ST. VINCENT FOUNDATION

97027

PARTNERS IN HEALTH TELEMEDICINE NETWORK (PHTN)

Project Narrative

HEALTH CARE SCENARIOS:

Crow Indian Reservation, Pryor, Montana:

The Crow Indian Reservation has a particularly high incidence of trauma cases. In Pryor, Montana, it is a typical Montana winter day with fifty mile per hour winds, blowing snow, icy roads and a wind chill that plummets the temperature to forty degrees below zero. The winding, rutted road, forty-five minute "good weather" drive to Billings is no longer an option. A gunshot victim is hustled in from the back of a pick-up to the Pryor Health Clinic. The single RN on duty calls the Saint Vincent Hospital Emergency Department in Billings. The HELP helicopter is grounded and ground ambulance service is not an option either. A conference phone on an unreliable and noisy connection is the only communication tool.

Telemedicine will provide a better solution.....

Crow Indian Reservation, Crow Agency, Montana:

The Crow Indian culture demands that family and extended family show support for members who are ill. An elderly Crow man has been admitted to the Indian Health Services Crow Indian Hospital in Crow Agency. He has a compound fracture of his right tibia. An orthopedic specialist is consulted, via phone, at Saint Vincent Hospital in Billings. Adequate information regarding the necessity to transport this patient to Billings for surgery is not available. The transport decision is made. The man's supporting family and extended family set out on the two hour round-trip trek to Billings. The caravan consists of five cars and approximately twenty-two people. The man's wife, who is also ill, is being attended by a Crow Medicine man. The elderly man wants to remain in close contact with the Medicine man and his wife. He is convinced the only way he will get well is through the healing powers of the Medicine man. It will not be good for his wife to make this journey, but she and the Medicine man will travel to Billings later in the day.

Telemedicine will provide better solutions....

Saint Vincent Hospital and Health Center, Billings Montana:

Crow Indian cancer rates are high. Lifestyle changes in diet and exercise have been addressed in a culturally sensitive cancer prevention video produced by Saint Vincent Hospital and titled, "Old Man Coyote Speaks: Standing Strong Against the Cancer Enemy". Follow-up work is needed by the Saint Vincent Hospital Oncology Nurse Specialist. Local commitments and budgetary cuts have reduced her availability for travel to the Crow Indian Reservation to provide staff and community education courses.

Telemedicine will provide a solution....

1. Project Purpose

The Partners in Health Telemedicine Network (PHTN) uses two way interactive videoconferencing technology for the delivery of telemedicine activities. The PHTN's current equipment is Compression Laboratories Inc. (CLI). The project hub and urban provider is Saint Vincent Hospital and Health Center in Billings. The other Montana site is Saint James Community Hospital in Butte. This TIIAP Grant is for expanding the Network to include sites at the Indian Health Services (IHS) Crow Indian Hospital in Crow Agency and the Pryor Clinic in rural frontier Pryor, both of which are on the Crow Indian Reservation. (See attached Map).

The Partners in Health Telemedicine Network is the result of three years of research into the medical applications of videoconferencing technology by staff at Saint Vincent Hospital in Billings, Montana. Established in Billings in 1898, Saint Vincent Hospital serves as Montana's largest tertiary care hospital. It is a 314 bed public not-for-profit hospital and has a medical staff of 276 physicians associated with it in multi specialty group practices. Sponsored by the Sisters of Charity of Leavenworth Health Services Corporation, Saint Vincent Hospital has nearly 100 years of history providing cost effective, high quality healthcare in a spirit of justice and charity. The hospital is committed to improving the health status of the community and surrounding area, with special concern for the poor and underserved.

Located in southcentral Montana, Billings is a transportation, business and medical hub, and the largest city in a 500 mile radius. As a regional referral center, Saint Vincent Hospital recognizes many of the problems associated with the delivery of rural medical care. The hospital operates a number of programs designed to help address those problems while supporting the rural primary care providers in its service area. Examples include a fixed wing and helicopter advance life support air ambulance transport service, outreach physician services providing eighty clinics per month, and locum tenens (temporary, part time) physician service. Many of these programs have been in place for over ten years. The PHTN was conceived as an additional outreach program designed to meet the needs of the rural communities served. Research and experience suggests that the smallest and least adequate facilities have the greatest need for telemedicine consultations, yet they have the fewest resources for the start up costs of purchasing the videoconferencing systems. The rural sites were chosen based on need, limited resources, degree of interest in the project expressed by the communities, and because of the varying levels of care provided in those communities.

The Crow Service Unit (which includes the Crow Agency Hospital and Pryor Clinic) is located on the Crow Reservation, whose eastern boundary is adjacent to the Northern Cheyenne Reservation. The Reservation is approximately 60 miles wide and 40 miles in length, encompassing 1,574,394 acres. The 1995 IHS Official Population is 10,073 Indian people, which averages to 4 people per square mile. (Please see attached table).

The Pryor Clinic, in Pryor, Montana, exemplifies the most basic level of service, It is staffed by one RN who provides all of the health care services in this community. Many times she is in need of consultative services by a primary care physician or a specialist. Because the clinic has no specialty care available, she refers her patients to Crow Agency or Billings. Many times the services needed can be taken care of by a 20 minute consult over a telemedicine system.

The IHS Crow Agency Hospital has a full complement of primary care services, but has expressed an interest in the need for continuing medical education. In addition, it is expected that specialist medical and mental health services will be provided over the network to patients referred by their primary physician, which will help IHS Crow Agency Hospital retain the care of the patients in their local community and significantly reduce the cost of health care.

One primary purposes of this project is to expand services by providing specialist medical and mental health care services, and enhancing emergent services including determining the need to transport trauma cases to Billings. Interactive telemedicine used in trauma cases will allow physicians to see the patient and to determine the course of treatment prior to delivery in the Emergency Room. They will be better able to prepare operating rooms or other triage activities when trauma cases are transferred to Billings by helicopter. Continuing medical and higher education are also identified as much needed services for both Crow Agency and Pryor.

Members of the PHTN realize the rural frontier needs for telemedicine are different from urban needs. Ease of use, mobility and portability of a telemedicine unit is crucial for the rural clinic or hospital that will move the system from a telemedicine studio to an exam room or emergency department. The needs of the rural or frontier community have not been included in the design of existing telemedicine units. The PHTN is partnering with National Aeronautics and Space Administration (NASA) and its design partners KRUG Life Sciences, TIE Communications and CLI, and Indian Health Services to develop such a system. This system, which includes the NASA/KRUG TIP unit (Telemedicine Instrumentation Pack) will be placed at the Pryor Clinic.

In 1996, the PHTN in conjunction with NASA, had an opportunity to demonstrate the TIP unit. The TIP, a small hand-held device, transmits clear, color, accurate images of any affected area of a patient's body, including the ear or eye. This portable system, designed to meet the mass, volume, and power constraints of space flight, is in a package about the size of a small suitcase, and can be used for terrestrial applications. In partnering with NASA/KRUG, TIE/CLI and IHS, the PHTN will bring rural telemedicine healthcare needs into the evolution of the TIP unit and telemedicine system design. This project will provide needed data to NASA and KRUG for refinement of the system through the provision of medical services to rural patients.

Part of the plan for this project is a phased program. We will use currently technology, and then, through experience, will recommend refinements and enhancements for the development of better telemedicine systems. We are limited by the technology currently available, but we will plan and develop new applications as we look at what is potentially available to us down the road. Standard videoconferencing systems will be placed at the Crow Indian Hospital and Saint Vincent Hospital. A TIP unit will be placed in Pryor Clinic, incorporating a "needs driven" design of a specialized telemedicine system. Our proposed project analyzes systems use and types of use to determine the technology needed for rural telemedicine applications. The following goals and objectives reflect activities to be carried out during the grant period.

Goal: To enhance small community medical services, retaining local patients who otherwise would be referred out of the community for a higher level of medical or mental health care.

Objectives: 1) Survey community need for specialty physician services, which may include dermatology, cardiology, orthopedics, and neurology; 2) Conduct scheduled specialty clinics, appropriate to community need, on a regular basis, via telemedicine; 3) Provide specialty physician consultations on demand, via telemedicine, specific to individual patient or provider needs; and 4) Provide emergent medical and mental health consultations on request.
Evaluation: Quantify the impact of telemedicine services on the local retention of patients who otherwise would have been referred out of the community. After each telemedicine interaction, the local health care provider will determine whether the telemedicine service alleviated the need for referral out of the community.

Goal: To decrease overall costs to rural residents for accessing and using primary, secondary and tertiary health care services, including providing 24 hour emergency care services.
Objectives: 1) Provide access to higher level of care in the rural community than otherwise is available; 2) Provide a greater expedience in accessing the appropriate level of care for new and pre-existing morbidities; 3) Demonstrate savings in patient's time and travel expense by using telemedicine services.
Evaluation: Based upon scheduled clinics and consultations provided via telemedicine, document what medical services were provided in rural communities that otherwise would not have been provided. Estimate for each patient receiving services via telemedicine, the time required to access the appropriate level of care via telemedicine, versus if travel or referral were required. Estimate and log travel time, mileage, and expense that would have been incurred to gain the same level of care had telemedicine services not been available.

Goal: To positively impact the financial well-being of rural communities by improving local retention of health care revenues.
Objectives: 1) Monitor telemedicine interactions for local retention or referral of patients as a result of a telemedicine consult; 2) Identify those patients who were clearly retained in the rural community as a result of a telemedicine interaction; 3) For each rural site, document the specific revenue generating services which were provided locally, rather than elsewhere, as a result of a telemedicine interaction; and 4) Compile site specific data which demonstrates the total revenue retained in the rural communities which can be attributed to telemedicine services.
Evaluation: For each inpatient retained, record the amount of revenue generated by that patient's in-hospital stay. For each outpatient, record the revenue generated in the physician office for all services delivered pertaining to the complaint that generated the telemedicine consultation. Quantify the financial value of care provided to patients retained in the rural community as a result of a telemedicine consult.

Goal: To improve medical and mental health care professionals' personal and professional satisfaction with rural practices and thereby their recruitment and retention.
Objectives: 1) Provide specialist services, via telemedicine, enhancing scope of services delivered by local providers; 2) Enhance level of communication between isolated rural providers and urban colleagues; 3) Increase access to continuing medical education offerings.
Evaluation: Survey providers who have participated in telemedicine interactions, (direct care, consultation or continuing education), for their level of satisfaction with the services provided and whether or not they believe telemedicine contributed to their professional satisfaction.

(5) **Goal:** To develop a telemedicine system design and configuration for rural needs and usage.
Objectives: 1) Place TIP unit at Pryor Clinic for clinical applications and consultative referrals to Saint Vincent Hospital and IHS Crow Agency Hospital; 2) Document data gathered as a result of TIP unit use to determine types of consults conducted and medical information gathered; 3) Propose changes to TIP configuration to meet the "needs based" applications of rural frontier communities regarding telemedicine applications.
Evaluation: Evaluate results of TIP unit usage. Determine level of use diagnostically by both the referring provider and the consulting physician, as well as the appropriateness of the data gathered by the TIP. Make recommendations to KRUG Life Sciences for changes in system configuration to meet the "needs based" criteria of rural frontier communities.

2. Project Feasibility

The ability to connect to other Telemedicine Networks is a critical issue for the PHTN. The majority of Telemedicine Networks operating today are compressed videoconferencing systems. The equipment used in the PHTN is from CLI Corporation. The CLI mediaconferencing systems meet the minimum standard set by business and education and include: video conferencing; audioconferencing and document conferencing. CLI's equipment is standards compliant, with higher speed proprietary algorithms. Although current standards meet the basic needs for business and education, realistic high speed standards for telemedicine applications have not been proposed. Physicians are displeased with transmission at 384kbps rates, but will work with transmission speeds at 768kbps. For telemedicine standards, we propose to set a minimum rate standard at the Pryor clinic at 768kbps. One proposed outcome of this project is to develop and propose transmission standards and guidelines for telemedicine applications.

The TIP unit, which will be placed at Pryor Clinic, incorporates a CLI Codec and will have a transmission speed of 768kbps. The TIP is a small, portable, medical diagnostic system developed by KRUG Life Science for NASA's Johnson Space Center. It allows medical personnel to see, listen to, and examine many bodily systems (skin, eyes, ears, heart, lungs, bowel). It can store and transmit the information quickly without sacrificing significant information quality.

The PHTN was developed after thorough research into the delivery of telemedicine services by project staff, and as the result of a comprehensive Telecommunications Needs Assessment conducted by Interwest Consulting. The survey consisted of two phases :1) interviews with staff and physicians at Saint Vincent Hospital and 2) focus groups with stakeholders at the hospital in Crow Agency. The study concluded that there was interest in pursuing telemedicine in several areas including radiology, pathology, linkage of rural emergency departments to the emergency department, scheduled physician consultations involving physicians and patients, geriatric assessment, cardiac rehabilitation and exercise programs and transmission of medical data, such as fetal heart rates, EKG's, and other medical information. In addition, follow-up focus groups have been conducted with Crow Indian Hospital medical staff and the Pryor Clinic RN and staff. (Please see attached resumes' and job descriptions)

Through research and discussion with operational telemedicine network staff, we found that the systems currently in use are based on videoteleconferencing platforms and technology designed

for education and business uses. Within the last year, a few systems have been developed specifically for telemedicine, (Teledoc unit from NEC and the FRED unit from VTEL), but we are not convinced that these units were developed by system engineers with detailed input from the medical users and providers. We suspect they were built with a speculative notion about the needs of the medical community. Informal surveys indicate that some of the networks using these systems are not finding them adequately fulfilling their needs. In addition, no unit has been designed specifically to meet the needs of rural and frontier communities.

3. Community Involvement

Each participating site in the PHTN, including IHS Crow Agency Hospital, Pryor Clinic, Saint James Hospital, NASA/KRUG Life Sciences, and TIE Communications, and CLI Inc., have participated in the design, planning, and proposed implementation of the PHTN. In August of 1996, demonstrations using the TIP unit and CLI systems interacting with Saint Vincent Hospital and Crow Agency Hospital were conducted. Discussion ensued regarding partnering these entities to design a telemedicine package that is user friendly, easily mobile, and can meet the needs of rural frontier communities and space flight. The patients benefit because they will receive quality health care in their home town rather than traveling hundreds of miles to access services. The PHTN benefits because the rural frontier communities will receive telemedicine services via a small, user friendly product designed specifically for telemedicine applications. TIE Communications and CLI benefit because they have the opportunity to design and configure a "needs based" videoconferencing system with telemedicine applications in mind. NASA/KRUG benefit from having systems tested in a terrestrial application which potentially will have high volume use -- something they cannot test adequately during space flight.

A Telemedicine Advisory Council (TAC) has been created to contribute to applications development and to address practice and policy issues. This group was instrumental in the development of the Telemedicine strategic plan. This plan is being used as a demonstration tool for the Sisters of Charity of Leavenworth as they plan a corporate telemedicine structure. They plan on using the PHTN as a test bed for educational purposes for other sites that are planning on building a telemedicine system to serve patients. The TAC will be expanded to include representatives from Saint Vincent Hospital, Saint James Hospital, Crow Agency Hospital and Pryor Clinic. In addition, higher education facilities, community businesses and Tribal Leaders with both the Crow and Cheyenne Indian Nations will be invited to participate in the TAC.

Montana State University in Billings has indicated an interest in using the system to provide upper level graduate courses and medical courses to communities on the network. Community businesses have expressed an interest in using the system for conducting business meetings between their Billings offices, branch offices and corporate offices in larger cities such as Seattle, Minneapolis and Washington D.C. Since the system is designed with an open architecture and is standards compliant, all of these scenarios are possible through the PHTN, which enhances project sustainability after the grant period. The PHTN will also coordinate activities with the Montana Healthcare Telecommunications Alliance (MHTA). This alliance is composed of the directors of all of the telemedicine networks in Montana. Cross network medical consultations can be accessed through the MHTA and education programs for PHTN can be organized and accessed through the MHTA .

Although many outside applications are possible with the configuration of this telemedicine system, we remain focused on the beneficiaries of the development of this system. Medical consults in the specialties such as dermatology, orthopedics, psychiatry, internal medicine, gastroenterology, neurology, neurosurgery, pediatrics and radiology will be available over this system. Many other specialties and subspecialties will be available to the rural frontier communities with the implementation of this system.

Courses

Directly related to medical care, other benefits include bringing preventive health care courses offered in Billings, Butte and Crow Agency to all participating sites. Other telemedicine networks in the state can access those courses, or can offer courses over the network. The Indian Health Services can access the network to provide educational components to all seven Montana Indian Reservations. [Cultural diversity training and health care services to the Native American population can be provided over the network to help the providers in Billings and other urban centers understand the cultural needs and healing practices of the Native American population.] This all can only enhance the delivery of care for all patients, not only rural patients but also urban patients who have different backgrounds from the care giver.

4. Reducing Disparities

One factor contributing to the problems of rural healthcare systems is the tendency for rural residents to leave the community for health care services. "Outmigration" occurs when patients are referred by their primary care provider (or self-refers) out of the rural community to a large urban center, due to lack of local specialist services, lack of appropriate hospital services, or because the rural resident chooses not to use local services. The economic impact of outmigration can be devastating. Vital patient care revenues are lost by the local physician and hospital. Outmigration results in decreased inpatient use of rural community hospitals, contributing to poor financial condition. Even if the primary care provider fulfills the patient's immediate needs, for every specialist consultation and every diagnostic work-up referred out of town, revenue is lost. The broader economic base of the community is undermined. Patients take grocery, clothing, pharmaceutical, and durable goods dollars with them to the urban centers. These dollars are vital to the survival of a rural community. We hope to address this factor by providing specialty services in the client's home communities through the Partners in Health Telemedicine Network.

Many factors posing difficulty in accessing medical health care in rural areas apply equally to mental health services. Mental health services in rural Montana are almost non-existent. Psychiatrists are in particularly short supply. There are no psychiatrists or child psychologists in Big Horn County. The closest reside in Billings. The Crow Reservation has contacted Saint Vincent Hospital and has requested in-service training and counseling dealing with alcohol, drug and gambling addiction for both the Crow and Cheyenne Indian Nations. Videoconferencing provides a cost effective alternative to travel for both the patient and provider. The prevalence of mental disorders in rural areas is similar to that in urban centers yet services available to rural residents are usually more limited, both in number and scope. Those services that do exist are most commonly provided by non-physician psychiatric professionals. Telemedicine has the potential to impact all of these issues.

5. Evaluation and Dissemination

Many health care providers, such as the Virginia Mason Medical Center and the University of Minnesota have expressed an interest in this project. They too, are interested in the development of a telemedicine tool for rural, frontier communities. They will provide invaluable information and insight for the partners in this project. They have been invited to participate in the teleconferences with PHTN, NASA/KRUG, and TIE/CLI. (Please see letters of support).

The PHTN will develop a comprehensive data collection mechanism. Each partner has a different focus for evaluation, and those foci will be identified and incorporated into the comprehensive evaluation specifically designed for the project. KRUG Life Sciences have designed an evaluation tool for the TIP unit which will help determine the success of the unit. An evaluative relationship, developed with NASA/KRUG, TIE/CLI and PHTN, will meet the needs of each of the partners in the project. Evaluation consultants will be used to help determine the success of the project, and the outcomes analysis of the PHTN. If those resources are available through the partners, they will be used for the evaluation component. If not, outside experts in the telemedicine field will be solicited to assist in the development of the evaluation component and in data interpretation.

PHTN will develop reports in several formats dependent upon the perspective or data requested. Each conference conducted over the network will be assigned an ID number. All data collected on each conference will be linked to that number. The tools used to collect the data will include end user surveys (one each for providers, patients, conference participants, and conference originators), a remote site log sheet, and a master log sheet. The project coordinators will collect the necessary data as telemedicine and videoconferences occur.

As part of the evaluation process, a survey will be developed to identify current perceptions of telemedicine by providers who have not had prior introduction to this technology. Data gathered by this survey should reveal valuable information regarding perceived barriers to use. Barriers identified in the survey will be acknowledged and activities will be planned to address them. The provider survey, administered at the beginning, middle and end of the grant performance period, will monitor the project's success in overcoming those barriers.

The evaluation tool will have questions regarding the relationship between the RN and the supervising Physicians. For consultations that involve an RN and a telemedicine consultant, an additional component of the evaluation tool will include questions regarding whether the telemedicine consulting physician was a primary or alternate supervisor of the RN. If neither, additional questions will determine if the RN's supervising physician was consulted in any manner before the telemedicine consultation was sought and the outcome of the supervisor's consultation. This information will help determine if the relationship between the RN and the supervising Physician has benefited from the use of a telemedicine system.

Project staff will track start up costs, operating costs, equipment costs, etc. Knowledge gained and lessons learned will be disseminated by project partners and other health service organizations who have been consulted with and instrumental in the development and deployment of this project. This data will be compiled into a final report at the end of the grant.