# Telemedicine & Telehealth Projects

# Serving Indian Health Service & Tribes

**Prepared by:**

Paulette C. Hansen
Steven B. Starosto

American Indian Information Network
7010 Phoenix Avenue NE, #215
Albuquerque, NM 87110

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*IHS Area Information Systems & Biomedical Staff*
- Dale Armstrong, Tucson Area Office
- Bob Beneke, Aberdeen Area Office
- Janet Bergemann, Sacramento Area Office
- Keith Creiglow, Alaskan Native Medical Center
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*IHS Service Unit & Tribal Staff*
- Margaret Alspaugh, MD, Clinical Director for Red Bluff &Greenville

- Bonnie Baxster, Chief Technologist, Imaging Department, Warm Springs Service Unit
- Tom Birdinground, Director, Neah Bay Service Unit
- Richard Cordes, Health Director, Alabama Coushatta Tribe of Texas
- Tina Dowman, Health Director, Passamaquoddy Pleasant Point
- Chris Devlin, Executive Director, East Aleutian Tribes, Inc.
- Lt. Tom Duran, CIO, Northern Navajo Medical Center
- Roberta Cahill, Community Health Coordinator, Fort Thompson Health Center
- Todd Gallardo, Interim Director, Telemedicine & Telehealth, Round Valley Health Center
- Patti Faller, RN, Fort Peck Tribal Dialysis Unit
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# Executive Summary

This study presents the findings of the American Indian Information Network's effort to identify and inventory telemedicine and telehealth use within Indian Health Service (IHS) and tribal clinics. Emphasis is placed on programs funded outside of IHS by other federal agencies or other entities. Known internal IHS projects are also documented. See Chapter 4 for area office summaries and project descriptions.

## A. Overview of the Indian Health Service

The Indian Health Service (IHS) is an agency within the U.S. Department of Health and Human Services and is responsible for providing federal health services to American Indian and Alaskan Natives. As the principal federal health care provider and health advocate, the agency serves approximately 1.5 million natives residing on more than 550 federally recognized tribes in 35 states.

On August 18, 2000, President Clinton signed H.R. 1167, the Tribal Self-Governance Amendment of 2000. The Amendment gives federally recognized tribes greater flexibility to administer federally funded Indian health care programs established for their benefit.

Tribes have been able to assume some control over the management of health care services since 1975 when Congress enacted the Indian Self-Determination and Education Assistance Act, PL 93-683. This right was expanded in 1992, under the Tribal Self-Governance Demonstration Project which simplified the self-determination contracting and compact processes and facilitated the transfer of agency programs and to tribal governments. Since 1992, the agency has signed 44 compacts.

By 2000, almost 44 percent ($1.06 billion) of the IHS appropriated budget is allocated to tribally managed programs through compacts and contracts. Tribes now manage 13 hospitals, 158 health centers, 160 Alaskan village clinics, 76 health stations, and 28 residential treatment centers.

Unless otherwise provided, federal agencies did not qualify for grant programs operated by another agency. As such, the only way Indian Health Service can benefit from a federal telemedicine / Telehealth grant is for the grant recipient to be a tribal entity or when a third party names IHS as an end-user site. An example, is when University of Arizona applied for two Rural Utilities Service grants to set-up telecom and equipment for remote consultations at the new Hopi Indian Health Center and the Whiteriver PHS Indian Hospital.

## B. Summary of Findings

The projects reviewed covered a wide range of telemedicine applications. As shown below, usage ranged from dermatology to child sexual abuse.

Child Sexual Abuse, Cardiology, Dentistry, Dermatology, Home Care, Mental Health, Neurology, Nephrology, Obstetrics, Oncology, Ophthalmology, Orthopedics, Pharmacy,

Pediatrics, Physical Therapy, Psychiatry and Psychology, Pulmonary. Rheumatology, Surgery, Wound Management.

Several IHS facilities have low telemedicine / telehealth use levels for a variety of reasons. These sites provide the agency with test sites for developing a national support team that could be deployed to encourage and support new projects.

The national team should reflect the crosscutting interests of the agency and reflect clinicians, biomedical engineers, computer information specialists, and program managers.

The national team should create model deployment concepts and protocols to support service units and tribes in the development, implementation, and suitability of new programs.

The Indian Health Service should involve tribes in the discussion on how to phase-in telemedicine / telehealth options as a safety net for self-determination and ways to cut costs. Another reason for involving tribes is that they are eligible for federal and private sector grants.

A training program could be set-up for incoming clinicians assigned to an unit using telemedicine / telehealth. A training relationship could be set-up with a university that offers the clinical the ability to see actual operations.

University settings that have telemedicine centers for training may be possible partners for training and consulting services based upon regional identity.

## C. Characteristics of Grant Recipients

Since 1994, the Rural Utilities Service, Office for the Advancement of Telehealth, Office for Rural Health Policy and the Department of Commerce Technology Opportunity Program (formerly TIIAP), have awarded ___ projects totaling $ ____ million. Of that amount, ___ projects ____ dollars were awarded for direct Indian benefit.

The projects reviewed by this project included eight tribally related health entities; six tribal health consortiums; three hospitals, ten regional telemedicine / telehealth networks, six universities, one nonprofit, two local governments and the Phoenix Indian Medical Center.

## D. Project Implementation

Most projects were implemented over a three-year time period preceded by at least one full year of planning and grant submittal. The Indian sites were mostly end-users of telemedicine / telehealth networks or services. This helped several sites become more accustom to what was expected upon equipment arrival. Staff turnover affected several projects and not all end-user sites were involved in equipment selection or understanding the full potential of equipment use.

# Chapter 1 — Introduction

Chapter One describes the major federal telemedicine / telehealth grant recipients, their relationship with IHS and tribes and commonly used terms.

## A COMMON TERMS

- **Telehealth**—refers broadly to the use of electronic communication and information technologies to provide or support a diverse group of health-related activities that may include health professionals' education, community health education, public health research, and the administration of health services.

- **Telemedicine**—refers to the use of electronic communication and information technologies to provide or support a diverse group of health-related activities that may include health professionals' education, community health education, public health research, and the administration of health services.

- **Telemedicine / Telehealth Network**—a set of functional relationships among facilities. A network usually contains a hub and at least one spoke, but may contain multiple hubs or spokes. A network can contain several different projects with distinctly separate funding sources. As a sum of all these parts, the network provides and obtains telemedicine services such as consults.

- **Primary Organization**—the organization that is involved with a telemedicine project(s) but does not provide patient or clinical care.

## B FUNDING SOURCES

### B1 Competitive Grants

For the past decade, Congress has provided continuous grant funds for telemedicine and telehealth projects which Rural America and tribal entities are eligible. Since 1994, the four agencies listed below have awarded ___ projects totaling $___ million.

- US. Department of Agriculture, Rural Utilities Service Distance Learning and Telemedicine Loan & Grant Program
- Department of Health & Human Services, Office of Rural Health Policy
- Department of Health & Human Services, Office for the Advancement of Telehealth.
- Department of Commerce, National Telecommunications Information Administration's Technology Opportunity Program (Formerly TIIAP)

Information is provided elsewhere on their grant criteria and description of specific projects that provide benefit to IHS or tribes.

The chart shows grant distribution totals by these federal agencies.

**Chart 1-1 Selected Federal Telemedicine / Telehealth Funding Fiscal Year 1994-2000**

| Agency | Number of Projects | Dollar Total |
|---|---|---|
| Department Health & Human Services, OAT/ORHP | | |
| Department of Commerce, NTIA/TOP | 43 | $18,629,246 |
| U.S. Department of Agriculture, Rural Utilities Service | 157 | $37,899,077 |
| **Grand Total** | | |

In August 1998, the Office of Rural Health Policy reorganized and a new agency called the Office for the Advancement of Telehealth assumed management of existing and future telemedicine projects. Both agencies operate under the Health Resources and Services Administration. For tabulating convenience, the project spending was combined. NTIA/TOP program formerly known as TIAPP.

## B2 National Library of Medicine Contracts

The National Library of Medicine (NLM) has funded 19 telemedicine related contracts under its High Computing Performance Computing and Communications Program. This program has three purposes: 1) to evaluate the impact of telemedicine on cost, quality, and access to health care; 2) to assess various approaches to ensure the confidentiality of health data transmitted across electronic networks; and 3) to test emerging health data standards. See agency web site — <http://www.nlm.nih.gov/research/telemedicine/html>

One NLM contract preformed by the University of Alaska implemented a telemedicine test bed project for 26 Alaskan Native villages. Community health aides for an average cost of $38, excluding medical care have forwarded over 6,000 consults. Seven remote private clinics that serve communities with native populations have been added for a total contract value of $2.8 million.

## B3 Congressional Appropriations

Currently, Congress is funding a special 3-year diabetic retinopathy program at the Phoenix Indian Medical Center and an Alaskan statewide telemedicine network that includes 193 village clinics and other federally supported sites.

The Alaskan Federal Health Care Access Network is a $30 million four year project that designs and implements a telemedicine delivery service to 235 facilities. Network members include the Alaskan Native Tribal Association/IHS, Department of Defense (Navy and Army), the Veterans Administration, and the U.S. Coast Guard. This project builds upon the NLM's project success and interest in sharing limited resources to improve health care for 210,000 federal beneficiaries. See Chapter 4 for a detailed discussion.

Congress also funds a $2.15 million diabetic retinopathy program administered by the Phoenix Indian Medical Center Eye Clinic in association with the Joslin Vision Network. IHS was selected because serves a high diabetic population and it diverse facilities could serve as a model for the Veterans Administration and Department of Defense on screening approaches. This funding is outside of the $30 million special Indian diabetic program available from the Centers for Disease Control.

## C STUDY OVERVIEW & METHODOLOGY

### C1 Study Overview

In July 2000, the IHS Department of Environmental Health and Engineering initiated a study to provide the agency an overview of telemedicine / telehealth projects undertaken by service units and area offices through internal and external resources.

This report is designed to fill critical gaps by describing projects that use telecommunications technologies to provide clinical care, distance learning, or data sharing, or to achieve service integration goals. Another information area is the extent to which contract care third party hospitals and universities with regional telemedicine networks have extended services to the agency's service units through federal grants or partnerships.

Where available, specific cost information is included on the use of outside grant dollars for telecommunications transmission costs and associated cost for purchase, lease and installation of clinical/non-clinical equipment. Information is also included on the feasibility, costs, appropriateness, and acceptability of telemedicine services and technologies.

Comments offered by the service units and other appropriate outside resources were assessed for lessons learned in how best to organize and provide telemedicine services in a sustainable manner.

### C2 Methodology

The American Indian Information Network (AIIN) collected information for this report from federal agency grant recipient listings and conducted phone interviews with grantees, IHS and tribal health facility and other program staff. On-site project visits were made to the Whiteriver Indian PHS Hospital, the Phoenix Indian Medical Center, the Alaskan Native Medical Center, the Alaskan Federal Health Care Access Network, and the Northern Navajo Medical Center. AIIN also reviewed industry, government, and tribal literature related to native telecommunications capacity, health care delivery, and telemedicine.

Project information and interviews were based upon a mix of questions related to project function and objectives, facility characteristics, project institutional arrangements, and end-user needs. Actual interviews project questions were tailored to determine if the project affected the way the organization provided services and if these changes were temporary or likely to be sustained. Most of the projects reviewed were almost completed with up to 2 years prior spent in grant writing and waiting for funding. As a result, some project experienced staff turnover

and end-users were just starting to receive their equipment due to delays in the core project components.

Collected information and observations used in the report illustrate the differences in federal grant programs had in project creation, scale and scope and what factors at the Federal level and at the local project level influenced the extent of implementation.

## C3 Report Characteristics

This report describes each grant recipient, project purpose, funding source, partners and beneficiaries and point of contact. Since most grant recipients were non-tribal or IHS affiliated, the descriptions are based upon their program with information on the relationship to Indian Country. An overall summary of the grant projects/programs is provided.

## C4 Structure of the Report

The remainder of this report provides findings from phone interviews, on-site visits, and literature. The results are organized as follows:

Chapter 2—Characteristics of Grant Recipients and Project Partners
Chapter 3—Project Characteristics
Chapter 4—Project Descriptions
Chapter 5—Summary and Conclusion

# Chapter 2 — Characteristics of Grant Recipients & Partners

This Chapter describes the organizations involved in developing and implementing telemedicine / telehealth projects. The organizations include the direct grant recipients, project partners, and end-user sites.

## A. KEY FINDINGS

The majority of federal grant recipients were organizations involved in establishing a regional telemedicine / telehealth network and represented either universities or health care provider system. Only a handful of tribal entities actually served as grant administrators themselves -- Leech Lake, Mille Lacs Band of Ojbwe, Rocky Boy Health Board, Cazabon Band of Mission Indians, Northwest Portland Area Indian Health Board, Oglala Sioux Tribe, Choctaw Nation Health Services Authority, and the Round Valley Health Center. Two Indian community colleges -- Salish & Kootenai and Tohono O'odham -- received telecom infrastructure grant support to offer medical education related courses. Six Alaskan entities representing native health corporations, tribal consortiums, or community partners received $1.6 million for basic telecom hardware and equipment infrastructure to improve community access.

## B. Eligible Project Organizations

By Federal law only state, local, tribal governments, universities and colleges, and nonprofits are eligible to apply for the telemedicine / telehealth grants. Federal agencies have approved grants where Indian Health Service hospital or clinic was identified as an end-user project site. As end-users, service units have received grant-funded equipment, telecom connections, and in some case no or reduced monthly recurring telecom costs.

## B1 Types of Organizations Receiving Grants

This section shows the distribution of 39 government grants by the amount and type of organization responsible for administration. Indirect Indian beneficiaries are shown in Italics below the grantee's name.

**Tribal Government Entities**

- Alamo Navajo School Board
- Cabazon Band of Mission Indians
- Choctaw Nation Health Services Authority
- Leech Lake Tribal Government
- Mille Lacs Band of Ojibwe Health and Human Services
- Rocky Boy Health Board, Chippewa Cree Tribe
- Round Valley Indian Health Center
- Oglala Sioux Tribe CHR Program

**Tribal Health Consortiums**

- Bristol Bay Area Health
- Council of Athabascan Tribal Governments
- East Aleutian Tribes Inc.
- Northwest Portland Area Indian Health Board
  *Couer d'Alene Tribe, Grande Round Tribe, Lummi Nation, Samish Tribe, Shoshone-Bannock Tribes, Swinomish Tribe, Port Gamble Tribe and Quinault Nation*
- Norton Sound Health Consortiums
- Tanana Chiefs Conference, Inc.

**Hospital/Clinics**

- Clallam County Hospital District 1
  *Neah Bay Service Unit and Quileute Health Center*
- McKennan Health Services
  *Pine Ridge PHS Indian Hospital, Rosebud PHS Indian Hospital and Sisseston PHS Indian Hospital*
- St. Vincents Hospital
  *Crow Agency PHS Indian Hospital and Lame Deer PHS Indian Hospital*

**Telemedicine / Telehealth Networks**

- Alaskan Federal Health Care Access Network
  *194 tribal health sites*
- Albuquerque High Performance Computing Network (Education/Research)
  *Northern Navajo Medical Center*
- Dakota Health Network, Avera St. Luke's
  *Sisseston PHS Indian Hospital*
- Dakota Telemedicine Network (Medcenter One)
  *Fort Yates PHS Indian Hospital*
- DownEast Telemedicine Network
  *Aroostock Band of Micmac and Houlton Band of Maliseet*
- Mountain Plains Health Consortium
  *Aberdeen Area Tribes (except Tama, Iowa) and the Morning Star Manor, Fort Washakie, Wind River*
- Northeast Telemedicine Network
  *Passamaquoddy Indian Township and Passamaquoddy Pleasant Point*
- Northland Health Care Alliance (TeleCare Network)
  *Eagle Butte Family Health Center and West River Health Center*
- Tele-Network for Chronic Pain Management
  *Neah Bay Service Unit and Quileute Health Center*
- Upper Peninsula Telehealth Care Network & Marquette General Health System
  *Bay Mills Health Center and Sault Ste. Marie Health & Human Services*

**Universities and Colleges**

- Salish & Kootenai Community College
- Tohono O'Odham Community College

- University of Alaska
  *26 native village clinics and seven private clinics serving native populations*
- University of Arizona
  *Hopi Health Care Center, Whiteriver PHS Indian Hospital*
  *The State of Arizona provided equipment, telecom connections and recurring telecom costs for the IHS Tuba City Medical Center, Navajo Nation Sage Memorial Hospital at Ganado.*
- University of New Mexico
  *Northern Navajo Medical Center*
- University of South Dakota
  *Wagner PHS Indian Hospital and a Native American Boarding School*

**Other**

- Aleutians East Borough School District
  *Six East Aleutian villages*
- California Telemedicine and Telehealth Center
  *Up to 18 California Tribes*
- City of Galena, Yukon Koyukuk
- North Dakota Hospital Research and Education Foundation
- North Idaho School Education Program
- Phoenix Indian Medical Center
  *Phoenix Indian Medical Center, Eye Clinic, Sells Indian PHS Indian Hospital and a third site to be named*

### B2 IHS &Tribal Project Partners

This section describes entities that administered grants that directly interfaced with Indian Health Service or tribally operated programs.

**The Arizona Telemedicine Program** is a multidisciplinary clinical program of the University of Arizona Health Sciences Center. The program was created in July 1996 by the State Legislature under a special appropriation for eight sites that included the Tuba City Medical Center and the Navajo Nation Sage Memorial Hospital in Ganado. The Whiteriver IHS Indian Hospital and the new Hopi Health Center were added through Rural Utilities Service grants obtained by the University of Arizona. Other network additions are the Flagstaff Medical Center and the Northern Arizona Behavioral Health Authority. The program utilizes a state of art Asynchronous Transfer Mode (ATM) network with switches in Flagstaff, Phoenix, and Tucson. The sites have T1 connections via a dedicated VPN (Virtual Private Network) from the University of Arizona Medical Center. A new effort called Project Nightingale will interconnect this network with other health care networks in the state.

**California Telehealth & Telemedicine Center** will manage a new grant for up to 18 tribes for diabetic retinopathy screening programs. Tribal participation is based on successful competition with awards by February 2000. The supporting medical provider is the Los Angles Eye Institute. The California Rural Indian Health Board is providing assistance to the Center on outreach and selecting an advisory board.

**Clallam County Hospital District 1 (dba Forks Community Hospital)** developed a telemedicine network consisting of eight mental health providers in nothernmost Washington State. The project focuses on mental health and chemical dependency treatments, and HIV counseling. Quileute Health Center and Neah Bay Service Units are remote sites.

**Dakota Health Network, Avera St. Luke's Hospital, Aberdeen** operates a 13-site Telehealth program in Northeastern South Dakota and Southeastern North Dakota for medical education and offers telemedicine consultation services in mental health, cardiology, pulmology, orthopedics, pediatrics, trauma, dermatology, post-operative care, wound care, and counseling for nutrition and diabetes. The Sisseston Indian PHS Hospital is an end-user site.

**Dakota Telemedicine Network** is operated from Medcenter One a large regional hospital located in Bismarck, North Dakota. The network includes twelve sites including the Fargo VA Medical Center and offers 270 medical specialties. The Fort Yates PHS Indian Hospital is a member. Medcenter One also provides Fort Yates on-site health care professional treatment such as nephrology.

**DownEast Telemedicine Network** connects 15 Washington and Aroostoock County medical and mental health facilities home care agencies near Bangor, Maine. Its members represent all health, home care, and schools entities within these two counties. The Passamaquoddy Pleasant Point and Indian Township health clinics are members.

**McKennan Health Service** is part of the McKennan Hospital system based in Sioux Falls, South Dakota with over 100 affiliated hospitals and clinics in Eastern South Dakota and surrounding states. McKenna manages an obstetrical care access project for IHS hospitals at Sisseston, Pine Ridge, and Rosebud.

**Mountain Plains Health Consortium** operates from the Fort Meade Veterans Medical Center in South Dakota. The consortium has an interagency agreement with the Aberdeen Indian Health Service's Black Hills Training Center for distance education and on-site training. The consortium serves the Aberdeen Area, except Tama, Iowa, and a Wind River tribal facility.

**Northeast Telemedicine Network** operates from the same regional medical center as the DownEast Telemedicine Network. The Northeast Telemedicine Network concentrates on continuing education for health care staff and facilitating communication between home care agencies and health care providers. The network provides 24-hour monitoring home care patients by providing triage nurse availability as well as in-home telemedicine monitoring. Telemedicine application emphasis is placed on pulmonary, wound care management, and mental health. The main network providers are the Visiting Nurses Association and the Sunrise Health Care Coalition. A new outreach mental health program will be phased-in under a new $600,000, 3-year program. The Aroostock Band of Micmac and Houlton Band of Maliseet are network members. The Passamaquoddy Pleasant Point receives services under a contract.

**Northland Health Care Alliance** operates the TeleCare Network in association with the St.. Alexius Hospital in Bismarck, North Dakota. The TeleCare Network includes 12 hospitals, four

long-term nursing homes and four South Dakota satellite clinics that includes the Eagle Butte Family Health Center and West River Health Center. The Eagle Butte site is inactive.

**North Idaho School Education Program** is a local nursing service cooperative associated with five regional healthcare providers. The program develops age-appropriate health promotion curricula for delivery in part, through interactive video and broad bandwidth telecommunications technologies. Children from the Kootenai and Coeur d' Alene tribe receive benefits.

**REACH - Realizing Education and Community Health** is operated by Benefis Healthcare (formerly Deacones Medical) as a telemedicine network for specialty services and physician consultations. Emphasis is placed on expanding the level of obstetrical, geriatric and mental/addiction services and continuing education for physicians, lab technicians, X-ray technicians, physical therapists, registered and licensed practical nurses, medical records personnel, EMTs, and administrators. The Rocky Boy Health Board is a member.

**St. Vincent's Hospital** in Billings, Montana, managed a NASA technology transfer to the Lame Deer PHS Indian Hospital. The project uses a rugged portable diagnostic system for gathering vital statistics on home bound diabetic patients. Crow Agency was the original site, but withdrew when it learned the equipment was unsuitable for ambulance use. Lame Deer and Crow both received videoconferencing equipment, and telecom upgrades. Lame Deer and the Billings Area Office also received staff support costs.

**University of Alaska** received a National Library of Medicine contract to rollout basic telemedicine service to 26 native villages as a test pilot for a statewide strategy. A contract amendment extends service to seven remote private clinics that serve the general and native populations were added.

**University of New Mexico** operates a telemedicine network from the School of Medicine. It also has an arrangement with the Albuquerque High Performance Computing Center's Education and Research Center which is co-located at UNM. The AHPCC uses advanced Internet-based systems and high performance computing to enhance education, training, patient care management and problem solving in collaboration with students, and healthcare providers at dispersed locations. The Northern Navajo Medical Center is a partner for both the Telemedicine Network and AHPCC.

**Upper Peninsula Telehealth Care Network and Marquette General Health System** operates a continuing medical education program for 13 hospitals, three rural health clinics, a medical center, and two tribal health centers. Telemedicine applications include psychiatry, surgical follow-up for pediatric and cardiothoracic patients, neontal discharge planning, pediatric learning assessments, and dermatology. The videoconferencing network is also used for health care administration and is open to community groups and businesses. The Bay Mills Indian Community and Sault Ste. Marie Health and Human Services are members.

## B3 Discontinued or Inactive Programs

Seven federal grant projects were completed with no additional service or the grant withdrawn. One project was cancelled because the grant was inadvertently awarded to a federal agency. Another was declined due to inability to obtain IHS support for recurring telecom costs. One IHS service unit discontinued use of a regional telemedicine network.

- **The Alamo Navajo School Board, Inc** declined a FY 1997 grant for $133,280 from the Department of Commerce. The School Board failed to attract a commitment from the IHS area or regional office for recurring T-1 telecom costs. Unnecessary expenditures were avoided because the grant coordinator understood that the telecom connection and support payment needed to be resolved before ordering equipment.

- **Eagle Butte Family Health Center** discontinued use of a grant-provided telemedicine service by St. Alexius Medical Center's affiliated TeleCare Network. The $65,000 TeleCare Network uses a NEC TeleDoc™ 5000 unit that is a fully integrated self-contained, portable telemedicine device providing two-way interactive video and audio. Twenty specialties including cardiology, orthopedics, dermatology, emergency medicine, neurology, obstetrics, mental health, pediatrics, and wound management as well as telehealth services are also provided. Discontinued use is attributed to high patient loads and small facility size. TeleCare received approximately $600,000 from the ORHP, FY 1997-99. Another $720,000 was awarded by the Office for the Advancement of Telehealth for FY 2000-02.

- **North Dakota Hospital Research and Education Foundation**—Two Indian organizations participated in distance education project to address the shortage in licensed practical nursing. The Cankdeska Cikana Community College and the Recruitment/Retention of American Indians in Nursing (RAIN) Program at the University of North Dakota assisted the Foundation in supporting Indian students from the Turtle Mountain Band of Chippewa and Spirit Lake Sioux. The program graduated five Indian students. The project also identified community partnership strategies to establish effective distance learning project. The tips are available in a "how to" manual prepared for the Office of Rural Health Policy. The grant amount was $384,128 for FY 1997-98.

- **North Idaho School Education Program**—American Indian children from the Kootenai and Coeur d'Alene Tribes joined other school children in a five county area to received health educational training from the North Idaho School of Nursing Services Cooperative. The project provided disease prevention and health promotion education to more than 29,600 school-age children. The Office of Rural Health Policy grant of $399,186 for FY 1997-1999 funded the distance education project. Participating school districts may continue the program at their own cost.

- **Sells PHS Indian Hospital**—This Indian Health Service hospital applied and received a Rural Utilities Service grant of $280,900 for FY 1999 for a teleradiology program. The grant was rescinded because Sells is a federally operated facility.

- **Tele-Network for Chronic Pain Management**—The Quileute Health Center, Neab Bay Service Unit and their referral hospital, Clallam County Hospital District 1 participated in a project for chronic pain management with the Seattle-based Virginia Mason Medical Center. The entire project only attracted 25 patients. Clallam received a separate federal grant that includes the same two tribes. The Department of Commerce in FY 1996 funded the chronic pain management project for $474,499.

- **Child Psychiatry Services**—The University of South Dakota School of Medicine delivered two-way interactive child counseling services between a child psychiatrist and students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD. The grant funded a two-way interactive link between the McKennan Hospital University Medical Center in Sioux Falls, South Dakota, and the IHS Wagner Health Center and a Native American Boarding School. Medicaid paid for consults. The project used a 56 switched line with VTEL interactive video technology. A FY 1997 Department of Commerce grant of $54,880 was used towards a total project cost of $110,397 over 24 months. This project was discontinued when the child psychiatrist moved.

### B4 IHS Internal Projects

The Indian Health Service has several internally managed telemedicine / telehealth programs. These projects result from individual provider or area office interest in improving local service. The Navajo and Alaska Area Offices have a multi-facility teleradiology program. The Portland Warm Springs Service Unit operates a limited teleradiology program from a dedicated line. The Navajo Area Office is planning a mobile mammography program based in Tuba City. The Carl Albert Indian Hospital moved from a beta test site to a full clinical operation for diabetic retinopathy screening. A similar program using a different equipment approach is operated by the Phoenix Indian Medical Center. Congress funds this program in association with the Joslin Vision Network. In Alaska, a Dillingham optometrist also uses remote experts for a small number of diabetic retinopathy cases. Fourteen HIS service units will receive colposcopes and accessories and training for child sexual abuse with remote consultation capability. Monthly Grand Rounds and one-week percetorships at the University of Southern California are also available. The project is funded through an interagency agreement between HIS and the Department of Justice, IHS received equipment and training funds for 14 service units in child sexual abuse examinations and treatment. The existing program at the Fort Duchense Indian Health Center is helping the national office coordinate the effort.

## C FACTORS INFLUENCING THE EXTENT OF SUCCESS

Both IHS and tribal facilities tended to under use the telemedicine / telehealth system offerings. Several key factors emerged that contribute to successful project.

### C1 Commonly Shared Goals

The projects examined in this report shared common goals and objectives in overcoming barriers of geographic, remote and small populations and limited telecommunication capacity. Commonly shared elements are:

- Targeted Health Professional Shortage Areas Medical Underserved Areas
- Formed regional strategy to overcome weak telecommunications infrastructure
- Improved patient care by through remote expert consultation
- Increased provider retention by reducing isolation through outside professional support and continuing education
- Reduced less time between diagnose and delivery of services
- Expanded opportunities for training and continuing education of rural medical professionals
- Provided education and medical information in a community-wide setting
- Achieved major cost reduction in operation and future cost-savings
- Developed a regional marketplace niche
- Tested new equipment for a more cost-effective rural community healthcare solution
- Required filing for Rural Healthcare Services universal service discount program.

### C2 Contributions of Partner Organizations

The partner organizations were in many cases necessary to the planning, implementation and sustainability of the projects. The organizations in varying degrees provided the following services:

- Business Case Use Model
- Critical mass to organize limited resources in health professional shortage areas
- Direct cash or in-kind services for grant matches
- In-kind staff, equipment and supplies
- Personnel for planning and implementation
- Telecommunication acquisition services
- Grant administration
- Organizational criteria for grant eligibility for IHS end-user sites
- Other institutional arrangements that helped project

## D Internet Telemedicine / Telehealth Resources

The Internet contains many valuable resources on the technology use and application, trends, databases of projects and funding. Below is a sample of well-known sites:

### D1 Associations / Non-profit / Federal Resource Centers

- **American Telemedicine Association** (ATA) is the leading resource and advocate promoting greater access to medical care for consumers and health professionals via telecommunications technology. ATA seeks to bring together diverse groups from traditional medicine, Internet online firms, academic medical centers, technology and telecommunications companies, e-health sites, medical societies, government and others in order to resolve barriers to the advancement of telemedicine through the professional, ethical and equitable improvement in health care delivery. <http://www.atmeda.org/index.htm>

- **Telemedicine Information Exchange** (TIE) is a comprehensive, international, quality-filtered resource for information about telemedicine and telemedicine-related activities. <http://tie.telemed.org>

- **The Telemedicine Research Center** (TRC) is dedicated to telemedicine research, education, and the creation, management, and dissemination of information about telemedicine and telemedicine-related activities. <http://trc.telemed.org>

- **The Association of Telehealth Service Providers** (ATSP) is an international membership-based organization dedicated to improving health care through growth in the telehealth industry. <http://www.atsp.org/about/homepage.asp>

- **The Rural Policy Research Institute** (RUPRI) conducts policy-relevant research to assist policymakers and citizens in understanding the rural impacts of public policies and programs The Institute's Rural Telecommunications Panel conducts and synthesizes research on federal and state telecommunications policy and the effect of that policy on infrastructure development and rural access. <http://www.rupri.org>

- **The Rural Information Center Health Services** (RICHS) is a joint project of the Office of Rural Health Policy (ORPH), Department of Health & Human Services, and the National Agricultural Library (NAL), United States Department of Agriculture. Operating as part of NAL's Information Center, RICHS collects and disseminates information on rural health issues. http://wwww/nal.usda.gov/tic/richs

- **The Department of Defense** sponsors a Telemedicine Research Lab that covers current issues and policies in the telemedicine arena. <http://www.matmo.org/>

### D2 Legal Issues and Consulting

- **Arent & Fox,** based in Washington-DC, is widely published in both law journals and trade magazines and has a well-known web site on electronic healthcare and telemedicine law. <http://arentfox.com/quickGuide/businessLines/e-health/e-health_telemed/e-health_telemed.htm>

### D3 Industry Magazines

- ***Telemedicine Today*** is an international publication for distance health care, provider information on technology, telecommunications, teleradiology, home health, and video conferencing. Web site address: <http://www.telemedtoday.com>

- ***Telehealth Magazine*** focuses on the implementation and management of medical communications technologies and related information networks. Web site address: http://www.telehealthmag.com/

### D4 Government Report

- A newly published joint report from the USDA Rural Utilities Service and the USDC National Telecommunications Information Infrastructure (NTIA) is available free online. *Advanced Telecommunications in Rural America: The Challenge of Bringing Broadband Services to All Americans.* Ten U.S. Senators requested this report on the evaluation of broadband deployment in rural versus non-rural areas and the effects of the Telecommunications Act of 1996 on that process. It is available in PDF file from either agency. Web site addresses: <http://www.usda.gov/rus/telecom/telecomact/act.htm> <http://www.digitaldivide.gov/reports.htm.>

### D5 Universities

- **The East Carolina University School of Medicine** began conducting telemedicine consultations in 1992 and to date have completed over 3,000 consultations in 34 different specialties over its REACH-TV Network. < http://www.telemed.ecu.edu/>

- **Texas Tech University** is recognized as a developing pioneer in applying live interactive video in the practice of medicine and remains actively involved in the daily practice of telemedicine with numerous clinics, on-going telemedicine research, development and training projects. http://www.ttuhsc.edu/telemedicine

- **The University of California at Davis** operates a Regional Outreach and Telehealth component as part of its telemedicine health system program. The web site has links to telemedicine, applied medical informatics, a telemedicine learning center and it community hospital network. <http://telemedicine.ucdmc.ucdavis.edu>

## E FEDERAL AGENCIES & GRANT PROGRAMS

### E1 Office for the Advancement of Telehealth (OAT)

OAT administers its own rural telemedicine grants as well as those that were awarded by the Office of Rural Health Policy before August 1998. OAT program objectives are to demonstrate how telemedicine can be used as a tool in developing integrated systems of health care, thereby improving access to health services for rural residents; and to evaluate the feasibility, costs, appropriateness, and acceptability of rural telemedicine services and technologies. <http://telehealth.hrsa.gov>

*Applicant Network Participation Requirements:* **Applicants** must be a multi-specialty entity (e.g., hub) located in an urban or rural area that can provide 24-hour access to a minimum range of specialty health care services (see below). For the purpose of this grant program, a multi-specialty entity may be a tertiary care hospital, a multi-specialty clinic, or a collection of facilities that, combined, could provide 24-hour specialty consultations. Applicants should have at least two rural health facilities (e.g., spokes), which may include small rural health facilities

(fewer than 100 staffed beds), rural physician offices, rural health clinics, rural community health centers, or rural nursing homes.

*Clinical Network Service Requirements:* Applicants must provide a minimum of seven clinical telemedicine services over the network, one of which must be used to stabilize patients in emergency situations. Not all services need to be provided to all sites. The applicant and its network members must select the other six services to be provided. These services must be based on the documented needs of communities to be served. In addition to emergency stabilization services, at least two of the grant-funded services provided by the telemedicine network must include consultant services of physician specialists. All services provided with funding from this grant program must be available from the multi-specialty entity on a 24-hour basis unless there is strong justification for more limited availability. An entity is considered capable of providing 24-hour specialty consultations if it has specialists on call.

*Permissible Use of Grant Funds:* Operating costs of the telemedicine system, including compensation for consulting and referring practitioners. Transmission costs and clinician compensation payments; costs incurred in rural communities, including rural staff salaries and equipment maintenance; and equipment placed in rural communities, regardless of where purchased (50% or more of grant award must be spent in these combined areas) Equipment for clinical services and to serve a variety of nonclinical purposes, including didactic education, administrative meetings, etc. Grant dollars may not be used to support didactic distance education activities. Transmission costs such as the cost of satellite time or the use of phone lines. However, those applicants who anticipate high transmission rates for all or some of their sites should consider activities to achieve more sustainable rates.

*Clinical compensation payments* up to a maximum of $60 per practitioner per consult. If a third payer, including Medicaid or Medicare, can be billed for a consult, the grantee may not provide the practitioner with an OAT/ORHP-funded compensation payment.

E*quipment* purchase, lease, or installation inside the health care facility for providing telemedicine services, such as codecs, cameras, monitors, computers, multiplexers, etc. (No more than 40 percent of the total grant award may be used for this purpose each year.)

*Statutory Funding Preferences for* Networks: Networks with the majority of health care providers serving in the rural areas or regions within their service areas. Any federally qualified health centers, rural health clinics, and local public health departments serving in the rural area or region. Outpatient mental health providers serving in the rural area or region. Appropriate social service providers (e.g., agencies on aging, school systems and providers under the Women, Infants, and Children [WIC] program to improve access to and coordination of health care services).

## E2 Office of Rural Health Policy (ORHP)

ORHP is the former agency that administered rural telemedicine projects prior to the formation of the Office for the Advancement of Telehealth in August 1998. The program had funded eleven projects in FY 1994 for a 3-year period and 18 projects in FY 1998 for a 3-year period. It

operates a rural health outreach grant program that focuses on service delivery through creative strategies requiring the grantee to form a network of with at least two additional partners. It also has a network development grant program designed to develop organizational capacity in the rural health sector through formal collaborative partnerships involving shared resources and possible risk-taking. <http://www.ruralhealth.hrsa.gov>

### E3 Rural Utilities Service's Distance Learning Telemedicine Program

The DLT program is designed to meet educational and health care needs of Rural America. RUS is engineering based agency and since 1949, it has worked with over 900 small phone companies to start or improve services. Since 1993, the DLT program has funded 306 projects in 44 states and two U.S. territories totaling $83 million. The DLT Program offers grants, a combined loan/grant, or a loan only. For FY 2000, RUS had available $13 million for grants, $130 million for loans, and $70 million in combined loans and grants. and loans/grants. <http://www.usda.gov/rus/telecom/dlt/dlt/htm>

*Competitive DLT grants* are available annually with a 30 percent local match requirement. The program has a $50,000 minimum and $350,000 maximum award levels. Eligible purposes are: equipment purchases; computer hardware and software; audio and video equipment; computer network components; terminal equipment; data terminal equipment; inside wiring; interactive video equipment; any other facilities that further DLT services; acquiring instructional programming; and providing technical assistance and instructions for using eligible equipment.

*Loan/Grant Combination* packages are accepted year-round and processed as received. It is a noncompetitive process, no matching requirement, and $50,000 minimum project level. This program funds medical equipment; links between medical professionals in the same facility; site development and alteration of building; purchasing land; purchasing or constructing buildings; and acquiring telecommunications transmission facilities provided that no facilities exist.

*Loan Program Features* are similar to the combined loan/grant program except that it covers project-operating costs during the first two years and educational broadcasting for distance learning purposes.

### E4 National Telecommunications Infrastructure Administration Technology Opportunity Program (formerly TIIAP).

Since 1993, NTIA has awarded 456 grants totaling $149.7 million with 42 projects identified as telemedicine / telehealth. NTIA has a robust grant program web site that provides the abstracts for the nearly 700 applicants which apply each year. In addition, helpful information is provided on past grant reviews. NTIA guidelines vary slightly each year but in general an applicant can request up to $600,000 in total federal support with a 50% match. Hardship cases need only provide a 25% match.

TOP grants support four application areas — community networking and services, lifelong learning and the arts, health, and public safety. Each application is compared against applications representing the same area. Examples of qualifying health projects include, but are

not limited to: systems that improve the social and medical models of care to consumers in their place of residence; telemedicine system that offer integrated approaches to extending and integrating medical and dental expertise to rural or underserved urban areas or non-traditional settings; projects designed to improve communication, collaboration and knowledge among and between health care; project to improve access and timeliness of care for those in emergency situations; and explore various methods to extend services beyond the emergency room; projects that integrate technology to asses community needs and develop innovative health technology models of care delivery across the care continuum; projects that integrate triage mechanism into improving care delivery to the uninsured, and low income populations; and networks or information services aimed at disease prevention and health promotion. The annual grant announcement and guidelines provide more specific information on allowable costs. See <http://www.ntia.doc.gov/otiahome/top/grants>

# Chapter 3 — Project Characteristics

This chapter addresses the project barriers to telemedicine / telehealth access that the projects were designed to address, the different approaches, and factors that affected their success. Some projects are shown as case models for success and failure.

## A Key Findings

## B Barriers to Access

Access to affordable telecommunication is the major barrier to implementing telemedicine / teleheath projects in Rural America and especially Indian Lands. Other barriers are economic and organizational structure, cultural and geographic.

### B1 Telecom

In Rural America, the first question that needs to be resolved in planning a telemedicine / telehealth is the cost and availability of telecommunication services. Many projects examined for this report had difficulty in obtaining requested services. It took the University of Arizona more than a year to negotiate with four telecos to establish service to IHS Tuba City Indian Medical Center and the Navajo National Sage Memorial Hospital under remote consultation services provided under direct state appropriations. The annual recurring cost per site is $61,000.

The delays and cost, however, become starker on Indian Land. The Arizona Public Service Commission verified that Quest (formerly US West) quoted Pima Maricopa Indian households near Scottsdale line cost installations up to $150,000. Other places such as the Round Valley Health Center outside of Sacramento cannot upgrade a fractional T-1 line into a full T-1 and realize that a valley-wide solution is required for affordable telecom and telemedicine / telehealth.

Without a major incentive for marketplace development, multiple federal agencies and tribes have taken incremental approaches to solving their problems. Telecom solutions were sought one-at-a time for local institutional service for tribal governments, hospitals, agency headquarters, schools and businesses etc. Few or no engineering solutions that encompassed the entire reservation area have been funded. Instead incremental solutions by multiple-parties the norm. This has resulted in common problems shared by many reservations such as the lack of a business model design, understanding of technology use cases, little to no technical design capabilities, improperly designed infrastructure, under capitalization, incorrect staffing, vendor dumping, over acquisition of equipment and to poor end-to-end planning.

Another telecom barrier is the low household phone penetration rate on Indian Lands, which affects everything from scheduling medical appointments to the feasibility of tele-home care. Today only 47 percent of the 720,000 Indian households have phone service, compared to a national average of 94 percent. That rate is rarer on most Indian lands such as the Navajo Nation where only about one in five households have telephones. The average Navajo lives five hours

walking distance from a phone. Census data from 1990 shown below illustrates a sampling of phone penetration rates for reservations with 500 or more households.

| Reservations and Trust Lands | Percent of Homes with a Telephone |
|---|---|
| San Carlos Reservation, AZ | 16.1% |
| Navajo Reservation & Trust Lands (AZ-NM-UT) | 18.4 % |
| Gila River Reservation, AZ | 22.2% |
| Mississippi Choctaw Reservation & Trust Lands, MS | 33.6% |
| Fort Apache Reservation, AZ | 35.5% |
| Northern Cheyenne Reservation & Trust Lands, MT-SD | 39.0% |
| Pine Ridge Reservation & Trust Lands, NE-SD | 41.4% |
| Mescalero Apache Reservation, NM | 41.6% |
| Spirit Lake Sioux Reservation, ND | 42.6% |
| Standing Rock Sioux Reservation, ND-SD | 43.2% |
| All Reservations and trust lands | 53.4% |

Source: "Assessment of Technology Infrastructure in Native Communities", prepared by the College of Engineering, New Mexico State University for the Economic Development Administration, Department of Commerce, June 1999, p 17.

## B2 Cultural Barriers

A major cultural barrier for distance education and medicine is the inability or hesitance by providers themselves to incorporate technology into service delivery. Once in place, many telemedicine applications are possible by adding periperhals such as an otoscope, dermasope, or electronic stethescope. One IHS service unit director whose hospital had low telemedicine use pointed out that a successful program required 15-20 clinical and support staff buy-in before it could realize its full potential. Others said that an administrative advocate was useful, but a clinician advocate was a necessity to demonstrate use and benefits.

This technology cultural barrier is also evident at lower levels. The Alaska Telemedicine Test Bed project deployed mainly ear, eye and throat telemedicine services using community health aides who meet a minimum 6$^{th}$ grade education requirement and have four weeks of health training. The 26-villages recorded over 6,000 consults in three years. Project success is attributed three factors. The technology was simple and easy for aides to understand those benefits for themselves and the village. Secondly, a coordinator established a personal relationship with the aides and coached them when usage dropped or through a problem. Lastly, the project is easily replicated and sustainable by using a plain old telephone to transfer images for remote consultation.

This project recognized that time has a relationship to the geographic and remoteness of Alaska. Seven minutes to transmit an image is not a long time compared to a 2-week waiting on exchange of medical information to and from Anchorage or the cost of an emergency transport or scheduled clinic visit. This concept is being changed in Alaska because the universal service discount program now includes long distance charges in the discount calculations. In Fund Year

2, ninety-two Alaskan villages received $4 of the $6 million approved nationwide for subsidies. This amount, however, may be lowered based on paperwork showing actual installation of satellite services. Local villages or outside programs pick-up a portion of the actual cost so there is an incentive to select a cost efficient telecom costs.

### B3 Economic & Organizational Structure

Another barrier that affects the project provider and end-user is the economic and organizational structure of Indian health care delivery. IHS/tribal clinics recognized the immediate value of telehealth to cut travel costs for training or administrative meetings. Telemedicine, however, was viewed as a luxury and clinics cited structural reasons why use level was low. Two top reasons cited was high patient loads and staff turnover that kept them from learning and maintaining staff skills on equipment use.

The Neah Bay Service Unit and the Quileute Health Center were involved in two outside managed telemedicine projects. The first one for chronic pain management failed because the grantee's concept and end-user partners failed to generate a sufficient patient load. A small community hospital that also participated receives a grant for telehealth counseling services for alcohol/drugs and HIV. Both grants provided telecom hook-ups and equipment with the later grant providing more useable solutions. According to Neah Bay's Service Unit Director a major drawback was lack of scheduled time for their three providers to participate. The director assumed the burden for coordinating the unit's involvement in these grants and has interest in expanding telemedicine .use with a provider outside of the local community. A relationship is sought with Port Angeles or the University of Washington's School of Medicine to reduce patient transport costs which typically run between $5,000 and $7,000 per incident. The site coordinator for Quileute Health Center was the tribe's only community health aide who thought that both grants provided a good learning curve and benefits were realized for her work area.

On a national scale, one grantee partner observed that Indian Health Service operates on fixed revenue stream and either lacks the ability or vision to support tribal clinics in becoming more efficient through telemedicine. Other grantee partners simply could not understand IHS/clinic timelines for project milestones or the delays for internal agency assistance on telecommunications and equipment orders.

The self-determination goals of tribes will also impact the agency's available resources to lead a national effort to support and enhance the development of telemedicine / telehealth. As a safety net strategy for tribes, a technology strategy that reduces both facility administrative costs and medical costs while improving patient care appears logical. The agency has engaged in this discussion and educational awareness of telemedicine / telehealth at various levels and forums. A national strategy and torchbearer that can hold the interest and energy of national and regional interests that represent the clinician, biomedical engineers, computer information specialists, and administrators is not yet evident. Of the IHS Area Offices, Alaska, Phoenix and Navajo have the most active telemedicine use.

### B4 Geographic

Elimination of geographical isolation is a major barrier that telemedicine / telehealth touts as a major program benefit. This isolation relates both to the patient and the clinician. Patient transport decisions can be made quicker with more information. Pre and post operation services can be provided at the local end and eliminate trips to regional medical centers. The local on-site primary care provider can receive quick, efficiently guided consults that results in a faster treatment time and apply that knowledge when presented with similar symptoms. Access to continuing medical and community education, Grand Rounds and administration via distance provides major benefits by saving travel time and costs.

## C ACTIVITIES PROMOTING TELECOM ACCESS

### C1 Technology & Telecommunication Trends

The need for expensive telecom solutions is becoming a distant past based on manufacturer response to large federal government spending on telemedicine for the Veterans Administration, Department of Defense, and grant programs. Manufacturers of video conferencing, imaging, computer, medical and multimedia equipment have responded with less costly and miniature equipment that is portable and operate at several bandwidths. This marketplace push has also resulted in a major price decline keep competitive. Grantees experienced $50,000 price difference within the videoconferencing equipment line purchases over a 3-year time period.

Joining the manufacturers in encouraging a healthcare provider shift to electronic communications are the large regional phone and cable companies, the cellular phone systems and Internet provides. The American Telemedicine Association claims that the shift from dedicated facilities to desktop videoconferencing, use of personal computers for store-and-forward, and Internet based telemedicine will dramatically accelerate telemedicine use and increase access to distributed medical data.

Evidence of this phenomenon is the growth of multimedia and or interactive health communications. The interaction of an individual, i.e. consumer, patient, caregiver, or professional, with an electronic device or through communication technology to access or transmit health information, or to receive or provide guidance and support on a health-related issue is more common. Interactive applications include health information, remote consultation, diagnosis, x-ray or CT Scans and other technology-mediated applications that relay information, enable informed decision making, promote healthy behaviors, promote information exchange or self-care, or manage demand for health services.

Interactive health communication applications have great potential to improve health and well being. Compared to more traditional media, interactive media has several advantages for health communication efforts. These include: improved access to individualized health information; greater access to health specialty information, ability to promote interaction and social support among users or between clinician-patient relationships; and enhanced ability to provide widespread dissemination and immediate updating of information.

The force that is driving this convergence is IP (Internet Protocol); a universal means of communicating packages of data that represent voice, video, multimedia, or data itself. The evolution of the Internet as a universal means of communication is driving the implementation of telecommunication systems in rural and remote areas as well as emerging countries, where the development of communications infrastructure has often been delayed due to the costs involved.

Today, however, with the Internet being critical to global development, the balance is more often shifting towards action. As businesses, organizations and governments are becoming aware that high-speed access to the Internet is mandatory if they are to participate in the 21st century information economy, the building of infrastructure to support access to the Internet is becoming a higher priority.

This convergence of the infrastructure needs of the Internet and Intranets establishes synergy between two very different groups of users: the multinational corporation with remote offices that need to be connected to the corporate intranet; and the local businesses and population who need access to the global Internet, especially to the US backbone of the Internet. Technology for Internet and intranet access has evolved to the point where low-cost satellite and wireless local loop solutions allow ubiquitous coverage and high performance for the distribution of data to remote locations around the world.

The latest technology in the satellite broadcast market is called Digital Video Broadcast (DVB). DVB technology is also used to distribute data, such as web pages, through low-cost, receive-only terminals. In addition, satellite return links are added in regions where the terrestrial infrastructure is inadequate or unavailable. Using such two-way satellite Internet service providers (ISPs), corporations and organizations with remote offices in emerging countries can have reliable and low-cost access to the global terrestrial information network. For multinational corporations, that may mean access to a virtual private network between their headquarters and remote offices. In the case of ISPs, that may mean high-speed access to the US Internet backbone, where 70% to 80% of the web content is hosted.[1]

Satellite technology, coupled with wireless local loop technology, can provide wide area network (WAN) connections as well as the local 'last mile' distribution to end-users. One of the benefits of the combination of satellite technology and wireless local loop technology is the speed with which it can be implemented anywhere in the world. The features of modern satellite communications technology and modern wireless local loop technology include rapid deployment, the bypass of terrestrial infrastructure that may not be supportive of emerging high-bandwidth applications or low in cost. Together, these technologies make it a practical reality for anyone to participate in the explosive growth of access to information. This infrastructure will provide not only Internet access and Intranet access, but also VOIP (Voice-over-Internet Protocol) as well, and will support the accelerated development of multimedia applications.

[1] Globecomm Systems Inc.

## C2 Federal & Tribal Communications Initiatives

### C2.1 Universal Service

The Rural Health Care Program (RHCP) is a universal service support program authorized by Congress and designed by the Federal Communications Commission (FCC) to provide reduced rates to rural health care providers for telecommunications services related to the use of telemedicine & telehealth. Telecommunication companies contribute to a Universal Service fund, which makes money available for rural health care discounted rates.

Congress authorized this program in Section 254 of the 1996 Telecommunications Act. After lengthy public comment and input, the FCC defined eligible rural health care providers and services and established a mechanism that could distribute up to $400 million annually to benefit these providers through the non-profit Universal Service Administration Corporation (USAC).

The program is complex and many providers cannot achieve large cost savings. The FCC 's benchmark, used to calculate subsidies, reflected "list" rather than "discount" prices negotiated by urban health care providers. Thus, the difference between the rural rate and the FCC's benchmark is often small, non-existent or negative for the rural health subsidy applicant. Consequently, out of more than 2,500 initial inquiries, only 450 rural health providers submitted or planned to submit applications to USAC, during the first year.

The FCC has modified its application process by eliminating the 30-day wait period, per location funding limit, and the use of an "eligible telecommunication carrier" which qualifies long distance carriers in Alaska and other types of carriers in the Lower 48 for the discount. These changes will make it more profitable for some providers to apply.

Though Congress allows up to $400 million in subsidies, the FCC can vote to lower the amount to a more realistic level based upon anticipated interest. For Year One, the FCC set a $100 million level, Year Two $12 million, and the absence of a FCC vote for Year Three returned the dollar level to $400 million. The actual use level for Year One is $1.28 million. As of September 8, 2000, Year 2 support level was only $5,661,297. Nearly $4 million will go to ninety-two Alaskan Native Villages. The Alaskan amount may be adjusted depending upon the date those actual satellite services was installed.

Federal grant programs for telemedicine /telehealth require the grantee to file for this discount. A roster of entities that received Funding Commitment Letters for Year 2 is posted on the FCC web site at <http://www.rhc.universalservice.org> Review of the roster shows that limited Indian health centers have applied other than those from Alaska.

The telemedicine / telehealth network provider for the Rocky Boy Health, Chippewa Cree Tribe, applied for a discount. Under the network arrangements, Rocky Boy pools $500 a month with other members for telecom costs. Prior to Year Two Funding, network members subsidized Rocky Boy's actual service cost by additional $471 per month. The RHC discount reversed that cash flow by dropping Rocky Boys actual annual cost from $11,652 to $5,262 or $438.50 per month.

The rural health care provider selects the type of telecom service such as ISDN, T-1 or satellite. Since the provider pays part of the bill, there is an incentive to select a service that represents actual needs. Tribal health services may also be included in the application; however, the federal government requires exclusive use for healthcare. An example of a denied application by RHS was a program that mainly transmitted child sexual abuse data to law enforcement. RHC said in this case that the tribe had to show a greater connection to health care such as a mental health purpose.

The healthcare provider may also combine its application with a similar discount provided for schools and libraries. This combined choice was selected by the East Aleutian Tribes (EAT) in Alaska who have formed a community partnership with the Aleutians East Borough School District. The Funding Year 2 subsidy is $271,848. The School District also received a $233,767

For more information on the rural healthcare discount program call 1-800-229-5476 or 202-263-1624.

## C2 FCC Marketplace Incentives

The Federal Communications Commission has investigated the lack of dial-tone phone service on reservations and taken action to provide carriers an incentive to improve services. The FCC is implementing several marketplace incentives for land and wireless companies to provide more services by offsetting the cost of deployment. Wireless carriers may also get a boost if the FCC adopts proposals to establish special bidding credits for future auctions for tribal areas and to change geographic license areas, so they do not divide up the reservation. The FCC also plans to expand the types of companies that can be designated as eligible for federal subsidies to encourage wireless carriers and tribal telecommunications companies to participate. For more information, see <http://www.fccc.gov/indians>

To help individual households, the FCC approved a plan starting in October 2000 so one-third of the Indian reservation household that qualify as low-income may receive basic local telephone service for only one dollar a month. Households ordering phones would receive $100 towards connection costs. These benefits are being offered under existing FCC programs to ensure low-income access to phone service. The FCC will rule on how these benefits will be applied in Oklahoma where reservations were abolished upon statehood in 1907. If favorable, half the Indian population may become eligible.

## C3 Tribal Utilities

The Mescalero Apache Tribe recently joined a growing solution by tribes to form their own telecos. The tribal telecos receive funding under a Rural Utilities Service program begun in 1949 that has helped over 900 small phone companies start or improve services. The RUS program has six Indian tribes as borrowers. The statistics shown below show the phone penetration rates used as a basis for lending to the tribes.

| Borrower | Pre-Loan Service Rate | Post-Loan Service Rate |
|---|---|---|
| Tohono O'odham | 13% | 95% |
| Gila River | 44% | 54% |
| San Carlos | 25% | New loan |
| Fort Mohave | 30% | 65% |
| Cheyenne River Sioux | Unavailable | 75% |
| Mescalero Apache | 40% | New loan |

### C4 Consortiums

The Northern Navajo Medical Center has developed a Memorandum of Agreement (MOA) with the General Services Administration for the provision of broadband solutions for the Center and other regional tribal entities. Other consortium members are tribal groups, the Bureau of Indian Affairs and the Office of Environmental Health. GSA would establish billing accounts, as appropriate with input from members for recovering costs of establishing and maintaining the broad band services. The effort is expected to result in lower costs. The MOA cites this example: *the monthly recurring access charge for a DS3 delivered by MCI to Shiprock is in access of $19,000 per month while the same DS3 delivered to Albuquerque is only $1,402 per month. In actuality, the DS3 service availability into Shiprock may not even be available at the $19,000 price. The achievement of anticipated savings could capitalize a considerable amount of microwave or other transmission media equipment. Once the equipment is fully capitalized resulting savings will be passed on to applicable consortium members.*

## D ACTIVITIES SUPPORTING TELEMEDICINE / TELEHEALTH

Many efforts are working together to support the expansion of telemedicine / telehealth. As evidenced from the type of projects reviewed, use can be expanded through regional networks that fill marketplace niches. Major providers and universities usually create these networks. Large new network deployment such as the 235 site Alaskan Federal Health Care Access Network may result in a prototype that can be used in other native or low-income communities or a state model. Congress has also lent support by introducing legislation that makes it easier for providers to receive reimbursement.

## E BARRIERS TO PROJECT DEVELOPMENT, ACCEPTANCE AND SUCCESS

Even with rapid marketplace integration of computers and telecommunications and e-health commerce, some providers still have unanswered questions related to telemedicine liabilities, state licensures and reimbursement policies to sustain the technology application. Other concerns are the high resource requirements for planning, technology selection and implementation. The solution needs to be scaleable to the project. Scalability is the built-in capability for equipment to grow wit and needs and change with technology. It allows basic devices to be upgraded via the replacement of more powerful components rather than the purchase of a while new piece of equipment.

Department of Health and Human Services agencies like the Bureau of Primary Care, the Health Care Financing Administration, and the Office for the Advancement of Telehealth and

associations have focuses on these barriers and solutions. The agency web sits provide detailed information on these topics, government regulations and solution trends.

## F PROJECT IMPLEMENTATION STRATEGIES

The experiences of the grantees interviewed demonstrate the importance of ensuring that all parities involved have mutually agreed upon roles and that these roles be placed in writing. The basic steps involve holding stakeholder meetings and developing alliances with organizations that are capable of performing their assigned roles, conducting a needs assessment, enlist project advocates in both the primary grant organization and end-user sites and establish clear expectations of the project benefits and cost allocations.

Telecom service can be affordable through partnerships to share access costs. Several projects that were reviewed charged a monthly fee to generate a pool of funds that made it easier for high-cost locations to participate. Others such as the University of Arizona assumed responsibility for creating the network and either assumed all costs or made each end-user responsible for recurring monthly costs. Most networks have applied for the Rural Healthcare universal service discount for sustainability. The Portland Northwest Indian Area Health Board helped tribes with Internet access to participate in its health programs. The Oglala Sioux Community Health Representative program is building a web site that enables the CHR equipped with radios and laptop computers to download health information.

Central to success is an on-going strategy to train staff on equipment use and for maintaining skills during staff turnover. This strategy should relate to the project support for equipment, end-user sites and be sustainable beyond the grant period. Training and support should be integrated into program operations using computer hardware as much as possible.

## G LESSONS LEARNED

The project and IHS/clinic staff interviewed for this project emphasized that a shared vision of the project, technology use, and roles along with administrative and clinician advocacy were fundamental to success. The on-site coordinator need not be full time but must have access and support of both the administrator and clinicians. The project needs to build support in at all project levels from the hub-site down to the end-users. Without these factors, most projects will not leave up to their potential, may fade away or the equipment stored in closet.

The Alaskan Clinical Engineering Services that supports the Alaskan Native Medical Center and the Alaskan Federal Health Care Access Network successfully donwsteamed the associated technology and financial risks. ACES trains its staff on each vendor's equipment annually, so the high support costs incurred with most vendor agreements are gone. When deploying systems, ACES has an inclusive bilateral financial portion of their agreement that returns approximately eleven percent of the purchase cost of the system back to ACES. This cost-savings covers other costs of supporting remote sites. ACES offered the following advice. perform due diligence on writing system specifications; select a vendor relationship with in-house staff responsible for first call and the vendor second along with a contract reduction; solicit an in-house medical advocate for the system; select a prime vendor to integrate all vendors and off the shelf technology needs

into the system; integrate the telemedicine technology into the overall medical operations so there is no stop and stare on the learning cycle when interfacing with other sites

Other project staff had less specific suggestions but valuable insights to share that may make your life easier. Their thoughts are:

- The partners involved in the project need to be committed and matched for the ability to perform their end of the bargain.

- Clinics and hospitals should not underestimate the amount of time it takes to incorporate and use telemedicine / telehealth.

- Projects can fade away or partners become less willing to perform when projects are delayed for a good length of time due to telecom connection problems or lack of money.

- Grant writing should require at least one-year advance planning for technology choices and matching telecom needs with actual need. It is very difficult to adjust grant budgets and equipment choices during grant administration.

- The project should establish clear time frames and goals, meet actual client needs, and are affordable with a business plan for sustainability.

- The equipment should match the need such as a high quality camera for eye images.

- The telemedicine work area should be a dedicated space with lighting, patient access, and not require continual readjustment.

- Grantees and end-users should be aware that grant administration could be overwhelming, especially if the agency requires data input from all sites and not just the ones funded by the grant.

- Grantee should have knowledge of the federal agency offering the grant and how the agency operations impact grantee expectations and oversight.

- Telecom connections should be handled through a turnkey solution for the end-users to save time and money on negotiating services.

- The grantee and end-user needs to have the adequate resources for assuming project responsibilities.

- Project partners should periodically evaluate project deployment and level of use.

- The project concept should be kept as simple as possible and that the technology should not drive the project.

- Grantwriters should not apply for grants if the organization has to substitute its actual need for what is deemed fundable.

- The solution needs to be scaleable for project sustainability.

# Chapter 4 — Project Descriptions by Area Office

This section provides a description of telemedicine / telehealth projects associated with Indian Health Service units and tribal clinics. The descriptions arranged by area offices follow a short summary section of each area. The funding sources are abbreviated as follows: Rural Utilities Service (RUS), Office for Rural Health Policy (ORHP), Office for the Advancement of Telehealth (OAT), National Library of Medicine (NLM) and Department of Commerce Technology Opportunity Program (TOP).

## A. ABERDEEN AREA

The Aberdeen Area hospital and clinic system has limited internal telemedicine use. The Rosebud IHS Public Health Hospital transmits radiology film to the Rapid City PHS Indian Hospital once a month. The Aberdeen Area Black Hills Training Center has an interagency agreement with the Fort Meade Veterans Medical Center for satellite distance education and on-site training.

Fort Yates and Sisseton PHS Indian Hospitals and the West River Health Clinic are served by three regional telemedicine / telehealth networks. Eagle Butte Family Clinic retains equipment, but is no longer an active member in the same network used by West River.

The McKennan Health Services will manage an obstetrical care access program for PHS Indian Hospitals at Pine Ridge, Sisseton, and Rosebud. The hospitals will use 3-D ultrasound equipment to capture hand-scanned images that no longer rely on the skill of the person acquiring images. The perinatologist at the remote site is able to rotate the images for enhanced viewing of heart valves etc.

### A1 Obstetrical Care Access Project for Sisseton, Pine Ridge and Rosebud

| | |
|---|---|
| Area Office | Aberdeen Area |
| Indian Facility | Pine Ridge PHS Indian Hospital<br>Rosebud Indian Health Service Hospital<br>Sisseton Indian Health Service Hospital |
| Primary Use | Telemedicine (neonatal) |
| Use Status | New project |
| Facility Contact | Terri Friend, Nurse Midwife and Project Contact<br>Dr. Michael Cerney, Director of OB/Gyn, Dr. LaSeur, Clinical Director)<br>Pine Ridge PHS Indian Hospital, Pine Ridge, SD 57770<br>Phone 605-867-3128, Fax 605-867-3217 |

Kathy Ray, Project Contact
Dr. Timothy Ryschon, Clinical Director
Rosebud Indian Health Service Hospital,
Soldier Creek Road, Rosebud, SD 57570
Phone 605-747-2231, Fax 605-747-2216

Peggy Johnson, Director of Nursing
Dr. Fernando J. Zambrana, Clinical Director
Sisseton Indian Health Service Hospital, PO Box 189, Sisseton, SD 57262
Phone 605-698-7606, Fax, 605-747-2216

Funding

RUS - FY 98 - $205,706
McKennan $141,000, plus in-kind protocol development, perinatology data review, telecom costs (switched 56 line to McKenna), and one full-time staff support

Grant Contact

Deb Soholt, RN, MS, Director, Women's & Children Services & Project Administrator, Phone 605-322-3490, E-mail <Deb.Soholt@mckenna.org>
Dr. Gary Helmbrecht, Principal Investigator/Maternal-Fetal Medicine, Phone 605-322-8933
McKenna Health Services (Avera McKennan Hospital), 800 East 21st Street, Sioux Falls, SD 57117-5045,Web site: <http://www.mckenna.org/>

**Summary**

**Three South Dakota IHS Indian Hospitals located at Pine Ridge, Sisseton, and Rosebud will serve as a beta test site for 3-D ultrasound equipment with prenatal case review provided by McKennan Health Services, Sioux Falls.**

McKennan Health Services located in Sioux Falls manages a federal grant for 3-Dimensional ultrasound consultation for three tribes with higher than average statistical levels of infant mortality and morbidity compared to the U.S. rate of 8.5 per 1,000 live births. The three end-users Indian Health Service sites and rates are Pine Ridge (25.1), Sisseton (13.3), and Rosebud (18.5).

The project deploys the Medical Ultrasound Three-dimensional Portable Advanced Communication (MUSTPAC) as a beta-testing site for FDA product approval. Another beta test site is the Philadelphia-based Mercy Hospital that will collect data in the emergency room for kidney and gallstone detection. Prior field-testing included Bosnia and Mt. Everest. MUSTPAC was developed for the Defense Advanced Research Projects Agency (DARPA) by the Pacific Northwest National Laboratory. The portable unit is equipped with advanced communications and can capture 3-D images instead of the conventional 2-D for ultrasound remote consult readings.

The expert reading the image can manipulate the image taken from a free-hand scan for closer evaluation of hard to see heart valves etc. This equipment overcomes an existing problem of the image quality dependent upon the skill of the person acquiring the image. A person with

knowledge of anatomy can learn how to use the equipment in 15-minutes. The end-users at the Indian hospitals for this project will be physicians, midwives and/or a family nurse practitioner.

The project's medical services include 3-D ultrasound imaging to all obstetrical patients, complete with consultation and evaluation by a McKennan perinatologist. Imaging during early pregnancy confirms intrauterine location of fetus or placenta, genetic screening, and accurate pregnancy dating. Mid-pregnancy applications focus on fetal anomalies. During late pregnancy, the imaging detects abnormalities in growth and predicts birth weight. The perinatologist expert can review store-and-forward information or in real-time with the examiner using a virtual wand. The technology supports educational services.

The MUSTPAC system used for this project is bench assembled and marketed as a prototype for a unit cost of $115,333 installed. Beta test data will detail a Food and Drug Administration (FDA) application for commercial production. A FDA approved portable 3-D unit price is expected to drop below $50,000. The project start date was delayed to the higher than expected McKenna cost share. Equipment installation and on-site training is scheduled for November 2000.

### A2 Sisseton Indian PHS Hospital, Dakota Health Network

| | |
|---|---|
| Area Office | Aberdeen Area |
| Indian Facility | Sisseton Indian PHS Hospital |
| Primary Use | Telehealth, telemedicine available |
| Use Status | Sustainable |
| Facility Contact | Brian LaBelle, Site Coordinator, Sisseton PHS Indian Hospital, PO Box 189, Sisseton, SD 57262<br>Phone 605-698-7606, Fax 605-698-4270,<br>E-mail <blabelle@abrsi.Sisseton.aberdeen.ihs.gov> |
| Grantee | Dakota Health Network, Avera St. Luke's Hospital |
| Funding | ORHP - FYs 96-98 - $603,432 |
| Grant Contact | Gene Reich, Director, Avera St. Luke's Telehealth Services, 305 South State Street, Aberdeen, SD 57401<br>Phone 605-622-5035, Fax 605-622-5041<br>E-mail <Gene.Reich@averastlukes.org> |
| **Summary** | **The Sisseton Indian PHS Hospital receives continuing education from the Dakota Health Network operated by Avera St. Luke's in Aberdeen, South Dakota.** |

The Sisseton Indian PHS Hospital is a member of the 13-site Avera St. Luke's Dakota Health Network that offers consultation services in mental health, cardiology, pulmonology, orthopedics, pediatrics, trauma, dermatology, post-operative care, wound care, and counseling on diabetes and nutrition. Another system use is staff training, grand round (physician) conferences, distance education, administrative meetings, and community meetings. In 1997, Avera St. Lukes installed at Sisseton a $20,000 Picture Tel unit equipped with $5,000 in peripherals. Interactive videoconferencing takes place over ISDN lines (384 Kbps). The project covered $7,200 in telecom costs, but as of October 2000, Sisseton becomes responsible for a $300 monthly connection charge. Sisseton hospital staff gave high marks to the educational programs, but indicated that the network was not heavily used for either education or medical consultation. Sisseston used the dial-up feature to consult with a burn specialist outside of the Dakota Health Network. The Sisseton patient referral pattern does not include Avera St. Lukes location in Aberdeen which may affect the interest in network use. Avera St. Lukes, however, provides daily courier service to Sisseton and other nearby towns for radiology services. This hospital also provides a regularly scheduled on-site radiologist.

### A3 Fort Yates PHS Indian Hospital, Dakota Telemedicine Network

| | |
|---|---|
| Area Office | Aberdeen Area |
| Indian Facility | Fort Yates PHS Indian Hospital |
| Primary Use | Telemedicine |
| Use Status | Sustainable |
| Facility Contact | Penny Wilke, MD, Clinician Director, Fort Yates PHS Indian Hospital, PO Box J, Fort Yates, ND 58538<br>Phone 701-854-3831, Fax 701-854-7399 |
| Grantee | Medcenter One, Dakota Telemedicine Network |
| Funding: | TOP - FY 96 - $400,000<br>RUS - FYs 96-97- $816,968 |
| Grant Contact | Carla Anderson, DTN Director, Medcenter One Health System, 300 North 7th Street, Bismarck, ND 58606<br>Phone 701-323-5616, Fax 701-323-5260, E-mail: <daktele@mohs.org><br>Web site: <http:www.medcenterone.com> |
| **Summary** | **The Fort Yates IHS Hospital's telemedicine program is evolving and a higher use rate is expected after facility remodeling is completed. The existing use rate has been affected by having scheduled-site provider services.** |

The Fort Yates primarily used Medcenter One consultation for kidney dialysis and its use declined when Medcenter One's nephrologist hired a Physician Assistant for on-site service to the Indian hospital. Other on-site specialty services are also provided. Telemedicine use is temporarily on-hold during facility remodeling. The Clinician Director is interested in more emergency room applications. As such, the Fort Yates Hospital may change or have dual telemedicine partners that represent two referral hospitals in Bismarck, North Dakota, that are located one block apart. These telemedicine providers offer different flexibility between rollabout and fixed equipment and the choice of specialty consultations. This flexibility may be an important consideration because 15-20 Fort Yates Hospital Staff are involved in deciding the level and actual use of telemedicine. . West River Health Center, a Fort Yates' satellite clinic, uses the TeleCare Network connected with St. Alexius Medical Center.

Medcenter One operates the Dakota Telemedicine Network (DTN) from its integrated medical facility. The network has twelve sites, including the Fargo VA Medical Center. The DTN system is a closed, linking videoconferencing equipment at each site via dedicated T-1 lines. The Vtel videoconferencing rollabout equipment consists of camera and microphones, dual monitors, a document camera, and inputs and outputs for videotape recorders. The local physician uses a video recorder to present the patient for consultation when a specialist is not available for immediate consultation. Computers may also be connected to the system. The system is not yet Internet-based, but operates with an icon-based control panel and stylus. Each site is also connected to the hub via a dedicated analog phone line for scheduling services and faxing patient records from site-to-site.

DTS provides over 250 specialty consultation services. A full-time medical director, a telemedicine coordinator and support staff, manage the hub site. DTS supports a Fort Yates on-site coordinator position. Fort Yates also received equipment and a no-cost telecom connection. Currently, Medcenter One serves about five percent of its patient population through telemedicine consultations. DTS has resulted in a referral rate drop from the end-user sites, including the Fort Yates facility.

### A5 West River Health Center, McLaughlin

| | |
|---|---|
| Area Office | Aberdeen Area |
| Indian Facility | West River Family Health Center, Cheyenne River Sioux |
| Primary Use | Telehealth, telemedicine available |
| Use Status | Sustainable |
| Facility Contact | James Foote, West River Health Center,<br>PO Box 879, McLaughlin SD 57642, Phone 605-823-4458<br>Fax 605-823-4181 |
| Grantee | TeleCare Network, Northland Health Care Alliance (St. Alexius Hospital) |

| | |
|---|---|
| Funding | ORHP - FY 97 - $441,804<br>OAT - FY 00-02 - $720,000 |
| Grant Contact | Tim Cox, President, Northland Health Care Alliance, 400 East Broadway, Suite 300, Bismarck, ND 58501<br>Phone 701-250-0709, Fax 701-250-0739<br>E-mail <tcox@northlandhealth.com> Web site <http://www.telecare.org> |
| **Summary** | **The West River Health Center uses the TeleCare Network on a limited basis for emergency room consultation.** |

The Northland Health Care Alliance operates the TeleCare Network through St. Alexius Hospital in Bismarck, North Dakota. The network serves 12 hospitals and four long-term care facilities and several affiliated sites in South Dakota. TeleCare Network uses NEC TeleDoc™ 5000 units that are fully integrated self-contained, portable telemedicine device providing two-way interactive video and audio. Members have consultative access via telemedicine to physicians and other clinicians in over 20 specialties including cardiology, orthopedics, dermatology, emergency medicine, neurology, obstetrics, mental health, pediatrics, and wound management. TeleCare also supports consultations with allied health professionals; administrative meetings, continuing education, employee assistance sessions, and patient care conferences. TeleCare has new equipment so member can dial-up experts outside of the TeleCare Network. The West River Health Center has a low use level, mostly for emergency consultations.

### A6 Oglala Sioux Tribal Community Health Representative Program

| | |
|---|---|
| Area Office | Aberdeen Area |
| Indian Facility | Oglala Sioux Tribal Community Health Representative Program |
| Primary Use | Telehealth |
| Use Status | Growing |
| Facility Contact | James Watters, CHR Director, Oglala Sioux Tribe, Main Street Box A, Pine Ridge, SD 57770<br>Phone 605-867-5801, Fax 605-867-5406 |
| Grantee | Oglala Sioux Tribe |
| Funding | TOP - FY 97-00 - $208,989 |
| Grant Contact | See Facility Contact |
| **Summary** | **The Olgala Sioux Tribe operates an innovative Community Health Representative Program (CHR) that provides a wireless** |

**communication network to connect its field workers with patient records and other resources.**

The Oglala Sioux Tribal Community Health Representative (CHR) Program has a digital wireless home health care service called the Tribal Community Health Information Network. The CHR program provides critical health care services for elderly, home-based patients, and young mothers whose children require medication attention. The network testing has been completed and equipped with 25 hand-held radios and laptops. A web site is under construction for accessing information on diabetes, nutritional data, antidotes to toxins, and emerging infectious diseases. These tools will give CHR field workers the ability to manage patient needs visitation schedules, pharmacy requirements, and emergency services for homebound patients. This tribal initiative helps curb the health care crisis on the reservation, which lacks a health care preventive program. The CHR program has a FCC license to operate its own radio frequency. Project completion could not have been achieved without major in-kind support from an Idaho-based engineering firm for system design, deployment, and training. Full system deployment is set for January 2001. In the future, the system may add a paging system to coordinate responses from health and emergency services for high-risk patients. Separate from the grant, the CHR program will have the ability to download patient data into the Indian Health Service Record Patient Management System form the nine tribal district CHR Offices.

### A7 Mountain Plains Health Consortium

| | |
|---|---|
| Area Office | Aberdeen Area |
| Indian Facility: | Black Hills Training Center |
| Primary Use: | Telehealth, on-site training |
| Use Status | Continuing |
| Facility Contact | Co-located Mountain Plains Health Consortium |
| Grantee | Mountain Plains Health Consortium |
| Funding | RUS FY 95 $300,000 |
| Grant Contact | Jan Smith, Coordinator, Mountain Plains Health Consortium, Box 187, Fort Meade, SD 57741<br>Phone 605-347-7117, Fax 605-317-7119<br>E-mail <heds@heds.org> Web site <http://heds.org> |
| **Summary** | **The Fort Meade VA Medical Center provides the IHS Aberdeen Area telehealth and on-site training through an interagency agreement.** |

The Mountain Plains Health Consortium represents an interagency agreement between the Indian Health Service's Black Hills Training Center and the Fort Meade VA Medical Center for

continuing education courses and on-site training. IHS contributes to staff, operations and satellite transmission costs. The satellite downlink hardware installation costs were paid by a federal grant. The consortium serves the Aberdeen Area, except for a satellite center in Tama, Iowa. The consortium also serves a tribal facility called Morning Star Manor, Fort Washakie, Wind River.

## B ALASKA AREA

The Alaska has a twenty-five year history with telemedicine that was driven from necessity by extreme weather, remote populations, poor transportation services, and high cost. Blue Cross and Blue Shield estimates that health care costs are 300 percent higher than the Lower 48 States.

Federal agencies spend an estimated $700 million a year on direct health care to over 200,000 Alaskan beneficiaries. In 1996, the Department of Defense, Indian Health Service (Alaskan Native Tribal Health Consortium), the Veterans Administration, and the U.S. Coast Guard started to share scarce resources and were able to save $2 million in less than 24 months.

In 1999, Congress began to support a combined federal interagency four year $30 million plan to connect 235 sites in a telemedicine network. The network is called the Alaska Federal Health Care Access (AFHCAN). AFHCAN is required to forge partnership arrangements with other hospitals in Alaska to ensure transfer of telemedicine and knowledge to the entire Alaskan population.

In September 2000, the AFHCAN project will use the Maniilaq Association (Kotzebue Service Unit) as a deployment test. Eleven Maniilaq villages, along with another sixteen, also participate in the on-going $2.8 million Alaska Telemedicine Test Bed Project funded by the National Library of Medicine under a competitive grant with the University of Alaska. Over 3-years, Community Health Representatives equipped with digital cameras and video otoscopes have referred more than 6,000 cases that average $38 apiece, excluding health care costs. The transmission occurred over regular phone lines. Project use evaluations still continues. A NLM contract amendment for $805,000 adds seven additional sites that are private sector clinics with a large native clientele.

The Alaskan telecommunications picture improved recently under the Federal Communications Commission's universal service program. In Funding Year Two, ninety-six rural Alaskan sites shared $4 million of the $6 million approved nationwide. The actual amount will be adjusted based upon the date of actual telecom equipment installation.

The Rural Utilities Service funded six federal grant initiatives for local telecom improvements that supported health care. The projects are listed below, but not described elsewhere in the report.

- **Bristol Bay Area Health**—$300,000, FY 1997
- **Council of Athabascan Tribal Governments**—$317,729, FY 1996
- **Norton Sound Health Corporation**—$313,025, FY 1999

- **Tanana Chiefs Conference, Inc.** —$259,064, FY 99
- **City of Galena, Yukon Koyukuk**—$186,490, FY 2000
- **Aleutians East Borough School District**—$271,848, FY 2000

## B1 Alaska Telemedicine Test Bed Project, University of Alaska

| | |
|---|---|
| Area Office | Alaska Area |
| Indian Facility | Multiple native village clinic |
| Primary Use | Telemedicine |
| Use Status | Growing |
| Facility Contact | University of Alaska |
| Grantee | University of Alaska, Anchorage, Applied Science Laboratory |
| Funding | NLM Contract NO1-LM-6-3540, $1.99 million, plus $805,000 amendment, 10/1/96 - 9/30/01. |
| Grant Contact | Frederick W. Pearce, Ph.D., University of Alaska at Anchorage, Applied Sciences Laboratory, 3211 Providence Drive, Anchorage, AK 99508<br>Phone 907-786-4183, Fax 907-745-2259<br>Web site http://www.137.229.128.211/NLM/index.html |

**Summary** **The Alaska Telemedicine Test Bed Project demonstrates that telemedicine was a viable alternative for remote clinics operated by community health aides.**

The Alaska Telemedicine Test Bed Project builds upon the organizational successes of prior telemedicine efforts to coordinate the replication of scaled, tested approaches to telemedicine and health care informatics in rural Alaska. Working partners include the university and civilian, military, and native health care organizations. Four regional health corporations and 26 villages participate in the project.

- **Yukon-Kuskokwin Health Corporation, Bethel**—Villages of Chevak, Hooper Bay, Kotik, Marshall, and St. Mary's
- **Norton Sound Health Corporation, Nome**—Villages of Elim, Gambell, Savoonga, Shishmaref, and Stebbins
- **Maniilaq Association, (Kotzebue)**—Villages of Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Noatak, Noorvik, Selawik, Shungnak and Point Hope (North Slope Borough).

- **Bristol Bay Health Corporation, (Dillingham)** —Villages if Goodnews Bay, Kolignaek, Manokotak, Perryville, and Port Heiden

The project used high school students to install computer workstation, digital cameras, and video otoscopes, and a printer at each site. The cart design was variable to meet space constraints in clinics as small as 600 square feet. Transmission occurred over a regular phone line. So far, over 6,000 consults have been recorded with a $38 cost average, excluding medical. Community health aides who met a minimal sixth grade education requirement manage the sites. The high school students taught the equipment use to the aides. A university coordinator integral to the project regularly contacts the aides to ensure continued use. The consults concentrated on ears, eyes, and throat, dermatology, and occasional emergencies such as consultation for animal bites. The project has three evaluation models designed to analyze issues and project benefits. One evaluation focuses on ear problems and effective medication treatment. The project has been extended into its fifth year by the National Library of Medicine that added seven remote private clinics that serve native populations. The project's success is linked to a simple operation, end-user staff support, and understanding that technology alone should not drive a project.

## B2 Alaska Federal Health Care Access Network

| | |
|---|---|
| Area Office | Alaska Area |
| Indian Facility | Alaskan Native Medical Center, 194 tribal sites |
| Primary Use | Telemedicine |
| Use Status | Growing |
| Facility Contact | Vonni Carole, Director Tribal Support Services, Alaskan Native Tribal Health Consortium, 4141Ambassador Drive, Anchorage, AK 99508, Phone 907-729-1909, Fax 907-729-1901, E-mail <lcarole@anthc.org> |
| Grantee | Alaska Federal Health Care Access Network |
| Grant Funding | Congress, FY 99-2, $30 million (includes $4 million, OAT) |
| Contact | Linda Lekness (Director) Tom Bohn (Telecom), Steward Ferguson (Technology), and Ellen Provost (Project Evaluation), 4201 Tudor Centre Drive Suite 310, Anchorage, AK 99508<br>Phone 907-729-2260, Fax 907-729-2269, E-mail <afhcan@afhcan.org><br>Web site <http://www.afhcan.org/> |
| **Summary** | **The AFHCAN is ready to deploy telemedicine to 235 sites using the Maniilaq Association (Kotzebue) as a deployment test site in September 2000.** |

The Alaska Federal Health Care Access Network (AFHCAN) project costs $30 million over four years to deploy telemedicine to 235 sites. A project office manages the project with the Alaska Native Tribal Health Consortium (IHS-related), Department of Defense (Army and Navy), the Veterans Administration, and the U.S. Coast Guard.

The AFHCAN project has successfully coordinated and completed the integration of communications by developing a hybrid network. This network includes Alaska's two long distance carriers (AT&T Alaskcom and CGI), several federal sector healthcare organizations, regional hospitals and rural clinics, including 37 member organizations. The network combines a hybrid of topologies including fiber optic, wire-line, unlicensed wireless radio, microwave radio, satellite, Internet, frame relay and private line. The integrated equipment ranges from a single DS0 (56/64K Private Line), a DS1 (T1 1.5Mb Circuit) to a new technology, the Satellite PRI (Digital T1 1.5Mb Circuit). AFHCAN also supported each village site in filing a federal application for a rural health care telecom discount with the Federal Communication Commission. The applications are filed yearly basis and for Year Two, Alaska villages received $4 of the $6 million approved nation-wide.

The Alaskan Clinical Engineering Services associated with the Alaskan Native Medical Center (ANMC) supports AFHCAN telemedicine delivery. ANMC is managed by the Alaskan Native Tribal Health Corporation, which provides primary and secondary teleradiology services to 42 service units. Radiologists use a Picture and Archiving Communications System (PACS) at 43 internal workstations, plus remote sites.

ACES used leading edge manufacturers and suppliers of radiology and are able to leverage their vendors via an internally developed performance relationship contract. This allows them to downstream the associated technology and financial risks. As such ACES/ANMC/AFHCAN has limited their exposure and finances by having internal trained personnel from ACES trained on each vendors equipment annually. This alleviates the high support costs incurred with most vendor support agreements. By working out all these details upfront, they have been able to "optimally package" a turnkey solution including maintenance and their own internal trained support. When deploying systems ACES has an inclusive bilateral financial portion of their arrangement, this returns approximately eleven percent of the purchased cost of the systems back to ACES, thus more than paying the system support ACES internally provides to the remote sites. This arrangement will allow the Alaskan project to better sustain the program.

In September 2000, AFHCAN will install equipment using the Maniilaq Association (Kotzebue) as a test pilot for deployment. The equipment rollout consists of an acquisition workstation; acquisition hardware; software, display workstation, web server, printer and network router. Medical equipment includes digital cameras, EKG, otoscope and scanner. Each site will be able obtain, view, create, and move permanent patient data records. The major equipment difference between AFHCAN and the University of Alaska Telemedicine Test Bed Project is the addition of an EKG peripheral, higher computer capacity, and that a touch screen replaces a keyboard.

The AFHCAN project funds most "one-time" costs with participating sites responsible for recurring costs such as equipment parts, extended warranty cost beyond year one, telecom costs, and staff training transportation and housing costs. AFHCAN will fund:

- Initial purchase of equipment, shipping and handling, and the first-year manufacturers warrant

- Equipment deployment, including assembly, burn-in and testing, re-packing, and shipping to member organization sites

- Installation costs which includes salary, per diem, travel, specialized transaction equipment and tools for Alaskan Clinical Engineering Support (ACES) personnel

- Support costs for the first 12-months following equipment installation, including toll-free phone support, replacement parts and shipping, and on-site support help as required

- Regional training sessions to train local Super-Users/Trainers

- Training materials, including videos, CD-ROMS and manuals

AFHCAN has not yet developed a sustainable model that includes training, business and legal costs, a help desk, and remote control for teleradiology equipment diagnostics. The AFHCAN evaluation model is an early stage. The first planned medical assessment planned is for ear treatments for improved patient care and treatment cost reductions.

Project funding from various agencies is transferred to the AFHCAN project office. Part of that funding includes $4 million from the Department of Health and Human Services' Office for the Advancement of Telehealth (OAT). OAT will require AFHCAN to meet its grant requirements for program use and will reserve $400,000 or ten percent for cost associated with travel to Alaska and routine project monitoring. In addition, OAT has awarded the East Aleutian Tribes $990,000 over 3-years to implement a local plan for six frontier communities. See section below for description.

### B3 Eastern Aleutian Tribes, Inc. (EAT)

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|---|---|
| Area Office | Alaska Area |
| Indian Facility | Eastern Aleutian Tribes, Inc. (EAT) |
| Primary Use | Telemedicine & Telehealth |
| Use Status | New Project |
| Facility Contact | Patty Linduska, Director of Grants/Program Development<br>Chris Devlin, Executive Director<br>Eastern Aleutian Tribes, Inc., 1600 A Street, #104, Anchorage, AK 99501<br>Phone 907-277-1440, Fax 9071-227-1446, E-mail <eat@alaska.net><br>Web site under construction. |

| | |
|---|---|
| Grantee | Eastern Aleutian Tribes, Inc. (EAT) |
| Funding | OAT - FY 01-03 - $990,000 |
| Grant Contact | See Facility Contact |

**Summary** **The Eastern Aleutian Tribes is implementing a new telemedicine and Telehealth network in association with the school district in six frontier communities.**

The Eastern Aleutian Tribes (EAT) are located in the 8,029 square-mile area in the Bering Sea and Pacific Ocean with a land base of 6,985 square-miles. EAT formed a community partnership with the school district to maximize infrastructure resources and to sustain and improve health care for its native members by offering health care to the entire community. The school district received $233,767 from the Rural Utilities Service for local school and hospital high-speed connections. The school district and EAT combined their application to the Federal Communication Commission's universal service telecom discount program for a telecom discount that resulted in a $271,848 subsidy for Funding Year 2.

The Aleutians East service community is comprised of the six frontier communities of Akutan, False Pass, Nelson Lagoon, Cold Bay, King Cove and Sand Point. The permanent population is 2,500 with another 8,500 temporary residents during the peak-fishing season. The communities are geographically isolated from each other and from Anchorage. Airfare travel to Anchorage costs $550 to $1,000 with less costly sea travel available based upon weather conditions. Federally the area is designated as a Health Professional Shortage area, Medically Underserved Area, including medical, behavioral health, and dental.

OAT's grant funds will address the limited availability of physician specialty services, psychiatry, dental, case management and on-site supervision by physicians or mid-level providers for radiology or nutritional counseling. Existing phone consultation will be expanded through telemedicine's ability to transfer medical images; patient records and provides follow-on care for patients. Telemedicine consultations will occur via video conferencing and store-and-forward with a three-year plan for adding medical function areas. During year one, emergency medicine, ears/nose/throat, and dermatology will be available. Year two plans include radiology, dental and psychiatry with OB/GYN and nutritional counseling added in year three. The telehealth activities include administrative services connecting to EAT's Anchorage-based clinical director, continuing medical education and preceptorships by health professional students.

EAT supports the area-wide solution because the annual reoccurring cost base for Indian Health Service payments supplies less than 50 percent of the EAT budget. This small cost base also affects revenue from the Alaskan Federal Health Care Access Network (AFHCAN) which is estimated at $70,000 to $100,000 per year for three years.

Program sustainability is based upon cost savings from administrative and patient reductions in travel; patient revenue from the non-native and seasonal worker community; and, further identification of outside revenue resources. EAT's success in attracting a solid staff core with technical skills necessary to meet the vision for short and long-term health care helps local program development as well as coordination with the AFHCAN Project for an effective strategy.

### E4 Bristol Bay Area Health

| | |
|---|---|
| Area Office | Alaska Area |
| Indian Facility | Bristol Bay Area Health |
| Primary Use | Telemedicine (teleoptometry) |
| Use Level | Sustainable |
| Facility Contact | Jim Pickard, DO, Bristol Bay Health Corporation, Dillingham, AK 99576<br>Phone 907-842-5201, Fax 907-842-9354 |
| Grantee | Not applicable |
| Funding | $30,000 IHS Local Program Funds |
| Grant Contact | See Facility Contact |

A Bristol Bay Area Health program is a 100% store-and-forward teleoptometry program with ANMC and the University of Southern California College of Optometry. The program started in July 1996 with $30,000 in IHS funds. The images are captured with an analog video camera and then digitized before e mailing to remote experts. The Eye Clinic sees 2,000 patients a year and on average sends 2-3 images a month to experts on cases that usually involve diabetic retinopathy. If you are interested in replicating this program, the eye doctor recommends a camera with high resolution. A T-1 transmission is used.

## C. ALBUQUERQUE AREA

The Albuquerque Area has no telemedicine or telehealth projects. The Alamo Navajo School Board, Inc declined a FY 1997 grant for $133,280 from the Department of Commerce because it failed to attract a commitment from the IHS area or regional office for reoccurring T-1 telecom costs. Unnecessary expenditures were avoided because the grant coordinator understood that the telecom connection and support agreement were necessary before any equipment purchases.

## D. BEMIDJI AREA

The Bemidji Area Office has two telemedicine and one telehealth grant projects. The Mille Lacs Band of Ojibwe and Leech Lake tribal governments received grants for a telepharmacy and a community wellness program that supports diabetic care. In addition, Leech Lake has a telehealth grant to support education through local schools. The three-grant programs total $1.2 million, and are in the early implementation phases. The Bay Indian Mills Community and Sault Ste. Marie tribes receive benefits from a Michigan telehealth network operated by Marquette General Health Systems.

### D1 Upper Peninsula Telehealth Network & Marquette General Health System

| | |
|---|---|
| Area Office | Bemidji Area |
| Indian Facility | Bay Mills Health Center<br>Sault Ste. Marie Health & Human Services |
| Primary Use | Telemedicine & Telehealth |
| Use Status | Growing |
| Facility Contact | Walt Parish, Clinic Coordinator, Bay Mills Health Center, 12124 West Lakeshore Drive, Brimley, MI 49715<br>Phone 906-248-3204, Fax 906-248-5765<br><br>Russ Vizina, Director, Health Division, Sault Ste. Marie Health & Human Services, 2684 Ashmun Street, Sault Ste. Marie, MI 49783<br>Phone 906-632-5274, Fax 906-632-5276 |
| Grantee | Marquette General Health Systems, Upper Peninsula Telehealth Network |
| Funding | OFHP - FY's 94-00 - $921,233<br>RUS - FY 93, 96, & 98 - Total $765,797 |
| Grant Contact | Sally Davis, Community Relations, Marquette General Health System, 420 West Magnetic Avenue, Marquette, MI 49855<br>Phone 906-225-3120, Fax 906-225-3842, E-mail <sdavis@mgh.org><br>Web site <http://www.mgh.org/education/telemed.html> |
| **Summary** | **Both the Bay Mills Indian Community and Sault St. Marie tribal health clinics participate in a regional telemedicine and telehealth network called the Upper Peninsula Teleheath Network.** |

Marquette General Health System is the hub of the Upper Peninsula Telehealth Network that provides 22 end-uses with continuing education, videoconferencing and imaging services. The network operates over ISDN lines. Each site pays for telecom installation, monthly costs, and

shares site equipment cost. By November 2000, the network will combined its original videoconferencing system with Internet protocol videoconferencing using an Accord Bridge to provide a transparent merger for the end-user sites. Other network equipment includes PictureTel, Concord, Picture Swiftsites, Polycom ViewStations, and RSI Video Flyers. Peripheral equipment includes document cameras, electronic stethoscopes, computer mediator, microscope, auxiliary cameras, and ultrasound machines.

Telemedicine applications include psychiatry, surgical follow-ups for pediatric and cardiothoracic patients, neonatal discharge planning, pediatric learning assessments, dermatology, physical therapy, prenatal consults, pre-chemotherapy assessments, and case conferences. The Marquette General Health System is a component of ORHP/OAT's national evaluation of telemedicine.

The Sault St. Marie Health and Human Services operates a large health center and three satellite clinics to serve its 13,500 members. The main tribal clinic uses a PictureTel Concord. Additional rollabout equipment will be installed in a conference room and clinician area. Recently, the tribe installed a T-1 connection and plans improved connections to its satellite clinics. Future telemedicine emphasis will be neonatal. Upper Peninsula Telehealth Network uses in 2000 has been limited to nine programs.

The Indian Bay Mills Health Center had a delayed in start-up due to telecom connection problems. The Center and tribe have agreed to share a T-1 line, which allows the Center to come on-line. The Center will receive a PolyCom View Station and related peripherals such as an electronic stethoscope that may be used for cardiac patient follow-up. Bay Mills plans on using the Upper Peninsula Telehealth Network for distance leaning, clinical, and administrative purposes.

### D2 Leech Lake Tribal Council

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|---|---|
| Area Office | Bemidji Area |
| Indian Facility | Leech Lake Tribal Health |
| Primary Use | Telemedicine & Telehealth |
| Use Status | New Projects |
| Facility Contact | Dr. Linda Fritzell, Health Planner, Leech Lake Reservation, RR 3 Box 100, Cass Lake, MN 56461, Phone 218-335-3215, Fax 218-335-8219, E-mail <frizzell@paulbunyan.net> |
| Grantee | Leech Lake Tribal Council |
| Funding | TOP - FY 99-01 - $560,000<br>ORHP - FY 01-03 - $570,000 (estimate) |

Grant Contact See Facility Contact

**Summary** **Leech Lake's Tribal Health Division is developing a comprehensive community wellness program distributed to area clinics, schools, and possible patient home care. Emphasis placed on diabetic care.**

The Leech Lake TOP project structure is wrapped around a sustainable tele-wellness infrastructure, starting with building capacity in the area of health and reaching into community networking; education, culture, and lifelong learning; public safety; and public services, and communications. Emphasis is placed on improved appointment compliance, expert consultation, retinal eye exams for diabetes management. The system supports eleven IHS primary care providers, one physician, and two tribal mid-level providers among six satellite clinics.

The grant application described two diabetic programs. First, a home monitoring system operating over a 2-way interactive audio/visual video box with a connection over regular phone lines to a nurse's station was planned. A 12-home rollout would produce annual cost savings of $38,000 in nurse travel to remote homes. The second application was diabetic retinopathy workstation with a high-resolution reading. This equipment is not easily scaleable to smaller populations and requires 2,000 patients a year for cost recovery. Both technology choices are under review.

The GSA is providing assistance on equipment vendors and a telecom solution for the remote areas with poor infrastructure. A fractional T-1 line from Paul Bunyan Phone is an option since ISDN is not available at two sites. Three videoconferencing units will be installed with more planned as telecom capacity is increased. Video conferencing can be back hauled to Fargo for dial-up services.

The project serves the IHS service unit, Tribal Health Division (Cass Lake, MN) and the satellite clinic at Ball Club. Site connection is through videoconferencing and Internet. Remote satellite clinics at Inger and Onigum have Internet only. Internet access exists for Bug-O-Nay-Go-Shig, a tribal K-12 school at Bena. By year 3, the project will extend coverage to other residents through the additional schools of Cass Lake Bena Pubic School, Laporte Public School, Walker Hackensack-Akeley Public School, Leech Lake Tribal College, Bemidji State University, and the City of Cass Lake. Residents and students will benefit from the hook-up through limited classroom presentations and access to health information via the Internet.

Collaborative project planning partners include the Tribal Health Division, Regions Hospital (St. Paul), Cass Lake service unit (hospital/clinic), Paul Bunyan Telephone (Bemidji), Merit Care (Fargo, ND), and St. Luke's Hospital and Clinics (Duluth).

Another Leech Lake Tribal project expands distance education and enhances already-existing medical primary care services at the tribes K-12 Mino-A-Yan School which has a school clinic. This clinic has a chemical dependency, mental health, and health program and is connect to the Tribe's telemedicine wellness program. This project focuses on primary care services and curriculum for youth at-risk, the medically underserved children and adolescents, the homeless, and the surrounding community. Other involved project partners are the Bug-O-Nay-Ge-Shig

School, Cass County Health and Human Services, Minnesota Board on Aging, Paul Bunyan Rural Telephone Cooperative, and the Regions Hospital.

### D3 Mille Lacs Band of Ojibwe

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|---|---|
| Area Office | Bemidji Area |
| Indian Facility | Mille Lacs Service Unit |
| Primary Use | Telemedicine (Telepharmacy) |
| Use Status | New Project |
| Grant Contact | Sharon Gialason, Executive Director, Health & Human Services, HCR 67 Box 241, Onamia, MN 56359<br>Phone 320-532-4163**,** Fax 320-532-4354 |
| Grantee | Mille Lacs Band of Ojibwe |
| Funding | RUS - FY 00 - $107,305 |
| Facility Contact | See Facility Contact |
| **Summary** | **The Mille Lacs Band of Ojibwe is implementing a remote operated pharmacy operation throughout its population area.** |

The Mille Lacs Telepharmacy Project improves access to pharmaceuticals by tribal members who need to drive 30-80 miles for the closest service. Two outlying tribal clinics will be able to dispense medications and pharmaceuticals through a remote controlled package and bottle dispenser. Consultation will be provided through videoconferencing equipment connected to the pharmacy. Two T-1 lines have been ordered.

## E. BILLINGS AREA

The Billings Area Office installed videoconferencing equipment at the Blackfeet, Fort Belknap, Fort Peck and Wind River Service Units. The equipment lacks medical peripherals and is used mainly for administration. Similar videoconferencing equipment was installed under federal grants at the Crow Agency PHS Indian Hospital, Lame Deer PHS Indian Hospital and the Rocky Boy Cree Health Center. Fort Belknap and Rocky Boy have had limited telepsychiatry use. The Fort Peck Tribe operates a dialysis unit with access to videoconferencing at a neighboring non-Indian hospital. The Rocky Boy Chippewa Cree Tribe is a member of a regional telehealth network. The Salish & Kootenai Tribal College is planning 60 health courses leading to accredited degrees for Montana, Idaho, and Washington.

## E1 Fort Peck Tribal Dialysis Unit

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|---|---|
| Area Office | Billings Area |
| Indian Facility | Fort Peck Tribal Dialysis Unit |
| Primary Use | Telemedicine (nephrology) |
| Use Status | Sustainable |
| Facility Contact | Patti Faller, Registered Nurse, Fort Peck Tribal Dialysis Unit,<br>1107 H Street East, Poplar, MT 59320<br>Phone 406-768-3491, E-mail <rfaller@nemontel.net> |
| Grantee | Operated by Tribal Funds |
| Funding | Operated by Tribal Funds |
| Grant Contact | See Facility Contact |
| **Summary** | **The Fort Peck Tribal Dialysis Unit has a supporting nephrologist located 300 miles away and remote consultation is available through a neighboring hospital.** |

In 1989, the Fort Peck Tribe started an 18-patient kidney dialysis program that is operated by five nurses, two technicians and two social workers. A supporting nephrologist is provided through Medcenter One located 300 miles away in Bismarck, North Dakota. The nephrologist is on-site once a month. Videoconferencing service with the nephrologist is available through the Poplar Community Hospital, which belongs to a regional telemedicine network. The program also contracts with Vision Net in Great Falls, Montana, for diabetic eye care. Patient referrals are received from Indian Health Service, hospitals within a 200-mile radius and, occasionally from the Trenton Indian Service Area near Williston, North Dakota. The tribal program worked with Indian Health Service to formalize a kidney health protocol for care, prevention and education.

## E2 Lame Deer PHS Indian Hospital

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|---|---|
| Area Office | Billings Area |
| Indian Facility | Lame Deer PHS Indian Hospital |
| Primary Use | Telehealth, telemedicine available |
| Use Status | Sustainable |
| Facility Contact | Lionel Green, On-Site Coordinator, Lame Deer PHS Indian Health Center,<br>Lame Deer, MT 59043 |

Phone 406-477-4400, Fax 406-477-4427

Grantee: St. Vincent's Hospital

Funding: TOP - FY 97-00 - $464,264
NASA in-kind equipment

Grant Contact: John Zauher, Project Director, Saint Vincent Hospital, PO Box 35200, Billings, MT 59107
Phone 406-237-4530, E-mail <jzauher@svhhc.org>

**Summary** **The Lame Deer PHS Indian Hospital is using a NASA developed portable telemedicine unit for a homebound diabetic education program. Equipment use may be expanded to dermatology.**

This project represents a transfer of technology used by NASA astronauts to Native Americans in rural Montana. St. Vincent's Hospital in Billings administers the project grant. Originally, the project partner was the Crow Agency PHS Indian Hospital, which declined participation when it learned that the technology could not be used in an ambulance setting. The nearby, smaller Lame Deer PHS Indian Hospital accepted the technology transfer project. Prior to the change, St. Vincent's had already provided Crow with a $30,000 videoconferencing system and installed telecom improvements. Lame Deer received the same videoconferencing equipment and one-year salary for an on-site coordinator. St. Vincent's accommodated the Indian Health Service by placing three higher cost switches at Crow and Lame Deer at a $33,000 cost. It also provided the Area Office with an estimated $20,000 for related personnel costs. In exchange, IHS is responsible for the reoccurring telecom costs.

The project uses the Telemedicine Instrumentation Pack (TIP) developed for NASA for spaceflight land telemedicine applications and videoconferencing. TIP is a rugged portable diagnostic system housed in a suitcase. It provides complete telemedicine solutions for primary healthcare and can operate on any available bandwidth that supports real-time video or store-and-forward for high data integrity remote diagnosis. Non-physician personnel (nurses, physician assistants, technicians and rural health workers) can use the equipment.

The system can accommodate new sensors and software. TIP comes with a NASA software package called ALICUBE™ that easily combines paper-based patient records, medical images, digital files, text, voice recordings and other material into a single electronic patient chart. The chart can be e-mailed to any location in the world for consultation. NASA provided a free TIP unit that was bench assembled prior to commercialization. A commercial off-the-shelf TIP unit is now available by CyberMdx, Inc. for $30,000.

Lame Deer for most of the project recorded limited telemedicine use. The on-site coordinator hired with project funds for the last year used the TIP unit for a diabetic educational program that served approximately 50 households. The coordinator and a nurse visited homes of known diabetics with overdue clinical visits. The Community Health Representative informed the patients in advance of the pending visit. The nurse used the TIP unit to record vital statistics,

which were later downloaded, at the hospital for a doctor's review. When necessary, the doctor scheduled a clinic appointment. Older patients, in particular, appreciated the technology because the service appeared more personal than in a clinic setting. The educational information received in the home with this equipment made some patients aware that diabetes can be controlled to a far greater degree than they thought. As a result, patients sought a higher level of continued care.

Lame Deer is considering a dermatology application for this equipment.

### E3 Rocky Boy Health Board, Chippewa Cree Tribe

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|---|---|
| Area Office | Billings Area |
| Indian Facility | Chippewa Cree Health Center |
| Primary Use | Telehealth, telemedicine available |
| Use Status | Sustainable |
| Facility Contact | Gail Torres, On-site Coordinator, Chippewa Cree Tribe, Rocky Boy Health Board, Rural Route 1, Box 664, Box Elder, MT 59521<br>Phone 406-395-5008, Fax 406-395-4781 |
| Grantee | Rocky Boy Health Board, Chippewa Cree Tribe |
| Funding | ORHP/OAT - FY 97 - $151,721 |
| Grant Contact | See Facility Contact |

**Summary** **The Chippewa Cree Health Center is member of an educational network operated by Benefis Healthcare in Great Falls that also offers telemedicine applications.**

In January 1998, Chippewa Cree Health Center joined the REACH (Realizing Education and Community Health) Montana Telemedicine Network. The network provides a link to a tertiary care hospital in Great Falls and seven other rural hospitals. The telemedicine network provides specialty services and physician consultations, obstetrical, geriatric, and mental health/addiction services. On the telehealth side, the network provides education for lab technicians, X-ray technicians, physical therapists, registered and licensed practical nurses, medical records personnel, EMTs, and administrators. Rocky Boy pays $500 monthly for the network's telecom fee. Grant funds purchased a Picture Tel 45 Concord video conferencing unit at an estimated at a cost of $80,000. The rollabout equipment can be accessed in the emergency room, patient exam room and a conference room. The on-site coordinator is also a computer and data entry operator. Current use by Rocky Boy is limited to educational programs and occasional patient information consults that do not involve a clinician. Earlier in the project, Rocky Boy had used the system

for bi-monthly mental health consultations. REACH was started in FY 1994 with a Rural Utilities Service grant of $100,000 to Benefis Healthcare (formerly Deaconess Medical Center).

### E4 Salish Kootenai College, Pablo, Montana

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|---|---|
| Area Office | Billings Area |
| Indian Facility | Salish Kootenai College |
| Primary Use | Telehealth |
| Use Status | New project |
| Contact | Mike O'Donnell, Director, Distance Education, S&K College, PO Box 117<br>Pablo, MT, 59855<br>Phone 406-675-4800 x 203, Fax 406-675-2427<br>E-mail <mike_odonnell@skc.edu> |
| Grantee | Salish-Kootenai College |
| Funding | RUS - FY 00 - $108,780 |
| Grant Contact | See Facility Contact |
| **Summary** | **The tribal college serving the Flathead Indian Reservation received a grant to implement a plan for 60-health related course offering to other colleges in Idaho, Oregon, and Washington.** |

The Salish-Kootenai College is located on the Flathead Reservation and serves an Indian Health Service health compact tribe. Funding will be used to establish a distance learning program on ten reservations in Idaho, Oregon, and Washington. As many as 60 health-related courses, leading towards accredited degrees is planned.

## F. CALIFORNIA AREA

The California Area has three grant projects. The Round Valley Health Center is developing a major telehealth and telemedicine service delivery plan with funding from two entities. The Cabazon Band of Mission Indians operates a telehealth school project with a planned telemedicine expansion. The California Endowment will fund up to 18 tribal projects for diabetic retinopathy screening through the California Telehealth and Telemedicine Center.

### F1 Cabazon Band of Mission Indians

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| Area Office | California Area |
| Indian Facility | Cazabon Band of Mission Indians |

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|---|---|
| Primary Use | Telehealth, telemedicine available |
| Use Status | New Project |
| Facility Contact | Dr. William Whiteley, Cabazon Band of Mission Indians, 84245 Indio Springs Drive, Indio, CA 92201, Phone 760-345-9342, Fax 760-345-9342 |
| Grantee | Cabazon Band of Mission Indians |
| Funding | RUS - FY 99 - $245,000 |
| Grant Contact | See Facility Contact |

**Summary** **The Cabazon Band of Mission Indians delayed grant implementation until the tribe completed its IHS compact arrangement. Plans are underway to implement an Internet-based videoconferencing system that supports telehealth and medical consultation through the Indio Emergency Medical Group's to the local school system and community.**

The Cabazon Band of Mission Indians is planning as distance learning capabilities, health care education and medical services delivery with a prime goal of distance learning at 25 end user sites. Project partners are the Unified School District, Desert Sands Unified School District, University of California San Diego Medical Center, Santa Rosa del Valle Medical Group and Valley Partnership. Project beneficiaries will include approximately 11,500 secondary and elementary school students and 3,897 patients at the Indio, Coachella, and San Diego medical clinics will benefit from this project. The system will use internet-based videoconferencing system that supports medical consultation through the Indio Emergency Medical Group's link with two outlying rural clinics**.** After the system is operational, an expanded link to the Medical Center at the University of California, San Diego

### F2 California TeleHealth & Telemedicine Center (CTTC)

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|---|---|
| Area Office | California Area |
| Indian Facility | California Rural Indian Health Board (CRIHB) |
| Primary Use | Telemedicine (Opthalmology) |
| Use Status | New Project |
| Facility Contact | Wayne Isaacs, Information Systems Coordinator<br>California Rural Indian Health Board (CRIHB)<br>1451 River Park Drive Suite 220, Sacramento, CA 95815<br>Phone 916-929-9761, Fax 916-929-7246<br>E-mail <w.issacs@mail.ihs.gov> |

| | |
|---|---|
| Grantee | California Telehealth & Telemedicine Center |
| Funding | Up to 18 tribes ($60,000 estimate per tribe) |
| Grant Contact | Heather Bernikoff, Project Coordinator, California Telehealth & Telemedicine Center, 1215 K Street, Suite 800, Sacramento, CA 95814<br>Phone 916-552-7687, Fax 916-552-7588<br>E-mail <hbernikoff@calhealth.org> |
| **Summary** | **The California Rural Indian Health Board is technically assisting the California Telehealth & Telemedince Center to encourage Indian organizations to apply for up to 18 diabetic teleopthalmology grants.** |

The California Telehealth & Telemedicine Center, through generous funding from The California Endowment, will partner with the California Rural Indian Health Board (CRIHB) to develop and implement a diabetic teleopthalmology grant program. Up to 18 grants will be awarded over two years. CRIHB will staff and organize seven regional meetings throughout the state for Tribal Health and Urban Health Program representatives to become familiar with the program. Only Indian Health Programs with a Title V Compact, PL 638 Contract or compacts with the Indian Health Service and certification as a Medi-Cal provider are eligible to apply.

CRIHB will also help recruit a six-person Advisory Committee from organizations involved in providing health services to the American Indians in California. Year One grant proposals are due January 2001 with awards by February. Hardware grant equipment includes a Pentium III computer workstation, video capture card, and a mobile workstation stand. Peripheral equipment includes an auto-chart projector, screen mirror set, a pinhole occluder, and Tenopen XL, non-mydriatic fundus camera, exam chair, and AIT mobile tail for non-mydriatic camera. Software to capture images, videoconferencing equipment, and encounter documentation will be provided along with telecommunications.

The Los Angeles Eye Institute (LAEI) at Charles R. Drew University of Medicine and Science will provide clinical and technical teams to sites receiving grants. Other technical assistance includes infrastructure and delivery system assessment, clinical protocol development, implementation, and quality control of clinical data, and medical service delivery. The LAEI program representative is Dr. Charles Flower, who operates teleopthalmology programs in large urban public housing developments, by training community members to conduct the eye exams, which are reviewed by experts under a store and forward system.

### F3 Round Valley Indian Health Center

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|---|---|
| Area Office | California Area |
| Indian Facility | Round Valley Indian Health Center |
| Primary Use | Telemedicine & Telehealth |

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|---|---|
| Use Status | New Project |
| Facility Contact | Todd Gallardo, Interim Director, Telemedicine & Telehealth, Round Valley Health Center, Corner of Highway 162 & Biggar Lane, Covelo, CA 95428<br>Phone 707-983-6404, Fax 707-983-6184<br>E-mail <allardo_t@hotmail.com> |
| Grantee | Round Valley Indian Health Center |
| Funding | TOP - FY 00 - $140,000<br>California Telehealth & Telemedicine Center, 2000, $78,000 |
| Grant Contact | See Facility Contact |

**Summary** **The Round Valley Indian Health Center is managing two new grants for the combined use of telemedicine and telehealth.**

The Round Valley Indian Center is a 638-IHS contract care facility and a nonprofit organization that serves an area population of 2,800, of which 1,029 are Native Americans. The reservation base is 1,700 acres in the Valley, plus 32,000 acres of surrounding mountainous terrain. Outside patient transport care can be as far as four to eight hours away.

Besides the Department of Commerce TOP Grant, Round Valley has funding from the California Center for Telemedicine and Telehealth and Telemedicine for network design to establish telemedicine and telehealth services. CTTC will provide matching contribution for a T1 line, which may end-up as added bandwidth to the existing fractional T1 line since the phone company lacks capacity for a regular T1 line. The fractional T1 uses a frame relay network for health related data and Internet access and was obtained through the IHS/FTS2000 contract with GTE (now Vorizon).

The Round Valley network will be a collaborative effort among all the major community health-related services. The projects will set-up videoconferencing capability at three sites. Learning kiosks, through a line-of-sight wireless system, will connect the Health Clinic, the Parenting Center, and the Indian Education Center. The Indian Health Center will be linked to outside specialists. As October 2000, Round Valley is gathering information about equipment and planning a rollout strategy that effectively uses the resources available under the two grants and local programming funds. Telemedicine applications have not been selected, though a team has identified their needs as mental health, diabetic, and obstetric care. Each patient will receive an e-mail account to interact with on-line providers, receive newsletters and ask questions.

## G NASHVILLE AREA

The Nashville Area benefits from two related telemedicine / telehealth projects operated in association with Aroostock and Washington County hospital/clinic and home care providers. The DownEast Telemedicine Network and the Northeast Maine Telemedicine Network both use the Regional Medical Center, an ambulatory care clinic in Lubec, Maine. These programs serve the Passamaquoddy Tribes of Pleasant Point and Indian Township, the Aroostock Band of Micmac, and the Houlton Band of Maliseet.

### G1 Passamaquoddy Pleasant Point & Indian Township Health Centers

| | |
|---|---|
| Area Office | Nashville Area |
| Indian Facility | Passamaquoddy Indian Township<br>Passamaquoddy Pleasant Point |
| Primary Use | Telehealth, telemedicine available |
| Use Status | Growing |
| Facility Contact | Elizabeth Neptune, Health Director, Passamaquoddy Indian Township, 1 Newell Drive Box 97, Princeton ME 04668<br>Phone 207-796-2322<br><br>Tina Dowman, Health Director, Passamaquoddy Pleasant Point, PO Box 351, Perry, ME 04468<br>Phone 207-653-0711, Fax 207-853-2347 |
| Grantee | Regional Medical Center at Lubec, Inc., DownEast Telemedicine Network |
| Funding: | ORHP/OAT - FY 97-99 - $681,377<br>NLM - FY 98 - $49,895 Internet connection<br>RUS - FY 00 - $269,360 |
| Grant Contact | Doug Kingsbury, Regional Medical Center at Lubec, Inc., Rural Route 2, Box 380, South Lubec Road, Lubec, ME 04652<br>Phone 207-733-5541, Fax 207-733-2847 E-mail <d.kingsbury@rmcl.org><br>Web site http://www.rmcl.org/sssite/Page_1x.html |
| **Summary** | **Passamaquoddy Indian Township and Passamaquoddy Pleasant Point have received equipment and support from the DownEast Telemedicine Network (DETNET).** |

The DownEast Telemedicine Network connects 15 Washington and Aroostook County health and mental health care organizations, centers, a hospital, private physician offices, mental health agencies, a home care agency, and a school system. With a tertiary care hospital and a

psychiatric hospital in Bangor and two Indian health centers (Passamaquoddy Pleasant Point and Passamaquoddy Indian Township). The network began operations in the summer of 1998. The network utilizes open-architecture Polycom View-Stations and ISDN connections. Clinical telemedicine offerings include emergency medicine, neonatology, substance abuse counseling, mental health counseling, diabetes education, endocrinology, and neurology. Other system uses are health profession student supervision, continuing education, and administrative meetings. During the 3-year project, both tribes received a Polycom ViewStation, TV, carts, and no-cost ISDN connections. Staff development services have been provided for the clinician and administration. Compared to other small users, the Indian centers use has been minimal and mostly for administrative and continuing education. Limited or no use was recorded between the Indian Centers and their patient referral partners. Additional use for mental health is being considered.

### G2 Aroostock Band of Micmac, Houlton Band of Maliseet & Passamaquoddy Pleasant Point

| | |
|---|---|
| Area Office | Nashville Area |
| Indian Facility | Aroostock Band of Micmac<br>Houlton Band of Maliseet<br>Passamaquoddy Pleasant Point |
| Primary Use | Telehealth, telemedicine available |
| Status Use | Growing |
| Contact | John Quellette, Health Director, Aroostock Band of Micmac, Edgemont Drive, Presque Isle, ME 04769<br>Phone 207-764-7219, Fax 207-764-7768<br><br>Doug Lindsay, Acting Health Director, Houlton Band of Maliseet, RR 3 Box 460, Houlton, ME 04730<br>Phone 207-532-2240, Fax 207-532-2402<br><br>Elizabeth Martin, Health Director, Passamaquoddy Indian Township, 1 Newell Drive Box 97, Princeton ME 04668<br>Phone 207-796-2322 |
| Grantee | NE Maine Telemedicine Network |
| Funding | RUS - FY 98 - grant ($108,467) loan ($157,533)<br>RUS - FY 00 - $64,000 (Visiting Nurses Association)<br>TOP - FY 98-01 - $600,000<br>ORHP - FY 00-02 - (estimate $600,000)<br>Robert Woods Johnson - 1998 - $450,000 |
| Grantee Contact | Carol Craew, Director, NE Maine Telemedicine Network |

& Sunrise County Home Care, RR 2 Box 38, Lubec, ME 04652, Phone 207-733-9705, Fax 207-733-7555

**Summary** **The Aroostock Band of Micmac and Houlton Band of Maliseet have access to 24-hour home care monitoring and continuing education from the Northeast Maine Telemedicine Network. Similar service is provided under contract to the Passamaquoddy Pleasant Point Health Center.**

The Northeast Maine Telemedicine Network, serves to extend the clinical Telehealth delivery system throughout Aroostock County, which comprises another large rural region to the north, as well as into patients' homes of both Arroostock and Washington counties through home telemedicine technologies. In Washington County, the Sunrise County HomeCare Services, a division of the Regional Medical Center, provides the home telehealth services. The DownEast Telemedicine Network also operates from the same Regional Medical Center. The Northeast Maine Telemedicine Network concentrates on continuing education for health care staff and facilitating communication between home care agencies and health care providers. The network provides 24-hour monitoring home care patients by providing triage nurse availability as well as in-home telemedicine monitoring.. Telemedicine application emphasis is placed on pulmonary, wound care management, and mental health. The main network providers are the Visiting Nurses Association and the Sunrise Health Care Coalition, which is comprised of all health care organizations in Washington County. In Aroostock County, the Aroostock Band of Micmac and Houlton Band of Maliseet, are members along with four health centers, and the county mental health agency, and the county's largest hospitals. A new outreach mental health program will be phased-in under a new $600,000, 3-year program.

The Maliseet Indian health center will shortly receive a Polycom ViewStation and ISDN hook-up now that the center has completed remodeling. The Micmac Clinic opened its new clinic in May 2000 and, has used its equipment for Grand Rounds and mental health. The Clinic intends to use the equipment for patient consultations with its referral hospitals. The Maliseet and Micmac's each contributed around $4,000 towards the $8,000 equipment cost. The tribes are responsible for the ISDN hook-up that costs $35 per month.

The Passamaquoddy Pleasant Point Health Center has a contract for network service. It has successfully used the network to provide home care for an infant-at-risk with directions from a tertiary care hospital in Bangor.

## H NAVAJO AREA

The Navajo Area Office has an internal teleradiology network designed by MEDTEL with four main sites at Shiprock, Gallup, Tuba City, and Chinle. Eight smaller sites are located at Winslow, Inscription House, Crownpoint, Tsalie, Kayenta, Fort Defiance, Tohatchi and Dzilth-Na-O-Dith-Hle.

The University of Arizona's private telemedicine network serves the Tuba City Indian Medical Center and the Navajo Nation Sage Memorial Hospital at Ganado. The Indian sites were among eight funded by the State of Arizona. The State gave each site $160,000 in equipment and pays an annual reoccurring telecom connection cost of $61,000 per year. The equipment is the same as provided the Whiteriver PHS Indian Hospital except that equipment prices dropped by $70,000 between installations.

Since May 27, 1997, Tuba City has recorded 355 consults for the following clinical areas: cardiology (14), dermatology (216), endocrinology (1), gastroenterology (1), hematology/oncology (4), infectious diseases (1), neurology (2), nephrology (1), orthopedics (1), orthopedics surgery (2), pediatric dermatology (78), pediatric poison (2), psychiatry (15), radiology (1), surgery (2) and surgical oncology (4). Sage Memorial statistics are not available from the university as a non-IHS facility.

The Northern Navajo Medical Center has a partnership with NASA and the University of New Mexico for special services.

A mobile telemamagraphy program is planned with operation based at Tuba City.

## H1 Northern Navajo Medical Center

| | |
|---|---|
| Area Office | Navajo Area |
| Indian Facility | Northern Navajo Medical Center |
| Primary Use | Telemedicine |
| Use Status | Sustainable |
| Contact | Lt. Tom Duran, CIO, Shiprock Service Unit, Navajo Indian Health Service, PO Box 160, Shiprock, NM 87420, Phone 505-368-6608, Fax 505-368-6260, <tduran@navsra.navajo.ihs.gov> |
| Grantee | NASA Partnership |
| Funding | Not Available |
| Grant Contact | Dr. Muriel Ross, NASA Ames Research Center |
| **Summary** | **The Northern Navajo Medical Center has a partnership arrangement with NASA to use a highly sophisticated medical 3-D image resolution to assist in diagnoses.** |

In November 1998, the Medical Center showcased the Virtual Collaborative Clinic (VCC) application developed by NASA Ames Research Center for Bioinformatics under the direction of Dr. Muriel Ross. The technology combines highly sophisticated medical 3-D imaging resolution

of 24-bit color stereo medical images with high-performance, high-speed networking. The final product is easy to use and runs on a common PC with a graphics card and a mouse to point and click for commands. The three components of the virtual collaborative clinic includes the VCC, the cyber-scalpel (virtual 3-D cutting tool), and the Mesher applications (3-D image generator from CT or MRI scans. The fourth component includes stereoscopic images derived from echocardiography ultrasound sources. NASA successfully tested Internet 2 data transfer at Shiprock at 32 MB per second, which is above the typical MPEG video stream or compressed video streams sent across the Internet of 1.5-2 MB per second.

## H2 Northern Navajo Medical Center

| | |
|---|---|
| Area Office | Navajo Area |
| Indian Facility | Northern Navajo Medical Center |
| Primary Use | Telehealth |
| Use Status | Growing |
| Facility Contact | Lt. Tom Duran, CIO, Shiprock Service Unit, Navajo Indian Health Service, PO Box 160, Shiprock, NM 87420<br>Phone 505-368-6608, Fax 505-368-6260<br>E-mail <tduran@navsra.navajo.ihs.gov> |
| Grantee | University of New Mexico, Albuquerque High Performance Computing Center (Education and Research) |
| Funding | OAT - FY 00 - $894,956 |
| Grant Contact | Ernie Herrera, Associate Director, High Performance Computing Education and Research Center, University of New Mexico, 1601 Central Avenue NE, Albuquerque, NM 87131,<br>Phone 505-277-8249, E-mail <eherrera@ahpcc.unm.edu> |
| **Summary** | **The Northern Navajo Medical Center receives telehealth education through an advanced high performance computing center associated with the University of New Mexico** |

The Northern Navajo Medical Center is a member of the University of New Mexico School of Medicine Telemedicine Network. As a member, it also participates in a medical training program offered to the Medical School by the Albuquerque High Performance Computing Center (HPCC) which is co-located at the University. The training program called TOUCH — Telehealth Outreach for Unified Community Health — operates under an Office for the Advancement of Telehealth one-year grant of $894,956. The Northern Navajo Medical Center will soon receive $13,400 for installation of a mini Access Grid Studio to access the training.

The Albuquerque HPCC uses advanced Internet-based information systems and high performance computing to enhance education, training, patient care management and problem solving in collaboration with students and healthcare providers at dispersed locations. The project demonstrates the feasibility of employing advanced computing methods to enhance education in a problem-based learning (PBL) format currently being used in a medical school curriculum, applying a specific clinical case (i.e. brain-injury) as model and deploying to remote sites/workstations. Other TOUCH partners include the University of Hawaii School of Medicine and the Maui Community College. Additional funds are anticipated in FY 2001. The Albuquerque HCCP web site also includes a Native America Outreach Program that may be of interest to the IHS and tribal healthcare community. See: <http://www.ahpcc.unm.edu/>

## I OKLAHOMA CITY AREA

The Oklahoma City Area has an internal telemedicine application in the area of diabetic retinopathy at the Carl Albert Indian Hospital. The Choctaw Nation operates a telemedicine network over a state communications system to three remote sites of Broken Bow, McAlester, and Hugo.

### I1 Carl Albert Indian Hospital

| | |
|---|---|
| Area Office | Oklahoma City Area |
| Indian Facility | Carl Albert Indian Hospital |
| Primary Use | Telemedicine (ophthalmology, diabetic retinopathy) |
| Use Status: | Sustainable |
| Facility Contact | John Garber, OD<br>1001 North Country Club Drive, Ada, OK 74820<br>Phone 580-436-4512, 580-421-6290 |
| Grantee | Internal IHS Project |
| Funding | $10,000 local programming funds |
| Summary | Since February 2000, the Carl Albert Indian Hospital has operated digital disease detection and tracking system to assist in managing diabetic retinopathy. |

Diabetic patients in primary care clinics undergo digital retinal imaging. A digital fundus camera is used along with an off-the-shelf workstation able to optimize management of large sets of image data. The display monitor is specially designed to view the images of 3-Dimensions using "stereoscopic display". These images are transmitted to the Inoveon Evaluation Center in Nashville, Tennessee, for an interpretation of the state of retinopathy and recommendations for

preferred care based on the American Academy of Ophthalmology Preferred Practice Patterns. The hospital served as a beta test site for they system originally developed at the University of Oklahoma's Center for Telemedicine. The system was clinically validated and commercialized as a service and is available to others through Inoveon Corporation of Oklahoma City. Inoveon offers a turnkey solution where it provides the equipment and full-time employee and the end-user simply pays on a per-patient basis. A T-1 connection is used by the facility, but other alternatives are also feasible (ISDN, DSL, cable-modem). The screening program averages 20-25 consult per week and expects the number to reach 500 for the year 2000.

## I2 Choctaw Nation Health Services Authority

| | |
|---|---|
| Area Office | Oklahoma Area |
| Indian Facility | Choctaw Nation Health Services Authority |
| Primary Use | Telemedicine |
| Use Status | Sustainable |
| Facility Contact | Theresa Jackson, Director, Physical Services<br>Choctaw Nation Health Services Authority, Route 2 Box 1725, Talihina, OK 74571, Phone 918-567-7000 x 7096, Fax 918-567-7041 |
| Grantee | Choctaw Indian Nation Hospital |
| Funding | RUS - FY 97 - $198,352<br>RUS - FY 99 - $195,812 |
| Grant Contact | See Facility Contact |

**Summary:** **The Choctaw Nation Indian Hospital operates a telemedicine network connecting three remote clinic sites of Broken Bow, McAlester and Hugo.**

The Choctaw Nation Indian Hospital used grant funds to establish a local and wide area network system to serve the hospital and three remote clinics in Broken Bow, McAlester and Hugo. Videoconferencing equipment connects physicians and other health care providers for consultation among patients, local physicians, and remote specialists. Teleradiology components allow the interchange of images among the four sites. Telemedicine use was expanded through the second grant to enhance video conferencing capabilities through Oklahoma's OneNet services. OneNet is Oklahoma's telecommunications network for education and government that uses fiber optics and wireless technologies for voice, video, and data transmission.

Direct medical eye care services and medical training is provided from the Northeastern State University College of Optometry, Tahlequah, and Oklahoma State University College of Osteopathic Medicine, Tulsa. Other specialty services include medical care for diabetes,

cardiology, orthopedics, and ophthalmology. Telehealth training is available for providers, students and residents for medical and non-medical training. The Choctaw Nation Health Service Authority covers 15,000 square mile area with a population well over 60,000 people.

## J PHOENIX AREA

The Phoenix Area manages a national congressionally funded diabetic retinopathy program at the Phoenix Indian Medical Center Eye Clinic. The Arizona Telemedicine Network operated by the University of Arizona provides telemedicine / telehealth services to the Whiteriver PHS Indian Hospital. Similar services are planned for the new Hopi Health Care Center and the Phoenix Indian Medical Center. A teleradiology project connecting the Phoenix Indian Medical Center with an IHS facility at Parker is in the planning stages.

### J1 Hopi Heath Care Center

| | |
|---|---|
| Area Office | Phoenix Area |
| Indian Facility | Hopi Health Care Center |
| Primary Use | Telemedicine |
| Use Status | New Project |
| Facility Contact | Lisa Sumner, Clinical Director<br>Hopi Health Care Center<br>PO Box 4000, Polacca, AZ 86042<br>Phone: 520-737-6002 |
| Grantee | University of Arizona |
| Funding | RUS - FY 99 - $121,175<br>Hopi Health Care Center $52,000 |
| Grant Contact | Kevin McNeal, Ph.D. Arizona Telemedicine Program, University of Arizona, Health Sciences Center, PO Box 245105, Tucson, AZ 85724-5105, Phone 520-626-2493 |
| **Summary** | **The new Hopi Health Care Center will become a new member of Arizona Telemedicine Network operated by the University of Arizona.** |

The new $40 million Hopi Health Care Center opened on June 21, 2000, and replaced the smaller Keams Canyon and Second Mesa Clinics. Although, the hospital operates under a family practice model, it offers specialty clinics such as ophthalmology, surgery, and podiatry. Telemedicine will be used to reduce patient travel because pre and post-operation can be done at Hopi. The Center will contribute $52,000 towards equipment costs. A Tandberg

videoconferencing system is planned. An application will be filed for a universal service discount to cover a portion of the T-1 reoccurring costs estimated at $2,000 per month.

### J2 Fort Duchesne PHS Indian Health Center, Child Abuse Program

| | |
|---|---|
| Area Office | Phoenix Area |
| Indian Facility | Fort Duchense PHS Indian Health Center |
| Primary Use | Telemedicine (child sexual abuse) |
| Use Level | Growing |
| Facility Contact | Commander P. Jane Powers, FNP, Director, Child Abuse Project, Fort Duchense Indian Health Center, PO Box 160, Fort Duchense, UT 84026, Phone 801-722-5122, Fax 801-722-9137 |
| Grantee | Fort Duchense PHS Indian Health Center (administering unit) |
| Funding | Interagency Agreement DOJ/IHS, FY 99-00, $265,241 estimate |
| Grant Contact | See Facility Contact |
| **Summary** | **The Fort Duchense child sexual abuse program will be replicated in 14 IHS/tribal units with funding provided under an interagency agreement between HIS and the Department of Justice.** |

Fort Duchense has a child sexual abuse program managed by P. Jane Powers, a family nurse practitioner. IHS gave the service unit a colposcope with an attached 35mm camera and trained the family nurse practitioner on equipment use through two agency colposcope courses. She then completed three "mini-residencies" in the evaluation of physical/sexual abuse of children with Dr. Astrid Heger at the Center for the Vulnerable Child at Los Angeles/University of Southern California, Dr. Helen Britton of the Child Protection Team at Primary Children's Medical Center in Salt Lake City, and Dr. Leah Lamb at Cooks Medical Center, Fort Worth, Texas.

Formal didactic certification was obtained from Cabrillo College in Santa Cruz, California, under the SART/SANE (Sexual Assault Response Team/Sexual Assault Nurse Examiner) program. The Phoenix Area Office, the service unit and Jane Powers contributed to training costs. Since 1995, the program has been able to save the service unit $100,000 by eliminating a 300-mile round trip to Salt Lake City for photo reviews. The unit now scans 35mm colposcopic photographs into a personal computer through a color scanner, and the images are sent by modem over a regular phone line to an outside expert who also uses Second Opinion Software. The photos can be reviewed interactively, either immediately or at a later date.
The Fort Duchess program is recognized nationally. The response to a June 1998 article in the *IHS Peds Notes* by Dr. Bill Green, Albuquerque Area, prompted IHS to arrange an interagency agreement with the Department of Justice Office of Crime Victims to fund similar programs at

other sites. Dr. Al Hiat coordinates this effort for the IHS national office with Jane Powers. DOJ funds will be used to purchase $119,910 in equipment (colposcopes, cameras and accessories) for 18 doctors in fourteen service units. Didactic classroom and computer training and travel funds for training and follow-on preceptorships at the University of Southern California is also funded. The Fort Duchense program will conduct Grand Rounds with the participants using field cases.

The American Indian Information Network through company donations will provide participants Second Opinion and Leisegang ImageQuest software packages. If successful, this project may be funded again through the IHS/DOJ interagency agreement. Project total is estimated at $265.241, including the software donation. Participating services units include:

- Alaska Area - Bethel, Dillingham, Juneau, and Kotzebue
- Albuquerque Area - San Fidel Hospital serving Acoma and Laguna Pueblos and Cannoncito
- Billings Area - Crow Agency PHS Indian Hospital, Harlem PHS Indian Hospital, Lame Deer PHS Indian Health Center, Poplar PHS Indian Health Center, and Fort Washakie PHS Indian Health Center
- Navajo Nation - Tuba City
- Phoenix Area - Gila River Healthcare Corporation, San Carlos Unit, and Whiteriver PHS Indian Hospital

### J3 Phoenix Indian Medical Center (PIMC), National Diabetic Retinopathy Project

| | |
|---|---|
| Area Office | Phoenix Area |
| Indian Facility | Phoenix Indian Medical Center, Eye Clinic |
| Primary Use | Telemedicine (Opthalmology) |
| Use Level | Growing |
| Facility Contact | Mark Horton OD, MD, Phoenix Medical Center, Eye Department, 4212 North 16th Street, Phoenix, AZ 86016, Phone 602-263-1504, Fax 602-263-1635, **E-mail Mark.Horton@mail.ihs.gov** |
| Grantee | Phoenix Indian Medical Center, Eye Clinic |
| Funding | Congressional Line Item - FY 99-01 - $2,150,000 |
| Facility Contact | See Facility Contact |
| **Summary** | **The Phoenix Indian Medical Center Eye Clinic manages a congressional project for diabetic retinopathy in association with the Joslin Vision Network. In November 2000, the Sells PHS Indian Hospital will be added as project site. A third site outside of the U.S. Southwest Region will be added later.** |

The Phoenix Indian Medical Center (PIMC)'s operates a collaborative project with the Joslin Vision Network which is managed by Dr. Mark Horton. Congress directly funds the project over 3-years from FY 1999-2001 for $2,150,000. These funds are separate from the $30 million Center for Disease Control Diabetes Project. Congress asked PIMC to participate because of the high rate of diabetes among native people and IHS sites vary in size to test the scalability of equipment. Project funds support the PIMC and Sells PHS Indian Hospital sites. A third site outside of the U.S. Southwest Region will be selected when Joslin provides a third technology update.

The PIMC operation has been very successful because a workstation is co-located in the center's waiting room. By asking a few questions they are able to determine their last opthamalogical exam or if they have ever had one before. As the wait time averages approximately twenty minutes, the technician is able to finish a digital retinopathy scan and send the images across the street while the patient returns the waiting room without missing the scheduled appointment. The reading is completed during the time the patient has their schedule medical visit. If immediate care is required, the patient is notified before leaving the facility. If not, the patient is asked to schedule a regular follow-up visit in the future.

Using this approach, PIMC has been able to increase the amount of Native Americans seen for eye examinations more than threefold the normal, with this simple and effective program the examined patient rate attained is fifty-six percent of the Native American community visiting PIMC annually. Dr. Horton attributes program success to the fact patients does not their eyes dilated, its painless, and it does not compete with other appointments. A technician operates the waiting room workstation with the actual retina reading done by the Eye Clinic staff housed in an adjoining building behind PIMC.

This project is beneficial to native people who experience a high rate of diabetes. If regularly screened, only two percent of diabetic cases will result in blindness. In the future, Dr. Horton and Joslin are investigating a web-based solution to distribute services to rural clinics and support them via the Internet

### J4 Whiteriver PHS Indian Hospital

| | |
|---|---|
| Area Office | Phoenix Area |
| Indian Facility | Whiteriver PHS Indian Hospital |
| Primary Use | Telemedicine (cardiology, dermatology) Telehealth |
| Use Status | Sustainable |
| Facility Contact | Cathy Griggs, Procedures Nurse, Whiteriver PHS Indian Hospital, PO Box 860, Whiteriver, AZ 86942<br>Phone 520-338-4911 x402, Fax 520-338-1122<br>E-mail <Cathy.Griggs@mail.ihs.gov> |

| | |
|---|---|
| Grantee | University of Arizona |
| Funding | RUS - FY 98 - $142,075 |
| Grant Contact | Sally Beinar, Arizona Telemedicine Program, University of Arizona, Health Sciences Center, PO Box 245105, Tucson, AZ 85724-5105 |

**Summary** **The Whiteriver PHS Indian Hospital receives medical consultation service from the Arizona Telemedicine Network operated by the University of Arizona.**

Whiteriver is an acute care inpatient hospital located approximately a 4-hour drive to Phoenix Arizona. Whiteriver is connected to the University of Arizona's virtual private network via a dedicated T1 a dial-up bandwidth network, configured to accommodate a single large data demand such as radiology and CT scans to several small data demands such as a live dermatology consult while transferring digital photographs.

Whiteriver is able to connect into several university sites within the Medical Center to obtain the necessary specialty needs. With every telemedicine specialty they do here, they have worked around and make it work with a Tandberg Videoconferencing system integrated with AMD peripherals. In addition, they have been able to integrate Cardiology with treadmill and halter monitor. Other functional uses include dermatology and occasional neurology and rheumatology.

The first University of Arizona consult occurred on March 4, 1999, and Whiteriver has logged 89 cases through September 27, 2000. Seventy-eight dermatology consults were recorded — 48 adults and do pediatric cases. Other uses include cardiology (1), neurology (5), pediatric cardiology (1), plastic surgery (1), rheumatology (1) and surgery (2). In addition, twelve treadmill and halter consults have been recorded with a Florida-based expert.

The service unit has a $120,000 contract with a radiologist from nearby Springerville for daytime reads and once a week on-site visit. The University connection is used mainly after hours and on weekends. In exchange for Whiteriver's annual recurring telecom costs of $21,600. The typical consult can be completed within one hour. Data transmission is split between store and forward and real time video. The program is well accepted by the hospital administration, staff and patients. The biggest lesson learned by staff was that telemedicine programs require more time than anticipated to install, use and maintain skills. Applications such as cardiology, for example, require a high skill set. The staff recommends the use of an exclusive area for telemedicine that does not require adjustments of equipment placement and lighting, etc.

## K. PORTLAND AREA

The Portland Area has limited telemedicine / telehealth applications. The Northwest Portland Indian Health Board used Department of Commerce funding to provide Internet access to eight tribal members. The Quileute Center along with Neah Bay Service Unit belongs to a

telemedicine network operated by the Clallam County Hospital District 1. The Forks project evolved from a chronic pain management project failed to produce a high patient level. The Warm Springs Service Unit has a limited teleradiology program for outside consultations.

## K1 Clallam County Hospital District 1

| | |
|---|---|
| Area Office | Portland Area |
| Indian Facility | Quileute Health Center<br>Sophie Trettevick Indian Health Center, Neah Bay |
| Primary Use | Telemedicine, (mental health) |
| Use Status | Sustainable |
| Facility Contact | Lisa Horton Quileute Health Center, PO Box 180, La Push, OR 98350, Phone 360-374-9035, Fax 360-374-2644<br><br>Tom Birdinground, Service Unit Director, Sophie Trettevick Indian Health Center, PO Box 410, Neah Bay, WA 98357<br>Phone 360-645-2233 |
| Grantee | Clallam County Hospital District 1 (dba Forks Community Hospital) |
| Funding | ORHP - FY 98-00 - $540,951 |
| Grant Contact | Roger Harrison, Manager, Information Services Clallam County Hospital District 1. 530 Bogachiel Way, Forks, WA 98331<br>Phone 360-374-6271, Fax 360-374-6238 |

**Summary** **Quileute Health Center and Neah Bay receive benefits from a telemedicine network formed by a nearby small hospital at Forks, Washington.**

The Clallam County Hospital District developed an expanded telemedicine network consisting of eight mental health care provider and consumer entities in northernmost Washington. The project focuses on mental health and chemical dependency treatments and confidential HIV counseling. Quileute Health Center and Neah Bay receive program benefits. Both Indian health centers and the hospital were end-user sites in an earlier grant for chronic pain that provided a limited introduction to telemedicine. The Vtel Desktop equipment used by the chronic pain grant has been replaced by Polycom equipment which costs around $8,000 per unit. Clallam pays the telecom costs and may continue to do so after the grant ends. Three ISDN lines for more effective pricing have replaced the earlier T-1 connections. Neah Bay would like to expand its telemedicine services to a larger hospital in Port Angeles or the University of Washington, Medical Center for access to specialty services and emergency care. Neah Bay patient transport costs to Port Angles or Seattle cost between $5,000 and $7,000 per trip.

## K2 Northwest Portland Area Indian Health Board

| | |
|---|---|
| Area Office | Portland Area |
| Indian Facility | Northwest Portland Area Indian Health Board |
| Primary Use | Telehealth |
| Use Status | Sustainable |
| Facility Contact | Jim Fry, Information System Specialist, Northwest Portland Area Indian Health Board, 527 Southwest Hall Street, Suite 300, Portland, OR 97201 Phone 503-228-4185 x298, Fax 503-228-8182, E-mail <jfry@npaihb.org> |
| Grantee | Northwest Portland Area Indian Health Board |
| Funding | TOP - FY 97-98 - $490,000 |
| Grant Contact | See Facility Contact |

**Summary** **The Northwest Portland Indian Health Board worked cooperatively with eight tribes on building an Information Technology Infrastructure to support Internet, e-mail, and telehealth service access provided by the Washington State Department of Information Service, and private Internet providers.**

The Northwest Portland Indian Health Board worked cooperatively with eight tribes on building an Information Technology Infrastructure to support Internet, e-mail, and Telehealth services provided by the Washington Department of Information service, and private Internet Providers. Connections were sought for the Circle of Health project that facilitates disease surveillance and the collection and analysis of epidemiology information for area tribes. Additional funds are being sought to assist the remaining tribes. Eight tribes received the following benefits from this grant:

- **Couer d' Alene Tribe** (2/99) A new Wellness Center has opened along side of a well-established clinic. Services implemented include a dedicated 384 KB line, e-mail software applications, and training.

- **Grande Ronde Tribe** (1/99) An extended intertribal network has been implemented to link multiple offices to the new clinic and administrative buildings. Project resources included a new mail server, router, dedicated T-1 line, and training.

- **Lummi Nation** (12/98) The project added resources to an existing tribal network. Added services include a new mail server, new mail server software and training.

- **Samish Tribe** (12/99) This site has new office, which has been wired for a local area network, and an e-mail/file server. A dial-up solution to a local ISP provides the routing of the Internet e-mail.

- **Shoshone-Bannock** (4/99) The facility had an existing local area network spanning seven facilities. Services implemented included a dedicated T-1 line, e-mail server and training. This site has also successfully bridged the IHS health network to the tribal network.

- **Swinomish Tribe** (12/99) The Internet connection was installed at a new clinic wired for a local area network and fiber optics for connectivity to other tribal health buildings.

- **Port Gamble Tribe** (10/98) This tribe is connected to the Washington State IGN network. Added services included a new mail server, mail software, route, a dedicated 384KB connection, and training. The network is expanding to include other tribal offices.

- **Quinault Nation** (5/00) The tribe recently installed a dedicated line from the Washington State IGN network to service the entire Taholah campus. Services included a dedicated line to IGN, an e-mail server, and training.

### K3 Warm Springs Service Unit

| | |
|---|---|
| Area Office | Portland |
| Indian Facility | Warm Springs Service Unit |
| Primary Use | Telemedicine (teleradiology) |
| Use Status | Sustainable |
| Facility Contact | Bonnie Baxster, Chief Technologist, Imaging Department, Warm Springs Service Unit, PO Box 1209, Warm Springs, OR 97761, Phone 541-533-2461 |
| Grantee | Not applicable |
| Funding | Not known, internal IHS program funds |
| Grantee Contact | Not applicable |
| **Summary** | **The Warm Springs Service Unit sends and receives radiology film over a dedicated fax line.** |

Since November 1996, Warm Springs has transmitted teleradiology images over a dedicated fax line to experts in Portland and Bend, Oregon for remote consultation. Warm Springs has a contract radiologist and the transmission of images for remote consultation only occurs 2-3 time a month. Images are also transmitted from nearby hospitals that treat Warm Springs patients over the weekend when the Warm Springs clinic is closed.

## L. TUCSON AREA

The Tucson Area will soon have a new health curriculum offering by the Tohono O'odham Community College. In November 2000, the Sells PHS Indian Hospital will have a diabetic retinopathy-screening program installed by the Phoenix Indian Medical Center. The diabetic eye program is funded directly by Congress outside of the $30 million Center for the Disease Control diabetes authorization. (See Phoenix Area)

### L1 Tohono O'odham Community College

| | |
|---|---|
| Area Office | Tucson Area |
| Indian Facility | Tohono O'odham Community College |
| Primary Use | Telehealth |
| Use Status | New Project |
| Facility Contact | Ben Standifer, Information Technology Specialist, Tohono O'odham Community College, Sells, AZ 85634<br>Phone 520-383-8401, Fax 520-383-8403<br>E-mail <Ben.Standifer@tocc.cc.az.us> |
| Grantee | Tohono O'odham Community College |
| Funding | RUS - FY 00 - $288,100 |
| Grant Contact | See Facility Contact |

**Summary:** **The Tohono O'odham Community College will distribute health-related curriculum to several educational and tribal reservation sites.**

The Tohono O'odham Community College will offer distance learning courses in cooperation with the Tucson-based Pima Community College. The courses will be distributed to eleven district sites and three area high schools. The distance education network will also have an expanded library research and medical education services, especially for diabetes management. The expanded curriculum may benefit as many as 350 to 500 students. The reservation population is over 17,500. In FY 1997, another Rural Utilities grant of $154,045 was awarded to install videoconferencing networks at the three high schools, two Bureau of Indian Affairs schools and a combination high school/middle school from a public school district. This grant

occurred before the Tohono O'odham Community College existed

# Chapter 5 — Summary & Conclusions

The Indian Health Service and tribes have been introduced to telemedicine / telehealth programs through grant projects and regional providers and universities.

Not all of the projects produced positive return for the Indian entity involved in the project. In most cases, the project was either flawed or the IHS/tribe was not adequately prepared for assuming their responsibilities as end-users. All but one project though was able to recover with some level of use. Telemedicine equipment is stored on-site one service unit.

Some tribal clinics project participation coincided with building new clinics or remodeling. As end-users of the projects, they were able to plan for equipment integration and the partnerships.

October 2000 launched a noteworthy project. The McKennan Health System will provide obstetrical care to Pine Ridge, Sisseton and Rosebud. The project uses a 3-D ultrasound free-scan device to capture images no longer dependent on the skill sets of the person acquiring the image. The project is oriented towards lowering infant mortality and morbidity rates, which are much higher at these locations than the national average of 8.5 percent per 1,000 live births.

Another new project is Leech Lake's two efforts to develop a community-wide wellness program that offers distance education and medical services to schools and clinics. The project may include a tele-care concept for homebound diabetics. A diabetic retinopathy-screening plan is another project feature.

This project assessment also found several models that have benefited Indian Health Service. The University of Arizona Telemedicine offers a turnkey solution for telecom procurement and specialty services. The State Legislature started the program by funding eight sites, two of which were located on the Navajo Nation. The sites are the Tuba City Medical Center (IHS) and the Navajo Nation Sage Memorial Hospital in Ganado. The University received two Rural Utilities Service grants to expand services to the new Hopi Health Care Clinic and the Whiteriver PHS Indian Hospital. The Phoenix Indian Medical Center (PIMC) is expected to join the virtual private network for support services offered by the University. The chart below summarizes costs related to these Indian sites.

| Indian Sites | Funding Source | Equipment Costs | Reoccurring Telecom Costs |
|---|---|---|---|
| Ganado - Tribe | State | $160,000 | $61,000 |
| Hopi - IHS (new facility) | RUS | $121,175 + $52,000 Hopi | $24,000 (estimate) |
| Tuba City - IHS | State | $160,000 | $61,000 |
| Whiteriver - IHS | RUS | $142,075 | $21,600 |

The University/State equipped the Ganado, Tuba City and Whiteriver facilities with similar equipment. Whiteriver and Hopi are responsible for recurring telecom costs. The State Legislature still assumes telecom costs for Ganado and Tuba City. Now that the rural healthcare universal service requirements have changed, the University will apply.

The diabetic retinopathy screening programs by the Carl Albert Indian Hospital and the Phoenix Medical Center are models. The Carl Albert facility served as a beta test site for equipment developed by the University of Oklahoma and moved into a full clinical operation in February 2000. Inoveon is now the commercial supplier of the technology. Though not used at this project, Inoveon offers clinics no-cost equipment and one full-time staff person. Inoveon recovers its costs on a per patient fee basis ($75-$85 range, depending upon site). Five hundred expert consult readings are expected by the year's end. PIMC uses different technology than Carl Albert, which does not require the patient to have their eyes dilated. Screening is increased by having the equipment placed in the waiting room and exam completion without interfering with the patient's scheduled visit elsewhere in the clinic. This project is congressionally funded. A similar site will be deployed at Sells PHS Indian Hospital this November. A third site outside of the US Southwest Region is planned.

The Alaskan Federal Health Care Access Network started deployment in September 2000 and eventually will provide equipment and short-term support to 194 Alaskan villages. AFHCAN has not developed a sustainable business model for future operation. The project builds upon the success of a continuing National Library of Medicine Alaskan Telemedicine Test Bed Project that rolled out telemedicine, mostly ear, nose, and throat and dermatology use to 26 villages. Community Health Aides manage these sites and have recorded over 6,000 consults. The high number of consults is attributed to an evaluation model that examined the effectiveness of ear treatment protocols. Both projects are likely to provide Indian Health Service information on how best to deploy telemedicine on a larger scale.

**Recommendations**

- Several IHS facilities have low telemedicine / telehealth use levels for a variety of reasons. These sites provide the agency with test sites for developing a national support team that could be deployed to encourage and support new projects.

- The national team should reflect the crosscutting interests of the agency and reflect clinicians, biomedical engineers, computer information specialists, and program managers.

- The national team should create model deployment concepts and protocols to support service units and tribes in the development, implementation, and suitability of new programs.

- The Indian Health Service should involve tribes in the discussion on how to phase-in telemedicine / telehealth options as a safety net for self-determination and ways to cut costs. Another reason for involving tribes is that they are eligible for federal and private sector grants.

- A training program could be set-up for incoming clinicians assigned to a unit using telemedicine / telehealth. A training relationship could be set-up with a university that offers the clinical the ability to see actual operations.

- University settings that have telemedicine centers for training may be possible partners for training and consulting services based upon regional identity.