Final Report of the Alaska Telehealth Advisory Council

Including the History of Health Telecommunication

and the Evolution of Telehealth in Alaska

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Acknowledgement

I am pleased to present this report of the historical and current activities on the advances in telecommunications for the delivery of health care services in Alaska. For the past eight years the Alaska Telehealth Advisory Council (ATAC) has been a significant part of that development and now it is time to move on to a new phase.

I have had the privilege of serving as Facilitator for this Council from start to finish. It has been an amazing journey like no other that I have ever had. The Council was comprised of stakeholders who had a vested interest in health and in the exchange of health information. The effort had no official State or institutional standing, but because of the stature of the Council Members, the body had significant influence on the development of telemedicine in Alaska and planted the foundation for the future efforts for electronic health information exchange across the State.

As a testimony to the wisdom of its members, upon review of the work that had been accomplished and issues that remained that were beyond the council’s influence, the decision was made to sunset at the end of September 2007. How many organizations have we all been associated with that should have “declared victory” and gone home? I think there are a lot that should have; few that actually have and the usual course is a “mission drift” usually driven by the chase for funding.

To all of who have participated both as Council Members and other active participants, I want to give you a heartfelt thank you. I also want to give a special “thank you” to Dena Fuskin who has served as our Project Officer and directs the Office for the Advancement of Telehealth which has provided the major funding for most of the Council’s work. She has been a consistent mentor and advisor and has been very committed to this work in Alaska.

The one person who deserves the most credit and gratitude for all the work presented in this report is Senator Ted Stevens. It has been his vision, and his skill as our Senator that have advanced health care services and delivery in our State including advanced telecommunication. His office has been involved with every major project mentioned in this report. As a testimony to his vision, various applications of telemedicine have taken root in Alaska and are now accepted as a part of how health care is delivered. His vision has also provided the foundation for our next effort, the statewide exchange of electronic health information. Saying thank you seems insignificant to express how grateful we are for his leadership.

We are sun-setting in style! It has been a great trip and watch what happens next.

Thomas S. Nighswander, MD MPH
Foreword

In the following pages we have attempted to outline the activities and history of the Alaska Telehealth Advisory Commission/Council. The work of the Council was done in partnership with many others in the State as we have tried to note in this report. The Statewide Alaska Federal Health Care Access Network and its companion projects are reviewed. In addition, several Telemedicine activities have taken on a life of their own and we have tried to provide documentation for this, although we are sure that there are some that we have missed.

Through the work of the Council, we have been able to obtain a great deal of information about the history of Telecommunication in the delivery of rural health care in Alaska. We felt it was important to include this information not only for historical background, but to have it documented for the historical record.

For the projects and other efforts we have missed, please excuse our omissions.

The Editors
Alaska Telehealth Advisory Commission (and Council)

How it Began

The Alaska Telehealth Advisory Commission was formed at the request of Senator Ted Stevens. In November of 1998, Health Commissioner Karen Perdue represented the State as our senior health officer at a meeting with Senator Ted Stevens when he discussed the funding of the Alaska Federal Health Care Access Network (AFHCAN) project. Given the challenges of Alaska, he saw the possibilities of what this technology could do not only for health care issues, but also education.

His vision was that this initiative, while initially directed to the Federal Partners in Alaska, would have spin-offs that would be available to all Alaskans.

To provide some level of coordination and cooperation, he asked Commissioner Perdue to organize an advisory body that consisted of the potential major players in Telemedicine in our state. He and his office had a direct hand in the membership of the Commission, which included representatives from the telecommunication industry, the major hospitals in our state, professional provider groups, and the University of Alaska.¹

Commission Membership and Mission

Chaired by the Alaska Commissioner of Health and Social Services, Karen Perdue, the original Alaska Telehealth Advisory Commission’s membership, presented alphabetically, were:

Doug Bruce, Chief Executive Officer – Providence Health Care Systems
Sam Cotton, Representative – Alaska Public Utilities Commission
Gary Davis, Representative – Alaska House of Representatives
Ron Duncan, Chief Executive Officer – GCI
Mark Hamilton, President – University of Alaska
Jerome List, M.D., Representative – Alaska State Medical Society
Richard Mandsager, M.D., Representative – Alaska Federal Health Care Partnership
Ernie Meier, Chief Executive Officer – Alaska Regional Hospital
Tom Posey, President – AT&T - Alascom
Paul Sherry, President and Chief Executive Officer – Alaska Native Tribal Health Consortium
Alex Spector, Director – Department of Veterans Affairs

The mission of the Alaska Telehealth Advisory Commission was expressed in the charge that the Chair made to the Commission during its first meeting:

1. Explore and document the potential for and challenges to telehealth development and delivery in Alaska, using the best professional information available.

2. Propose a framework for rational development and deployment of statewide capacity for telehealth/telemedicine systems.

3. Establish core principles to ensure a coordinated, cost-effective, and integrated approach to telemedicine in Alaska.

4. Consider ways to assess effectiveness, efficiency, and whether or not telemedicine is improving equity of access to health services for all Alaskans.

5. Recommend a long-term process for addressing issues as they emerge with changing technologies and practice patterns.

The Commission met as a whole only five times, one full day each month from January through May 1999. The “Interim Report” from the Commission was published in June 1999. In addition to the meetings of the entire Commission, five “subgroups” were formed, including additional individuals and representatives who were not members of the Commission, each of which was to discuss separate topics: (a) Legal Issues, (b) Fiscal Issues, (c) Communication Policy, (d) Professional Development, and (e) Oversight. The issues and recommendations developed during the subgroup meetings were brought back to the Commission and adopted as Commission recommendations during the April 1999 meeting. They were included in the Report of the Commission, published in June 1999.
The Core Principles

Although the Commission was in existence for only six months, it accomplished a prodigious amount of work, producing principles and boundaries that are still guiding those involved in continuing development of telehealth in Alaska today. Most important among those were the "Telehealth Core Principles," articulated below:  

1) Any entity that becomes engaged in statewide telehealth in Alaska should ensure equal access, when financially realistic, to all Alaskans who would benefit from this technology.

2) All entities participating in telehealth must assure that their systems meet inter-connectivity and inter-operative standards and participate in the coordination of other telehealth efforts in the State of Alaska.

3) All telehealth applications should be acceptable to both the patient and the provider and be easy to use.

4) All entities that participate in telehealth must determine their financial viability for the long term, including the provision of professional capacity development and training as an ongoing component of operating expenses.

5) All participants in telehealth in Alaska should engage in a needs assessment and evaluation of services.

Although at first glance these principles may now seem relatively simple and "obvious," in 1999 they were not. Competition was high, individuals and organizations were scrambling to find the best technology to suit their individual needs and the telecommunications systems to support any type of statewide telehealth program were uneven at best, and, in some parts of the State, non-existent.

The Commission's Vision

Given the context and environment in which the Commission did its work, its accomplishments were not only influential but remarkably visionary. For one, the Commission members realized that the Commission itself had a very short (six-month) life span, but that its work could not possibly be completed within that period of time. It was therefore decided that an Alaska Telehealth Advisory Council should be established to continue the Commission's work, not only to refine principles, standards, and guidelines that were initially proffered by the Commission but also to expand the group's involvement in telehealth and to monitor, to the extent that it could, the development of the telehealth system in Alaska. For another, the recommendations of each of the five subgroups of the Commission, which were adopted by the entire Commission, should be pursued by the new Council. Abbreviated statements of these recommendations are presented below, and, as the reader will see, the events that have taken place since that June 1999 report have in many cases resulted from these recommendations (and principles).

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Commission Recommendations

The recommendations that were developed by each of the workgroups and subsequently adopted by the Commission as a whole are presented below.

Fiscal

The Subgroup began its work with the premise that, in Alaska in 1999, there were few mechanisms in place for paying for telehealth practices per se (unless they were so imbedded in other medical procedures that they were unnoticed in the billing and payment process). Yet the only way that telehealth could conceivably “work” in Alaska was if the payers, including the government and the private sector, established policies, procedures, schedules, and methods for covering telemedical consultations and the abundance of other telehealth procedures and events that could, in the long run, be eligible for reimbursement. Given that setting, the following recommendations were presented to and adopted by the Commission:

1. At that time Medicare reimbursement for real-time teleconsultation was available only if it originated in a health profession shortage area. The Commission recommended that this be changed and that Medicare cover the entire State of Alaska.

2. For Medicaid, the Commission recommended that codes be modified to capture telemedical encounters and procedures, either through programmatic or regulatory change.

3. In order for telehealth technology to achieve sustainability in Alaska, reimbursement for telehealth services was a fundamental issue. The Commission recommended that Medicaid, a significant payer of medical services in Alaska, set the standard for reimbursement for telehealth services.

4. The Commission recommended that the Alaska Telehealth Advisory Council, proposed to continue the Commission’s work, complete appropriate research and make specific recommendations to the Health Care Finance Administration (HCFA) regarding the definition of an “encounter,” for the purposes of enabling telemedicine “encounters” to be billable.

5. The Commission also recommended that the continuing Alaska Telehealth Advisory Council be charged with the task of researching the fundamental issue concerning the predicted inequitable cost differential that will result from the implementation of telehealth in Alaska, with small, locally based clinics incurring increased costs and hub or urban hospitals incurring decreased costs.

In addition to these recommendations, the following principles related to Medicaid, which originated from the fiscal subgroup meeting, were adopted by the Commission.
Medicaid Telehealth Reimbursement Principles

- Patients should be served in the least restrictive environment. Care provided to patients should be as close to home as feasible.

- All telehealth care providers billing for Medicaid services must be enrolled with Medicaid.

- All reimbursable services must be covered in the current Medicaid benefit package.

- Payments will not be made for use of telemedicine technology (purchase, maintenance, or training).

- Technical and consultants' fees, both in store and forward, will be reimbursed by CPT4 according to the established fee schedule.

- Modifiers will be developed to identify telehealth services and facilitate the collection of data.

- Remote monitoring services will be covered for established technologies (e.g., EKG, perinatal monitoring).

- There will be no geographic barriers to reimbursement—payment will be made whether the patient and/or provider are located in a rural village or urban city.

Transfer of income and expenditures resulting from telehealth exchanges was a topic of frequent discussion and study by the Commission, which predicted that as telehealth grew in Alaska costs would be assumed by the Alaska Native Medical Center (for consultations and time spent by physicians and medical specialists reviewing incoming telehealth transmissions) while regional Native health corporations would experience savings, due to lowered expenses for Medivac and other transportation costs. As will be seen later in this report, that was an accurate prediction.

Legal

The Legal Subgroup of the Commission took a slightly different tack on its approach to reviewing actual and potential legal problems and proposing recommendations about ways to overcome those problems. It first developed a list of legal issues, which included the following:

1. The highest priority was to enable telehealth. Nothing was foreseen within the legal arena that would hamper or stifle the furtherance of telehealth/telemedicine in Alaska.

2. A tacit assumption was that all legal matters were best left within the State's jurisdiction to resolve rather than being relegated to the federal level. They were also best left to professional practice.

3. Regarding medical records, it was noted that in Alaska there is no regulation requiring a medical provider to produce or retain any medical record at all, including a record of telehealth activity.

4. The growth of telehealth in Alaska did not need federal or State "supervision or oversight."

Given the foregoing, the recommendation from the Legal subgroup that was adopted by the Commission as a whole was basically a charge to the soon-to-follow Advisory Council:
Existing groups (e.g., the Federation of State Medical Boards, State of Alaska Boards and Commissions, Associations) should be charged with the responsibility to study these many legal issues and recommend solutions.

**Communication Policy**

Issues related to telecommunications were a hotspot for the growth of telehealth in Alaska because of the reality of endemic competition among telecommunication providers. One of the prominent issues was the “last mile problem.” When the major Long Distance Carriers (LDCs), AT&T-Alascom and GCI, transmitted complex Telehealth information over their ground and satellite based systems and that information reached a rural destination, it must be carried over the “last mile” on the Local Exchange Carrier’s (LEC’s) equipment. In that setting, provision of telehealth services requires the interconnection and cooperation of both the LDCs and the LECs, a situation that grows in complexity when the Universal Service Fund (USF) for Rural Health Care Providers was added to the scenario. Federal and State policies prohibit the LDC from being “eligible” to receive federal support directly for telehealth services even though the LDC service is a critical and at times expensive component of telehealth service. To resolve this dilemma, which could easily have crippled Alaska’s development of a statewide telehealth system, a stipulation was crafted jointly by the major LDCs and most of the LECs and was approved by the APUC (see U-97-173[4], 5/13/99). It permitted LDCs providing telehealth services in Alaska to receive USF indirectly through an FCC waiver. This has come to be known as the “Alaska Solution.”

Within this setting, the Communication Policy recommendations were as follows. The sequence does not imply any priorities.

1. In general, regulatory agencies and organizations need to establish their goals and explain the purposes for regulations but not prescribe the technology that must be used to achieve the goals. (In retrospect, the point that the Commission was making was extremely important, and it was, stated simply, that regulatory agencies should state what they want as an end product but not how to get to that point.)

2. Initial and ongoing training must be supported as operational costs for any telehealth endeavor. This must be considered an essential aspect of the sustainability of the overall telehealth system.

3. The majority of the Commission recommended that the FCC should be requested to change its regulations regarding the definition of an “Eligible Telecommunications Carrier” or take other action as necessary to give the Rural Health Care Providers (RHCPs) relief from any regulatory restraints that might prevent them from enjoying the benefits of better technology, service options, and pricing.

4. The Commission supported the concept of the model that has been so effective in enabling the educational system; Alaska would likewise benefit from further development of the telehealth system.
Professional Development and Capacity Building

Reflecting back on the recommendations of the Communication Policy group, the professional development group concentrated on the need for training, not only as the telehealth equipment is deployed in Alaska, but, for the long term, to ensure that new staff who replace those who have already been trained are able to receive the training that they need, quickly, to prevent an erosion over time of the capability of rural clinic staff and others to utilize telehealth equipment to which they have access. The “worst case scenario” was likened to the situation that occurred in Shishmaref when electricity-generating windmills were constructed and used only briefly before they fell into disarray due to insufficient training of village residents on maintaining them and keeping them in good repair.  

1. Expenses for both initial and ongoing training need to be built into the operating costs for the provision of telehealth/telemedicine, thereby to be covered in the reimbursement for that service.

2. Federal and State government funds that are coming into the system at the present time are helping to “jump-start” the training and education that will be needed to initiate telehealth, but the continuation of professional development should not rely on these government “subsidies.”

3. It is recommended that training and continuing education be incorporated into the job descriptions of the end-users of telehealth and telemedicine hardware and software.

4. Asynchronous training should be available, to enable end-users to learn at their own speed and to fit education into their work schedules.

5. Medical providers should be a key focus of professional development, and professional associates should play a key role in providing this training.

As will be seen, ongoing training is a major need today and will continue to be so in the future, requiring sustaining financial and professional support. For the AFHCAN project alone, the training demands related to maintaining and fully utilizing well over 250 telehealth units scattered all across Alaska are enormous.

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3 This example was brought to the Commission’s attention by Mark Hamilton.
The Transition to the Alaska Telehealth Advisory Council

As mentioned earlier, when the sunset for the Commission approached, its members voted to continue the work that had begun by transitioning into a Council, with a limited number of representatives added to the group, and the Alaska Telehealth Advisory Council (ATAC) has been in place ever since, holding four meetings between September 1999 and June 2000 and three meetings during every State Fiscal Year since that time.

When ATAC held a planning retreat in October 1999, it revised its Vision to the following:

Telehealth systems would be accessible to all patients and providers, operate under effective voluntary standards, are easy to use and highly acceptable by both patients and providers, and importantly are financially sustainable.

The Council was able to establish working groups and sponsor projects deemed necessary to advance Telemedicine in the State.

Working Groups:

Technical Workgroup
The technical workgroup was composed of 14 public and private members. They developed standards of security, file formats, software, videoconferencing, and standards for support and maintenance. (Available in the FY 2000 Annual Report).

Legal Review
A brief legal review of state laws revealed no impediments to the development of telemedicine. The State Medical Board had already determined that any consultant from outside the State would need an Alaska License to see telemedicine patients from Alaska (no different from any other consulting physician who comes to Alaska).

Telepsychiatry Standards
The criteria for using Telepsychiatry, call for balancing several factors including the medical necessity for timely access to a psychiatrist, the availability of on-site psychiatric services in the community, the type of

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4 The additional entities were the Mental Health Trust Authority, Primary Care Association, Nursing Association, Alaska Telephone Association, and a representative of private insurance.

psychiatric service needed and the quality of videoconferencing equipment and connectivity quality. In Alaska with many remote community mental health centers staffed by mid level practitioners, the need for psychiatric backup favors the extensive use of Telepsychiatry.

**Early Projects sponsored by the Council**

In December 1999, the ATAC decided that it would be helpful to conduct a survey to assess the state of readiness for telehealth from the private sector beyond the scope of the work of the Alaska Federal Health Care Access Network. At that time coordinated information was scarce concerning the readiness of non-federal rural health care providers for participation in telehealth programs. Using funding from the Office for the Advancement of Telehealth, the firm Daniels, Tschannen & Associates in Anchorage was selected to design and conduct the survey, and a total of 132 questionnaires were sent to rural health clinics, rural hospitals, community mental health centers, rural physicians, and Pioneer Homes. Of those 53 (40%) were completed and returned. Recommendations that resulted from the survey include:

- sponsoring and promoting legislation at the State level,
- funding development of a working prototype telehealth model,
- sponsoring training programs,
- funding support for required hardware and software needs,
- telehealth program information sharing within the State, and
- coordination of efforts with other agencies interested in advancing telehealth programs in the state

The survey also found that a large percentage of providers were connected to the Internet, with primary use being e-mail, that numerous participants expressed an interest in participating in a telehealth program with proper safeguards and security in place, that there is a lack of training on computer use for telemedicine purposes and handling medical information, and that there is a lack of easily available and affordable technical support for rural programs.
Telemedicine Efficacy

Efficacy Project

A telemedicine efficacy pilot was launched that focused on the private sector to determine the return on investment of time and money. What was the value to the patient? What is the effect of the patients' and providers' time and resources? What is the satisfaction level for both? There was only modest use of telemedicine in the private setting. The most successful encounters were from a midlevel practitioner on the road system but 40 miles from the nearest city. For this practice Telemedicine encounters reduced patient travel, provided expert consultation on site and was very well received by both the patient and provider. Where store-and-forward (an image and message that is sent to a consultant for viewing when convenient), applications were appropriate and used, 55% of the patients avoided travel. For practicing primary care physicians located in urban centers, they was little economic incentive or perceived need for using this tool.

A second endeavor that was initiated during FY 2000 was the Telemedicine Efficacy project, which was awarded to the firm of Kez'aani, LLC, also located in Anchorage. The focus of the project was to generate telehealth clinical encounters for the evaluation and development of telehealth reimbursement guidelines, to demonstrate interoperability capabilities of several different delivery systems, and to develop a telehealth consultation process that is easy to use and time efficient for the busy practitioner.

Clinicians Rapid Access Project

A network that provided immediate access to the practicing physicians in Alaska is important for disease reporting, bio terrorism activities, epidemic outbreaks and other critical communication needs. In partnership the State of Alaska Division of Public Health and the Alaska State Medical Association, project funds were awarded to the Association for a pilot to electronically connect 500 clinicians in Alaska over a secure private network.

This was an ambitious project that was ahead of its time. A small company with very innovative staff was retained to do this work. Unfortunately they could never get their technology to work and the company folded. In addition the physician leader, an early adaptor of technology, could not generate interest among the practice community to participate.
The Medicaid Telehealth Reimbursement Research Project

Reimbursement for Telemedicine services is a critical element for success. Real time face to face encounters using secure video conferencing facilities lend itself to a reimbursement methodology based on in-office face to face encounters. This is not practical in most remote clinical settings in Alaska.

Store-and-forward, asynchronous encounters are the principle mode of telemedicine in Alaska, except for Telepsychiatry.

Setting the standard for Alaska Medicaid was an early goal. Working with our two major reimbursement partners, the Alaska State Medicaid System and the Premera (Blue Cross and Blue Shield of Alaska), the Council was able to contract with a national firm, Myers and Stauffer, to recommend specific Medicaid payment and coverage policies. Over a two year period and after three reports including reviewing Telehealth funding initiatives in other states, the unique features of Alaska, our technological and health delivery infrastructure, a series of reimbursement recommendations were made. Using that information the Medicaid Division instituted comprehensive reimbursement for these services. They are in use today.

In addition on May 4, 2000, Senator James Jeffords6 (of Vermont) introduced S. 2505, the “Telehealth Improvement and Modernization Act of 2000,”7 which amended Title XVIII of the Social Security Act to permit telemedicine services to be reimbursed by Medicare. The Act also stated that “in the case of any Federal telemedicine demonstration program in Alaska or Hawaii, the term ‘telecommunications system’ includes store-and-forward technologies that provide for the asynchronous transmission of health care information in single or multi-media formats.” A provision of the Act mirrored precisely the recommendation from the Medicaid Telehealth Reimbursement Research Project that the originating site receive a “facility fee” and the physician at the distant site receive “an amount equal to the amount that such physician or provider would have been paid had the item or service been provided without the use of a telecommunications system. The Act passed Congress and took effect on October 1, 2001. All insurance companies have followed this lead.

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6 With Senators Rockefeller, Grassley, Breaux, Murkowski, Stevens, Bond, Inouye, Harkin, Roberts, Thomas, Bingaman, Conrad, Kerry, and Edwards.
7 Available at www.muhealth.org/~telehealth/geninfo/s2505.pdf
Projects related to Telepsychiatry.

Telepsychiatry

There have been several Telepsychiatry projects and programs in Alaska. Three of them will be described here.

Department of Corrections

The Alaska Department of Corrections (DOC) implemented a statewide Telepsychiatry project in December 1997. The system used Plain Old Telephone Service (POTS) lines and 8x8 video-conferencing equipment (videophone) that usually connected at about 19.2 kilobauds. The bandwidth was limited to 33 K, with typical connections in the 18-24 K range. Each site was equipped at a cost of less than $600 with the only additional operating cost being the long-distance charge for the standard telephone.

The primary objective of the project was to supplement existing on-site psychiatric services and to assess the effectiveness of low technology equipment. The “target audience” was - and continues to be - incarcerated men and women with illnesses who need psychiatric assessment and treatment, and the project was designed to enable psychiatrists in Anchorage to assess the condition and stability of these
inmates without having to fly out to visit the facilities or having the inmate fly to Anchorage, saving the Department money and expanding psychiatric services to facilities that would otherwise not have access to them. By mid-1999 the Telepsychiatry network included Anchorage, Bethel, Fairbanks, Juneau, Kenai, Ketchikan, Nome, Palmer, and Seward and was providing 15 or more consulta week.

The types of services provided via videoconferencing have included emergency examinations, follow-up psychotropic medication consultations, discharge planning examinations, clinical staff supervision, and a civil commitment examination (Ex Parte) of a dangerous mentally ill inmate who was being released.

The DOC acknowledged that, because of transmission speed, the system was not adequate for psychotherapy and was of limited use for assessing movement disorders, but, as the telecommunication capabilities and capacities have increased since the DOC Telepsychiatry program began, the ability to include examinations of movement disorders has also improved.

A number of benefits have been realized as a result of the DOC Telepsychiatry program:

- A doctor-patient relationship is more often established, which has improved patient compliance.
- The availability of follow-up Telepsychiatry examinations has allowed for more timely “fine tuning” of psychotropic medication prescriptions than was previously possible, which in turn helps to improve patient compliance.
- Patients and staff have reacted favorably to the system. Most patients look forward to “seeing the doctor” using this technology. The staff appreciates the backup that this system provides since they can quickly have patients seen by a psychiatrist when they have concerns about a patient’s condition.
- Utilizing Telepsychiatry has enabled the DOC to hold down transportation costs associated with flying an inmate into Anchorage because there was no psychiatrist available in the facility, while at the same time improving quality of care and patient compliance.

By FY 2000 DOC had completed more than 1,300 consultations using the Telepsychiatry system. In 2007 this system was still being used in Bethel and Nome. The other DOC sites had onsite availability to psychiatry.

Low and High Bandwidth Telepsychiatry

To advance the use and evaluate the effectiveness of Telepsychiatry in Alaska, in FY 2000 ATAC sponsored two grants, one for low-bandwidth Telepsychiatry and another for high-bandwidth Telepsychiatry. The low-bandwidth project, using videophones and POTS, was awarded to Eastern Aleutian Tribes, Inc., (EAT) for services to Sand Point and King Cove. The plan was for a psychiatrist in Anchorage to provide weekly Telepsychiatry services to these communities via a videophone and to fly out and visit the two communities once every two months.

Five videophones were acquired for the project and passed tests that were conducted in Anchorage, but when they were subjected to ten tests in the King Cove clinic, usable connections occurred only 50% of

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the time over a two-day period. The tests conducted between Anchorage and Sand Point were even less successful: only three of fifteen attempts, carried out over several days, connected correctly.

The EAT project failed because of technical problems with phone transmission of the video signals. The unsolved technical problem was the inability of the videophone to lock into a fixed baud rate. The modem of the videophone automatically attempted to increase the baud rate when higher bandwidth was available. When an increase was negotiated, the connection would fail in the satellite system. The manufacturer of the phones said the negotiating principle was an integral feature of the videophone and could not be turned off. Additionally high winds in the Aleutian chain caused ground transmitters to vibrate, creating dropped signals and lack of bandwidth provided for poor quality videos. At that point, EAT opted to expand its network to include T1 satellite circuits among all of its village clinics and the Anchorage office, and they abandoned the POTS videoconferencing pilot.

This was in contrast to the experience in the Department of Corrections whose links using video were satisfactory. Most of the DOC locations were in more favorable weather environments and stable bandwidth environments.

The Gateway Center for Human Services in Ketchikan was awarded the high-bandwidth Telepsychiatry project, which focused on the child and adolescent population in Ketchikan with eventual expansion to the Metlakatla Indian Community on the Annette Island reserve. Use of the higher bandwidth (>128 kbps) was intended to enable observation of play groups and other high motor activity of the children, which could not be transmitted effectively with the lower bandwidth.

In the fall of 2000, the Gateway Center filed for Universal Services Funding for its Alascom T-1 line, and approval was received in June 2001. In its original proposal, the Gateway Center planned to rely on a psychiatrist in the Lower 48, but as the project progressed a child psychiatrist from Bartlett Hospital in Juneau became available and was placed under contract to provide the Telepsychiatry services.

Unfortunately, this project also had its problems. As noted in the FY 2002/03 Annual Report of the ATAC: “In Southeast Alaska, the Metlakatla/Bartlett high-bandwidth Telepsychiatry project sponsored by Gateway Mental Health Services has stumbled. As of July 30, 2003, there was no longer a contract between the Bartlett Mental Health Services and the community of Metlakatla. When the original champion of this project accepted the position of Director of the Alaska Psychiatric Institute, there were changes in administration in Metlakatla, and the support for this project disappeared.”

However while the project was in operation the Alaska Science and Technology Foundation sponsored an evaluation of the Gateway (Ketchikan and Metlakatla) done by Alaska Center for Rural Health (ACRH), University of Alaska Anchorage. The evaluation was designed to answer the following two questions:

- Does Telepsychiatry improve the timeliness and ease of access to a psychiatrist?
- Does the Telepsychiatry encounter meet the standards of a face-to-face encounter to satisfy the requirements for reimbursement by a third-party carrier?

Interviews conducted by staff of the ACRH addressed how Telepsychiatry affected care in terms of cost, timeliness, quality, and access.
The evaluation revealed better access to care for unresolved mental health issues in the community. The community perception was that the care was of good quality. The telepsychiatrist thought that the quality of service was somewhat compromised in comparison to in-person consults. The distance between patient and provider was seen as an advantage because of anonymity issues in small communities. The visits did take longer than in-person visits sometimes due to lag times in the transmission. Financial sustainability was compromised due to a lack of an effective billing system in the community. The principal recommendation from the project was community training for local staff for the patient intake process: registration, initial assessment, equipment training, and billing. (The full report is available from the Alaska Center for Rural Health)

Building on the above experience, the Alaska Psychiatric Institute (API) has established a Telepsychiatry service to support rural community health centers. They have used a staff psychiatrist who had initial exposure to the Ketchikan project.

Now with improved equipment and bandwidth, API is providing weekly consultation services to community mental health centers in Galena, Kenai, Fort Yukon, Talkeetna, Naknek, Soldotna and training to Chief Andrew Isaac Behavioral Health clinic in Fairbanks and the Bristol Bay Area Health Corporation in Ketchikan.

**API Director Ron Adler**
Promoting his Alaska Tele Behavioral Health Project
Most recent projects sponsored by ATAC

Expansion of telehealth to Community Health Centers
The ENT Center of Excellence
Chartlink Alaska
The EHR Alliance
Distant Education Using Telehealth Infrastructure

OAT Expansion Grant Progress and Status

In 2005 the Office for the Advancement of Telehealth (OAT) awarded a grant to ATAC (through ANTHC) to fund six new projects that had been described in the application submitted to the U.S. Health Resources and Services Administration. The grant, originally for one year, was extended to two years, ending August 30, 2007. There were two small supplemental projects added after the grant funding began. A brief description of each of these projects is presented here, as is a synopsis of the status of each project at the time of the writing of the Final ATAC Report.

1. Telemedicine Expansion to Community Health Centers – AFHCAN

ATAC funded the Alaska Federal Health Care Access Network (AFHCAN) to execute the first phase of a two-part plan, consisting of deployment of a complete AFHCAN Telehealth system to three Community Health Centers/Primary Care Safety Net Providers (CHCs/PCSNP), with ten specialty physician sites receiving AFHCAN software and hardware to respond to the cases sent from the CHCs.

Delays were encountered in this project due to concerns that expansion of the current telemedicine program beyond the AFHCAN and IHS sites could eliminate liability coverage by the Federal Tort Claims Act, which was finally clarified by ANTHC counsel. Deployment was scheduled for the summer of 2007, and AFHCAN anticipates having the servers on line and in use by the three Community Health Centers by the end of the grant period, August 30, 2007.

2. Telemedicine ENT Center for Excellence – AFHCAN

This project established a Virtual Center of Excellence for Ear, Nose, and Throat (ENT) TeleConsultation at the Alaska Native Medical Center (ANMC) to focus on expert triage, thereby assisting remote clinicians in improved patient selection for actual referrals to ENT specialists within their regional geography. This service is provided via store-and-forward software developed by AFHCAN. The community targeted is the Yakama Indian Medical Center (YIMC) in the Portland Area Indian Health Service.

Equipment was placed at the YIMC in the fall of 2005, but initial utilization was limited due to staffing problems experienced at Yakama. The situation improved significantly in 2006 and into 2007, with utilization reaching levels approximately equivalent to levels documented in Alaska. Satisfaction data show a high level of satisfaction with the arrangement and a consistent conclusion among the providers that telemedicine improved patient satisfaction, communication with the doctor, and the quality of patient care. The objectives were fully accomplished, and the AFHCAN system continues to support the consultative role that ANMC is maintaining with the YIMC.
3. Development of a Statewide Regional Health Information Office (RHIO), Chartlink Alaska

The formation of an Alaska RHIO has involved development (and expansion) of partnerships between significant stakeholders in electronic health information. These include, among others, the State Department of Health and Social Services, organizations encompassed by the Alaska Native Tribal Health Consortium, and members of the Alaska State Hospital and Nursing Home Association, the Alaska State Medical Association, and Mountain Pacific Health Care (the CMS quality improvement organization for Alaska). The name of the new RHIO is Alaska ChartLink.

This project has advanced significantly under the leadership of Ms. Rebecca Madison, who has assembled a strong, steering committee and secured additional funding for Alaska ChartLink. A comprehensive business plan for the RHIO was completed and presented to the committee in February 2007. Ms. Madison also utilized national health care cost savings studies and projections to analyze Alaska’s projected health care savings over the next 10 years, as a result of the realization of the RHIO. A proposal seeking $6.5 million from the Alaska State Legislature for Alaska ChartLink and the Alaska Electronic Health Record Alliance (project 4) was submitted for consideration during the 2007 session. This project has exceeded its objectives, as stated in the OAT grant application.

4. The Alaska Electronic Health Record (EHR) Alliance

When fully operational, the Alaska EHR Alliance will assist private practitioners in Alaska in incorporating EHR into clinical practice by providing access to Information Technology planners, system consultants, clinical specialists who are experts in the use of the EHR, and funding support. With its efforts to assist small private physician practices in Alaska with transitioning into EHR, this project will develop a functioning and interoperable EHR in several private clinical offices in Alaska.

In addition to the funding from the ATAC, the Alliance secured $50,000 from Providence Alaska Health Systems, which paid for a business plan that was completed and presented to the Board of Directors in December 2006. Four workgroups were established: Statewide Clinical Workgroup, Clinical/Technical Workgroup, Finance/Legal Workgroup, and Marketing/Communications Workgroup, all of which have developed guidelines and procedures for the Alliance when it is fully operational. A two-phased plan for the future has been adopted, and, as mentioned above, the Alliance joined EarthLink in requesting $6.5 million from the Alaska State Legislature during its 2007 session. Although there was little likelihood that that request would be approved this year, the path has now been set for a successful approach in 2008. The project has accomplished all of its objectives.

5. Distance Education Using Telemedicine Infrastructure – UAA

ATAC contracted with the University of Alaska-Anchorage Health Distance Education Partnership (UAA-HDEP) to train Community Health Aide instructors in the use of distance education techniques and available AFHCAN technology. The training offers exposure, exploration, and training in distance delivery concepts, methods, and learning practices to Community Health Aide Program Instructors from each of the training centers in Alaska. This training builds on and expands training made possible by Denali Commission funds.

This project started slowly. There may have been some reluctance on the part of the Community Health Aide (CHA) Training Centers – and the CHAs themselves – to engage in a different mode of training, given their relative lack of experience with Telehealth. But a survey that UAA conducted revealed more
experience with and interest in distance education than had been expected. The UAA project manager met with the directors of the four CHA Training Centers on several occasions and made a lot of progress in moving the project forward, with the incorporation of CHP 131, Community Health Aide, Session I, being incorporated into the University of Alaska course catalog.

6. Evaluation

The evaluation of the OAT Expansion Grant has entailed separate evaluation strategies to assess the processes and outcomes of each of the eight separate projects supported by the grant, with periodic reports to ANTHC, ATAC, and the U.S. Health Resources and Services Administration. A final, summative evaluation report will be completed at the end of the extended grant period, August 30, 2007.

The external evaluation was contracted to an independent Alaskan consulting firm led by an experimental psychologist who has had extensive experience evaluating projects for over 30 years. The process and outcome evaluations have progressed steadily throughout the grant period, and the summative evaluation report will be completed at the end of the OAT grant.

Supplement A. Development of Technical Guidelines - AFHCAN

In collaboration with a number of key national telemedicine teams, AFHCAN project staff participated in the development of technical guidelines that are specific to a wide variety of clinical service deliveries.

Work on this project started late in the grant period. At the time of writing the ATAC Final Report progress has been documented, and it is anticipated that the technical guidelines will be completed by the end of the OAT grant.

Supplement B. Update of OAT Provisional Frontier Definition

This project updated the current national data set that is used to determine OAT’s definition of Frontier. In the future, the new definition will be used by national advisory committees when they award health services grants whose targets are the Frontier areas of the United States.

This project has only recently begun, but AFHCAN has assured ATAC that the updated frontier definition will be completed, at least in draft form for OAT’s review, by the end of the OAT grant period.
International Telehealth Conference

In March 2004 AFHCAN and multiple cosponsors presented "Innovation and Evaluation, an International Telehealth Conference. There were 260 participants from 25 different states, four Canadian provinces and 11 other countries. In their evaluation of the conference, participant comments included "much more scholarly and rigorous than most," "excellent and directly relevant," and "real—people cases, and successes as well as the challenges and failures of programs."

Presentations ranged from a review of the status and future goals for telemedicine in Alaska to innovation in Telehealth programs serving remote Northern Canada and in the Balkans.

**Innovation and Evaluation**

*An international Telehealth Conference*  
4th – 5th March 2004  
Anchorage, Alaska  
USA

This two day conference will bring together those interested in designing, using, and evaluating telehealth systems in rural and remote settings across the United States and the Arctic. This conference will run in conjunction with the Alaska Rural Health Conference (March 1st – 3rd, 2004) in Anchorage, Alaska. This week-long conference on rural health issues will culminate with the official opening of the new 40,000 square foot building.

Important Dates:

- Abstracts Due: Nov 14th, 2003
- Authors Notified: Dec 2003
- Early Registration Ends: Feb 1st, 2004
- International Telehealth Conference: Nov 1st – 3rd, 2004

Call For Abstracts

Interested authors are invited to submit abstracts for presentation at the conference. Abstracts must not exceed 200 words and must address translation of telehealth systems or innovative strategies. Abstracts accepted at the conference will be available on the conference website.

Accommodations

The group for the conference is the Anchorage Downtown Hotel in Anchorage, Alaska. Rooms are available until Feb 16th, 2004 using the code: Rural Health Conference. For reservations call (907) 274-5500.

Sponsorship

Opportunities are available for vendor displays and sponsorship. Contact committee members for more information.

Registration

Registration is available at [http://www.ruralhealthconference.com](http://www.ruralhealthconference.com)

For More Information

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ATAC Vision 2010

The vision for Telemedicine in Alaska was revisited in April 2004 during a retreat for the entire Council and associated stakeholders.

The consensus called for improving

- Open access for authorized individuals and institutions for medical services and information
- Telehealth Capacity to more sites including community health centers, Teleradiology in small rural hospitals, and private provider inter-connectivity.
- Broadband Video Conferencing for Telepsychiatry, Distant learning, emergency room real time consultation, enrolling and billing for telemedicine services
- Maintaining ATAC as a forum for coordination, advocacy and creative partnerships.

At the time of this report many of the actions that were called for in 2004 have been achieved or are actively being pursued. Seamless access for authorized clinical information is a continued issue that will be actively worked on at we transition to electronic health records and electronic health information exchange.
The Alaska Federal Health Care Access Network (AFHCAN), now in its ninth year of operations to improve access to health care for federal beneficiaries in Alaska through sustainable telehealth systems. AFHCAN continues to evolve and expand its services within Alaska where the number of users and clinical services has grown significantly over the years and now connects more than 700 providers spread over 250 sites – more than 90% of which are not accessible through the road system.

AFHCAN began as an initiative of the Alaska Federal Health Care Partnership (AFHCP) - a unique collaboration of agencies that provide care to more than 300,000 Federal beneficiaries throughout Alaska. AFHCP seeks to overcome the inherent difficulties of providing health care services in Alaska by having the partners - Veterans' Affairs, U.S. Army, U.S. Air Force, U. S. Coast Guard, Indian Health Service (IHS), and Alaska Native Tribal Health Consortium (ANTHC) - work together rather than separately. The mission of AFHCP is to provide federal beneficiaries with ready access to quality, customer-oriented, compassionate, comprehensive, and cost-effective health care, in a delivery system where the strengths of individual agencies are combined to provide quality customer service.

AFHCAN began as a project in 1998 to improve health care for federal beneficiaries using modern telemedicine technology. During the early years of the project there was overwhelming response for creating a store-and-forward telemedicine system in Alaska. Clinical needs assessment indicated that primary care, otolaryngology and cardiology were those services most needed and amendable to store-and-forward applications.

The AFHCAN project supports beneficiaries of IHS and tribal organizations, the Department of Defense, U.S. Coast Guard, and the VA. The project also provides benefits to state Public Health Nursing (PHN) offices. These beneficiaries represent approximately half of the states total population, as shown below:

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>DoD/USCG</td>
<td>75,000</td>
</tr>
<tr>
<td>VA</td>
<td>75,000</td>
</tr>
<tr>
<td>PHN</td>
<td>45,000</td>
</tr>
<tr>
<td>IHS/Tribal</td>
<td>120,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>315,500</td>
</tr>
<tr>
<td>Alaska’s Total Population</td>
<td>626,932</td>
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(Note: Some patients are beneficiaries of more than one organization)
Clinical services have greatly expanded, and the impact on patient care has subsequently grown as more than 68% of all cases now prevent patient travel. Health issues are being identified earlier – as evidenced by the fact that 8% of all telehealth cases actually cause patient travel. Through growing acceptance of telehealth, Alaska providers continually provide feedback and request new products and features. As a part of its mission, AFHCAN continues to review, develop, and deploy new telehealth technologies. After extensive market surveys, evaluations, in-house testing, and working with manufacturers; the AFHCAN carts now support live video conferencing and the number of supported biomedical peripherals on the cart have tripled. (This is all offered within the same four (4) square feet of floor space in a small clinic.)

In addition to the traditional Cart, new platforms have been developed that include a portable telehealth briefcase and wall mounted systems, along with a new patient-centric Web interface for the AFHCAN Software.

System Utilization

Usage of the AFHCAN telemedicine software continues to grow steadily, now averaging annually over 10,000 real clinical cases a year, and the total number of closed clinical cases in the AFHCAN system is now over 40,000.

Usage is projected to grow by 21% in FY07 (based on 7 months of data). This projected increase of 2,400 cases from FY06 is the largest growth in 4 years.
The growth in utilization can most likely be attributed to the growth in usage at existing sites and new services being offered via telehealth. Within Alaska, the greatest potential for growth will occur within the Yukon-Kuskokwim Health Corporation (YKHC), which began full scale deployment and adoption of telehealth in late FY06.

YKHC is projected to have a 170% growth in telemedicine activity in FY07. Norton Sound Health Corporation (NSHC) and ANMC are also projected to have significant growth, approaching the “gold standard of 3,000 cases set by Maniilaq Association.

AFHCAN Telemedicine - Organizational Usage

Outcomes

The AFHCAN Software continues to request providers to answer one evaluation question when creating or consulting on a telehealth case. AFHCAN staff has compiled and analyzed the results provided during the creation and review of 42,557 cases. The findings are summarized below:

- 64% of cases played a role in educating the patient. (N=1,713)
- 77% of cases helped make the provider’s job more fun. (N=1,897)
- 79% of cases were rated as improving patient satisfaction. (N=1,615)
- 86% of cases were rated as improving the quality of care for the patient. (N=1,681)
- 89% of cases helped providers communicate with a doctor. (N=1,606)
Providing Care at the Village

The traveling audiology program continued, employing an audiologist to travel to the village clinics and to provide care directly at the village clinic. The clinical workflow provides for the audiologist to send telehealth cases directly to ENT specialists, resulting in rapid turnaround for care delivery in the patient’s village location. 935 patients have been seen as part of this program at 39 village locations. 458 patients avoided travel, resulting in savings of $177,752 (just in airfare alone). This does not include savings in per diem or lodging. The entire cost for running this program was $74,000, resulting in a savings-to-cost ratio of 2.4. 294 patients avoided travel that would have required a parent or guardian to also travel. This represents a significant savings in time lost from work and disruption to families.

About 73% of the patients needed something done (meds, surgery, ongoing monitoring) and 27% needed to be screened out. Screening out patients at the village location allowed other patients to be scheduled and seen at specialty clinics – a collateral benefit from telehealth to “non-telehealth” patients.

Providing Training at the Regional Level

AFHCAN just started a program in partnership with ANMC to support specialists traveling to regional facilities on a bi-monthly basis to provide expert training, CME, and support for telehealth.

This is in response to a request from a specialist at ANMC who recognizes the value in having a personal relationship with the physicians that send cases to the consultant.

John Bocachica, MD
AFHCAN plans to monitor the impact from these trips on specialty consults to the ANMC specialty departments. One example is the impact of dermatology consults from YKHC to ANMC following a one-day visit by the ANMC dermatologist, Dr. John Bocachica, to Bethel. The dermatologist visited Bethel in July, causing the number of telehealth cases to more than double for the next 2 months.

Software – New Features, Faster

AFHCAN introduced significant changes and enhancements to the AFHCAN software in FY06 through four major releases/upgrades. Data obtained at the three test bed sites (Maniilaq Association, Yukon-Kuskokwim Health Association, and U.S. Coast Guard) indicates this software results in much faster user throughput and less time spent creating a case.

Other significant AFHCAN software achievements in FY06 include: Revamped AFHCAN Update product which allows staff to remotely install new software from a central server to remote servers, remote carts and remote clients through a fully automated process with rich reporting capability. AFHCAN staff began work on a major “re-factor” project, which promises to provide “line speed” data transfers, effectively allowing the rapid transfer of large data sets. AFHCAN implemented a world-class system that tracks design and test requirements for the development of software as a medical device. This system supports our regulatory compliance to Title 21 Code of Federal Regulations, Part 820.

Using the new software, health care providers are able to create most telehealth cases in half the time that it used to take. Other significant AFHCAN software achievements include:
- Revamped AFHCAN Update product which allows staff to remotely install new software from a central server to remote servers, remote carts and remote clients through a fully automated process with rich reporting capability.
- AFHCAN staff began work on a major “re-factor” project which promises to provide “line speed” data transfers, effectively allowing the rapid transfer of large data sets.
- AFHCAN implemented a world-class system that tracks design and test requirements for the development of software as a medical device. This system supports our regulatory compliance to Title 21 Code of Federal Regulations, Part 820.

In addition, the U.S. Air Force and U.S. Coast Guard requested AFHCAN to develop a client application that could be run on secure and hardened PC desktops — without requiring the installation of any new software. AFHCAN released the new web-consulting client in early FY07. This client application runs in virtually any browser on most operating systems — including Linux and Mac systems. Perhaps most importantly, the application does not require ActiveX controls or other “installable” software to be loaded on the client computer. As a result — this provides an acceptable telehealth system for the most security conscious environments.

This new application is a patient-centric client application that provides an intuitive “email-like” interface for consultants to review telehealth cases. This also provides consultants with a long requested ability to rapidly jump between cases for the same patient, view historical changes in images, and to find favorite cases. The application was designed to look and act like an email client, while providing all the multimedia rich experience and security of the standard AFHCAN client.

**AFHCAN Telehealth Cart**

AFHCAN completed the re-design of the traditional AFHCAN cart in FY06 and reduced direct and overhead costs, by outsourcing the manufacturing and assembly of certain equipment for our telemedicine platforms. This keeps staff cost low and reduces the need for manufacturing space, while increasing our access to external technical resources.

**The AFHCAN Telehealth Cart**

- Original v1 cart supported 4 devices
- New v3 cart supports 13 devices
- Consist of “kits” with options, mounting instructions, etc.
- Reduced cost with outside manufacturing
- Upgrade done “onsite” with simple handtools.

An MRP (Material Resource Planning) software system has been purchased and will be implemented to track all deployments.
Interfaces

AFHCAN began the design work for an HL7 interface between the AFHCAN telehealth system and RPMS. This work is being coordinated with the IHS, whose CIO has committed resources to the development of an HL7 telehealth interface specification. Funding has been secured to hire a consultant for the initial development of a conformant specification and two AFHCAN staff members have achieved HL7 Certification.

As well, a relationship with Joslin Vision Network Interface has been established to allow AFHCAN to provide a DICOM interface to the JVN software. This will allow users to take advantage of the JVN software to capture retinal images of diabetic patients, for example, and rely on the AFHCAN software to store and transmit these images securely to a remote site.

Services: Training and Support

AFHCAN staff have completely rewritten the training manuals, support materials, and assembly / installation instructions and developed a comprehensive multi-module CBT (computer-based training) and WBT (web-based training) systems.

AFHCAN provides training in many different areas such as: installation and cable management, software administration for IT specialists, clinical use of biomedical equipment, and clinical use of telemedicine software.


Other Alaska Sites

Funding was obtained to provide AFHCAN Carts and telehealth solutions to 9 of the 16 Community Health Centers / Primary Care Safety Net Providers (CHCPCSNP) that were not part of the original AFHCAN project. Significant project management and in-kind contributions were made by the Alaska Primary Care Association (APCA) and the Alaska Native Tribal Health Consortium’s (ANTHC’s) AFHCAN Office. AFHCAN and APCA are currently working on project requirements that are necessary prior to deployment, to develop partnerships with the telecommunications companies in Alaska to host the AFHCAN servers, connect the sites, and a business case analysis for all sites, prior to participation.

The Alaska Federal Health Care Partnership (AFHCP) contributed funds for phase one to deploy solutions to three CHCPCSNP sites, and the Alaska Telehealth Advisory Council (ATAC) through OAT/HRSA funding to deploy solutions to twenty consultants that will receive cases from the CHCPCSNP sites. The United States Department of Agriculture (USDA), Rural Utilities Services (RUS) provided grant funds to APCA for phase two that will deploy solutions to six more CHCPCSNP sites. Funding is still to be obtained for the remaining seven sites and any additional consultant sites.
Telehealth Resource Center

A proposal to fund the Northwest Telehealth Resource Center (TRC) has been approved by the Office for the Advancement of Telehealth (OAT, HRSA). Annual funding in excess of $250,000 was sought for 3 years to establish a TRC based out of Spokane. This proposal has been carefully developed over the last 2 years by a large group of dedicated telehealth systems in 8 states and the Pacific Islands. Currently, two representatives from Alaska are on the Board of the TRC – Rebecca Madison and Stewart Ferguson.

What’s Next

During FY07 AFHCAN will develop industry partnerships to market Telehealth Carts and Software; deploy upgrades of telehealth carts and servers; create Telehealth Interfaces (DICOM, HL7, JVN, RHO, and billing); re-factor Software; design version 2 of the Portable Telehealth System.

Expansion of AFHCAN Telehealth hardware, software, and services into the Indian Health Service (IHS) nationwide for: IHS Albuquerque Area; IHS Nashville Area; IHS Navajo Area; IHS Oklahoma Area; IHS Phoenix; Area; IHS Portland Area; Gallup; Phoenix Indian Medical Center; Tuba City, AZ; various Consultants.

Red Triangles = IHS Area Offices
Black Circles = Healthcare Facilities
AFHCAN filed a grant application to the USDA Rural Development, Distance Learning and Telemedicine Program FY 2007 in June 2007 for Telemedicine Outreach for Respiratory and Cardiac Disease to provide vital signs monitors and electronic stethoscopes to 22 Organizations within Alaska. Notification is expected in November 2007.

Future plans include the Integration of new devices (Stethoscope, etc) in the AFHCAN Store & Forward application and Video Teleconferencing; the design and marketing of Specialty Carts; full SART (sexual assault response team) compliance with AFHCAN application; CCOW compliance with AFHCAN client application and integration of an electronic version of the Community Health Aide Manual (CHAM).
Evaluation of Alaska Telemedicine

In October 2002 the University of Alaska was awarded a contract to evaluate telemedicine in Alaska. The goals were to measure the impact of telemedicine on the rural health systems from the perspective of the rural provider; measure the impact of telemedicine on the business and policy of health care in Alaska; and review the impact of telemedicine on statewide telecommunication infrastructure and technology support services.

During the meeting of the Alaska Telehealth Advisory Council on January 18, 2002, Ms. Liz Connell, who attended the meeting via teleconference from Senator Stevens’ office in Washington, D.C., announced that “the Senator would like to see the University of Alaska’s President’s Office conduct a high-level evaluation of the status of telemedicine (in Alaska), as well as recommendations on steps needed to have a sustained, operational network.” Ms. Connell noted that Senator Stevens had secured $35 million to $36 million for the AFHCAN project.

The University of Alaska received federal funds to conduct the evaluation, which began in 2002. The evaluation used several methods to obtain data: Key Informant Interviews; AFHCAN Project use and Evaluation Data, Medicaid Data; and Health Organization Surveys of Health Providers; business personnel in the health entities, and technology personnel.

Many documents were provided by staff and ATAC. It also incorporated material that was obtained from interviews that staff of the University of Alaska conducted with members of the AFHCAN team, who are quoted in the report. Financial sustainability, access to funding, quality high bandwidth capacity and reliability were the primary concerns of the key stakeholders. They anticipated the future issues of technical standards and privacy and confidentiality issues.

The funding for the evaluation came at an early time in the history of the telemedicine program. It was conducted before all the equipment and software was functional at the village level and before the concerted effort in training had been established.

However, as a testimony to its success in 2007, most of the tribal health organizations have included telemedicine as a standard part of their operational budget. It is an integral part of the way health care is delivered in rural Alaska.

Ongoing Major Telehealth Activities in Alaska

There are two other major telehealth/telemedicine efforts in Alaska: Teleradiology and Telepsychiatry.

Teleradiology in the Federal and Tribal System

One of the earliest programs to demonstrate success in telemedicine and have an immediate return on investment has been the use of telemedicine in radiology. This has occurred in both the public and private setting. The most active programs have been in the tribal health system and now within the Alaska Small Hospital Improvement Network.
The Alaska Federal Health Care Partnership (AFHCP) began their first health technology initiative in 1997 by introducing Teleradiology to Alaska’s four largest Federal health care facilities: ANMC, Elmendorf Regional Medical Center, Bassett Army Community Hospital, and the Veterans Affairs Medical and Regional Office Center.

This multiyear project added computer radiography (CR), workstations, digitizers, and frame grabbers to 11 regional hospitals, subregional clinics, and some villages, which include bi-directional functionality.

This project continues to be the driver to implement new imaging services in locations where it was not considered possible because of the obstacles associated with wet processing, and improve delivery of diagnostic interpretive services to remote facilities, most of which required postal delivery of films, the elimination of processor chemicals and film due to associated problems such as film and chemical shipping and storage and low processors utilization.
Teleradiology has greatly decreased the turn around times for diagnostic interpretations from 9 to 21 days to within 24 hours and immediate response on emergencies. There were approximately 55,000 diagnostic interpretations via teleradiology within the Federal and Tribal sectors in fiscal year 2006. ANMC by itself supports 11 sites and provides approximately 11,000 diagnostic interpreted studies annually. Another estimated 10,000 clinical interpretations are performed.

This number does not include several small native hospitals (Sitka and Maniilaq) that use private vendors for their Teleradiology service.

The lesson learned from statewide Teleradiology in the need of basic radiology training at the sending facilities. Good quality images require proper positioning of the patients correct settings on the x-ray equipment. The quality of the transmitted files is not dependent on technology but the training and experience at the originating site.

**Alaska Small Hospital Improvement Network**

Teleradiology in the critical access hospital project sponsored by the Alaska Small Hospital Process Improvement Network (ASHPIN) is under the umbrella of the Alaska State Hospital and Nursing Home Association. Five of the rural non tribal hospitals have collaborated to organize a shared teleradiology service. This has solved a chronic operational problem of a small but critical volume of radiological images and the expense of hiring a fulltime radiologist or having an intermittent radiologist on site.

In late 2003, the Alaska State Hospital and Nursing Home Association (ASHNHA) and ASHPIN, a division of ASHNHA, began to investigate alternative means of supporting Teleradiology for the ASHNHA membership.
Funding efforts and project planning for what came to be called the Alaska Rural Telehealth Network (or ARTN) got underway in February of 2004 with the development of a long-term strategic business plan for a Telehealth network which would initially develop Teleradiology capacity but be capable of supporting a wide variety of Telehealth modalities.

A comprehensive survey was done with an aim toward cataloguing the current assets and developing an understanding of the Local Area Network (LAN) and the Wide Area Network (WAN) resources at the various participating ARTN sites, as well as developing a sense of awareness of the project’s formation at the local level.

In November, 2006 funding efforts were successful. Funding agencies had come to recognize the value of the ARTN project, because of its potential to augment Alaska’s growing Telehealth infrastructure while providing improved access and level of rural / remote healthcare services. Current funding totals $4.4 million with local community hospital and clinic commitments at another $1.1 Million

In addition a number of individual ARTN member sites began to move toward new Teleradiology investments.

The plan for the project was to first develop the ARTN’s core infrastructure, then develop and implement connectivity to that core from participating “edge” sites. Subsequently, the project would move toward acquisition and distribution of Teleradiology equipment.

A contractor was hired to:

- Provide targeted Teleradiology equipment elements to each site on the basis of imaging workflow volumes (...per now somewhat dated studies carried out during the survey work in 2004);
- Provide a consistent set of telecommunications infrastructure elements at each participating member;
- Provide a core network infrastructure while incorporating VOIP (Voice-Over Internet Protocol) dial tone gateway services; state-of-the-art IP video conferencing services; streaming IP content services; and a public Internet Virtual Private Network (VPN) concentration portal; and
- Develop a central data / image storage capacity at the ARTN WAN core to facilitate deep archive DR and offsite backup services.

Current participating community health care centers (with status of installation) include the following.

- Homer (Completed)
- Petersburg (Completed)
- Sitka (Completed)
- Unalaska (Completed)
- Wrangell (Completed)
- Glennallen (Completed)
- Soldotna
- Cordova
- Seward
- Kodiak
- Valdez
- Talkeetna
Telepharmacy

Telepharmacy has been an unanticipated use of telemedicine and has had a major beneficial impact on the use and monitoring of pharmaceuticals in rural Alaska. Health Aide clinics have always had medicine available, provided by the pharmacies from their referral facilities.

ANMC and Southcentral Foundation (SCF) established a Telepharmacy program to improve pharmaceutical care to its patient population of more than 36,000. Chronic medications are filled through SCF’s Village Pharmacy division, but acute medications were distributed by non-pharmacy personnel; and prior to this program there was no pharmacist clinical oversight of the more than 18,000 prescriptions being processed per year. This program began as a pilot project in 2003 and currently serves 15 locations: Adak, Chistochina, Cold Bay, False Pass, King Cove, McGrath, Mentasta Lake, Nelson Lagoon, Nilavena, Ninilchik, Sand Point, Seldovia, St. Paul, and Whittier.

The remote clinic faxes a prescription (Rx) request to the ANMC pharmacy, a Pharmacist reviews the request and contacts the prescriber as needed. Then the Pharmacist enters the prescription into the electronic health record. An Rx label prints out at the remote clinic and the staff scans a barcode on the Rx label. This barcode releases the medication from the Automated Dispensing Unit (ADU). Each medication is labeled with a 2 dimensional barcode, and the barcode label on the medication container is scanned as a safety check. The ADU securely stores up to 120 different medications.

The Telepharmacy program has made it possible to bring all medication procurement, storage and accountability into compliance with the standards of practice; has improved access to needed medications; and has allowed ANMC to record prescribing trends, collect data that are used to further improve the medication-use safety initiative, and to reconcile patient medications across the continuum of care. The number of prescriptions per month is approximately 2,000. Pharmacists are able to have greater influence over the prescribing habits, encourage medication adherence, and help make medications more cost effective for their patients.
What’s Next?

Almost nine years have passed since the first meeting of the Alaska Telehealth Advisory Commission. Amazing advancements have taken place in those years, and both telehealth and the telecommunications in Alaska have expanded and grown more sophisticated exponentially each year.

Senator Stevens’ original vision for the Commission (and then Council) was to ensure that the AFHCAN project, which he was instrumental in funding, would expand over time to include private entities that were not a part of the federal partnership. There was also a consensus among the ATAC members that meeting regularly to share information and discuss both successes and new challenges was helpful to everyone and would clearly further the telemedicine/telehealth development in Alaska.

The expansion he envisioned is occurring at its own pace and where programmatically and financially it makes sense.

The continued development of electronic health records (which includes telemedicine) and health information exchange in Alaska will require a leadership group a bit different from the ATAC including representation from the public and business communities.

Sun setting ATAC and starting with a new leadership group that has an updated vision for telecommunication and health care is prudent and will provide for a refreshed and innovative approach to several of the lingering issues and many new ones that were first revealed in the Telemedicine effort.

This new effort is part of a national initiative for improved quality, efficiency and access to health care. Alaska has the opportunity again to help lead the charge.

ATAC provided a foundation of trust and a mechanism for working together by players who in the past had no easy mechanism to exchange information. The foundations that were built over these last nine years will serve us well into the future.
APPENDIX
The Earliest Beginnings

Old single sideband radio from historical files. The only means to communicate with the Community Health Aide (CHA).

In the early years of the Alaska Territory, very little expert medical care was to be found. Some private practitioners were located in the larger towns but most were unserved. Missionaries provided basic care in some of the larger Native villages but most were without medical services of any kind. In the remote villages, the only medical care most ever saw was when the Coast Guard cutter Bear made its yearly visits along the coast.¹

Telecommunications

By 1905 there were about 2000 miles of submarine cables connecting Alaska to the lower 48 states. There were approximately 1500 miles of telegraph lines installed in the state providing a rudimentary communication system between the military installations and some of the towns.

Local telephone systems were installed in several of the larger towns but there was no long distance service. The only communications with the outside world was by telegraph or surface mail.

¹The narrative in the first 11 pages of this report was written primarily by Howard Bonar.
By 1915 the military had abandoned most of their land lines within Alaska in favor of radio-telegraphy. The maintenance costs were substantially reduced. Frequent line breakage caused by weather, moose, and vandalism had been a constant source of telegraph service outages.

The Beginning of Telemedicine in Alaska

On March 16, 1931, provision of education and health care services to Alaska Natives was turned over to the Bureau of Indian Affairs (BIA). Hospitals were built at Mountain Village, Kotzebue, Unalaska, Barrow, Bethel, Kanakanak, and Tanana. All were provided with short wave (high frequency) radio equipment.

As part of their program to improve healthcare, the BIA provided the teachers heading for the Native villages with a standard medical kit. It included drugs, first aid manuals, and a shortwave radio to communicate with the hospital doctors when they needed help. We assume they received some sort of training. This was the beginning of organized telemedicine in Alaska.

The atmospheric conditions that make long distance radio communications possible are also a major cause of the problems in maintaining a reliable short wave radio communication circuit. With powerful radio equipment, well designed and properly installed antennas, and well-trained operators, it is possible to have a high degree of communications success. These ideals were seldom achieved in most villages.

With all its faults, the radio systems and the volunteer providers did result in a substantial improvement in the delivery of health care to the Alaska Native populations. It was really only first aid but it was far better than nothing. Shown here: Bertha Moses, Health Aide in Allakaket talking on the radio phone, circa 1970

On July 1, 1955 health care of Alaska Natives was turned over to U.S. Public Health Service (PHS). There was an agreement between the Department of Interior and PHS for the joint use of their radio
frequencies. As a result of this sharing, the schools, village clinics, and the Native hospitals could communicate with each other.

In 1964, the Alaska Indian Health Service began a program to train volunteer Community Health Aides to provide basic health services in their home villages. They worked out of their own homes or out of small clinics located in some of the village schools. They were allowed to use the school radios for their consultations with the doctors.

In 1967 PHS began building clinics in the villages of Alakanuk, Aniak, Norvik, Savoonga, Selawik, St. George, and St. Paul. Radios were installed at each location. Local volunteers were given basic training in delivering basic health care and operating the radios.

**Improving Communications**

In September of 1968, a two-day communications conference was held in Anchorage sponsored by State of Alaska Department of Economic Development; Frank H. Murkowski was commissioner. A report given by the officer in charge of the Alaska Communications Service indicated that only 39 communities in Alaska had dial-up long distance telephone communications. All others relied on the radio-telephone or the telegraph.

Also in 1968, the Indian Health Service received funding to hire 185 Community Health Aides (CHAs) for 157 communities. The need and pressure for better communications to the villages increased. This system of health care delivery required frequent exchanges of patient information between the minimally trained CHAs and the doctors.

Daily schedules of radio calls were established in each service unit, and the doctor on duty would call each village on his list to see if there were any patients to discuss. Each patient’s case was handled at once and, as a result, all of the CHAs had to stay near their radios until they had been called for their reports. It was time consuming and sometimes frustrating because of the nature of the high frequency radio operation. At times, electrical interference at either end or atmospheric disturbances would make reception extremely difficult if not impossible. It was often necessary for one village to relay messages for another because of poor reception.
In 1968, United States Senator Mike Gravel learned about the ATS-1 satellite program and brought pressure to include Alaska in the experiments. He was successful and when the installations were made a number of communities in Alaska were included.

The original program was designed primarily for educational purposes but there was a secondary medical component. The physical location of the transmission equipment in the villages was determined by the availability of electrical power.

The project was deemed a great success by all accounts. Once the original program was over, some of the earth station equipment was reassigned.

In the Summer of 1971, ATS-1 earth stations were installed in 19 Alaska villages where HF radio reception was particularly troublesome. They were: Allakaket, Arctic Village, Barrow, Barter Island, Chalkyitsik, Emmonak, Fort Yukon, Homer, Hooper Bay, Huslia, Kanakanak, Nulato, Ruby, Sand Point, Saint Paul, Stevens Village, Tanana, Venetie, and Anaktuvuk Pass. Some of these installations were later relocated to interior villages. More powerful base station transmitters were located at: Juneau, Anchorage, Fairbanks, Nome, Kodiak, Kotzebue, and Bethel.

The official dedication of the system was held at the Alaska Native Medical Center (ANMC) in September of 1971 with Governor Egan and Senator Stevens as guests of honor. The system worked very well in the villages, but in Anchorage local interference made it unusable. The transmission equipment was later relocated to the upper Hillside area which cured the noise problem. A remote control unit at ANMC provided good service for the life of the program.

After completion of the scheduled experimental use of the system, the satellite was made available again for use by the Indian Health Service (IHS), which had the use of it for about four hours every morning for scheduled medical traffic in the Tanana Chiefs Region. In case of a medical emergency, it could be used at other times. Afternoons and evenings, the satellite was reserved for use by an educational consortium in Pacific Rim Countries.

Medical consultants were available or on call at the Tanana Hospital. In addition, the University of Alaska could be called in for special programs. ANMC in Anchorage monitored the medical traffic and their doctors could also be called on for consultation.

In an analysis of the program, the Tanana Chiefs reported a 400% increase in doctor-to-CHA contacts. The clear and reliable voice communications encouraged the CHA to use it more often than the HF
radios, and the frustration from poor reception was eliminated. Medical mistakes from misunderstood symptoms or treatment instructions were greatly reduced.

This system continued in daily use until about 1980 when dial-up telephone systems were installed in almost all village clinics.

Medical Records

In conjunction with the ATS-1 experiment, a task force was established to design a standard patient encounter form that would have all the data fields necessary for a comprehensive medical record. It was planned to be ready when the medical experiments started, but they didn’t make it. What seemed like a simple project became a glaring example of some people’s resistance to change. The form design was finally completed and became an integral part of the Indian Health Service’s medical records system.

Once the patient encounter form fields were finalized, design of a new medical records system was started which would use main frame computers in the major IHS Medical Centers for storage and retrieval of information. The Mumps programming language was chosen for the development because of its ability to minimize the amount of disk space needed for each record.

Since that time there has been a continual program of upgrading and enhancing the software and hardware to take advantage of new computer and communications technology. In Alaska, the goal is to put all patient encounters into the central data base with minimum duplication of effort.

Access to key patient information immediately from a health care provider’s work station can only result in better diagnosis and treatment and can help prevent misdiagnosis and medical errors.

In Alaska, the Indian Health Service Medical Records system has been expanded to cover all IHS and State of Alaska Clinics. The State Clinics serve a lot of Native patients and it therefore makes good sense to have those encounters included a single data base.

ATS-6 Satellite Experiment

On May 30, 1974, the ATS-6 satellite was launched. The WAMI (Washington - Alaska - Montana-Idaho) Telemedicine/Education experiments began. There were several installations made at schools across the state. The Tanana earth station installation was at the PHS hospital. Remote control equipment was placed in the nearby Tanana School for their use.

Galena and Fort Yukon clinics were equipped for telemedicine and two-way television broadcasting through the ATS-6 satellite. Biomedical telemetry included electrocardiogram and stethophone information.

The Galena clinic was a two-room log cabin on the bank of the Yukon River. These two locations were chosen for this part of the experiment because they had professional nurses on staff. Encoding equipment was installed for the television and voice transmissions. The coding equipment did not work properly so patient privacy was not well protected. Releases were obtained before transmission of any patient information.
The PHS Hospital at Tanana and the University of Alaska in Fairbanks had the receiving and recording equipment for processing the telemedicine transmissions. The experiment did not last long, and there were not enough cases presented to derive any meaningful statistics. What cases they did present over the system demonstrated that communications technology showed great promise in improving the delivery of health care services to remote areas.

**Village Telephone Systems**

In May of 1972, RCA turned on VHF radiotelephone systems in 19 villages. This was Phase I of an expansion program that would eventually provide a single telephone in a planned total of 118 villages. Completion was planned for 1974.

The system made extensive use of mountain top repeaters. In many cases, service to several villages was routed through one repeater. When they worked, they worked well enough but there was a serious problem. The provisioning of power supplies and channels had been based on the number of calls that had been handled by the radio telephone services. When a telephone became available in the village the explosion in usage overwhelmed the equipment. It was not an acceptable system for emergency medical communications.

In 1976, RCA Alascom began installation of the planned 120 earth stations they would co-own with the State in remote Alaska villages. Initially, each village received one commercial telephone installation. Most were installed in a community building. As with the VHF systems, the local community government was responsible for collecting the long distance telephone call charges and paying the monthly bill.

In addition to the commercial telephone, the IHS contracted for a private line phone to be installed in many of the village clinics. At the end of the installation phase, there were approximately 80 private line phones installed in village clinics. Each phone had five channels with channel one assigned to the Alaska Native Medical Center in Anchorage. Two IHS regional hospitals were assigned to each of the next three channels. The fifth channel was reserved for inter-hospital communications but was seldom used.

The system could have been adapted for biomedical telemetry but there was no user demand at that time so it was not done. The ANMC phone was monitored 24 hours a day seven days a week at the telephone switchboard office. In case of a medical emergency, any one of five remote control stations could be switched in for consultation. At the other hospitals, monitoring was less consistent at night and weekends but very good during the day.

The dramatic improvement in voice communications to the remote village clinics brought several immediate benefits that resulted in better health care. The scheduled medical traffic brought all the village CHAs together at one time. Just as with the radio network, they listened to the case presentations of their peers and heard the doctors’ diagnosis and treatment instructions. It was a very valuable learning experience for all of them. It also helped them understand that they were not alone. Other CHAs were experiencing the very same problems and concerns that they were.
ATS-6 Satellite Experiment Revisited

After providing satellite TV broadcasting to India for a year and then several months over Africa, the ATS-6 satellite was relocated to once again deliver coverage to most of the North American Continent. The limited success of the original experiment in telemedicine was sufficient to justify another trial of the technology. This time only four locations in Alaska would be involved.

The earth station at the Tanana Hospital was reactivated and new installations were made at the ANMC in Anchorage and at the PHS Hospital in Bethel. It was decided to place one station in a remote village clinic with only CHAs on staff. The Huslia health aides had been enthusiastic participants in the ATS-1 experiments for both the telemedicine and the educational programs offered over it. They were chosen to represent the villages in the experiment.

The clinic in Huslia was a two room log cabin with a lean-to store room. The transmitter equipment was placed in the store room and the control rack and video camera in the waiting room. There was not sufficient space in the exam room for anything besides the examination table and a small side table.

The system provided two-way black and white television transmission (not simultaneous) with an audio channel using the ATS-6 satellite. Voice control of the patient encounter process was provided using the Alascom clinic phone system or the ATS-1 clinic satellite phone.

Doctors in Tanana and Bethel were able to present patients and their X-rays to consultants at the ANMC hospital in Anchorage. An X-ray picture would be placed in the light box and the video camera focused on it. The received picture in Anchorage was good enough for many conditions examined by the orthopedic physician. It was not good enough for a radiologist to use for more critical examinations of soft tissue.

The health aides at Huslia received only one short day of instruction in using the video camera and the transmitting equipment. The next day they made their first case presentation with the technician present but not interfering or helping. Their case was a little girl with six fingers on each hand. The object was for the orthopedic physician to determine if she was a good candidate for surgery to give her a normal hand. The presentation gave positive assurances that yes she was indeed a good candidate and should be sent in as soon as the operation could be scheduled.
Again, there were not enough cases presented to provide any conclusive statistical data. The equipment worked well and the presenters had no problems dealing with the complex systems. It seemed to confirm the old adage that a picture is worth a thousand words.

By early Summer of 1979, the satellite was running low on the gas used for positioning the antennas. As a result, the NASA control center used the gyroscopic motors for redirection. It worked but was not precise so quite often reception was too poor to be useful. In August, the remaining fuel was used to boost the satellite out of its position in orbit to make room for later reuse of the space.

**Dial Up Telephone in the Clinics**

Once the Alascom earth stations were in place in the villages it became possible for the local exchange carriers to come in and install local telephone exchanges with long distance dialing capabilities. The process started in earnest about 1980 and by 1984 almost all villages of any size had a telephone system installed.

With dial telephones in almost all of the village clinics, IHS began turning off its private line system because of its high cost. The health aides would lose their daily party line conferences but the money saved would help pay for the expansion of other parts of the Native health programs.

**Slow Scan Television**

Around 1985 the North Slope Borough installed slow scan television systems in their village clinics and in the hospitals at Barrow, Kotzebue, and ANMC in Anchorage. It worked well for educational purposes and was useful in some consultations with the orthopedic physicians. It provided some of the same benefits enjoyed by the ATS-6 experiment without the extremely high costs. It was excellent for low grade X-ray but was not as effective for displaying the manipulation of joints, etc. It continued in use for a several years but then seemed to die out from lack of interest.

**Facsimile Machines and Telemedicine**

The use of the fax machine for sending patient medical information seemed to have come out of nowhere and burst full grown in the IHS system. Bristol Bay Area Health Corporation is thought to be the originator of this phenomenon. Privacy rules called for the receiving equipment to be located in the medical records department with restricted access. We assume that was the case everywhere it was used.

The CHA would prepare the patients encounter form with all of the vital signs. The form would then be faxed to the regional hospital. At his convenience, the doctor would examine the forms for the day, make a diagnosis, and write up the instructions. At the time scheduled for medical calls the doctor would then call the health aide and give her directions for treatment of each case reported.

This system worked very well because most of the patients came to the clinic in the afternoon and the medical traffic was usually handled in the morning. It was a great relief for the doctors because it eliminated most of the time wasted on the basic questions about vital signs and descriptions of the patients. That information was all on the faxed sheet in front of the doctor.
When the telephone systems were first installed in the villages, residents could call each other at any time. With only one long distance line per village, it soon became a major bottleneck for incoming and outgoing calls. Some of the phone companies installed multiplexing equipment that divided the single long distance line into up to four lines. As a result, the quality was still good enough for voice, but the use of computer modems and fax machines was severely impacted. Faxes could be scheduled in the middle of the night and would usually get through because they would have all or most of the available bandwidth. What started out as a very positive improvement to the delivery of health care became less dependable.

X-Ray Digitizer

In 1990, the Bristol Bay Area Health Corporation purchased a Discovery digitizer system. The plan was to send X-ray pictures over the telephone lines via dial-up modem to a monitor in the ANMC radiology department. The system worked but it had the same problem of low bandwidth that slowed down the fax transmissions. To further complicate the project, the radiologists declined to read the pictures because they did not feel the definition was good enough for critical diagnosis.
NSHC Experiments with Picture Phone

By the mid 1990s, the pressure was on to have a working telemedicine system in place in Alaska. Several conferences were held to discuss ways and means and how it could work. The regional Native Health Corporations were fully involved in the discussions and were eager to get started.

The NSHC worked with Alascom to put together a pilot project in one of their villages using a device called a picture phone. It was a display type phone with jacks for plugging in digital medical devices and cameras. With it they were able to carry out several successful diagnostic procedures including consultation with out of state specialists.

There were several pluses demonstrated by this experiment. Store and forward technology could provide useful telemedicine services to remote villages using existing poor quality phone lines. Some off-the-shelf technology could be easily placed into service immediately without extensive reworking or training of the operators. The CHAs were quite capable of operating complex diagnostic tools with a minimum of training.

The Alaska Telemedicine Project

In 1996 the National Library of Medicine issued a Request For Proposal (RFP) for the purpose of determining, among other things, the impact of telemedicine on the health care system as a whole and on the cost, quality, and access to care for specific populations.

The Alaska Telemedicine Project (also known as the Alaska Telemedicine Testbed Project), a consortium of interested health care providers, telecommunications companies, the University of Alaska, and interested private citizens, had been developing plans for just such a program. The RFP offered an ideal means of implementing the first step of a sustainable program.

A team was formed of IHS staff members including a biomedical engineer, communication coordinator, electronic medical records supervisor, and a representative of the Alaska Native Health Board. They were able to put together a plan that would accomplish the aims of the RFP as well as meet the needs of the remote Alaska villagers for improved health care.

After substantial modification to the plan by the University staff, the proposal was accepted by the Library of Medicine, and work began to acquire the hardware and software for the project. It seems that things went awry and progress was stalled in getting equipment out to the villages to begin the project. It is not known whether or not anything actually got done. The actual results of the program are shrouded in the mists of bureaucratic language.

It is known that the regional Native health corporations in the Alaska Area of the IHS individually and collectively decided that they could no longer wait for something to happen. The original plans were brought back out and carried forward.

Today's statewide network of telemedicine computers and diagnostic equipment are a direct result of that determination to find a way to improve the delivery of health care to the remote Native communities.
Telemedicine Advantages

In the early days of the HF radio traffic at the PHS Hospital in Bethel, a punching bag hung right above the radio. It received a lot of abuse as the doctors vented their frustrations caused by the communications problems and the difficulty in getting the needed information from the CHAs. By the end of their daily schedule, most of them were thoroughly wrung out from the stress and anxiety. Most of them were new to the idea of diagnosing illnesses and prescribing treatment for a patient they could not see. The responsibility they felt and anxiety over making a mistake was daunting. Understandably, staff turnover was high.

The same sort of stress was found on the village clinic side of the exchange. The Health Aide was reporting a close friend or relative, sometimes her own family members. Their concern about making a mistake and causing harm to someone they loved was always with them. Their stress level too was quite high and the staff turnover in the early years was substantial.

As each improvement in the communications technology was implemented, the relaxing of those tensions and cares were readily apparent to even a layman. More and more of the CHAs went on to school for additional training and many of them have achieved the title of nurse.

As a result of the telehealth movement in Alaska, benefits for the patients have been better health care, fewer mistakes, and fewer unnecessary expensive trips in to the hospitals. Since most patients have to pay their own way home, the savings to the patients can be substantial. In some cases, they have to pay their own transportation costs both ways. If the patient is a child, someone must travel with him/her resulting in double transportation costs. The personal expenses add up fast in these situations.

The improvements in communications have substantially shortened the number of hours spent each day by the doctors in dealing with the medical traffic. This leaves them more time to spend with those patients already in the hospital.

With electronic medical records on line, up to date and accurate patient records including all village clinic and hospital encounters are immediately available to the providers. It is no longer necessary to go through the time consuming process of retrieving the medical records file from the library and manually sorting through it for needed information.

The peripheral diagnostic tools that can be connected to the basic video camera offer a wide range of capabilities for patient examinations. If a wide band communications channel is available in the village clinics, the consultation with the doctor at the hospital could be immediate. If the connection is via narrow band communications, then store and forward technology would be used. As will be seen later in this report, store and forward technology is more than adequate for Alaska’s telehealth system, especially in the rural clinics and health centers.
Telehealth Development in the 1990’s

Starting fairly early in the decade of the 1990’s Alaska experienced an almost explosive expansion of telehealth that was aided by an equally rapid improvement in telecommunications capability and capacity, which had not been entirely expected, as can be seen by the Alaska Public Utility Commission’s report cited below.

Alaska Public Utility Commission

The March 1996 report from the Alaska 2001 Advisory Committee Alaska Public Utility Commission (APUC3), which was chaired by then Lieutenant Governor Fran Ulmer, described the evolution of the telecommunications infrastructure in Alaska, including the development of systems by the military and their transfer to the State of Alaska, privatization and emergence of local exchange carriers and competitive inter-exchange carriers. It did not, however, paint a very optimistic picture of a telecommunications’ future that could support a telehealth system in the State. In fact, in the report the Advisory Committee admonished the Commission that its regulatory policies were closely linked to service quality in bush Alaska and could have negative consequences for rural economic development. Quoting from that report:

As competition is introduced into telecommunications markets, monopoly firms are forced to become increasingly competitive and are facing new and different market incentives. Regulators need to be aware of those changing incentives and refocus their priorities if they wish to ensure a quality communications infrastructure.

A case in point is the growing disparity in service between urban and rural areas of the state for interexchange service. In urban areas service is very good and getting better. Currently Anchorage is connected to the lower 48 by fiber optic cable and Fairbanks and Juneau are connected to Anchorage by digital microwave. The transmission facilities between Anchorage and Fairbanks may soon be upgraded to fiber and AT&T has announced its intentions of installing a $25 million switch in Anchorage. Interexchange services in the bush, as discussed in a previous section, is characterized by poor voice quality, slow data transmission speeds and modem connections that spontaneously disconnect.

Part of the problem in the bush has to do with investment incentives faced by Alascom. As noted previously, upgrading all bush earthstations from analog to digital was originally scheduled for completion FY 1994, but has been delayed to the 1997-2000 time period. As the state agency responsible for overseeing the quality of the state communications infrastructure, the APUC needs to be aware of the economic development implications of this delayed deployment implications of this delayed deployment and how it might be related to its regulatory policies.4

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3 The narrative in the remainder of this chapter was written by Edward Deaux.
4 In 1999 APUC became the Regulatory Commission of Alaska (RCA) under Title 42 Chapter 4 Section 10 of the Alaska State Code.
Also in 1996, Lieutenant Governor Fran Ulmer organized the Telecommunications Information Council (TIC), with task forces on telemedicine, education, information systems, economic development, emergency communications and public broadcasting. The Telemedicine Task Force Report and others were summarized, and recommendations based on the task force reports and on hearings were published in the Telecommunications and Information Technology Plan of December 1996. The full Telemedicine Task Force Report included status reports and historical background on projects.

Computers continued to play an increasingly important role in health care delivery, administration, and public health services in the decade of the 1990’s. “Computer literacy” increased statewide as it did nationwide. Computerization of medical records and encounter (visit/billing) data became increasingly common with the Indian Health Service (IHS), the regional Native health corporations, and the public health nurses, all coming on line to use the Resource and Patient Management System (RPMS) to provide uniform data about patient encounters.

Some of the 1990’s Telemedicine Efforts

Since the early 1990s, the private hospitals, Native health corporations, Alaska Native Medical Center, federal services, and State public health services have sought to capitalize on and to stimulate deployment of computer resources, know-how, and telecommunications infrastructure to improve health care throughout Alaska. Projects have obtained start-up funding primarily from Federal sources, including the National Telecommunications and Information Administration (NTIA), National Library of Medicine (NLM), Indian Health Service (IHS), Rural Utilities Service (RUS), Department of Defense, Department of Veterans Affairs, and the U. S. Coast Guard, and private sources (i.e., hospital investment). Roughly in order of appearance, these projects have included the following, described in terms of three “phases”: (1) early prototype development, (2) general developmental phase, and (3) institutionalization phase.


CHAIN (Community Health Aide Information Network) Nome/Norton Sound Health Corporation (starting about 1992) was the first prototype program. This was a rather customized system, designed by Mike Terry and others. Mike Ackerman of the National Library of Medicine and Dena Puskine, then of the Office for Rural Health Policy, visited Nome and other sites in Alaska in 1994 at the invitation of the Alaska Telemedicine Project. The CHAIN system used email attachments of captured camcorder images, and PicazoPhone for telemedicine, a database of patient visit/clinical information, on-line conference groups, and billing information. However, it went into decline when the Norton Sound Health Corporation failed to provide for adequate ongoing technical support. The system was designed to operate over low bandwidth (9600 baud was about the maximum used -- average was about 300 to 2400 baud).

The Alaska Telemedicine Project (ATP), a consortium of partners that initially included University of Alaska Anchorage, AT&T Alascom, and Providence Health Systems, and later representatives from State, tribal and private organizations, began meeting in Anchorage in 1994.

Concurrent with the work of ATP, a Federal Partnership on radiology emerged -- an orthopedist and a radiologist in the federal system obtained several slow digital scanners for x-rays and set up a three-hospital system. Assistance for this project was provided by Tripler Army Base in Hawaii. Barriers prevented the system from being used to maximum efficiency or being fully utilized: consultant
radiologists were available only during certain hours -- not full-time round-the-clock, which was what the Community Health Aides needed for the resource to be dependable. Eventually five rural hospitals were added to the system. The larger clinics that expected to be added (McGrath, for example) have not been tied in.

The staff in the Kiana Clinic – 2004

Multiple projects across the State, including the Alaska Telemedicine Testbed Project funded by the NLM, Wrangell-Petersburg-Bartlett Project (small NLM grant), several Native health corporation projects, and the North Slope Borough project got underway in the period from 1995 to 1998.

The North Slope Borough successfully applied to NTIA for a grant to expand its Slope-wide "AuroraNet" project to include distance delivery health care (DDHC). The DDHC project hired consultants to expand the network to seven village clinics and added telemedicine workstations for multiple clinical applications. However due to high turnover, particularly at the Barrow hospital, the project never achieved full implementation.

In 1996, on behalf of the members of the ATP, the Applied Science Laboratory of the University of Alaska Anchorage was awarded a $2.0 million contract from the NLM to evaluate the uses of narrow bandwidth telemedicine and telehealth applications and technologies in "frontier" Alaska. Frederick W. Pearce, Ph.D., was the Principal Investigator. The "Alaska Telemedicine Testbed Project" (ATTP) developed, deployed, and evaluated the use of narrow bandwidth telemedicine for otolaryngology and
dermatology. Twenty-six villages and four regional medical hubs in western Alaska (i.e., Bethel, Dillingham, Kotzebue, and Nome) were chosen from among twelve proposals for participation. Ear, nose, and throat (ENT) services were chosen for statistical reasons, as they exhibited no evaluation bias for gender and age. Moreover otitis media was viewed as a serious clinical problem in rural Alaska.

ATTP deployed an Alaska Telemedicine Workstation designed to work in villages and clinics and to be used as productive tools by Community Health Aides. A one-year delay in the customization of Medvision software was a major obstacle in deployment and evaluation timelines. ATTP was designed to deliver a three-pronged evaluation to the NLM. Using 1996 air transportation records as baseline for the study, ATTP was designed to discover:

- Whether patients and providers perceived telemedicine encounters as good or better than current transportation-based models of health care delivery for ENT and dermatology.

- Whether the use of advanced telecommunications and information technologies could mitigate "professional isolation," the most cited reason for the high turnover of health care professionals in rural Alaska.

ATTP also completed a cost and benefits study designed (a) to analyze the benefits of telemedicine and telehealth services and (b) to identify the cost per transaction of each telemedicine encounter.

The results of ATTP showed that both patients and providers perceive telemedicine to be "as good as or better" than transportation-based models of health care delivery, but the provider "survival" data suggested that telemedicine and telehealth applications do not increase the length of stay of health care providers in rural Alaska. The cost analyses showed that the average telemedicine encounter cost less than $40 and that the costs were falling.

Providence Health Systems installed digital x-ray scanners in several rural hospitals, where adequate telecommunications support was available. For both Providence and Alaska Regional Hospitals, and for private physicians and groups that have invested in telemedicine software and equipment, these efforts have been made within the framework of organizational business plans, to be supported by their capital and operational budgets for provision of health services, rather than grants.

Passage of the 1996 Telecommunications Act stimulated new interest and activity in telemedicine deployment. Rulemaking began in 1997. Universal Service Funding (USF) for rural health clinics was delayed into 1999, with applications processed but funds not available in 1998. Response by rural health care providers eligible to apply for subsidized services was dramatic: as of early 1999, Alaska had 42 approved applications reflecting requests for services at 229 sites -- a larger number of sites than in any other state. Late in 1997, the Alaska Department of Health and Social Services Division of Public Health assigned a half-time staff person to follow telemedicine developments, with particular attention to those that would affect Medicaid services for children. This staff person also served as the outreach, technical assistance person, and policy analyst for the Department on Universal Service Funds.

Institutionalization Phase (1998-1999)

Investment in a major project proposed by the Alaska Federal Partnership Program: the Alaska Federal Health Care Access Network Project (AFHCAN) was assured by the end of 1998 through the legislative and budget initiatives of Senator Ted Stevens. The AFHCAN project is described in detail in Chapter Four.

Meanwhile, the ATTP was being implemented in the field at the Maniilaq sites (Northwest Arctic Borough), in the Yukon-Kuskokwim Delta, and at additional planned sites. The Alaska Native Health Board (ANHB) telemedicine staff developed expertise working on the ATTP/NLM project, and the Alaska Federal Health Care Partnership selected the ANHB to serve as the first project office for the AFHCAN project.

Telecommunications infrastructure advanced during 1998 with laying of new fiber optic cable and satellite dish deployment; unfortunately an important satellite launch that would have provided more capacity for Alaska unfortunately failed. State involvement is occurring through technical assistance from Alaska Department of Health and Social Services’ Division of Public Health and Public Health Nursing participation in AFHCAN.

Yukon Kuskokwim Health Corporation (YKHC), Tanana Chiefs Conference (TCC), Providence Health Systems, Norton Sound Health Corporation, Council of Athabascan Tribal Governments, and others were making consistent progress in training, equipment deployment and acquisition of software, trying to resolve telecommunications problems with greater access to bandwidth locally (WAN/LAN/wireless and traditional solutions) and regionally. TCC, Ketchikan General Hospital, and Bartlett Regional Hospital were the pioneers in seeking completion of Universal Service Funds contracts with telecommunication service providers. Bartlett Hospital in Juneau was using services provided by AT&T for weekly grand rounds and for clinical consults with Virginia Mason Medical Center in Seattle for over a year. The ATTP website was used by the UAA School of Nursing for web-enhanced distance education (including assignments, “classroom discussion” and peer as well as student/teacher conversation) and for clinical presentations.

Alaska Department of Corrections initiated telemedicine for intake and follow-up of mental health patients in prisons, using relatively low-cost and modest bandwidth video phones that use a television monitor. They used live video conferencing between Anchorage and the correctional facilities over the video phones, using “regular” phone lines (about 28.8 Kbps). In just a year and a half of experience, the psychiatric providers in Anchorage (one psychiatrist with part-time back-up and one psychologist) found the system highly effective, reducing transportation and security costs and provider travel while facilitating higher quality doctor-client relationships than telephone interviews. The video quality was adequate for observation except for fine motor skills observation, which they continued to handle in monthly personal visits to the correctional facilities. Client acceptance was extremely high. An expanded description of this program can be found in Chapter Five of this report.

The Arctic Council approved an Arctic Telemedicine Project as part of its two-year agenda for 1999-2000. The University of Alaska Institute for Circumpolar Health Studies was awarded a State contract for conducting a survey of Arctic nations' telehealth activities as part of that process. The survey was designed to lay the groundwork for information sharing and planning for sustainable development initiatives involving telecommunications for the improvement of health care, dissemination of health information, and health workforce training in the Arctic nations.
Internet-based information exchange through email and web access also quickly spread in Alaska as elsewhere, especially in 1998 and 1999 as access to “bandwidth” improved dramatically. This was recognized by the public health system and the health care delivery system as a tool for improving service, for providing training, and for obtaining information for consumers and for health professionals (i.e., for “distance learning”).