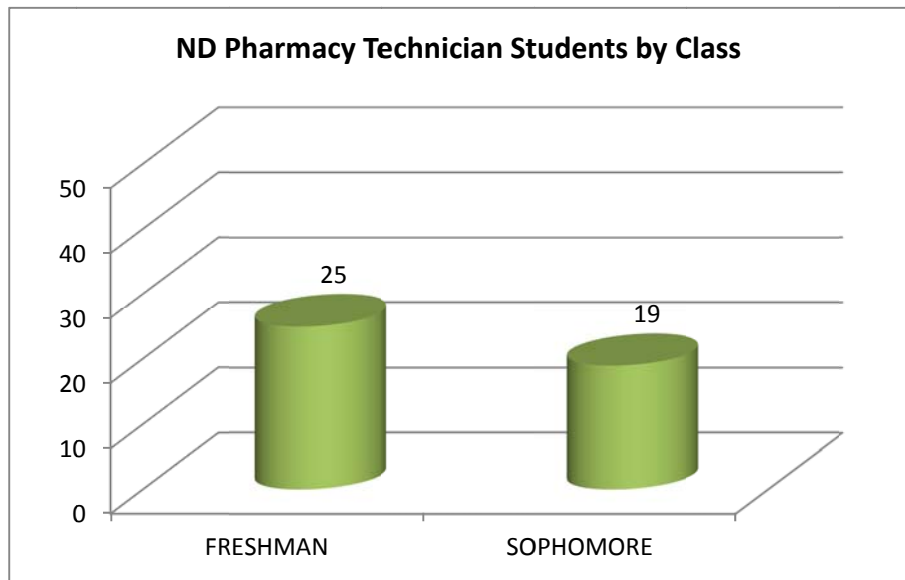
## PHARMACY TECHNICIAN

*Pharmacy aides perform administrative duties in pharmacies, often working as clerks or cashiers who primarily answer telephones, handle money, stock shelves, and perform clerical duties. Although in some states, the duties and titles of pharmacy aides and pharmacy technicians overlap, technicians usually perform more complex tasks, helping to prepare prescribed medication, counting tablets, and labeling bottles. Both technicians and aides work under the supervision and direction of at least one pharmacist, and refer any questions regarding prescriptions, information, or health matters to them. (Health Workforce Information Center, 2010)*

### Student Enrollment

As of fall 2009, a total of 44 students were enrolled statewide. In the past 12 months there have been 16 graduates (FINDET, 2009).

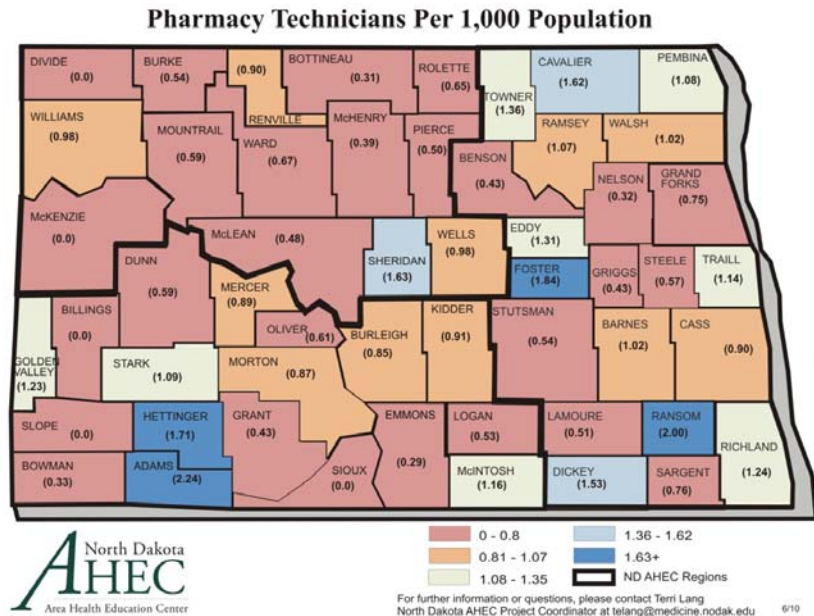
86% of current pharmacy technician students are female (FINDET, 2009).



Most pharmacy technician students are between 20 and 29 years old (FINDET, 2009)

## Current Supply Characteristics of Providers

There are a total of 545 pharmacy technicians in North Dakota. There are .84 pharmacy technicians per 1,000 people in ND compared to 1.08 nationally. 38 counties have less than the national average (ND Board of Pharmacy Licensure Database, 2010; U.S. Census Bureau, 2009).

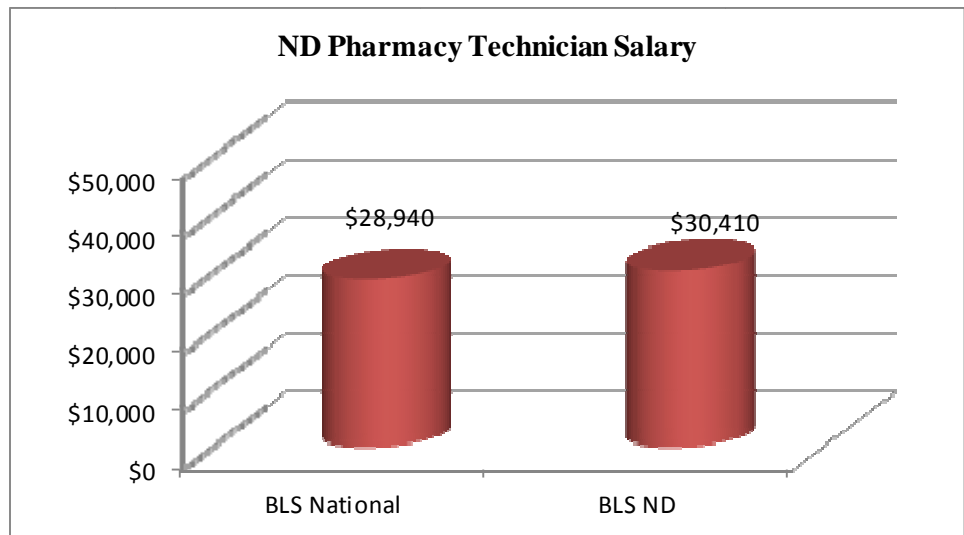


## Current Demand of Providers

In 2008 there were an estimated 506 jobs for ND pharmacy technicians which were projected to increase by 29% to 655 jobs in 2018 and are classified as an exceptional growth, high demand occupation (Job Service, 2010).

Data from the ND Job Service jobs website indicates that as of May, 2010 there are 8 job openings for pharmacy technicians in North Dakota (ND Job Service, 2010)

ND pharmacy techs average salary is higher than the national average (US Bureau of Labor Statistics, 2010).



### Pharmacy Summary

Several counties in ND have few or no pharmacists and/or pharmacy technicians. Although there are a small number of vacancies indicating that there is not a critical shortage of pharmacists

*Finding a pharmacy tech. declining reimbursement, and insurance mail order incentives mean lower income coming into my pharmacy, which means I can't offer as good wages as I would like. With the cost of living increasing, I am not able to offer a wage that a single person can afford to live on.*

## REFERENCES

American Association of Medical Colleges (2009). *2009 State Physician Workforce Data Book*. Center for Health Workforce Studies.

<http://www.aamc.org/workforce/statedatabook/statedata2009.pdf> (last access 8/6/10)

American Association of Physician Assistants (2010). *2009 AAPA Physician Assistant Census National Report*. Report #CENS2009-01.

[http://www.aapa.org/images/stories/Data\\_2009/National\\_Final\\_with\\_Graphics.pdf](http://www.aapa.org/images/stories/Data_2009/National_Final_with_Graphics.pdf) (last access 8/6/10)

American Association of Physician Assistants (2008). *Projected Number of People in Clinical Practice as PAs as of Dec. 31, 2008*. Information Update.

<http://www.aapa.org/images/stories/iu2008numclinpract.pdf> (last access 8/6/10)

ACT (2009, 2008, 2007, and 2006). *ACT Profile Reports- State. Graduating Class North Dakota*.

<http://www.act.org/news/data/09/pdf/states/Northdakota.pdf> (last access 8/6/10)

American Dental Association (1997). *Actual and Projected Percentage of Distribution of Active Private Practitioners 1982-2020*.

American Medical Association (2008). *Physician Characteristics and Distribution in the US*.

<https://catalog.ama-assn.org/MEDIA/ProductCatalog/m1990045/PCDSamplePgs2010.pdf> (last access 8/10/10)

American Medical Association (2008). *Physicians Professional Data*. Special Data Request.

AMN Healthcare (2009). *Clinical Workforce Issues: 2009 Survey of Hospital Chief Executive Officers*. AMN Healthcare and Council on Physician and Nurse Supply.

<http://www.merritthawkins.com/pdf/09CEOSurvey.pdf> (last access 8/6/10)

American Physical Therapy Association (2008). *Physical Therapy Vacancy and Turnover Rates in Acute Care Hospitals*. Physical Therapy Workforce Project.

Amundson, M., Moulton, P., Beyer, M., Kruger, G., Speaker, K., Zavalney, B. & Monley, K.

(2005). *North Dakota Dentist Survey Results*. North Dakota Center for Rural Health, University of North Dakota School of Medicine and Health Sciences.

<http://ruralhealth.und.edu/pdf/dentalreport3-05.pdf> (last access 8/6/10)

Amundson, M., Moulton, P., Kruger, G., Speaker, K., Zavalney, B. & Monley, K. (2005). *A Survey of North Dakota Physicians*. North Dakota Center for Rural Health, University of North Dakota School of Medicine and Health Sciences.

<http://ruralhealth.und.edu/pdf/physicianreport0305.pdf> (last access 8/6/10)

Brown, L. & Lazar, V. (1999). Trends in the Dental Health Work Force. *Journal of the American Dental Association*, 130. 1743-1749.

<http://jada.ada.org/cgi/reprint/130/12/1743?maxtoshow=&hits=10&RESULTFORMAT=&fulltext=trends&searchid=1&FIRSTINDEX=0&volume=130&issue=12&resourcetype=HWCIT> (last access 8/10/10)

Bureau of Health Professions (2000). *HRSA State Health Workforce Data Resource Guide*. National Center for Health Workforce Information and Analysis.

<ftp://ftp.hrsa.gov/bhpr/workforceprofiles/guide.pdf> (last access 8/6/10)

Cantor, J.C., Schoen, C., Belloff, D., How, S.K.H., and McCarthy, D. (June 2007). *Aiming Higher: Results from a State Scorecard on Health System Performance*, New York, NY: The Commonwealth Fund Commission on a High Performance Health System.

<http://www.commonwealthfund.org/Content/Publications/Fund-Reports/2007/Jun/Aiming-Higher--Results-from-a-State-Scorecard-on-Health-System-Performance.aspx> (last access 8/6/10)

Career and Technical Education (2009). *North Dakota Career and Technical Education Consolidated Annual Report*. ND State Board for Career and Technical Education.

<http://www.nd.gov/cte/about/docs/ConsolidatedAnnualReport2009.pdf> (last access 8/6/10)

Chen, F., Andrilla, C., Doescher, M & Morris, C. (2009). *The Availability of Family Medicine Residency Training in Rural Locations of the United States*. Policy Brief WWAMI Rural Health Research Center, University of Washington, School of Medicine.

[http://depts.washington.edu/uwrhrc/uploads/Rural\\_FM\\_Training\\_PB.pdf](http://depts.washington.edu/uwrhrc/uploads/Rural_FM_Training_PB.pdf) (last access 8/6/10)

Doescher, M., Fordyce, M., Skillman, S., Jackson, J., Rosenblatt, R. (2009). *Persistent Primary Care Health Professional Shortage Areas (HPSAs) and Health Care Access in Rural America*. Policy Brief WWAMI Rural Health Research Center, University of Washington, School of Medicine.

[http://depts.washington.edu/uwrhrc/uploads/Persistent\\_HPSAs\\_PB.pdf](http://depts.washington.edu/uwrhrc/uploads/Persistent_HPSAs_PB.pdf) (last access 8/6/10)

FINDET (2009). North Dakota University System. Medical program enrollments and graduates (FINDET Report No. 100236)

Finno, A. & Kohut, J. (2009). *The Future of the Psychology Workforce-Statistics and Trends*. Presentation at APA 117<sup>th</sup> Annual Convention, Toronto, CA. American Psychological Association: Center for Workforce Studies.

<http://www.apa.org/workforce/presentations/wpa-handout.pdf> (last access 8/6/10)

Greer, A. (2008, June). *Embracing accountability: Physician leadership, public reporting, and teamwork in the Wisconsin Collaborative for Healthcare Quality*. Commonwealth Fund, Pub.1142. New York, NY: [www.commonwealthfund.org](http://www.commonwealthfund.org)

Health Workforce Information Center, 2010 (2010). Individual Profession Summaries.

<http://www.healthworkforceinfo.org/>

HRSA (2010). *The Registered Nurse Population: Initial Findings from the 2008 National Sample Survey of Registered Nurses*. U.S. Department of Health and Human Service, Health Resources and Services Administration.

<http://bhpr.hrsa.gov/healthworkforce/rnsurvey/initialfindings2008.pdf> (last access 8/9/10)

Institute of Medicine Committee on the Health Professions Education. (2003). *Health Professions Education: A Bridge to Quality*. Greiner, A. and Knebel, E. (Eds). Washington, DC: The National Academies Press.

[http://www.acme-assn.org/valuable\\_resources/IOM-ABridgetoQuality.pdf](http://www.acme-assn.org/valuable_resources/IOM-ABridgetoQuality.pdf) (last access 8/9/10)

Institute of Medicine Committee on Quality of Healthcare in America. (2001). *Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century*. Washington, DC: The National Academies Press.

<http://iom.edu/~media/Files/Report%20Files/2001/Crossing-the-Quality-Chasm/Quality%20Chasm%202001%20%20report%20brief.pdf> (last access 8/9/10)

Job Service North Dakota (2010). *North Dakota Employment Projections 2008-2018 Edition*.

[http://www.ndworkforceintelligence.com/admin/gsipub/htmlarea/uploads/lmi\\_proj2018.pdf](http://www.ndworkforceintelligence.com/admin/gsipub/htmlarea/uploads/lmi_proj2018.pdf) (last access 8/9/10)

Job Service North Dakota (2009). *North Dakota Workforce Review*.

[https://www.ndworkforceintelligence.com/admin/gsipub/htmlarea/uploads/lmi\\_ndwr2009.pdf](https://www.ndworkforceintelligence.com/admin/gsipub/htmlarea/uploads/lmi_ndwr2009.pdf) (last access 8/10/10)

Klepser, D., Lampman, M., Radford, A., Richardson, I. & Rutledge, S. (2009). *Workforce Issues Among Sole Community Pharmacies*. North Carolina Rural Health Research and Policy Center and RUPRI.

[http://www.shepscenter.unc.edu/research\\_programs/rural\\_program/pubs/finding\\_brief/FB89.pdf](http://www.shepscenter.unc.edu/research_programs/rural_program/pubs/finding_brief/FB89.pdf) (last access 8/9/10)

Lang, T. Amundson, M. & Moulton, P. (2008). North Dakota Dentists Survey Results. North Dakota Center for Rural Health, University of North Dakota School of Medicine and Health Sciences.

Lang, T. & Moulton, P. (2009). North Dakota Nursing Needs Study: Licensed Nurse Survey Results. North Dakota Center for Rural Health, University of North Dakota School of Medicine and Health Sciences.

Lewin Group (2010). *The Status of Data Sources to Inform Health Workforce Policy and Supply Adequacy*. Report prepared for the Office of the Assistant Secretary for Planning and Evaluation.

Medicare Payment Advisory Commission. (June 2008). *Report to the Congress: Reforming the delivery system*. Washington, DC. [http://www.medpac.gov/documents/Jun08\\_EntireReport.pdf](http://www.medpac.gov/documents/Jun08_EntireReport.pdf) (last access 8/10/10)

Midwest Pharmacy Workforce Research Consortium (2010). *Final Report of the 2009 National Sample Survey of the Pharmacist Workforce to Determine Contemporary Demographic and Practice Characteristics*. Report Submitted to Pharmacy Manpower Project, Inc. Alexandria, VA.

<http://www.aacp.org/resources/research/pharmacymanpower/Documents/2009%20National%20Pharmacist%20Workforce%20Survey%20-%20FINAL%20REPORT.pdf> (last access 8/10/10)

Moulton, P. & Amundson, M. (2005). Medical Student and Resident Survey Results. North Dakota Center for Rural Health, University of North Dakota School of Medicine and Health Sciences.

Muus, K. (2000). *North Dakota EMS Providers' Demographic and Work Characteristics*. Fact Sheet for the Rural EMS Initiative. North Dakota Center for Rural Health, University of North Dakota School of Medicine and Health Sciences.

National League for Nursing (2009). *Findings from the Annual Survey of Schools of Nursing Academic Year 2008-2009*. [http://www.nln.org/research/slides/viewall\\_0809.htm](http://www.nln.org/research/slides/viewall_0809.htm) (last access 8/10/10)

North Dakota Clinical Laboratory Database (2010). Obtained April, 2010.

North Dakota Dental Database (2010). Obtained April, 2010

North Dakota Dietician Licensure Database (2010). Obtained May, 2010.

North Dakota Emergency Medical Services Database (2010). Obtained May, 2010.



- North Dakota Healthcare Association. (2002). *Healthcare Career Perceptions*.
- North Dakota Medical Database (2010). Obtained June, 2010.
- North Dakota Nurse Licensure Database (2010). Obtained April, 2010.
- North Dakota Occupational Therapist Licensure Database (2010). Obtained April, 2010.
- North Dakota Optometrist Licensure Database (2010) Obtained May, 2010.
- North Dakota Pharmacy Licensure Database (2010). Obtained April, 2010.
- North Dakota Physical Therapist Licensure Database (2010). Obtained June, 2010.
- North Dakota Physician Assistants Database (2010). Obtained June, 2010.
- North Dakota Psychology Licensure Database (2010). Obtained May, 2010.
- North Dakota Respiratory Licensure Database (2010). Obtained April, 2010.
- North Dakota Social Work Licensure Database (2010). Obtained April, 2010.
- North Dakota State Board of Chiropractic Examiners (2010). Obtained April, 2010.
- Pederson, C., Schneider, P., Schekelhoff, D. (2008). *ASHP National Survey of Pharmacy Practice in Hospital Settings: Prescribing and Transcribing-2007*. American Journal of Health System Pharmacy, 65. 827-843. <http://www.ajhp.org/cgi/content/abstract/65/9/827> (last access 8/10/10)
- Phillips, A., Quinn, A. & Heitkamp, T. *Who Wants to Do Rural Social Work? Student Perceptions of Social Work Practice*. Contemporary Rural Social Work, Forthcoming 2010.
- Prescott, P. (2000). The Enigmatic Nursing Workforce. *Journal of Nursing Administration*. Volume 30, No. 2. [http://journals.lww.com/jonajournal/Citation/2000/02000/The\\_Enigmatic\\_Nursing\\_Workforce.3.aspx](http://journals.lww.com/jonajournal/Citation/2000/02000/The_Enigmatic_Nursing_Workforce.3.aspx) (last access 8/10/10)
- Primary Care Office (2010). Tracking of Family Medicine, Internal Medicine, NP/PA Vacancies.
- Quinn, A., Phillips, A. & Heitkamp, T. *Practicing on the Frontier: Views from the Northern Plains*. Manuscript submitted for publication.

Reiner, K., Val Palumbo, M., McIntosh, B., Rambur, B., Kolodinsky, J., Hurowitz, L., Ashikaga, T. (2005). *Measuring the Nursing Workforce: Clarifying the Definitions*. *Medical Care Research and Review*, 62 (6). 741-755.

<http://mcr.sagepub.com.ezproxy.undmedlibrary.org/content/62/6/741.long> (last access 8/10/10)

U.S. Bureau of Labor Statistics (2010) *State Occupational Employment and Wage Estimates*  
<http://www.bls.gov/>

U.S. Census Bureau (2009) Population Estimates. <http://www.census.gov/>

Wakefield, M., Amundson, M. & Moulton, P. (2006). *North Dakota Health Workforce Pipeline*. Graphic generated for the North Dakota Healthcare Workforce Summit.

Wakefield, M. & Moulton, P. (2008). *Enhancing Health Care for Rural Populations through Interdisciplinary Training and Quality Improvement*. Report submitted to The Advisory Committee on Interdisciplinary Community-Based Linkages. Division of Diversity and Interdisciplinary Education, Bureau of Health Professions, Health Resources and Services Administration.

Woods, R. (2009). *Industry Output and Employment Projections to 2018*. *Monthly Labor Review*, Nov. 52-81. <http://www.bls.gov/opub/mlr/2009/11/art4full.pdf> (last access 8/10/10)

WWAMI (2009). *The Crisis in Rural General Surgery*. Policy Brief WWAMI Rural Health Research Center, University of Washington, School of Medicine.  
[http://depts.washington.edu/uwrhrc/uploads/Rural\\_Gen\\_Surg\\_PB\\_2009.pdf](http://depts.washington.edu/uwrhrc/uploads/Rural_Gen_Surg_PB_2009.pdf) (last access 8/10/10)

**Appendix A: Data Summary**

	Provider per 1,000 People in ND	Provider per 1,000 People in U.S.	% of ND Counties Below National Average	Average Age; % Male of Workforce	% Expected to Retire by 2020	# Currently In Workforce	Average Wage in ND	Average Wage in U.S.
<i>Physicians, All</i>	2.33	1.87	89%	51; 77%	34%	1,508		
<i>Anesthesiologists</i>	.11	.12	93%	50; 80%	29%	69	\$206,240	\$211,750
<i>Family Practice</i>	.55	.32	46%	50; 71%	31%	354	\$183,600	\$168,550
<i>General Internist</i>	.20	.16	83%	49; 75%	27%	129	\$200,720	\$183,990
<i>OB/GYN</i>	.09	.07	87%	50; 51%	33%	57	\$215,586	\$204,470
<i>Pediatrician</i>	.16	.10	83%	51; 57%	34%	102	\$155,450	\$161,410
<i>Psychiatrist</i>	.15	.07	83%	51; 64%	31%	94	\$150,760	\$163,660
<i>Surgeon</i>	.31	.15	76%	54; 96%	43%	201	\$222,730	\$219,770
<i>Other Physician/Surgeon</i>	.78	.89	93%	51; 84%	35%	502	\$196,250	\$173,860
<i>Dentist</i>	.61	.76	96%	50; 82%	37%	392	\$196,450	\$156,850
<i>Dental Hygienist</i>	.98	.57	72%	39; 1%	8%	633	\$58,370	\$67,860
<i>Physician Assistant</i>	.25	.23	43%	46; 22%	16%	225	\$76,260	\$84,830
<i>Advanced Practice Nurse</i>	.94	.48	35%	47; 19%	23%	607	\$56,110	\$66,530
<i>Chiropractor</i>	.48	.09	26%	43; 75%	16%	308	\$81,700	\$80,390
<i>Optometrist</i>	.25	.09	50%	44;	17%	162	\$112,610	\$106,960
<i>Registered Nurse</i>	9.88	8.35	31%	46; 5%	21%	7,915	\$56,110	\$66,530
<i>Licensed Practical Nurse</i>	4.80	2.40	9%	48; 3%	24%	3,083	\$34,810	\$40,900
<i>Psychologist</i>	.27	.03	74%			172		\$84,220
<i>Social Worker</i>	3.10	.24	4%	45; 13%	21%	1,998		\$50,470
<i>Physical Therapist</i>	.77	.57	61%	41; 31%	10%	500	\$64,750	\$76,220
<i>Physical Therapy Assistant</i>	.15	.21	72%	37; 20%	3%	100	\$37,710	\$48,590
<i>Occupational Therapist</i>	.67	.32	78%	40; 6%	10%	431	\$55,330	\$70,680
<i>Occupational Therapy Assistant</i>	.23	.09	54%	41; 5%	7%	150	\$40,420	\$50,830
<i>Dietician</i>	.46	.17	49%			298	\$47,910	\$53,230
<i>Respiratory Therapist</i>	.69	.35	81%	24%		448	\$43,800	\$54,200
<i>Paramedic/EMT</i>	3.55	.71	2%	39,41,47; 65,52,58%	7, 10, 17%	411, 1898, 254	\$29,070	\$33,020
<i>Laboratory Technologist</i>	1.01	.54	48%	47;	19%	654	\$48,680	\$55,620
<i>Laboratory Technician</i>	.47	.50	69%	46;	18%	304	\$32,730	\$37,860
<i>Pharmacist</i>	1.10	.87	57%			855	\$90,610	\$106,630
<i>Pharmacy Technician</i>	.84	1.08	70%			545	\$30,410	\$28,940