

Telethinking

With A. Stewart Ferguson, Ph.D.



A. STEWART FERGUSON, PH.D., is Director of the Alaska Federal Health Care Access Network (AFHCAN) in Anchorage, Alaska. Dr. Ferguson has been with AFHCAN since its inception in 1998, has served as both Technical Director and Deputy Director for the project, and was responsible for the initial design of the hardware platform supporting the biomedical devices. He also had key roles in product/software development, assessment, evaluation, and research. Prior to the AFHCAN Project, Dr. Ferguson served with the Alaska Native Health Board as CTO for the Village Telemedicine Testbed Project. He holds a Master's degree and a Ph.D. degree in Biomedical Engineering, and Bachelor's degrees in mathematics and electrical engineering.

Dr. Ferguson, please give our readers an overview of the Alaska Federal Health Care Access Net-

work (AFHCAN) project. How did it get started? What are its mission and goals?*

AFHCAN was a federally funded project that began in 1998; the first year of funding was for FY1999. But to understand the origins of AFHCAN, you have to go back one project earlier to the Village Telemedicine Testbed Project, which was funded by the National Library of Medicine (NLM) through a contract to the University of Alaska Anchorage (UAA). That project, led by Dr. Fred Pearce at UAA, ran from 1996–1999. Its scope was about 10% of that of AFHCAN; a telehealth solution was deployed to four regional hospitals and 26 villages. In the process of planning that project, the organizers sought input from organizations about whether they wanted to participate in telehealth. Every regional health corporation that provides care to Alaska Natives wanted to be part of that project. The interest was there, and the need was huge. Recognition of that need and the desire to participate—and the realization that the Testbed Project could only cover a small number of sites—led to the initiation of AFHCAN.

AFHCAN began as an initiative of the Alaska Federal Health Care Part-

*The Alaska Federal Health Care Access Network received the American Telemedicine Association's 2004 ATA President's Award for the Advancement of Telemedicine. The award recognizes a project, program, or institution that makes a substantial contribution to the advancement of telemedicine.

nership (AFHCP). The Partnership is a unique collaboration of federal agencies that has been in existence since 1994. It has brought together the Department of Veteran's Affairs (VA), Department of Defense (DoD), Department of Homeland Security (U.S. Coast Guard - USCG), Indian Health Service (IHS), and the Alaska Native Tribal Health Consortium (ANTHC) for the purpose of providing health care to more than 300,000 federal beneficiaries in the state of Alaska. The mission of the AFHCP is to provide federal beneficiaries with ready access to quality, customer-oriented, compassionate, comprehensive, cost-effective health care, in a health care delivery system where the strengths of individual agencies are combined to provide quality customer service. AFHCP submitted a proposal to Congress to fund the AFHCAN system. They proposed a four-year project that would provide telehealth solutions to 235 sites in Alaska that are part of 39 autonomous health organizations.

The original plan was to establish the telehealth system over a four-year period, and then to have it be sustained beyond that period by the participating organizations. We believed that it could be completed in four years because we benefited from the experience of the earlier NLM project. The early months of AFHCAN were consumed in design and development efforts, using the lessons learned from the NLM project. However, the software used for the NLM project was no longer available, and we could not find an exist-

ing software product that would scale to 235 sites and 39 autonomous organizations. We realized that the hardware also needed to be improved if we wanted to be able to deploy it to 10 times the number of sites. So we spent most of the first two years of the AFHCAN project conducting needs assessment and developing hardware and software solutions with constant feedback from the organizations. As a result, deployment came later in the project than we anticipated. However, we still achieved the goal of deploying equipment and software solutions to all of those sites within the four-year time frame of the project.

By October 2002, the end of the original four-year period, we had deployed equipment to all of the sites. Unfortunately, some sites, and some of the equipment, could only be used for local capture of data but not for transmission of data, because the connectivity was not yet available. It has taken until this year, which is the third year beyond the initial four-year period, to get some of the sites connected.

I think that one of the key issues in the successful design and management of the AFHCAN system was the reliance on statewide committees. Five expertise committees—Clinical, Training, Technical, Informatics, and Business/Legal—and an overall Steering Board met on a monthly basis for much of the four years. Leaders from all 39 organizations participated in these committees providing guidance and direction to the AFHCAN office.

In response to the question about AFHCAN's missions and goals, the mission defined in the original proposal was to improve access to healthcare for federal beneficiaries in Alaska through sustainable telehealth systems. The vision was 235 federal and state healthcare sites

linked in a telehealth network that was needs-based, flexible, sustainable, and coordinated with other telehealth systems in Alaska.

What are the main activities of the project, and how have those evolved since its inception?

First and foremost, we continue to improve our services and products for our Alaska sites. That is unchanged, although the number of users and clinical services has grown significantly over the years. The growing acceptance of telehealth and awareness of its capabilities have sparked an incredible response from the provider community. We have more than 700 users in Alaska that continually provide feedback and suggestions to improve our products to meet their clinical needs. We have physicians that provide feature requests daily, and community health aides in village clinics that are asking for mobile units and additional peripherals. We still see product redesign and expansion of services to improve the delivery of health care in Alaska as our core business.

Perhaps what has changed in this regard is that we are also expanding the AFHCAN system within Alaska, outside of the federal sector, to private sites and community health centers. We have a proposal in review for expanding the system to cover all 16 remaining community health centers and 20 private consultants, and our goal is to make this available to the whole Alaskan community.

We are also working actively with our federal partners, notably the Indian Health Service (IHS) and US Coast Guard, to deploy our systems at sites outside Alaska. This is exciting, as it represents an opportunity to share the products, services, and expertise that have been developed with federal funding.

Perhaps the largest change is that AFHCAN has evolved from a project mentality to a program mentality. The difference is that when you are a project and you have a finite amount of time, you primarily focus on the development and deployment of solutions. When you recognize that you will be around for a while, then you start to focus more on training and support issues, as these services are the key to long-term usage and survival of the system. That is a huge change that we have seen in our office. We were first and foremost a technology solutions provider early in the lifecycle of the project, and now we look at the whole product solution (WPS), in which we develop a product, we provide training, and we offer support. Although we continue to improve the product, we do not begin to deploy new versions until we have in place the curriculum for training, the knowledge base for support, and all related services in a healthcare environment.

The other main change is that we have expanded our system. We started with a basic system consisting of a mobile cart with four devices and software applications. We now have a much more sophisticated solution with more peripherals, more clinical services, and interfaces that we developed based on the knowledge we have gained about what works and what does not.

In order to provide a mechanism to support our efforts and reduce the reliance on federal funds, we are now looking into commercial ventures with our system. That is a natural evolution of major telehealth systems. Once they have accomplished what they set out to do, they start looking for partners that will enable them to get clinical services from other sites or to serve other sites with their own clinical services. In our case, we are looking to market our

products and services on a worldwide basis as a means of generating revenue and sustaining growth.

For example, we have designed mobile telehealth carts that contain many devices, have wireless network capability, and run our software on a large touch screen. You can complete an EKG or a video otoscopy exam with these devices. The cart packages all of these devices into a nice, simple user interface. We receive repeated requests from customers that want to buy the carts. We have found that there is a large international market for easy-to-use software that can move healthcare data from devices to consultants, and our application does that very well. It works via satellites, over dial-up, and over poor or intermittent connectivity—all the variables you might have in a remote region.

How did you become involved with the project?

My background is in biomedical engineering, which is a blending of engineering within the life sciences environment. I had opportunities to work on research projects that were fascinating and intellectually challenging, and to work with some incredibly bright and passionate people. But I think I was looking for something more applied that would have a more direct impact on people's health care delivery. This became more obvious when my wife and I moved to American Samoa. My wife was the clinical psychology consultant for the Territory, and I began to understand the basic health care needs in a remote setting, and to realize how much could be done through a blending of healthcare with communication technology. This was back in the mid-1990s when telehealth was taking off. When my wife and I decided to move back to the States, I decided to pursue a career in telehealth. I

was fortunate, because at that time in Alaska they were advertising for people to work on the NLM project. I flew up here and interviewed for a position, and I began work as a chief technology officer on the project. I have stayed with the field, and it is now my career and my passion.

In what ways is AFHCAN "typical" of what would be defined as a telemedicine/telehealth project? In what ways is it atypical?

AFHCAN is typical in the sense that we have a mix of rural, regional, and urban health centers that provide healthcare. Traditionally that used to be called hub-and-spoke, in which you are serving peripheral sites. Like many telehealth systems, 40 of our sites have store-and-forward and videoconferencing capabilities. We also have many similar health needs, and we do similar types of telehealth, such as teledermatology, cardiology, radiology, and ENT.

A lot of things do make us atypical, though. For example, we rely heavily on store-and-forward in our system, whereas most other telehealth systems have a heavy reliance on videoconferencing. That is because historically the connectivity has not afforded us the bandwidth to do videoconferencing in Alaska—partly because it is very expensive to get satellite connectivity.

In addition, we do a lot of product development in our office. We were not able to find the hardware and software on the open market that worked for us, so we developed our own solutions. A lot of systems use commercial, off-the-shelf products. We had concerns about sustaining many of the existing solutions, both in terms of support and training requirements. We budget an average of \$900 to fly to any one of our sites. If something breaks, it is very expensive to fix; likewise, it is

very expensive to retrain people. Creating simple but effective solutions is a key activity in our office.

Another factor that makes us somewhat atypical is that we are not a direct healthcare provider. Many telehealth systems are based in hospitals. One part of our corporation co-manages a hospital facility, but the AFHCAN office works with many autonomous organizations, and we do not manage or hire the care providers; rather we work as partners with them.

Finally, the majority of our cases do not go to specialists, they go to primary care physicians. Only about 25% of our cases go to specialists. The other 75% typically come from remote village clinics, at which we have a Community Health Aide (CHA) or a Community Health Aide Practitioner (CHAP). They create the cases and send them to a supervising physician, who is a family or primary care physician. As a result we tend to interface with more primary care devices, such as video otoscopes instead of ultrasound machines, vital signs monitors, tympanometers, etc. That does not mean that we do not have an interest in or cannot interface with more sophisticated devices, but it has just not been as critical for what we are trying to do.

What are some of the key challenges/issues involved in serving the health care needs of the people of Alaska: cultural issues; language issues; size, geography, and population distribution of the state; diversity of the population; travel considerations; and health issues and medical needs.

In terms of size, Alaska is huge. It is almost 600,000 square miles—one-fifth the size of all the other states combined. When you lay a map of Alaska on a map of the lower

48 states, it touches from California to South Carolina and from Canada to Mexico. Yet despite that size, it only has 12,000 miles of roads. It has the road system of Vermont in a state twice the size of Texas. Seventy-five percent of our communities and 25% of our residents are not connected by a road to a hospital. Those people have to depend on planes, boats, snow machines, and whatever form of transportation they can find to get to a hospital. When you combine that with the terrain and the many mountains and lakes, for example, it can be very difficult and very dangerous to get to the next level of care. To illustrate these points, consider Kotzebue, a hub town in the northwest corner of the state that serves 12 villages in an area the size of Maine. That region has only three miles of paved road. We have about 600,000 people in Alaska—about 1 person per square mile, which is about 70 times less than the national average. If Manhattan had the same population density as Alaska, it would have two people living there. Furthermore, about one-third of the state lies above the Arctic Circle, where it is dark and extremely cold in the winter.

The other aspect to consider is that half the population is congregated in Anchorage, as are most of the specialists and much of the medical care resources. Although it is very expensive, people have to fly a long distance to get to Anchorage for medical care. People from Kotzebue, for example, might have to spend \$600 to fly in to see an orthodontist just to have their braces tightened. Many communities in Alaska are medically underserved. We rank about 48th among the states in the number of doctors to residents; only Idaho and Oklahoma are ranked lower. But because most of our providers are in Anchorage, the ratio of providers to

residents drops as you go outside of Anchorage.

There are also some unique health-care needs in Alaska. Alaskans are more likely to die from external causes of death, such as violent death from injuries, suicides, and homicides, compared to people in any other state. Unintentional injury is the third leading cause of death in Alaska. The suicide rate is the second highest in the nation, and occupational injuries, from fishing, hunting, and trapping, for example, are a great risk. We also have infectious disease issues; a few years ago we had the highest outbreak of tuberculosis in the nation.

Ear disease has always been an important problem in Alaska and something the state has been working on aggressively. Chronic otitis media has a high prevalence in Alaska, and it is one of the leading causes of deafness. Alaska has a very rich oral tradition, and deafness is a debilitating handicap. There has been a huge effort among primary care physicians, audiologists, and ENT specialists to work on ear disease in Alaska, and it is something we have focused on in telehealth. We have sites in which the waiting time to see an ENT surgeon ranged from 6 to 12 months. In some places we have been able to eliminate the wait by using telehealth to triage the patients and get them directly into care. About 1,500 cases now come into the ENT specialists in Anchorage via telehealth each year, representing about 15% of our total telehealth caseload.

Many of these issues—including cultural and language aspects—had an impact on the technical design. When we established the project, we could not be sure that everyone who would use our system would be familiar with computers, and we did not want to assume that people knew

how to use a mouse or a keyboard, for example. The language consideration is also huge for us, because not everyone necessarily speaks English as his or her first language, and we were concerned about using a complicated user interface that would rely on a strong grasp of the English language.

We resolved this by focusing from the beginning on the simplest computer interface possible. All of our software is written to be readable at the sixth-grade level. We work very hard to keep it simple, as this speeds the acceptance and adoption by all providers, regardless of educational level. We worked with the academic review committee of the Community Health Aide Program (CHAP) to review the forms we use in our software, so that the verbiage we use in the forms is consistent with that used in the CHAP training and the manuals used by the CHA/Ps in providing healthcare.

Of course, we are very respectful of the many cultural issues in Alaska. When we work in the villages, we recognize that we are working with the tribes, and we do our best to make sure we are properly integrating and being respectful of their culture. We do not just bring in equipment and walk away. We are there to be a partner in healthcare.

Please describe the types of technology that the project is using. What technologies have been most effective, and why?

AFHCAN has developed and deployed three core technologies—the software, the portable telehealth cart, and a wide area network. Overall, we have been very happy with the basic design of our systems and are now focused on upgrading these systems with newer technologies available on the market.

The software has been incredibly effective, relying on a simple user interface and color-coded buttons. As evidence of the user acceptance, we see a steady growth in the usage of the system at most organizations despite turnover in the provider community. We will continue to maintain the same easy-to-use interface despite a major redesign of the software architecture. We started with a Web-based application and have changed to a client-server architecture. This change provides much greater performance and security enhancements, as well as faster feature development, and allows our providers to create telehealth cases independent of the connectivity. Even if there is bad connectivity, the user will still be able to create cases. This also allows us to develop a long-term roadmap based on a scaleable architecture that will allow us to move massive data sets, integrate live video conferencing, streamed video, code updates, and many other feature enhancements with a high degree of performance, quality, and stability.

The telehealth cart has not changed in the past four years, as we wanted to deploy a uniform telehealth platform. Now the cart is undergoing major changes. The cart is expanding to support 12 different medical peripherals (previously it only supported 4), as well as live video conferencing. The cart is also being redesigned to support commercial deployment, including Underwriters' Laboratory, Inc. (UL) approval, more rapid assembly time, and support for international markets.

The wide area network (WAN) was developed as part of the AFHCAN Project but is now managed as a separate department outside of the AFHCAN office. The WAN connects about 160 sites in Alaska and is used for many applications other than AFHCAN telehealth, including

telephony, teleradiology, telepharmacy, videoconferencing, e-mail, Internet access, and remote access to health records.

Please describe AFHCAN's virtual operating environment and how it is used.

We have about 300 carts deployed to our sites, more than 700 users, and 47 servers around the state. Each organization typically has its own server. In the typical scenario, a Community Health Aide in a village sees a patient, creates a case, and sends the data for a consult. The CHAs would walk up to the cart, log in, and within three touches be able to access any of the devices on the cart. They can take images of the patient (or ECGs, etc.), type in demographic information or a health summary or use electronic forms, and then send that case to a physician in their organization. The physicians receive an e-mail telling them that they have a case. They can log on, on any computer (not just a cart), look at the case, and either send a response directly back to the health aide or choose to send the case to a different organization for a specialty consult. In that case, they would select a group (or user) at another organization, and their AFHCAN server would move the data to the other organization's server. The specialists would then get an e-mail telling them that they have a case. With this process we move data every five minutes among 47 servers throughout the state.

One of the problems with these types of systems is that when people create and send off a case, they may wonder what happened to it. With our system, all of the activity on a case—anytime somebody looks at a case, adds something, forwards something, or even just makes a comment—is documented

to all of the sites that have had any interaction with the case. Everything can be tracked.

In the past four years, the system has been running on more than 40 servers, and we have processed about 30,000 cases. We have had some days in the Aleutian Islands where the weather was horrendous, the satellite dishes were subject to the full force of the winds, and the storms made it impossible for the providers to browse the Internet, send faxes, access their e-mail, etc., but they were able to transmit telehealth cases, because the software breaks the cases into small packets of data and continually tries to re-send each packet until it gets through. We are very proud of how the system has worked in inhospitable environments.

What technologies/advances would most benefit your efforts in the future?

I see our system moving in a few different directions simultaneously. One is the integration of more devices to provide a greater information dataset for providing care. I would like to see medical device manufacturers recognize that the future for them is to integrate their devices into computerized systems. We provide a simple interface on a single computer screen. A lot of medical devices are currently standalone instruments and do not come with a computer interface. But we are seeing a movement in this direction, and this will let us integrate more devices into our system.

The second technology that we are working on is the integration of telehealth with existing healthcare systems, such as electronic health records (EHR), DICOM systems, and even e-mail systems. We are heading in this direction to ensure that when our users create a case, they can incorporate the latest patient health data

from the EHR, DICOM images, and any other relevant patient-related data and move it seamlessly to a remote location for consult. That effort—similar to the national and regional activity to link health care organizations—depends on ancillary activity such as patient indices and harmonization of standards to be truly effective. We see the telehealth system as a potential communication layer between disparate systems that is able to relay a rich healthcare record for each patient.

The third advance I would like to see is a technical advance that blends store-and-forward with live video and makes that seamless to the user. Users would not have to go to a videoconferencing system to see a video, and then go to another site to do store-and-forward. I would like to see them be able to sit anywhere, anytime, and choose the technology that is most appropriate for their needs. That is where we are headed, to a blended telehealth solution.

How has the project been accepted by physicians and other healthcare professionals, by the public, by insurers?

Acceptance has been steadily growing, which is good news. Like any other change in the healthcare environment, it takes time. With telehealth you need to get two providers to accept, not just one. The biggest struggle is to have the physicians who receive the consults to be willing to take the time and to try this alternate method of healthcare delivery. They usually have serious concerns about their time constraints or being inundated with cases, and that is something that can be overcome with usage and experience.

We have learned to take telehealth one step at a time, applying what we learn in one department or

organization to the next. Listening to providers, and especially those that adopt the system, is critical. Perhaps more importantly, we rely on the providers who have adopted the system to help us understand and advocate for implementation of the system in other departments or facilities. A good example is work done at the Alaskan Native Medical Center, a tertiary care facility in Anchorage, in which we started with the ENT department four years ago led by Dr. John Kokesh. Now, thanks to his leadership and wonderful support from the administration, we have 17 departments that receive cases. We worked with one department at a time, listened to their needs, and tried to make the system work for them. In this way acceptance continues to grow.

We receive some measure of the value and acceptance of this system to the providers directly from our software. Our systems currently ask providers a single question each time they create or respond to a telehealth case. At this time, we have somewhere between 800 and 7,000 responses to each question. Overall, providers report that telehealth helped them communicate with another provider in 90% of the cases, and 77% report that telehealth makes their job more fun. This last statistic is particularly interesting, since we have providers who have threatened to quit if their telehealth technology is removed.

Acceptance by patients has been extremely high. Providers report that approximately 40% of the telehealth cases prevented travel, which represents savings in millions of dollars annually, not to mention the time and inconvenience to the families of the patients. Interestingly, about 8% of the cases caused travel, which suggests that we are catching healthcare problems earlier in the disease state. Providers also report

that 67% of the telehealth cases played a role in educating the patient, and 79% resulted in improved patient satisfaction.

Insurers in Alaska have been wonderfully supportive. We have a statewide system that supports telehealth. Medicaid regulations changed in December 2002 and now reimburse for telehealth as if it were care provided in person—and it does not matter whether it is in the form of store-and-forward or live video. Blue Cross and other providers also pay in Alaska, and Medicare pays for both store-and-forward and live videoconferencing.

How does AFHCAN interact with various elements of the government, including at the federal, state, local, and tribal level?

Alaskans have long recognized the need to work together to achieve results. Examples of this are manifested in the Alaska Federal Health Care Partnership—the original sponsor for the AFHCAN Project—and also in the Alaska Native Tribal Health Consortium (ANTHC), which is the managing partner for AFHCAN. ANTHC manages the statewide health services component of the Alaska Native Health System through participation with other Alaska native tribal health organizations in the Alaska Tribal Health Compact, a self-governance agreement with the Indian Health Service.

Within the tribal community, we work closely with our tribal partners throughout Alaska to continue to build our telehealth system. AFHCAN, which encompasses many organizations, has relied heavily on interactions with these organizations and also governmental agencies to develop appropriate solutions. The formation of statewide committees is one example of that cooperative approach.

But I think a true masterpiece of forethought was the creation of the Alaska Telehealth Advisory Council (ATAC) at the statewide level. This board was formed in January 1999, roughly coincident with the creation of AFHCAN, and has met regularly every since. The original charter for ATAC included the proposal for a framework for rational development and deployment of statewide capacity for telehealth/telemedicine systems, and establishment of core principles to ensure a coordinated, cost-effective, and integrated approach to telemedicine in Alaska. ATAC has been a powerful force behind the statewide adoption and promotion of telehealth. AFHCAN has worked to incorporate the statewide standards developed by ATAC for telehealth, and more recently is working on ATAC-funded projects to promote telehealth through the creation of a Virtual Center of Excellence for ENT to serve other states.

We still receive and rely on federal funding, but we need to find additional revenue sources so that we can help the system flourish and sustain itself beyond the federal funding sources. We continue to be funded through appropriations of the Indian Health Service, which is key to our being able to improve the design of the system and expand services within Alaska and also within federal partners outside of Alaska. We continue to interact with the federal agencies through our partners (IHS, USCG, US Army, US Air Force, and Department of Veterans Affairs), as we all have a vested interest in leveraging the solutions that have been developed by AFHCAN with federal funds. We also have a strong relationship with several government agencies that have been instrumental in the evolution of the AFHCAN system, notably the Office for Advancement of Telehealth (OAT).

We also have university collaborations within Alaska. The University of Alaska Anchorage was involved in early assessment work with AFHCAN and recently completed an evaluation of the AFHCAN Project. We now have a project under way with the University of Alaska to develop a cost model for telehealth. We are working with their Institute for Social and Economic Research to develop a cost model that we would like to share with the rest of the telehealth community.

I would also like to mention our efforts to work together more cooperatively with the telehealth systems in neighboring states. We are forming a Regional Telehealth Resource Center. We recently had our first board meeting and adopted by-laws. It is called the Northwest Regional Telehealth Resource Center, and it serves eight states and all of the Pacific jurisdictions. This includes Alaska, Hawaii, Washington, Oregon, Wyoming, Utah, Montana, and Idaho, and Pacific jurisdictions such as Guam and American Samoa. We are working together to share a "best practices" approach to telehealth, and to pool our resources and work together to the benefit of health-care.

Is the project involved in any international activities with other countries in the Arctic Circle region such as Russia, Norway, or Canada?

We have several international projects and initiatives already started and we hope to continue this effort in the future. The United States participates in the Arctic Council by virtue of Alaska being positioned in the Arctic; as such, we have close ties with telehealth systems in other Arctic nations. Last year, we hosted our first International Telehealth Conference in Anchorage, which attracted delegates

from 25 different states, 4 Canadian provinces, and 11 other countries. We plan to host a similar conference in 2007 as part of the International Polar Year and to provide an even greater international and Arctic focus on telehealth.

Our involvement with the Arctic nations recently led to a pilot project to deploy systems and share resources with two regions in Russia, the Sakha Republic and Khanty-Mansiysk Autonomous Okrug. We are working closely with the Northern Forum on this project. This is our first international deployment, and we are in the process of establishing a foundation for sharing knowledge in telemedicine, telehealth, mobile medicine, and distance learning to maximize the effort for the mutual benefit of all participants. We are still working on some funding issues for that project.

We are finding a huge interest for our systems in other countries and are committed to having our software available in multiple languages before the end of this calendar year. We initially expect to provide Spanish and Russian versions of the application, consistent with partnerships and Memorandums of Understanding that we have already developed with other countries.

We have several other projects under way at this time; most are in the early planning stages. We have just signed a Letter of Intent with the Republic of Kazakhstan and have had preliminary meetings with a delegation from Panama. There is a possibility of a cooperative project with Greenland, and we also hope to develop an exchange program with the Norwegian Center for Telehealth, in which we would exchange some personnel and expertise to learn from each other's Best Practices. It

is one of the largest telehealth centers in the world, and it is a collaborating center for the World Health Organization at an international level, so I think that we can learn a lot from them.

I think we can also learn a lot from our neighbors to the east (of Alaska). We have close ties with some of the Canadian projects and we hope to work more closely with them to share resources and joint projects.

Please identify one or more key lessons you have learned as a result of your participation in AFHCAN and what advice would you give to others thinking of initiating a similar project?

I would first point to the philosophy that you take when you are building a system. I believe it is our job to build systems that make providers want to use telehealth. A

lot of systems out there may be attractive and glamorous, but I wanted to build a system that would make a provider say, "I can't live without this." And that is very difficult. You really have to listen to the providers and understand how they do their job. You have to understand that they might be too busy to walk an extra 50 feet, and so they might not use your system. You have to build a system that providers not only can use, but also that they want to use. A big part of this for us was to make the system extremely simple.

When I was in Greenland making a presentation, Thomas Stensgaard, a cardiologist who designed the country's telehealth system, was amazed by the idea that we were given four years to build and deploy our system to 235 sites. He wrote to me and said, "I think what you are trying to do is impossible, and because of that you will probably succeed." I took from that the im-

portance of dreaming big—and not being constrained by what you can or cannot do. Telehealth is about dreaming, about getting people to do something very different from what they normally do. This project was designed with a very big vision. It has not been easy, but if someone had not dreamed it, it would never have gotten started.

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