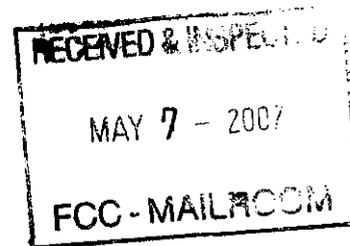


Federal Communications Commission - Rural Health Care Pilot Program
WC Docket No. 02-06
State: North Dakota

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Senator Kent Conrad
Department of Family and Community Medicine (UNDSMHS)
Neuropsychiatric Research Institute
Department of Clinical Neuroscience
Mercy Medical Center, Williston

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INTRODUCTION

The University of North Dakota, School of Medicine and Health Sciences (UNDSMHS), Center for Rural Health will serve as the lead applicant and will be legally and financially responsible for the conduct of activities supported by the FCC funds for this proposal. The Center will work in partnership with the, UNDSMHS Computer Services.

FCC Rural Pilot Program - **Development** Process:

Upon the announcement in September, 2006 of the FCC Rural Health Care Pilot Program, the Project Director at the Center for Rural Health(CRH), University of North Dakota, School of Medicine Health Sciences(UNDSMHS), immediately initiated a series of statewide electronic forums utilizing phone and video conferencing in an attempt to determine the most urgent communication needs of the health care providers in the state and to solicit ideas on how the FCC Pilot Program might best meet their needs.

Many health care providers as well as other parties such as the North Dakota Healthcare (hospital) Association, North Dakota Department of Health and the North Dakota State University(NDSU), College of Pharmacy (tele-pharmacy program) participated in the conferences. During the ensuing discussions, three things quickly became clear: 1) communication needs were very diverse and those needs were largely determined by the current progress that a health care provider has made in moving to an electronic or telehealth format; 2) There was very little understanding of how or why Internet-2 or the National LambdaRail might be utilized in healthcare delivery and very little experience or interest in either because of previous limitations on their use for commercial purposes; 3) There was no existing infrastructure in the state for delivering either Internet-2 or Lambdaail to commercial customers but rather only to universities, schools and state agencies on whose network non-state, commercial business is prohibited.

In order to discover and then examine the possible options that might be open for using the Internet-2 and National Lambdaail for telehealth applications, technology networking experts from all over North Dakota were asked to join subsequent conference calls. Those experts represented North Dakota's Information Technology Division, the NDSU and UND Information Systems divisions, the North Dakota University Systems Intenet-2 experts and additional outside consultants.

The networking expertise was impressive, the discussions were fruitful in terms of discovering ways that one of the nationwide backbone's services to rural areas could be beneficial. However, after countless discussions and even examination of enhancing the state's existing videoconferencing network for bioterrorism emergencies (BT-WAN), each implementation was determined to be impractical at this point.

Two of the biggest stumbling blocks were the existence of medium-speed, inexpensive and reliable broadband circuits that are already available in the state and the 15% match which can be significant to rural health care providers that are already struggling with a financial crisis. The expenditure of scarce funds for untried new technology was not appealing at this time.

The UNDSMHS then turned its focus inwards to examine the possibilities of developing a research and testing environment that might allow for developing and proving telehealth applications on a high-speed network and a nationwide backbone service at real health care facilities and on projects they want and need.

After close examination of funds that the UNDSMHS is already spending for communications between its campuses *and Rural Opportunities in Medicine (ROME)* sites and through close collaboration with the North Dakota Information Technology Division, a plan was devised that would allow combining existing UNDSMHS funds with the FCC's generous 85% match to significantly enhance the UNDSMHS's network architecture.

With this new enhanced network, titled the *Health Care Research and Education Network (HCREN)*, we will increase our ability to connect more health care professionals as teachers from all over North Dakota as well as our gifted researchers to the existing infrastructure we already use to disseminate healthcare education to communities all around the state.

The existing infrastructure we now utilize to broadcast such interactive health care education includes the videoconferencing bridge (Codian Multipoint Conference Unit) in Park River, the 40+ H.323 sites we administer around the state, the BT-WAN video network reaching all 42 hospitals around the state, North Dakota IVN, the North Dakota Health Care Review's Quality Improvement network at long-term care sites around North Dakota and the states telehealth networks in Bismarck and Fargo.

HCREN will also have the capacity to test new telehealth applications in order to determine their network requirements and it will allow our researchers to evaluate the efficacy of telemedicine as a treatment option in rural areas.

ABSTRACT

The Center for Rural Health (CRH) was established in 1980 and is located within the University of North Dakota School of Medicine and Health Sciences (UNDSMHS). CRH is serving as the lead applicant for the FCC Rural Health Care Pilot Program. The CRH serves as a focal point for rural health in North Dakota. As the federally designated State Office of Rural Health for the state, the Center connects the School of Medicine and Health Sciences and the university to rural communities and their health care institutions to facilitate the development and maintenance of the rural health delivery systems.

UNDSMHS, one of 126 medical schools in the U.S. and Canada, was established in 1905 and is fully accredited by the Liaison Committee on Medical Education. It is one of 22 “community-based” medical schools in the United States. “Community-based” means that the school is integrated into the medical system of communities where practicing physicians serve as members of the school’s faculty. Physicians teach medical students in hospitals, clinics and other settings in about 30 communities throughout North Dakota. The school is administered through four regional “canipuses,” based in Fargo (91,240 pop.), Bismarck (56,234), Minot (36,256), and Grand Forks (48,546), which represent the four quadrants (NW, **NE**, SE, SW) of the state.

ND demographics: In 2000 North Dakota’s resident census population was 642,200, which ranked 47th in the nation. North Dakota has four metropolitan counties, all of which have rural census tracts. The state’s population density is 9.2 people per square mile, and **68 percent of the counties are classified as frontier. Part or all of 83 percent of the counties in the state are designated as Health Professional Shortage Areas (HPSA), and 94 percent are designated as Mental Health Shortage Areas.**

Proposed Pilot Project: The Center for Rural Health, working in partnership with UNDSMHS Computer Services is proposing to construct a high-speed data network, the **Health Care Research & Education Network (HCREN)**, that will connect the UNDSMHS’s four main campus sites (Bismarck, Minot, Fargo, Grand Forks) and its own clinical medical sites to rural health care facilities (Jamestown, Dickinson, Williston, Hettinger, Devils Lake) in North Dakota. These hospitals have been chosen for this pilot program because they serve as sites for the *Rural Opportunities in Medicine* (ROME) program, which is a seven month interdisciplinary experience in a rural primary care setting, open to third-year medical students at the UNDSMHS and also serves students in the *Student/Resident Experiences and Rotations in Community Health* (SEARCH) program. This program offers a rural practice opportunity for students who have completed one year of training in the following: medicine, primary care, nurse practitioner, physician assistant, graduate social work and dentistry.

This enhanced high-speed HCREN will be utilized to: 1) **address the healthcare workforce shortage issues by** - providing a link to improve educational opportunities to students in health care professional training programs; providing continuing education for existing health care professionals and to pilot a possible solution to the documented shortage of mental health services in the state; 2) **promote health care research** - by facilitating new as well as ongoing research in health care delivery to rural areas; by facilitating pilot projects that will monitor the use of this high-speed network when implementing an electronic medical record as well as other technology applications. The results will be shared with other rural health care facilities which will help to inform their decisions as they adopt HIT to improve the quality of health care delivery; 3) **enhance health care education to rural and medically underserved areas**- by broadening the pool of possible topics/presenters to also include the health care professionals on the ROME campuses and UNDSMHS research programs. In addition, the UNDSMHS will **commission a Design Study to examine the feasibility of providing both fiber and Internet-2 capabilities** similar to those that prove efficient in HCREN pilot projects **to the 34 rural hospitals** in the state that are not a part of this pilot project.

UNDSMHS is **requesting a total of \$286,144** to support 85% of the costs required to construct the network; to support re-occurring costs to maintain the data lines for a period of two years; to provide the network with connections to Internet-2 (*The National LambdaRail is not available in North Dakota at this time.*); to commission a Design Study.

BACKGROUND

North Dakota State Summary:

In 2000 North Dakota's resident census population was 642,200, which ranked 47th in the nation. The male population was 320,524 and the female population was 321,676. Seventy-five percent of the population was 18 years and older with a median age of 36.2 years.

Of all United States, North Dakota (ND) is the most rural, with farms covering more than 90 percent of the land. North Dakota has four metropolitan counties, all of which have rural census tracts. The state's population density is 9.2 people per square mile, and **68 percent of the counties are classified as frontier** (federal definition of six or less people per square mile). In the 2000 census, North Dakota had the smallest population increase (0.5 percent), and the population has decreased 1.3 percent since 2000.

According to the 2000 census, 42 of North Dakota's 53 counties had population with 30 percent or more of residents living at or below 200 percent of the Federal Poverty Level (FPL). Part or all of **83 percent of the counties in the state are designated as Health Professional Shortage Areas (HPSA), and 94 percent are designated as mental health shortage areas.** A 2004 HRSA state planning grant survey found that 80 percent of the ND population is uninsured and 8.2 percent is underinsured. The uninsured are mostly young (15.9 percent), working (71.7 percent), and poor (70 percent of the uninsured have incomes less than 200 percent of the FPL).

American Indians (AI) are *the* largest minority group (five percent of total population) in **ND**. While the overall state population has declined, the American Indian population has increased by 22 percent. American Indians reported being uninsured at 37.1 percent. This population also has the greatest health disparities. North Dakota's American Indian population is 1.5 times as likely to die of heart disease, cancer, stroke, and influenza/pneumonia as the white population. In addition, American Indians are 6 times as likely to die from diabetes, 10 times as likely to die of cirrhosis, and 13 times as likely to die of homicide¹.

The University of North Dakota School of Medicine and Health Sciences (UNDSMHS)

UNDSMHS, one of 126 medical schools in the U.S. and Canada, was established in 1905 and is fully accredited by the Liaison Committee on Medical Education. It is one of 22 "community-based" medical schools in the United States "Community-based" means that the school is integrated into the medical system of communities where practicing physicians serve as members of the school's faculty. Physicians teach medical students in hospitals, clinics and other settings in about 30 communities throughout North Dakota, although the majority of training occurs in the state's four largest cities.

The school is administered through four regional "campuses," based in Fargo (91,240 pop.), Bismarck (56,234), Minot (36,256), and Grand Forks (48,546), which represent the four quadrants (NW, **NE**, SE, SW) of the state. Through this structure, education and training of undergraduate medical students and residents is coordinated and supervised. Practicing physicians on each campus serve as teachers, providing a broad spectrum of experience while caring for patients in hospitals, clinics, physicians' offices, nursing homes and other community health care facilities. Community resources for medical care services - such as mental health centers, alcoholic treatment units, public health clinics - also are utilized in the education programs. In addition to community hospitals, UND medical school-affiliated

¹ North Dakota Vital Statistics **Reports** 1985-2000

teaching hospitals include the Veterans Administration (VA) Medical Center in Fargo and U.S. Air Force Base hospitals in Minot and Grand Forks.

The school is routinely recognized by national organizations for leadership in rural medicine and the high proportion of graduates who choose to enter a primary care specialty. The school has been cited many times by the American Academy of Family Physicians for the high percentage of its M.D. graduates who choose to enter training in family medicine, practitioners whom are desperately needed in rural North Dakota. Today, about 45 percent of practicing physicians in the state have received some or all of their training through the UND medical school. In the past 30 years, the number of North Dakota physicians has increased nearly threefold, to about 1500, and the sophistication of medical services, procedures and surgeries has increased dramatically, allowing patients to remain in-state. However, the issue remains one of geographical distribution with shortages in with shortages in rural North Dakota.

UNDMSHS research is conducted in areas such as alcoholism in women, anorexia and other eating disorders, cancer, diabetes, diseases of metabolism, myopia (nearsightedness), multiple sclerosis and Parkinson's disease, among many investigations concerning human health. A Center of Excellence in Neuroscience has recently been established.

In addition to medical education, UNDSMHS also offers graduate education leading to the master's and/or doctoral degree in anatomy and cell biology; biochemistry and molecular biology; microbiology and immunology; pharmacology, physiology and therapeutics; clinical laboratory science, and physical therapy. It offers undergraduate degrees in athletic training, clinical laboratory science and occupational therapy. The school admits experienced, professional nurses to a master's degree program which prepares them to become physician assistants. Many of the graduates from these programs have remained in North Dakota.

Center for Rural Health

The Center for Rural Health (CRH) was established in 1980 and operates within UNDSMHS and has as its mission to connect resources and knowledge to strengthen the health of people in rural communities. CRH serves the people of the state, region and nation. As a resource, CRH staff members identify and research rural health issues, analyze health policy, strengthen local capabilities, develop community-based alternatives, and advocate for rural concerns.

The CRH serves as a focal point for rural health in North Dakota. As the federally designated State Office of Rural Health for the state, the Center connects the School of Medicine and Health Sciences and the university to rural communities and their health care institutions to facilitate the development and maintenance of the rural health delivery systems. In this capacity, the CRH staff works at the national, regional, state and community level

Although many specific activities constitute the agenda of the CRH, seven core areas serve as the focus:

1. **Education, Training, and Resource Awareness** – The Center is a resource for educational programs (i.e. quality and patient Safety; CMS updates; public health topics; health Information technology; grant writing) that incorporates rural health content. Educational efforts extend beyond the campus through continuing professional, consumer and policymaker education on selected topics.

2. **Community Development and Technical Assistance** - Active assistance is provided to rural health care providers, communities, associations, groups and states developing viable solutions to health care delivery problems.
3. **Rural Health Research** - Most of the Center's rural research can be grouped into three categories: health policy, health systems, and health personnel. Research efforts focus on helping to identify solutions to long-term problems surrounding rural health care delivery.
4. **Rural Health Policy** - The impact of public policies on rural health care is evaluated and information is used to inform policy decisions at the local, state and federal level.
5. **Rural Health Workforce** - Direct assistance is provided to rural communities and health organizations on their workforce issues (e.g., access to state and federal loan repayment, National Health Service Corps, interdisciplinary training, etc.) and the Center works closely with both private and public sources at the national and federal level.
6. **Native American Health** - The Center is a resource for Native American aging subjects and issues working with tribal governments throughout the country. Within North Dakota active assistance is provided to tribal entities on the following: identifying funding sources; needs assessment analysis; interdisciplinary training; work force development; mental health, and other areas. The Center is home to the National Resource Center on Native American Aging.
7. **Program Evaluation** - A strong feature of the CRH is its ability to evaluate the effectiveness of programs both at the process and outcome levels. Evaluation expertise lies in both quantitative and qualitative measures.

The CRH was designated (2004) as one of three Centers of Excellence in Research, Scholarship and Creative Activity by the University of North Dakota based on its record of service through outreach to communities, rural health services research, and strong partnerships with multiple programs across local, state, tribal, and federal government. The CRH's commitment to strengthening North Dakota's rural and frontier health care system is based on the recognition that access to quality health care is essential to the viability of rural and frontier communities in North Dakota.

The Center's activities related to each of the seven focal areas are critical to adequately sustaining private sector positions in health care. For example, the Center facilitates network development to achieve economies of scale across rural health care systems and conducts studies to better understand and plan for health workforce demand. This investment in reshaping rural health systems and restructuring community dynamics is essential to strengthening the foundation for rural community survival and statewide growth.

The CRH's efforts assist in building and promoting the viability and capacity of North Dakota's rural communities in a number of ways. To illustrate, the CRH provides direct technical assistance to members of rural health care facilities. By working with rural health systems to maintain and sustain their viability, the CRH not only assists in addressing health care access issues, but contributes to rural economic preservation and development.

For example, the CRH's Rural Hospital Flexibility program has helped North Dakota's 31 Critical Access Hospitals (CAHs) to continue to provide approximately 3,900 jobs (primary and secondary employment) in rural North Dakota. These rural hospitals have a primary and secondary payroll impact of over \$90 million (Gibbens, 2005). Through direct technical assistance (e.g., grant development, health professional recruitment/retention, health system development), the CRH provides public sector support and infrastructure development to private sector enterprises.

The second capacity-leveraging factor is associated with technology development. The Center works with rural hospitals, clinics, and other health care businesses (e.g., rural pharmacies) in grant

development to build new or expand existing technology for the benefit of rural patients. The Telehealth Network grants, the Rural Utilities Services Distance Learning grants, and the Universal Service Fund have benefited rural providers. The CRH has worked with all three programs to assist North Dakota's rural and frontier communities in improving access to and quality of local health care services.

The CRH is also recognized by national organizations and the federal government as a leader in rural health and rural community development. It has influenced the efforts of states across the country by developing innovative models for community development and local health system reform. In addition, the CRH is nationally recognized for its efforts to craft health policy-relevant research projects that are directly applicable to rural communities and providers. For example, the national reputation of the Center is acknowledged through federal support of its National Resource Center on Native American Aging which provides technical assistance and research to over 170 American Indian tribes across the nation. Also, through the U.S. Department of Health and Human Services' Agenda for Rural America initiative, the CRH's Rural Assistance Center (RAC) was designated to serve as the nation's clearinghouse for information on rural health and human services. Since its inception in 2002, RAC has been accessed by more than 148,000 information-seekers.

UNDSMHS Health Care Education - Outreach Programs **Rural Opportunities in Medicine (ROME)**

ROME is a seven month interdisciplinary experience in a rural primary care setting, open to third-year medical students at the University of North Dakota School of Medicine and Health Sciences. Students live and train in non-metropolitan communities under the supervision of physician preceptors. ROME students experience health care delivery in rural areas throughout the state of North Dakota, where providing access to health care is sometimes challenging. Students learn about problems commonly encountered in primary care, from routine health maintenance to medical emergencies and rare and unusual diagnosis. Each primary preceptor is board-certified in family medicine, but students also have the opportunity to work with board-certified surgeons, internists, pediatricians, and other specialists available in the community.

The ROME sites have been selected as key pilot nodes in the purposed HCREN network.

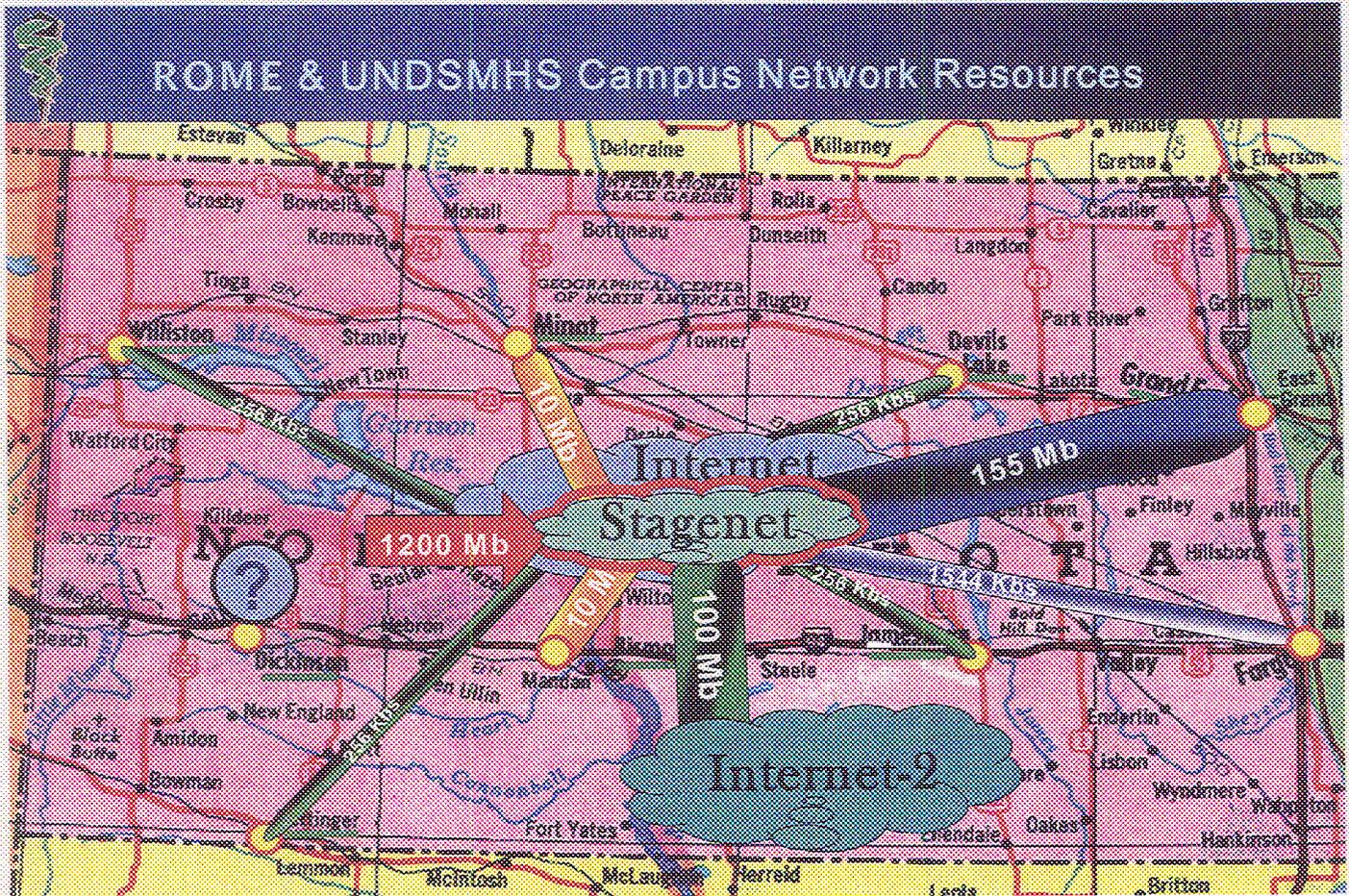
Student/Resident Experiences and Rotations in Community Health (SEARCH) Program

The Center for Rural Health coordinates the National Health Service Corps (NHSC), *Student/Resident Experiences and Rotations in Community Health (SEARCH)* program. This is a program that offers an opportunity for students who have completed one year of training in the following programs: medicine, primary care, nurse practitioner, physician assistant, graduate social work and dentistry. Exposing health care professional students to rural practice early in their training can dispel myths associated with rural practice. Students participate in the SEARCH program which is a four week summer rotation or a clinical field placement to learn about the role and function of interdisciplinary health care teams in rural areas. Community-based clinical focus provides students their first exposure to the rural setting which provides a very different atmosphere from the academic environment.

SEARCH is funded by the U.S. Department of Health and Human Services, Public Health Service, Health Resources and Service Administration, Bureau of Primary Health Care.

The Current UNDSMHS Network Infrastructure:

A conceptual depiction of the UNDSMHS current network resources is presented below. It should be noted that connections from the Bismarck, Fargo, Grand Forks and Minot campus sites are made into Stagenet but the connections from the ROME hospitals are being made to the commercial Internet through DSL lines and local Internet Service Providers.



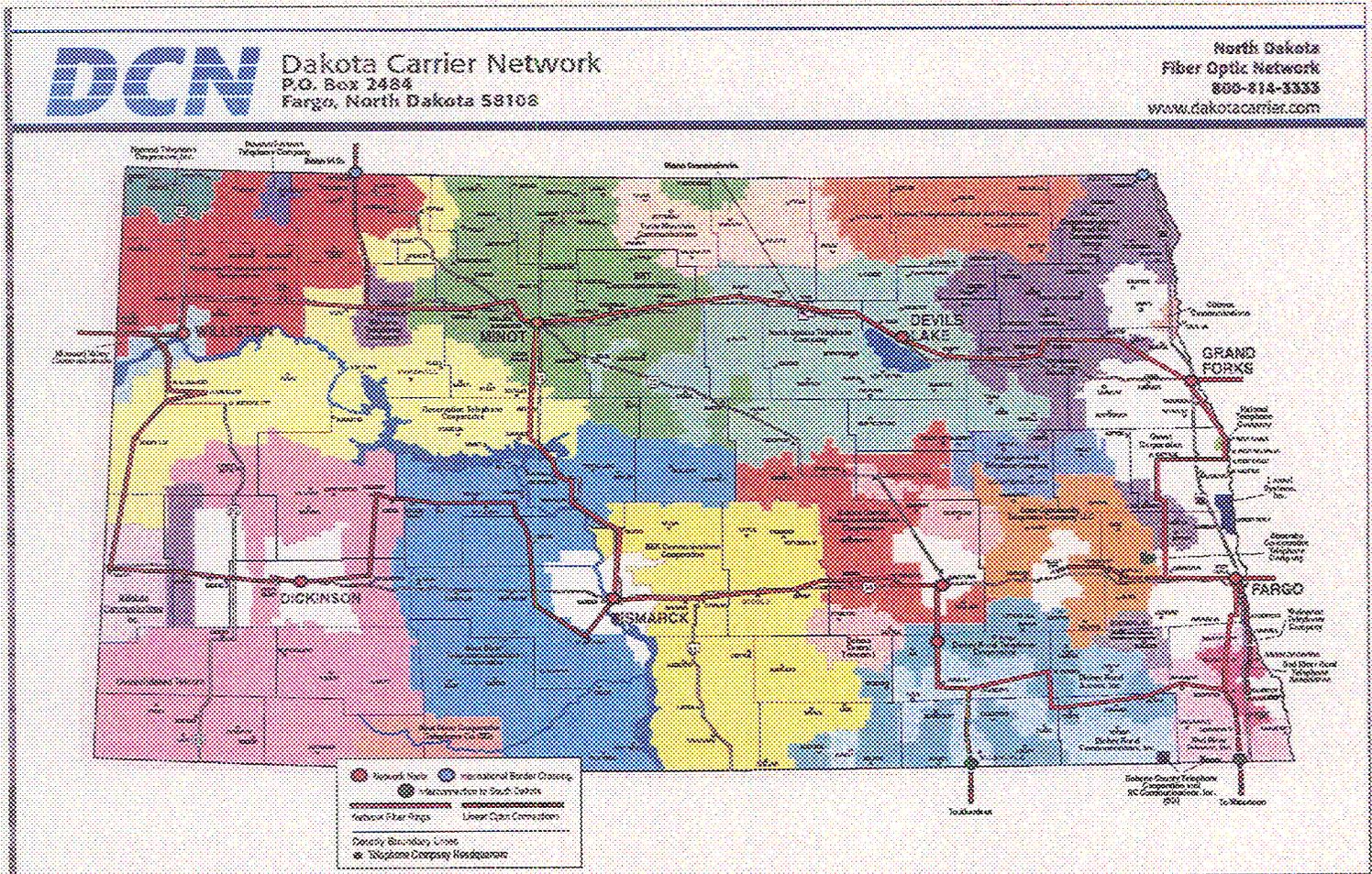
Also of note:

The Dickinson ROME site is scheduled to receive medical students for the first time in the fall of 2007 so an Internet connection to the Dickinson hospital has yet to be made.

Stagenet has a 1200Mb connection to the commercial Internet and a 100 Mb connection to Internet-2. Stagenet provides Internet-2 services to all of its endpoints.

Overview of North Dakota's IT Infrastructure

As a state institution, the UNDSMHS is obligated by law as stated in the North Dakota Century Code Section 54-59-08 to use North Dakota's Information Technology Department (ITD) for wide area network services.



ITD runs a virtual private network on a system leased from Dakota Carrier Network (DCN). DCN was formed by 15 independent rural telecommunications companies that together represent 85% of all of the telephone exchanges in North Dakota and serve more than 90% of the total surface area in the state.

Dakota Carrier Network operates a 100-percent fiber Synchronous Optical Network (SONET) ring communications network with backbone operating at 2.488 Gbps to link all regions of the state, including all of the major population centers.

ITD is using a Resilient Packet Ring (RPR) network as the backbone for the state of North Dakota. This is a highly reliable high-speed network that also employs Dense Wavelength Division Multiplexing (DWDM) to create paths on existing fiber having 72 wavelengths each capable of carrying 10 Gbs.

Internet-2 capabilities are an integral part of all Stagenet connections.

Goals and Objectives of the Proposed Health, Education and Research Network (HCREN)

Goal 1

Facilitate the assessment of the band-with utilization for the pilot project sites to determine the most appropriate use of high-speed network technologies to improve health care delivery and health care education to rural and medically underserved areas.

Objective -1:

The UNDSMHS will employ the services of North Dakota's Information Services Division (ITD) to deploy the highest speed StageNet Internet Connections locally available to the sites listed below.

The following sites will be connected.

The maximum bandwidths currently possible are:

<u>Rural Sites</u>	Proposed Bandwidth	Current
West River Medical Center, Hettinger	1.544 Mbs	256 K
Mercy Hospital, Williston	10 Mbs	256 K
St. Josephs Hospital, Dickinson	1.544 Mbs	none
Jamestown Hospital, Jamestown	10 Mbs	256 K
Mercy Hospital, Devils Lake	1.544 Mbs	256 K
The UNDSMHS Codian MCU in Park River ²	1.544 Mbs	none

UNDSMHS Sites

Grand Forks Campus	155 Mbs	155 Mbs
Grand Forks Altru Hospital	155 Mbs	155 Mbs
Bismarck Campus & Center for Family Medicine	100 Mbs	10 Mbs
Minot Campus & Center for Family Medicine	100 Mbs	10 Mbs
Fargo Campus	10 Mbs	1.5 Mbs
Neuropsychiatric Research Center in Fargo	10 Mbs	none

¹StageNet (Statewide Technology Access for Government and Education network) was established by North Dakota legislative action in 1999 to provide "broadband connectivity, Internet access, video conferencing and other networking services. All state agencies, colleges and universities, local government, and K-12 are required to participate in STAGEnet. "

ITD "is responsible for all wide area network services planning, selection, and implementation for all state agencies"

²The UNDSMHS houses a Codian Multipoint Conferencing Unit (A Video Bridge to allow multiple H.323 endpoints in a videoconference) in the Park River Polar Telecommunications Network Operations Center to take advantage of the 180 Mbs connection they have there to the commercial Internet. Polar sees their peak usage on their links during the evening hours and our peak usage occurs during the work day, so we have a very useful and affordable synergy. A Stagenet connection on port- two of that MCU will allow very high-speed videoconferences to be bridged between endpoints on Internet-1, Stagenet and Internet-2 through that video bridging device.

Objective - 2:

The UNDSMHS will utilize the HCREN for current research (listed below) and new research in health care delivery. It is expected that such adoption will greatly accelerate the ability to bring the latest in contemporary treatment options to rural areas with the potential of attracting additional participatory research from the rural sites.

Currently the UNDSMHS is implementing a number of medical research efforts that can be strengthened by the HCREN.

Current clinical³ research at UNDSMHS:

NORTHSTAR, a recently funded practice-based research network at UNDSMHS.* NORTHSTAR will focus on quality improvement in rural practice, **conducting practice research and identifying and testing new methods of health care delivery in the rural setting. The goals of this project are to improve quality of care in the rural primary care setting, and to facilitate learning for rural providers.

The Neuropsychiatric Research Institute's has been doing long-term research into the **remote delivery of cognitive behavioral therapy (CBT) via telemedicine for **treatment of bulimia nervosa in rural areas** where specialized treatments are usually not available. There appears to be a growing discrepancy between what is being used experimentally in academic centers and recommended by researchers in the field (e.g., cognitive behavioral therapy (CBT), and what is actually available in the community. Although this deficiency might be remedied through the development of training programs to improve therapists skills in this area, such programs would be difficult to administer logistically, and it is unlikely that most practitioners would have the time or financial resources to undertake such training. A randomized trial has recently been completed, comparing CBT delivered via telemedicine to CBT delivered in person in rural and smaller urban areas in North Dakota and northwestern Minnesota. The two treatments were equally effective and acceptable to patients, with good maintenance of treatment effects at 1-year follow-up.*

**From the UNDSMHS Department of Neuroscience:*

The Northern Plains Trauma Consortium will train North Dakota clinicians in a variety of evidence based **mental health interventions for traumatized children**. Specifically, the consortium will work to disseminate two treatments (i.e., Trauma Focused Cognitive Behavior Therapy, Structured Psychotherapy for Adolescents Residing in Chronic Stress) to North Dakota clinicians. Telehealth technology will be utilized to deliver supervision and actual interventions for children in extremely rural settings.

The UNDSMHS Department of Neuroscience also has an internationally renowned research group that has been **studying women's drinking since 1980. The project started by studying women in the United States, and over the last 20+ years has expanded to study drinking habits in 40 countries. Several projects including Gender, Alcohol and Culture: An International Study (GENACIS) would very likely be well served by the high-speed performance that is characteristic of Internet 2 connections from the U.S. to international sites. Readers may learn more about this research at: <http://www.med.und.nodak.edu/depts/irgga/>*

Family and Community Medicine Clinical Research Project for 3rd year medical students. The third-year research project is a collaborative effort by faculty from the Departments of Family and Community Medicine and Department of Internal Medicine. The objective of this project is to develop an understanding of research while utilizing the supervision and support of faculty from the Department of Family and Community Medicine and Department of Internal Medicine. All 3rd year medical students including the **ROME students are required to participate in this with a clinical research project.*

³ This list of research projects is most certainly not exhaustive nor is it a complete list of research done at UNDSMHS. Interested readers may learn more about other research done at UNDSMHS by visiting: <http://smhs.med.und.nodak.edu/UNDSMHS/research.html>

Objective - 3:

The UNDSMHS will work with the five pilot hospitals to monitor the band-width utilization for various electronic applications (i.e. clinical medicine, telemedicine, healthcare education and aspects of electronic medical records) that utilize the HCREN.

Based on the HIT (2005) Survey conducted by the North Dakota Health Care Review, Inc., the Medicare Quality Improvement Organization (QIO) for North Dakota, rural health care providers across North Dakota are struggling with the issues of implementing health information technology (i.e. electronic health records (EHR), picture archival and communications systems (PACS), laboratory information systems, etc.) and other technology applications which is being encouraged by the federal government. For example, of the statewide hospital responses, only 30% of hospital clinics indicated they use an EHR, and another 15-20% plan to implement in the next two years; and of the Critical Access Hospitals (CAH) that responded, about 25% use an EHR, and just under 10% plan to implement in the next two years.

With regard to barriers to implementing EHR, the statewide results reported over 90% of hospitals cited lack of financial resources as a barrier slowing or preventing implementation of an EHR in their organization. Other frequently cited barriers were availability of well-trained staff (40%), difficulty in justifying expense/determining return on investment (40%), and difficulty in achieving physician acceptance/use (28%).

In addition, lack of knowledge of just how much bandwidth is needed and what kind of network is required for each of the electronic applications that make up an electronic medical record system makes their efforts significantly more difficult and increases the potential of making very expensive mistakes. With the HCREN, we intend to offer the providers a tool to test the band-width issues in order to determine the most efficient and cost-effective solution.

Objective - 4:

The UNDSMHS will assist the hospitals and healthcare providers, in this rural pilot program to test the HCREN's Internet-2 capabilities as an "electronic healthcare information commons" where providers can meet at high network speeds with reasonable assurance of network compatibility. It is anticipated that this will prove to be a solution to incompatibility issues between various electronic networks that serve health care in the new electronic information age.

The UNDSMHS will also offer to extend its Internet-2 Participant Agreement to include sponsorship of North Dakota healthcare providers not listed above but who are actively involved in training medical and allied health students. The costs, if any, resulting from such Internet-2 connections will be the responsibility of the healthcare provider.

Goal 2

Utilize the HCREN to broaden the educational opportunities to students in health care professions and health care providers in the state.

Addressing healthcare professional education and health care workforce shortages are fundamental to the purpose of HCREN. When fully implemented, this program will assist the UNDSMHS not only with academic research and educational goals but also provide the medical students the chance to practice in a rural setting where those rural practice sites have state-of-the-art technology. In order to address the rural workforce shortages, a new generation of physicians and other allied health care

professionals require the assurance that latest technology is available.

Objective - 1:

The UNDSMHS will utilize HCREN's high-speed capabilities to originate health care training via videoconferencing from rural sites as well as from the four main campus sites that are now used for program origination. Such educational events would most certainly include but not be limited to current offerings such as Surgery Grand Rounds, Surgery Morbidity and Mortality conferences, Psychiatric Grand Rounds, the UNDSMHS Grand Rounds, Medical School for the Public and the Dean's Hour (in-house medical education).

Having higher bandwidths available at the rural ROME sites will allow us to tap into the knowledge and expertise of our faculty at those sites and allow them to share that knowledge with students, colleagues and peer healthcare providers all over North Dakota.

The UNDSMHS already has very sophisticated technologies available that allow program dissemination to nearly every health care provider in the state, and HCREN will *serve to significantly increase the number of locations* that such programming can emanate from.

Goal 3

Commission a Design Study to determine the cost and feasibility of providing fiber access and Internet-2 connectivity for all 34 rural hospitals in North Dakota.

Objective - 1: Assess the available communication options and the most cost-effective method to provide Internet-2 capabilities for each of the 34 rural North Dakota hospitals that are not a part of the proposed pilot project. Where needed, construction costs for implementing a fiber infrastructure will also be sought.

This study will be commissioned during the second year of the project to allow the design of the study to benefit from the collection and analysis of data from the HCREN sites during the first year of operation.

The UNDSMHS will provide 15% of the cost of this study.

Objective - 2:

The UNDSMHS Center for Rural Health will provide the results from the Design Study to the *North Dakota Statewide HIT Steering Committee* to inform the development of the State HIT Roadmap.

Goal 4

Facilitate communication to share lessons learned from the operation of the HCREN.

Objective - 1:

The UNDSMHS Center for Rural Health and Computer Services will coordinate quarterly videoconferences between the five ROME sites and the UNDSMHS sites using the HCREN to provide opportunities to share progress and trouble shoot.

Objective 2:

The UNDSMHS Center for Rural Health and Computer Services will coordinate two electronic forums annually to share information gleaned from research on the HCREN and to solicit suggested direction for additional research and/or services. These conferences will utilize state-wide videoconferencing

resources to convene participants in North Dakota.

Objective - 3:

The UNDSMHS Center for Rural Health will facilitate joint videoconferences with FCC Rural Pilot Programs in neighboring states, such as Minnesota, South Dakota and Montana to share lessons learned from each program's unique focus.

Objective - 4:

The UNDSMHS Center for Rural Health will disseminate the lessons learned to the *North Dakota Statewide HIT Steering Committee* to inform the development of the State HIT Roadmap. In addition, findings will be discussed in a policy brief to be provided to the state and federal policy makers.

Program Focus - Rural Health Care Pilot Program

The Center for Rural Health is involved in a number of areas of focus as described previously. The proposed HCREN will be utilized to address three main focus areas **health care quality/patient safety, health information technology and health care workforce**. The Center sees this FCC application as a valuable opportunity to enhance the existing network and connect rural health care facilities with a high-speed network to both the UNDSMHS educational as well as research services. The lessons learned and research results gleaned from this rural pilot program combined with the Design Study will serve to inform additional rural health care facilities throughout the state about sensible options when adopting the latest health information technology (HIT) applications to improve health care delivery.

Quality/Patient Safety

The CRH collaborates with the University of Minnesota Rural Health Research Center to form the Upper Midwest Rural Health Research Center (UMRHRC), one of eight national rural health research centers designated by the Office of Rural Health Policy. Through this partnership, the two Centers combine their expertise to conduct rural research on the quality of health care and the challenges of implementing quality improvement initiatives, including: limited resources, low volume of patients, small staffs, and inadequate information technology. The results of these ongoing studies are expected to produce important directives and recommendations for improving rural health care access, quality and efficiency.

The Building Research Infrastructure and Capacity (BRIC) grant, funded by the Agency for Healthcare Research and Quality (AHRQ), supports the Center for Rural Health's development of the Great Plains Institute for Rural Health Services Research (Institute). This Institute's faculty conducts research to assess the quality of healthcare in rural and frontier America, which contributes to the development of quality indicators appropriate for rural and frontier healthcare providers.

The CRH has also teamed with the University of Nebraska Medical Center to be one of 17 healthcare quality projects throughout the country funded by the federal Agency for Healthcare Research Quality. The project, a medication safety project, is the only one that focuses on rural and frontier hospital quality. Ten rural North Dakota hospitals volunteered to participate in the project to record their medication errors and near misses. This information assists them in examining the typical causes of medication errors so they can develop and implement quality improvement strategies appropriate for rural and frontier hospitals.

Health Information Technology

The Center for Rural Health is involved in planning and implementation of HIT in rural health care facilities in a number of ways. First, the PI for this pilot project serves as the director of the *BCBSND Rural HIT Grant program* which is administered through the CRH. This grant funds projects that demonstrate collaborative efforts involving rural health care facilities whose measurable outcomes improve access, safety, quality, effectiveness and efficiency of health services through the planning and implementation of an HIT infrastructure.

Also CRH administers the Medicare Rural hospital Flexibility (Flex) Program which assists rural hospitals by improving access to quality health services for rural North Dakotans. The ND Flex Steering Committee (Center for Rural Health, ND Healthcare (hospital) Association, and the ND Department of Health) administers the program. Thirty-one of 39 eligible hospitals (79%) have been designated as CAHs. All 39 of ND's rural hospitals have benefited from the Flex program. The focus currently network development, EMS, and quality improvement activities through Flex grants, research opportunities, technical assistance and community development.

Innovative projects include: 1) concentrated focus on performance management (including balanced scorecard), 2) quality improvement initiatives that foster increased networking (based on state-wide survey developed by Flex Program (nationally unique), 3) collaborative HIT development activities integrating Flex, the State Office of Rural Health (SORH), and the Small Hospital Improvement Program (SHIP), 4) refined orientation for new CEOs, 5) concentrated efforts to feature/share innovative projects occurring at the local level, 6) provide a bridge linking research opportunities available through the Center for Rural Health to critical access hospitals (e.g. medication error project and adapting aviation safety practices to rural medicine), 7) MN/ND Flex Programs matching funds to support emerging network.

The CRH also administers the Small Hospital Improvement program (SHIP). The Small Rural Hospital Improvement (SHIP) Grant Program provides funding to small rural hospitals to help them do any or all of the following: 1) pay for costs related to the implementation of PPS; 2) comply with provisions of HIPAA; 3) reduce medical errors and support quality improvement.

There is an ongoing effort on behalf of the CRH staff, through these three programs Flex, SHIP, and BCBSND and others to encourage rural health care facilities to work together as networks to improve quality/patients safety of health care services utilizing HIT.

Additionally, the PI serves as the Chair of the **ND Health Information Technology (HIT) Steering Committee**. This Committee recognized that in the foreseeable future, all information regarding patient care services and reimbursement will be required to be accessible electronically. The healthcare providers in the state, including clinics, hospitals, and long term care facilities, along with state agencies and organizations, have for some time been grappling with the emerging issues and challenges related to storing and exchanging information about patients and beneficiaries in a compatible electronic format. A major impetus for this was initiated when HIPAA was enacted in 1996. Based on HIPAA's information-sharing rules, it is in everyone's best interest to move forward in an open and cooperative dialogue that includes all stakeholders to determine how to best implement new health information technology initiatives.

For this reason the first "**ND HIT Summit**" was held in April, 2006 sponsored by Sen. Kent Conrad, ND Healthcare Review(QIO), ND Health Care (hospital) Association, ND Medical Association, the Center for Rural Health at UND School of Medicine and Health Sciences, BlueCross BlueShield of ND, and Gruby Technologies. As a result of a successful event, attended by over 160 participants, the

Summit partners recognized the need to continue the dialogue. In practical terms, the group is discussing issues such as:

- e How to build a confidential and protected, patient-centered index that can be shared between healthcare providers.
- The need to examine existing HIT systems and data bases (e.g. immunization registry, drivers' license data, Medicaid beneficiaries).
- e The assessment of current state laws and standards to assure that the data systems become interoperable.
- Identifying funding sources to develop, implement, and sustain the ND HIT system.

The committee consists of 18 members which are representative of the state health care system both medical and public health care facilities/organizations; rural and urban; third-party payer; academic and research; and consumers, etc. Upon the announcement in September of the FCC Rural Health Care Pilot program, the Steering Committee was fully supportive of an application being developed from our state as a priority.

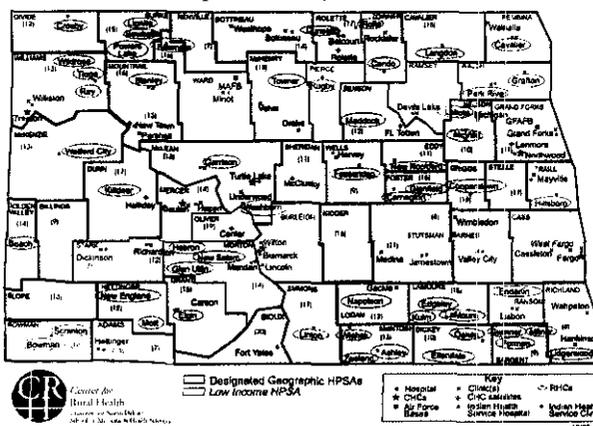
Health Care Workforce

Between now and 2012, seven of the top ten fastest growing occupations across the nation are projected to be in health care.' Just 13 years from now, demand is expected to outstrip supply for a number of health care occupations including a projected shortage of 100,000 physicians and 800,000 nurses.² Shortages of health care providers are problematic because they can negatively impact health care quality and access to health care services. Shortages can also increase stress on available providers and contribute to higher health care costs by increasing the use of overtime pay and expensive temporary personnel.

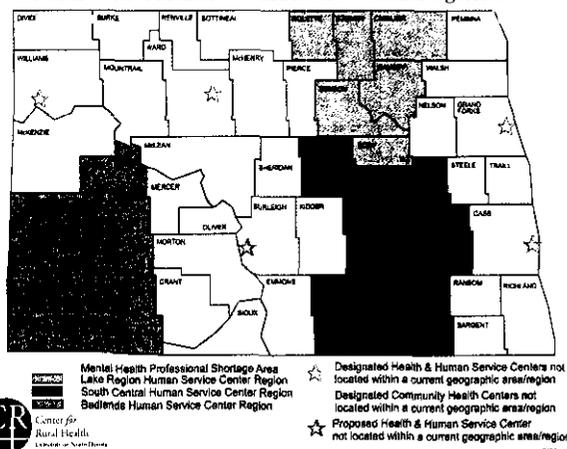
While workforce shortages are a challenge for the entire health care system, they are likely to be most severe in rural areas of the United States. Underscoring this point, the Institute of Medicine recently noted that, "efforts should be made to boost the supply of health professionals in rural areas"? However, demand for health care providers is not just about meeting rural versus urban health care needs in America. Rather, increasingly the market for the health care workforce is global, with rising international competition. As a result, the workforce that North Dakota competes for is a workforce that can be recruited from or recruited to not just other locations in the United States, but other countries.

Against this backdrop of increasing demand, North Dakota starts at a distinct disadvantage. Already 81 percent of the state's 53 counties are designated as federal primary care health professional shortage areas.

North Dakota Health Professional Shortage Areas
Rural Hospitals, Clinics, CHCs and RHCs



North Dakota Mental Health Professional Shortage Areas



One-third of North Dakota counties are designated as oral health shortage areas and 94 percent of the state's counties are designated as mental health professional shortage areas. Exacerbating this problem are survey data suggesting that approximately 26 percent of the state's physicians and 24 percent of the state's nurses are planning to retire by 2015-less than 10 years from now. These data are consistent with concerns expressed in 16 community forums held across the state over the past three years. In meetings held by the Center for Rural Health, difficulty in maintaining an adequate workforce, ranging from clinical laboratory and radiology technicians to emergency medical service providers, was a consistent concern. Urban-based health care providers are also expressing workforce concerns. Some urban concerns overlap with those of rural providers and communities, while other urban workforce issues are somewhat different (e.g., attracting physician specialists and high turnover rates for nurses). North Dakota faces current and emerging challenges related to features of both supply and demand. For example, North Dakota's current supply of physicians, dentists, dental assistants, podiatrists, pharmacy technicians, emergency medical service providers and radiology technicians is below the per capita average.⁴ In terms of demand, Job Service of North Dakota expects significant growth (over 10 percent) in demand for pharmacists, occupational therapists, physical therapists, medical and clinical laboratory technologists and technicians, physician assistants, registered nurses and others by 2014.⁵

Demand for health care providers is driven by many factors ranging from the increase in our state's aging population to the significant geographic distance that many clinicians cover in order to reach populations in need of health care. 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.

Addressing workforce supply requires a multifaceted approach, one of which the proposed Health Care and Education and Research Network(HCREN) will address by improving access to educational opportunities for continuing education to support the healthcare professionals currently practicing in the state as well as learning opportunities for students in various health care fields. It will also offer opportunities to conduct pilot studies that can help determine the effectiveness of telemedicine programs, for example telepsychiatry, as a tool to help overcome the acute shortages of mental health professionals in rural areas.

**SECTION 3
BUDGET**

Estimate the network's total costs for each year.

Reoccurring Line Charges:

Site	Annual cost	85% Annual cost	15% Annual cost
Bismarck UNDSMHS Campus	\$ 11,400	\$ 9,690	\$ 1,710
Devils Lake Mercy Hospital	\$ 11,400	\$ 9,690	\$ 1,710
Dickinson St. Joseph's Hospital	\$ 11,400	\$ 9,690	\$ 1,710
Fargo <i>UNDSMHS</i> Campus	\$ 11,400	\$ 9,690	\$ 1,710
Fargo Neuropsychiatric Research Institute	\$ 11,400	\$ 9,690	\$ 1,710
Grand Forks Altru Hospital	NIA	NIA	NIA
Grand Forks UNDSMHS Campus	NIA	N/A	N/A
Hettinger West River Medical Center	\$ 11,400	\$ 9,690	\$ 1,710
Jamestown Hospital	\$ 11,400	\$ 9,690	\$ 1,710
Minot UNDSMHS Campus	\$ 11,400	\$ 9,690	\$ 1,710
Park River to UNDSMHS MCU	\$ 11,400	\$ 9,690	\$ 1,710
Williston Mercy Hospital	\$ 11,400	\$ 9,690	\$ 1,710
Total Annual Cost	\$ 114,000	\$ 96,900	\$ 17,100

Construction Costs:

Site	Construction cost	85% of cost	15% of cost
Bismarck UNDSMHS Campus	\$ -	\$ -	\$ -
Devils Lake Mercy Hospital	\$ -	\$ -	\$ -
Dickinson St. Joseph's Hospital	\$ -	\$ -	\$ -
Fargo UNDSMHS Campus	\$ 58,000	\$ 49,300	\$ 8,700
Fargo Neuropsychiatric Research Institute	\$ 40,000	\$ 34,000	\$ 6,000
Grand Forks Altru Hospital	NIA	NIA	N/A
Grand Forks UNDSMHS Campus	N/A	N/A	N/A
Hettinger West River Medical Center	\$ -	\$ -	\$ -
Jamestown Hospital	\$ 640	\$ 544	\$ 96
Minot UNDSMHS Campus	\$ -	\$ -	\$ -
Park River to UNDSMHS MCU	\$ -	\$ -	\$ -
Williston Mercy Hospital	\$ -	\$ -	\$ -
Total Construction Cost	\$ 98,640	\$ 83,844	\$ 14,796

Summary Totals:

Summary Totals	Cost	85% of cost	15% of cost
Year 1			
Construction Costs	\$ 98,640	\$ 83,844	\$ 14,796
Reoccurring Line Costs	\$ 114,000	\$ 96,900	\$ 17,100
Total year 1 Costs	\$ 212,640	\$ 180,744	\$ 31,896
Year 2			
Reoccurring Line Costs	\$ 114,000	\$ 96,900	\$ 17,100
Total Commissioned Study costs	\$ 10,000	\$ 8,500	\$ 1,500
Total year 2 Costs	\$ 124,000	\$ 105,400	\$ 18,600
Total two year project costs	\$ 336,640	\$ 286,144	\$ 50,496