

**U.S. DEPARTMENT OF COMMERCE
National Telecommunications & Information Administration**

Evaluation of the
Telecommunications and Information Infrastructure Assistance Program

Case Study Report

**Tele-Network for Remote Pain Management
96078**

Seattle, Washington and Forks, Washington

Site Visitor: Laurie Somers

Dates of Visit: April 12-13, 1999

PREFACE

The following case study report is being issued as part of TIIAP's ongoing evaluation initiatives designed to learn about the effects of TIIAP funded projects. This report is one in a series of twelve based on in-depth case studies conducted in 1999 to study three subjects: (1) issues particular to rural communities (2) issues particular to urban communities, and (3) challenges in sustaining information technology-based projects. The case study reports give us evidence about the special challenges that each project faced and provide information for a better understanding of factors that can facilitate the success of such projects.

In addition to being urban or rural, the case study projects were selected because they involved distressed communities, represented innovative models for services, and affected measurable community outcomes. The case studies, conducted under contract by Westat, an independent research firm, consisted of extensive review of project files and records, interviews with project staff, representatives of partner organizations, and project end users. In addition to the 12 individual reports, a summary of findings across the projects is also available on the NTIA website.

NTIA wishes to thank the case study participants for their time and their willingness to share not only successes but also difficulties. Most of all, we applaud your pioneering efforts to bring the benefits of advanced telecommunications and information technologies to communities in need. We are excited about the case studies and the lessons they contain. We believe that these projects provide a unique insight into the variety of ways to eliminate "the digital divide" which exists in our nation. It is through the dissemination of these lessons that we can extend the dividends of TIIAP funded projects nationwide.

We hope you find this case study report valuable. You may obtain other case study reports, a summary of findings of the collected case studies, and other TIIAP publications through the NTIA website (www.ntia.doc.gov) or by calling the TIIAP office at (202) 482-2048. We also are interested in your feedback. If you have comments on this, or other reports, or suggestions on how TIIAP can better provide information on the results and lesson of its grants, please contact Francine E. Jefferson, Ph.D., at (202) 482-2048 or by email at fjefferson@ntia.doc.gov.

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Project Name	Tele-Network for Remote Pain Management
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Abstract	<p>Virginia Mason Medical Center (VMMC) in Seattle, WA, established a teleconsultation system for its Pain Management Program, which allowed patients to “see” a specialist at VMMC from their local clinic and in the presence of the local provider and family, in some cases. Local providers and consulting physicians were able to work together to provide a continuity of care not previously possible. Prior to the project, chronic pain patients had to travel several hours to Seattle for a relatively short consultation without their primary caregiver. The project linked three clinics and one hospital on the rural Olympic Peninsula, two of which were tribal clinics, through a hybrid T-1/ISDN connection.</p> <p>Project staff reported positive health outcomes, as well as saved time and money, for the 25 patients who used the system. The project had planned to serve more patients, but because of delays in setting up the system, largely due to vendor delays and the limitations of the rural infrastructure, they were not able to start early enough. Unsupported administrative responsibilities placed on rural clinics contributed to limited buy-in on the part of the clinics, and this also may have resulted in the project treating fewer patients than intended.</p> <p>VMMC staff and rural providers also built stronger working relationships with each other and with state and private insurers. The biggest hurdle now facing the project is working with the insurers to detail reimbursement policies for telemedicine. One rural clinic has recently received a large grant to expand the telecommunications infrastructure in the area, due in part to their experience with VMMC and the TIAP grant.</p>

A. Background
Community Characteristics

The Olympic Peninsula in Washington State is home to almost 90,000 people, but only 9,800 live in the western portion of the region targeted by the TIIAP project. The target area, the western portions of Clallam and Jefferson Counties, includes the Makah, Quileute, and Hoh Indian Reservations, and the population is 20 percent Native American, 4.5 percent Hispanic, and 75.5 percent white. Only 7 percent of the population in the entire region is over 60 years old; Virginia Mason Medical Center's (VMMC's) anecdotal evidence suggests that older people leave because of lack of access to health care.

Clallam County's per capita income is \$18,873 (14 percent below the state average) and the unemployment rate is 10.2 percent (more than twice the state average). Twenty-one percent of the residents in western Clallam and Jefferson Counties are on Medicaid, and 34 percent of the students in the Quileute Valley School District receive free or reduced-price lunches.

Project Overview

Problems/Disparities the Project Was Designed to Address. The western Olympic Peninsula area has been classified as a health professional shortage area. It is geographically isolated on the western side of the Olympic range, with frequent road closures due to fog and mudslides. Further, physician retention and continuity is a problem in the area. For example, in the federally run Indian Health Service system, physicians are rotated in and out of its two clinics in the area every couple of years.

As a major referral health care center, VMMC sees patients from all over the Pacific Northwest. With specialist medical care extremely limited in the target area of the western Olympic Peninsula, most patients must leave the area to receive care. The VMMC Pain Management Program's (PMP's) records indicated that it treats more chronic pain patients from the target area than from any other area. Chronic pain refers to pain lasting more than 6 months, most frequently in the lower back area. According to the project's TIIAP grant application, "chronic pain...frequently leads to loss of work, poor marital and family relations, and depression, while poor physical condition and the prolonged use of narcotics may be complicating factors...[but] participation in a pain management program has been shown to reduce primary care visits significantly (36 percent) and reduce patient anxiety, depression, and severity of pain." However, for patients from the target area, treatment entails a 5-hour drive or 10-hour bus ride to

Seattle by a two-lane road and ferry (no commercial air service is available), at least one night's stay, and the stress rural residents can often experience in a large city.

Internet access at the time of the grant application required long distance calls to an Internet service provider (ISP); consequently, as stated in the application, "the Internet connection rate for the entire 306 area code region (western Washington) is only 1.2 percent, compared with a 5 percent rate in the 206 area code region (Seattle and environs)." The Forks Community Hospital housed the only T-1 line in the region; there was no Internet access at the three health clinics in the region.

Technical Approach. VMMC's project, called the Tele-Network for Remote Pain Management, utilized three main technologies:

- Live Studio Link ups – VMMC installed an additional telemedicine set up in its physical therapy room. A desktop "SmartStation" with live video capabilities was installed in the PMP office. The La Push, Neah Bay, and West End Outreach clinics also had SmartStations. This teleconferencing system was to be used for evaluation of patients, physical therapy demonstrations, inclusion of the patients' families when appropriate, and conferences between team members and remote providers.
- Chronic Pain Management Home Page – The PMP created an in-depth information and educational resource on chronic pain management, with a question-and-answer section where visitors can query staff. The home page can also be used to collect potential patient data for referrals.
- E-mail and Internet Access – Providers at VMMC and the partner clinics have access to e-mail and the Internet for communication and health information and research.

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The equipment to be purchased through the TIIAP grant included a rollabout two-way interactive video system for the physical therapy studio, desktop televideo units for VMMC and three clinics, software to access the Internet, T-1 network connections for the video system, and telephone services for Internet/e-mail access.

Anticipated Outcomes. In its TIIAP application, VMMC listed a number of specific and measurable outcomes expected to occur as a result of the project:

- Increased success rate for treatment by 5 percent (from baseline of 86 percent), as measured by a survey of patients.

- Improved patient access to appropriate and timely specialty medical consultations, as measured by a 50 percent reduction in the number of trips to Seattle made by pain patients.
- Reduced professional isolation of remote providers, increased provider satisfaction, expanded clinical knowledge, and improved access to specialist expertise.
- Decreased costs to patients and/or payers (of workers compensation, for example), as measured by costs of transportation, room, and board for Seattle consultation, evaluation, and treatment appointments.
- Increased patient compliance, as measured by individual physicians.

Longer-term effects expected to occur as a result of the project included:

- Increased coordination of care and communication between primary and specialty providers, for a substantial positive impact on patient return to health outcomes.
- Enhanced collaboration between local private providers, public hospitals, and publicly funded providers for further integration of local medical services.
- Increased patient satisfaction, confidence, and peace of mind.
- Improved recruitment and retention of medical providers to the target area.

Project Status at the Time of the Site Visit

After a 9-month extension, the project closed on December 31, 1998. As of April 1999, the project was continuing to book pain management patients for consultations using the video equipment. Overall use is about the same as during of the latter part of the grant period. One local physical therapist estimated that she participates in consultations once or twice a month. During the week of the site visit, she had two appointments, but had not had others recently. A technical staff member indicated that the system sees large peaks and valleys in its use; he estimated 10 to 20 hours some months and 1 to 2 in others. Overall, he estimated 5 to 8 patient visits per month.¹ Physician education and administrative uses of the system receive similar use to patient visits.

¹ Initial patient evaluations run 3 hours, and follow-up appointments are ½ to 1 hour in duration.

Most respondents indicated that the system continues to be underutilized, due in part to technical difficulties and to the fact that the system still may not be well understood by remote providers and patients.

With pain management patients, the system is used more for follow-up appointments than for initial evaluations. The Neah Bay/Indian Health Service clinic provides the most referral patients, particularly those that would have difficulty traveling even 2 hours to Forks. La Push also provides a number of referral patients.

Continuing medical education (CME) is broadcast to Forks Community Hospital (FCH) alone or FCH and Neah Bay. The use of the system for CME depends largely on the topic covered and its relevance to these providers. Topics are selected by FCH and Neah Bay providers, although respondents noted that in some cases, the CME is too specialized for the generalist physicians.

Several group programs are provided, although interest from the remote clinics has been low. Psychology and vocational rehabilitation programs are offered throughout the week. These groups are held at VMMC regardless of whether remote sites participate.

B. Community Involvement Characteristics of the Grant Recipient Organization

VMMC is a major referral center and provider of continuing education to physicians and patients. The hospital first began a telemedicine program with clinics on the Olympic Peninsula in 1995 with live, interactive video between VMMC and several remote clinics in the Pacific Northwest, including FCH. Existing equipment was housed in a studio clinic and the teaching auditorium. Prior to that, VMMC had been involved with FCH and other regional clinics for 12 years, providing EKG and other services through analog lines.

The PMP at VMMC involves a coordinated team of health care professionals treating all facets of chronic pain problems, including physiatry (rehabilitation specialists), physical therapy, occupational therapy, rehabilitation psychology, and vocational counseling. Prior to the TIIAP grant, the PMP boasted a return to work success rate of 86 percent, as collected through vocational rehabilitation counselors' surveys of patients, payers, and employers.

VMMC and the PMP provided project management, specialty medical services, continuing medical education credits, and technical support. The PMP also scheduled and coordinated all consultations.

Partnerships

For the TIIAP grant, VMMC partnered with three target area health care providers:

- FCH, the only hospital in western Olympic Peninsula, is the key to access on the peninsula. VMMC had already established a video connection and T-1 line to FCH. West End Outreach Services (WEOS) is a department of FCH providing community mental health services, chemical dependency treatment, and rehabilitation services.
- Quileute Tribal Health Center in La Push (30 minutes from Forks) is operated by the Quileute Tribe. The clinic employs a family nurse practitioner, several nurses, and a mental health professional, and has weekly visits from a FCH doctor.
- Indian Health Services Clinic in Neah Bay (2 hours from Forks) is the administrative center for regional Indian Health Services. The Makah Tribe there employs three physicians, a number of nurses, a dentist, and a psychologist.

The clinics were selected because of their extremely remote locations, lack of providers, and the Native American populations who are traditionally underserved, particularly for pain management. These sites represent only the western, less populated portion of the Olympic Peninsula, although the original data on past chronic pain patient referrals were based on the Olympic and Kitsap Peninsulas. Thus the data used in planning the project overestimated the number of potential patients. In hindsight, project staff note they should have included the entire peninsula in order to increase their potential patient population in numbers and include more non-Native American patients to build a more diverse patient sample.

Partner clinics provided in-kind contributions of staff, staff time, and facility space. FCH/WEOS was the project's remote center. La Push and Neah Bay were to make patient referrals to VMMC physicians to use the system.

Community Outreach

Involving Community Stakeholders. The project staff and partners conducted an informal needs assessment prior to the application to TIIAP. A questionnaire was given to providers at the remote clinics to assess their interest in participating, as well as to understand how their patients might benefit from the system. No potential or current patients were directly consulted by the project, although some may have been approached by individual providers.

Because VMMC is a referral center, staff are always in contact with the remote clinics. They also keep historical data for pain management patient referrals from the Kitsap and Olympic Peninsula to VMMC's PMP. Project staff conducted interviews with several providers and asked what sort of clinical services they needed and explained how the technology could help them. Staff knew the Internet and its vast resources should be made available to remote providers.

Project staff assumed that because the Indian Health Service could not afford the technological solutions or Internet access themselves, they would be interested in participating. Staff felt they would get good buy-in from the providers once they learned about the system. In hindsight, project staff see that more deliberate strategies to ensure provider buy-in would have helped the project. However, the philosophy of the project director (and Director of Regional Services for VMMC) is that it is part of the responsibility of a referral center such as VMMC to provide any service available to its satellite and affiliated clinics. "If you know of something that can be done," he said, "you shouldn't sit on it and should get out there and set it up."

Our interviews and subsequent reviews of project materials suggest that the project was designed and begun without having a need established by potential *patients*; that is, the Tele-Network project at VMMC may have been designed around a technology, focusing on *provider* statements of how the technology would be used, rather than identified *patient* interest and willingness.

Project Outreach. Promotion of the Tele-Network services was conducted almost entirely by VMMC. Most of the activities were organized centrally by VMMC, but several were structured on a site-specific basis with the remote clinics.

VMMC medical and technical staff conducted a number of site visits to Forks, Neah Bay, and La Push. They provided updates on project implementation, checked technology functionality, reviewed technical concerns with clinic staff, and promoted patient referrals by

explaining how the equipment would assist in patient care. Project staff also conducted quarterly meetings with representatives from each of the clinics and VMMC. These meetings were used in much the same way as the site visits but also provided a forum for all participants to meet together and discuss the project.

After the equipment at the remote sites was installed, VMMC technicians conducted weekly technical equipment checks. The checks involved turning on the equipment and testing each component, including audio volume and clarity, lighting, and camera positioning. When there was a problem, additional troubleshooting was done over the system to ascertain the source of the problem. Staff believe these checks dramatically reduced technical difficulties with the equipment that caused downtime.

The physical therapist at FCH traveled to Seattle to meet with the physiatrist she would work with over the system. While clinical terms and practices are largely standardized, both the physiatrist and physical therapist agreed that it was extremely beneficial to their relationship to meet and discuss how they would work together, with the physical therapist acting as the physiatrist's "hands" during the consultations.

VMMC gave a 1-hour interactive video conference, "Cross-Cultural Issues in Health Care," via the video link to FCH. The cross-cultural factors were identified as areas that the project manager wanted to address prior to the initiation of treatment using the system. Health care providers were consulted regarding advice on making the clinics' desktop machines and the pain management website both user friendly and as culturally sensitive as possible, and a vocational rehabilitation counselor with extensive experience treating Native American injured workers was asked to review the entire project plan. Additional providers of care to Native American populations were sent materials to review and surveyed by telephone. The presentation was designed to make all staff aware of these cultural diversity factors. The talk addressed the specific issues of personal space, the role of provider or healer in health care, and personal contact.

VMMC provided 1.5 CME units in "Management of Acute and Chronic Pain" at FCH to familiarize health care workers with PM programs and staff. Eleven providers attended the professional exchange and discussion, and the session garnered favorable course evaluations, including some requests for another longer course.

The VMMC communications department assembled a communications package to help with publicity about the availability of pain management teleconsultation. This was done in

collaboration with remote clinics, and clinic staff review was generally positive. The package included flyers, letters for provider, letters for potential patients, and a press release. Project staff also created a brochure describing the Pain Management home page and the information and resources it provides. This was provided to the remote clinics to use with new providers and patients.

Training. Because VMMC had an existing telemedicine project with FCH, some staff at each location were already familiar with the systems. The project intended to use a train-the-trainer approach and had each site designate a staff member who would be trained; then he or she would train other staff. However, this met with limited success due to the high staff turnover in the remote clinics and in many cases, overburdened and technophobic staff. Instead, VMMC staff trained clinic staff in an ongoing manner. VMMC staff provided initial hands-on training to staff on-site.

With each equipment check, clinic staff, following VMMC technicians' instruction, would practice turning on the equipment and making the connections to VMMC. The studio systems were fairly simple to use and were operated by a touch panel that adjusted the camera, lighting, volume, zoom, focus, etc. The rollabout units were operated by a remote control similar to a television system and were therefore familiar to most users. The desktop units were less user-friendly and required learning some commands. Users were assisted with other skills, such as using the document camera for viewing x-rays, as necessary.

Several VMMC technicians were sent to the equipment vendor for formal training that included more technical aspects such as configuration and trouble shooting. The physicians at VMMC were not trained to use the equipment since a technician was always present to begin the session. A technician also began many of the remote video connections at FCH as well, but there were no technicians at either La Push or Neah Bay. Since the end of the grant period, the technician in Forks has provided all training at the remote sites.

Protecting Privacy. Project staff designed an Informed Consent, Waiver, and Release Form for patients to sign prior to each clinic visit involving a telemedicine consultation. The initial form gave consent for VMMC and FCH to use and reproduce the patient's name, picture, and voice, and to include this information in the patient's medical record. The form currently in use (forms were changed in May 1997) separates participation in the telemedicine session from videotaping and requires a signature for each. The newer form includes benefits (medical expertise out of the local area, continuity of care with a local provider, and no need for travel), unavoidable risks (communication delays, unclear voice or picture, and loss of information

privacy due to line problems), and other options (travel or no treatment). The form also stipulates that distant specialists will review the patient's medical history and may require a limited physical examination, that technicians may be in the room but can be asked to leave, and that the costs of telemedicine are not covered by all insurance companies and may be the responsibility of the patient.

VMMC and clinic staff were not aware of any patients who refused to sign the forms. Moreover, no patients reported in surveys that they felt uncomfortable providing personal or health information over the system.

The website developed by the PMP is password protected because it uses two forms for collecting data on potential patients that include confidential health information. Anyone inside or outside of the hospital or clinics can register to use the home page, and by doing so, receives a password via e-mail. Externally, Neah Bay and La Push have firewalls and FCH runs on a local area network (LAN), both of which keep out Internet wanderers. However, the system is not entirely confidential at the Neah Bay and La Push clinics because most of the computers are shared, and therefore e-mail is not private internally at those locations. This was another reason clinics limited patient access to the machines. One respondent noted that some of the users felt their information would not be safe without passwords, so keeping data confidential was of the utmost importance.

C. Evaluation and Dissemination Evaluation

In their planning, project staff included a number of measurable outcomes that were intended to be tracked and, in fact, were tracked where possible. VMMC staff commented that they needed assistance in how to evaluate their project and that they did not have a clear idea of how to go about their evaluation. Yet, they had an evaluation plan, and a variety of evaluation activities were conducted.

Overall evaluation approach. VMMC staff intended to conduct a relatively robust qualitative and quantitative evaluation of their project. The biggest problem was that they did not have a large enough sample size to make valid and reliable conclusions. Nevertheless, they kept data on the 25 patients who used the system and the health outcomes and financial and time benefits they derived. Project staff were hesitant to compare the health outcomes for patients who were treated on-site with the outcomes for patients treated by remote providers, since it is virtually

impossible to make valid and reliable comparisons among individuals who had unique ailments and were seen by different primary providers. Rather, the evaluation was geared more toward understanding the changes in the treatment processes that telemedicine allowed. And indeed, program records indicated timely teleconference scheduling, continued use of the technology, and reduced costs for room, board, and travel. However, even with these data on the patients, a lack of accurate comparison data on provider inputs (e.g., provider costs and time spent, compared to traditional on-site service delivery) makes it difficult to estimate the efficiency of the system, even as a process, as compared to traditional on-site pain management consultations and follow-up. A number of the data items planned (see Exhibit 1) still have been collected even though usage was low; however, many were not reported because they were not deemed significant.

Evaluation questions. The project plan included the measures shown in Exhibit 1 as those sample items that could assess the quality and effectiveness of the Tele-Network services. It was intended that these data would be gathered through both qualitative and quantitative means. Qualitative data on user satisfaction and suggestions for improvement were to be gathered through written surveys (Likert scale and comments) and focus groups of professionals and patients. Quantitative data to monitor reduction in costs, increases in compliance, and return-to-work rates were to be gathered through a pre- and post-project health care utilization comparison. Staff also planned to track home page and e-mail usage and the number of CME credits earned.

Aside from normal medical data, data collected for each patient included gender, age, year patient participated in the project, diagnosis, type of work (if working) the patient does, whether medicated, whether a local physical therapist participated in treatment, and case recommendations. Other data collected include:

- FCH's hours by program (pain management, speech therapy, physician education, other) for August to December 1998;
- short statements from participating physicians and psychologists;
- whether patients' visits were conducted via studio system or desktop system;
- whether others were in the room and the effect that had;
- perceived functionality of the technology;
- patient comfort;
- time or money savings; and

- satisfaction with telemedicine.

Exhibit 1

Performance Measures to Assess Quality and Effectiveness of Telemedicine Project

Quality Elements	Performance Measures
Efficiency	<ul style="list-style-type: none"> ▪ Average turnaround time consult requested to consult scheduled ▪ Percent of telemedicine conferences beginning promptly at scheduled time ▪ Average time of consult
Appropriateness	<ul style="list-style-type: none"> ▪ Percent of telemedicine consults deemed appropriate by specialist to utilize this technology ▪ Type of patient or diagnoses for which telemedicine is 1) highly effective and 2) ineffective
Technical Reliability and Excellence	<ul style="list-style-type: none"> ▪ Percent of telemedicine consults that were unable to be started or completed due to technical difficulty ▪ Clarity of transmission ▪ Down time of network
Patient Outcomes	<ul style="list-style-type: none"> ▪ Disposition of patient as a result of telemedicine consult (1=avoided trip for consultation and enabled patient to continue under care of local provider, 2=referred to VMMC for treatment or diagnostic workup, 3=admitted, 4=future telemedicine consult scheduled)
Cost Effectiveness	<ul style="list-style-type: none"> ▪ Average dollars per patient of costs avoided by telemedicine consult (travel, etc.) ▪ Operational expenses of telemedicine network ▪ Cost per consultation
Utilization	<ul style="list-style-type: none"> ▪ Average number of consults per week ▪ Average hours of usage per week ▪ Number of consults not able to be scheduled at desired time because of scheduling conflicts ▪ Number of consults with primary care providers presenting patient vs. patient alone consulting with specialist
Patient Satisfaction	<ul style="list-style-type: none"> ▪ Percent of patients willing to have telemedicine consult rather than travel out of area ▪ Percent of patients unwilling to participate in future telemedicine consult ▪ Percent of patients rating their satisfaction with telemedicine consult as “very good” or “excellent” ▪ Percent of patients who perceived the telemedicine consult added value to 1) their care and 2) their understanding of their clinical condition and treatment options ▪ Percent of patients “comfortable” or “very comfortable” interacting with specialist via video

VMMC patient surveys were intended to be completed soon after the visit, but when only a few were returned, the project manager completed many over the phone much later. Response was low (50 percent), but for those surveys returned, patients were pleased. Their concerns were more with workers compensation and insurance coverage for the care they received. There were some comments about the delay in video transmission, but patients appeared to become more comfortable with the delay over time.

Surveys of remote providers were not formalized and became more anecdotal. Much of the information VMMC physicians would provide was unwritten or left as medical notes.

A standardized inventory for patient evaluation was used for each treated patient. The inventory contains such items as whether a given patient was less depressed, had increased functionality, was stronger, had more endurance,² and learned what the provider wanted to teach. Specific outcome data beyond return-to-work data for treatment patients were not available for these variables; outcome data for this group of five patients who received referrals to on-site treatment was pooled with that of the all telemedicine participants.

The PMP's website also contained a survey about its usability and usefulness. Remote providers did not encourage patients to utilize the inventory on the website so there was little appreciable data available. Due to the small number of website visits, no analysis has been conducted on data submitted through the website.

Problems encountered in conducting the evaluation. VMMC faced a number of problems that directly affected their ability to evaluate their project as planned.

- Project staff felt they saw too few patients to conduct the full evaluation. They originally estimated that they would need to treat 60 patients per year to generate statistically significant data to understand how the telemedicine worked, and the project treated only 25 patients.
- Collecting outcome data at the remote sites and distributing evaluation inventory questionnaires proved to be too impractical, and perhaps too burdensome, an

² Data collected on patients treated in the PMP include: Return to work at 1, 4, 10, and 24 months from the start of treatment; sit-reach flexibility at discharge which was an increase of 3 cm or 10 percent of the sex- and age-related norm; target heart rate maintenance for 15 minutes (measure of aerobic conditioning at discharge); at least 20 percent increase in quadriceps strength from the start of the treatment program; at least 38 out of 40 possible points on a body mechanics evaluation at discharge; increase in one level of the physical capacity to perform work (lifting) from program start; ability to walk at least 4.8 km/hour at discharge; and a score of at least 15 on the Beck Depression Inventory Scale.

expectation for the remote providers. This changed and severely limited the original plan to conduct provider and patient surveys.

- Project staff indicated in their final report that they did not have accurate data on time spent by clinic staff with patients and with remote providers. They felt they did not spend enough time on this aspect of the evaluation early enough and had trouble recreating the data.
- The project wanted to create a telemedicine system where patient care was as similar to on-site care as possible, so they did not want to create an additional burden of reporting requirements for both patients and providers.
- Response rate for the patient satisfaction survey was only 25 percent. The survey was initially a paper survey, but telephone follow-up was conducted for nonresponse, increasing response to 50 percent. However, follow-up calls were conducted during working and early evening hours, so patients who had returned to work may have been missed.

Dissemination

During the grant period, dissemination about the project was limited. Staff attended several conferences and discussed the system. VMMC issued a press release about the free pain-management telemedicine classes available to Olympic Peninsula residents. Finally, the project coordinator presented at a poster session of VMMC's Medical-Surgical Nursing Potpourri about the project. The RNs and nurse technicians were interested largely in why the network design and implementation were problematic and found the session useful in explaining the technology. Several also felt more comfortable recommending telemedicine to associates or patients who would not travel to VMMC for treatment.

Toward the end of the grant period and following the grant period, VMMC staff have been very active in disseminating the project findings and seeking venues to present about the project.

Soon after the site visit, project staff were presenting at the annual conference of the Washington Self-Insured Association. This is a group mostly of employers who manage their own workers compensation claims, as most larger companies in Washington State do. They are a forward-thinking, politically active group that keeps abreast of issues in workers compensation and insurance in general. Project staff, including the project manager, a doctor, and the technical specialist, will be presenting what they did with the TIIAP grant in a session entitled, "The Telemanagement of Chronic Pain" at the 3-day conference.

The project manager is also working in the American Physical Therapy Association. The association has an Administrative Special Interest Group and a subgroup for Technology and Physical Therapy. These groups have typically been more interested in the Internet and applications for managing physical therapy practices, but there is a small but growing interest in telemedicine. She has submitted a project abstract, and if accepted, will be presenting on the project at the Physical Therapy Combined Sections Meeting in New Orleans in February 2000. The project manager also recently initiated planning for a 2 to 4 hour physical therapy course to be presented in Indianapolis at the National Physical Therapy 2000 Conference.

The American Physical Therapy Association also has a local section of administrators, mostly therapist managers. This group is very new to technology and the members are only beginning to learn about telemedicine. The project manager planned to meet with that group in June 1999 to share the basics of telemedicine and its implications for physical therapy.

D. Problems Encountered

Project staff identified a number of problems and obstacles they faced throughout the grant period and afterwards. The following sections group these problems in three categories: problems with partners and stakeholders, planning and administrative problems, and technology problems. One problem uncovered during the site visit that was not identified by project staff was a lack of an adequate needs assessment. Project staff at VMMC and FCH conducted some informal needs assessment with providers prior to applying for the grant; however, the informal manner by which it was conducted likely did not garner strong support. They used past referral patterns to estimate the number of patients who benefit from the system. These data referred to a much wider service area than the project targeted once implemented, and therefore the data likely overestimated the actual number of potential patients. Furthermore, they never talked with actual patients to describe the system and its benefits and limitations, ask whether they would want to participate in telemedicine, or discuss what their concerns might be. At best, this limited the referrals providers made. In the worst case, staff may have promoted a project for which no real need or interest was established. This is critical because patients who did use pain management services generally preferred the remote treatment, and yet the system was still underused. This indicates that there may not have been a patient base for the project.

Problems with Partners/Stakeholders

Lack of Commitment and Follow-Through by Partners. Project staff indicated that there was a lack of ownership and buy-in at remote sites, partly due to delays in start-up and partly due to staff turnover. Project staff felt that sites were passive in their interaction with the project and commented that project management experienced great difficulty in gathering information from the sites. VMMC staff acknowledged that clinic staff may have been directing their energies elsewhere and that they had competing priorities. The lack of commitment was evidenced by clinic staff's reported lack of time to promote the project and make more referrals. VMMC developed a brochure describing the project, telemedicine, and the benefits to patients, which was intended as a handout for patients to take some of the burden away from clinic staff.

As is often the case in technology projects, there was some resistance to using the new system which probably affected providers' commitment to the project. One respondent noted that providers who were familiar with telecommunications and technology embraced the project, but that those who only knew of hands-on medical care could not see where the value was added and were much less inclined to use the system. However, providers and patients alike seemed to become much more comfortable over time. Both patients interviewed commented that they felt like they were in the room with the doctor.

One respondent reported a couple of instances where there was not a good match between the patient and remote provider and the VMMC provider. Expectations for pain management and treatment philosophies were not congruent,³ and the remote provider was not inclined to work with the VMMC psychiatrist further.

Change/Loss of Key Personnel. Part of the problem the project was trying to mediate, the lack of specialist medical staff in the region, was also a problem in operating the project. Staff turnover at the remote clinics reached almost 50 percent prior to the grant and remained at almost this level throughout the period. The director position at the La Push clinic was left vacant for 4 months during the grant period. Project staff suspect this had a dramatic impact on the clinic's participation and lack of referrals to the telemedicine program. Project staff felt that

³ According to project staff, the management of the patient with chronic pain is not well understood by generalist providers in family practice, internal medicine, and in some cases by specialists, such as orthopedists and neurologists. Often this lack of skilled management is what contributes to the chronic or prolonged pain problems this patient population experiences. Frequently early warning signs of a patient's pre-disposition towards developing a full-blown, lengthy course of chronic pain problems are missed by medical providers and insurance claims managers. For example, the average time a PMP patient is off work due to chronic pain is 4 years. The pain program staff frequently need to provide case by case education and explanation of treatment philosophy, and still will find times when attending providers do not share the pain program's philosophy or treatment.

turnover in the clinics was partly mediated by consistency in the staff at VMMC who were able to keep the project running.

Change in Project Focus. The project's final report indicated that each of the three sites seemed to have different goals for the system, none of which were referral and treatment as expected by VMMC. They indicated in the final report that the sites were moving away from a provider-focused system (i.e., technology is designed to assist providers in delivering health care) to one that centered more on patients as end users of the system (i.e., technology is designed to provide patients with direct access to health care). In response, VMMC identified different providers to establish best services for each clinic. WEOS held psychotherapy groups several times per week in one quarter, four times in the next, then attendance waned and groups were canceled. FCH and the Neah Bay clinic participated in specialized CME and patient education programs, some outside of the PMP, such as colon cancer screening.

Some respondents did not seem to recognize divergence and, in fact, reported that referrals by providers are still being made. Others saw the divergence as a positive indicator that clinics knew what services they needed and were able to access them.

Cross-Cultural Differences. The project experienced some issues in working with and treating Native American patients. Staff indicated that the clinics may have been caught up in some local community politics that limited their involvement with the project. VMMC consulted specialists (prompted, but not paid for, by the TIIAP grant) to help them learn how to work in cross-cultural situations and increase their sensitivity to the types of care Native Americans expect to receive.

Providers in the remote clinics learned that their Native American patients often have a different cultural outlook on receiving medical treatments. Moreover, the concept of time is in many cases different than western conceptions of time. In the project these differences occasionally translated to canceled or delayed appointments when the patients arrived late or never arrived.

Cultural differences may also explain some resistance to technology. Healing in Native American cultures is seen as a sacred and traditional act, whereas health care in western cultures is very clinical, especially when conducted through technology.

Planning/Administrative Problems

Scattered Administrative Responsibility. Staff time for project coordination (e.g., setting up appointments, equipment testing) was concentrated at VMMC. The remote sites were expected to coordinate from their end, but they had not established a means or the time to do so. This was particularly a problem when there were problems with the technology, since there was no initial expectation that remote staff would be responsible for troubleshooting. The trained telecommunications staff at VMMC were not budgeted to support the troubleshooting effort at the level it required. The technicians are responsible for the extensive telemedicine telecommunications across the entire medical center.

The decentralized administration also affected the implementation of the website component of the project. Project staff acknowledge that planning for the website development and management was inadequate. While they delineated roles in development, review, and approval at the outset, the need for on-going training and maintenance of the website was not well identified in the grant plan. The project manager, physical therapist in charge of development, and others met weekly to discuss the content and functionality, but they had different ideas of where to go. Consequently, development and review took considerably longer and usage tracking is done infrequently. Early tracking was not provided as planned. Later, it was difficult to backtrack and collect these figures, and subsequently, tracking was stopped.

These administrative issues compounded problems with scheduling telemedicine consultations, which turned out to be more complicated than expected. The system is very decentralized because no one source has all the necessary information. In order to schedule an appointment, someone must coordinate with multiple people at both ends of the system. At VMMC, multiple doctors' appointment schedules must be obtained (and different departments and specialties run different lengths of appointments), the telemedicine studio must be reserved, and technical staff must be on hand. There is no master calendar at VMMC for physicians, staff, or room use. At the remote clinic, providers, patients, and clinic rooms must be coordinated. One person cannot coordinate it all, and no department or office wants to give up the authority for what it does coordinate. At the time of the site visit, staff felt they had not found a solution to this problem; however, they acknowledge that scheduling is similarly difficult and labor intensive with on-site pain management as well.

E-mail and Internet Service Less Accessible Than Originally Envisioned. Only 15 or 20 of the 60 computers at FCH are connected to the network and therefore usable for accessing e-mail or the Internet. Although some doctors use the Internet for clinical purposes,

computers are mostly used in management situations for e-mail. This is largely because the hospital administration is concerned about proper use of the telecommunications, and they are in the process of developing acceptable use policies. Hospital technical staff are currently tied up in ensuring the systems are Year 2000-compliant.

The project initially planned for patients and their families to be able to access the Internet to learn about their conditions and communicate with care providers. However, due to theft on several occasions, the computers are all placed in offices or exam rooms where patients have limited access. One respondent commented that using the Internet and e-mail requires a technological sophistication that most of their patients do not have, so this may have been an inappropriate goal.

Lack of Technical Expertise. The technician in Forks is currently the only person with technical expertise to manage the system in all three of the remote clinics. He noted that he is very active in ensuring there are no problems because he is very interested in seeing it succeed.

Another respondent felt the project needed more technical assistance in sorting through the technology problems. The telecommunications staff at VMMC ended up putting in considerably more work than initially intended to learn about the problems in the remote areas and solve the network design problems. As a side note, he reported that the two technicians at VMMC had left to work for the phone company, so that once again, they were left without experienced technical staff.

Technology Problems

Delays Due to Incompatibility Problems with Technology. The technology configuration initially envisioned for the project could not be implemented. Initially, the project intended to split the existing T-1 line into Forks four ways, providing one-quarter T-1 services to FCH, West End Outreach, Neah Bay, and La Push. However, after the grant was awarded and equipment was to be purchased, the available desktop equipment was configured to use ISDN, not T-1 lines. The smaller clinics needed desktop systems that do not require technical support staff to establish communications connections. But, when project staff began designing the network configuration to use ISDN connections which allow the more affordable systems, they learned that the only telephone provider in the area does not provide ISDN connections. VMMC telecommunications department staff worked with local providers to design a hybrid T-1/ISDN system, which allows ISDN switching to run on T-1 lines. Project staff attribute some of this line

problem to misinformation by vendors. One respondent suggested that more questions could have been asked at the outset to avoid these problems. With the technology incompatibilities, the initial estimated costs of connection were too low, and the vendor quotes were lower than actual costs of the equipment. VMMC absorbed these costs.

The delay in network configuration created delays in ordering equipment. And, unfortunately, severe vendor delays in delivering the rollabout and desktop units and later recalls and replacement of equipment created almost a 1-year delay in network deployment.

The solution to the technology incompatibilities, however, created an additional problem. Grand rounds, a regular weekly meeting conducted in most large medical centers and teaching hospitals that covers a different topic each week, are not currently being provided to the remote clinics due to the technical arrangement, even though they are broadcast to all of VMMC's other remote sites, including seven throughout Washington State and two in Alaska. The network configuration allows only one desktop unit to dial in at a time. In order to allow more desktop users, the configuration at every location must be reconfigured to match the desktop's configuration. VMMC staff have calculated that the impact of grand rounds services are greater in the other sites, and requiring each site to reconfigure each week is not worth the little interest in participation from the Neah Bay or La Push clinics.

Technology Not Performing as Expected. On a number of occasions sites experienced trouble with the audio portion of the teleconferencing equipment. When connecting sites, particularly multiple sites, users had trouble with low volume and feedback. The telephone company performed equipment checks to determine the source of the audio problems. These tests resulted in substantial cost to the clinics, and they determined that, in most cases, the audio problems were located at the remote site. It was found that problems were often due to the small microphones used with the desktop units. Small microphones were the only option offered by the desktop vendor at the time of purchase.

In addition, equipment in the remote clinics was occasionally relocated, causing problems requiring service to the systems. Dust from construction and moving equipment contributed to the loss of two or three referrals. Another equipment move required reinstallation and reconfiguration of several machines, which resulted in downtime on the system.

On other occasions there were problems with the equipment that resulted in delayed or canceled programs and consultations. In some cases, CME programs ended up being videotaped and shown at a later date, but this limited the interactive nature of the programs.

E. Sustainability and Project Expansion

Strategies Used to Fund Project Activities Beyond the TIIAP Grant Period

The three clinics committed at the outset to include maintenance costs for the system in their normal operations budgets after grant support ended. As of April 1999, VMMC and the clinics were still working through the details of transferring maintenance and line costs. VMMC currently has no budget for telemedicine maintenance or upkeep. The Telecommunications Department is a subunit of the Information Systems Department, which is largely focused on Year 2000 issues. Moreover, a new Televideo Advisory Group at VMMC will be deciding in a multidisciplinary manner where to take the systems. Staff see this as losing the voice of the small interest groups, such as the PMP. With limited resources but many ideas, staff hope that the hospital organization will continue an established program such as this one.

Reimbursement. According to project staff, the greatest issue for sustainability facing the clinics and VMMC is reimbursement for medical services delivered by way of the teleconferencing system. During the grant, provider salary hours were paid by the clinics and VMMC. However, having the clinics and VMMC absorb the costs for *virtual* doctor's visits rather than *on-site* doctor's visits resulted in lost revenue. The reimbursable costs for a typical on-site doctor's appointment cover not only salary hours, but also various overhead and administrative costs, as well as salaries for other health care workers associated with the appointment. During the grant, only the provider salary hours were paid by the clinics and VMMC; all other costs associated with a virtual appointment were not paid, and hence, represent lost revenues. This lost revenue to VMMC was approximately \$130,595, and the loss for the rural clinics is undetermined.

Workers compensation covered some of these services during the grant for pain patients *not* treated under the auspices of TIIAP by authorizing payment by physical medicine procedure codes. After the grant, VMMC did the billing, and the Washington State Workers Compensation Fund and the Health Care Financing Administration (HCFA), which supports Medicare and Medicaid, split payments between the clinics and VMMC.

Workers compensation and HCFA have recognized telemedicine as a viable means of providing some care but are not yet reimbursing for all telemedicine expenses. Some private insurers have indicated that they are willing to pay, although this is not yet documented in Washington State. Payers are concerned about where services were actually provided when the patient and provider are in different locations.

In September 1997, project staff held a demonstration and meeting for the Washington State Department of Labor and Industries, Health Services Analysis Section, and the Washington State Self-Insured Association, health care payers in many pain management cases. Staff conducted cost-benefit analyses and shared the benefits of telemedicine and teleconsultation to patients on workers compensation. As a result, the state office, which administers state workers compensation claims, published a bulletin in January 1999 detailing payment policy for consultation via telemedicine. The bulletin delineates what the insurers define as teleconsultation, specifying that it requires “an interactive telecommunication system, consisting of special audio and video equipment that permits real time consultation between the patient, consultant, and referring provider.”⁴ It specifies several conditions that must be met for the service to be covered, including that the referring provider must be physically present with the patient and they are to be compensated. Under the guidelines, both the consultant and the referring provider may bill the insurer, although the insurer pays only 75 percent of fee schedule or billed amount, whichever is lower. Also, providers are not paid for review of medical records or the required report that must be submitted, nor is payment allowed for telephone line charges or facility fees. VMMC staff see this as an important first step. And the association of employers and service providers with attorneys and labor liaisons is promoting telemedicine consultation as a service supported by both labor and employers. The executive director would like to organize a pilot telemedicine project for self-insured workers compensation.

Other revenue streams. Several respondents had a number of ideas for expanding the network for other purposes so as to generate additional revenue. Staff at FCH are considering using the system for community meetings, county government (the county crosses the Olympic

⁴ Provider Bulletin PB 99-01, published by Health Services Analysis Section, effective January 1, 1999.

Range) meetings, educational purposes, and computer training, all of which could be revenue generators. Other ideas are to use the system for planning for the community to assess local needs. They have emerging ideas of a master plan for the community. While they have not acted on these ideas, they have been getting the word out, and the ideas have been well received.

Project Expansions

FCH has received a 3-year, \$540,000 grant from the U.S. Department of Health and Human Services, Health Resources and Services Administration, Office of Rural Health Policy, to develop the Olympic Peninsula Comprehensive Telemedicine Network. The network will provide mental health, chemical dependency, and HIV counseling services to three mental health centers, county health and human services, county juvenile and family services, a school district, a medical clinic, and a children's advocacy group. The project will use FCH's link to the VMMC video bridge and will connect the new sites to Neah Bay, La Push, and VMMC.

Staff at FCH and VMMC are considering using the existing telemedicine system to transmit other medical data. Currently, the radiologist serving FCH comes regularly, but not frequently, from Bremerton; a teleradiology system would obviate this need. Respondents all agreed that the system could be used for other specialty care as well.

Newer technologies, such as "store and forward" systems, represent a possibility for the future. These currently run on proprietary software and require additional equipment, and so costs are prohibitive. The software can handle large, complex data files, but transmission time would severely cut in network time for teleconsultations and other network uses. However, new equipment is coming out that would shorten transmission time and might be cost effective in small clinics in the coming years.

F. Project Outcomes

Impact on End Users

Provider Retention. Project staff found that the system was not able to control provider retention in the remote areas as well as expected. While FCH staff have been relatively stable, and in fact, have been able to hire new personnel because of the project, staffing in the Neah Bay and La Push clinics is inherently inconsistent, due to the Indian Health Service rotation system. FCH staff attribute some of their stability to their close contact with their referral center,

VMMC. VMMC staff suggested that the technology may have supported strong relationships between providers at VMMC and the office staff in Forks.

Provider Interaction. Both the psychiatrist at VMMC and the physical therapist he worked with at FCH attributed their strong working relationship to the project. They had previously worked together but had never met in person and discussed their caregiving. After their day together, both were more comfortable providing care in a telemedicine situation. Not only has this improved the level of care they jointly provide, but the therapist has consulted the specialist as a resource for therapy suggestions on a number of occasions for other patients. She acknowledges she would not have had this opportunity prior to the project. Another provider noted that the system has enabled him to more easily provide advice on pain problems to new doctors with the Indian Health Service.

Impact on Other Beneficiaries

The project served chronic pain patients in remote areas who would not otherwise have received care or would have received delayed treatment at great expense. It provided pain management consultations to 25 patients through both initial patient evaluations and follow-up care during 1998 (the equipment became operational in October 1997), and the three remote clinics logged 66 visits (includes multiple visits by individuals). As is discussed below, these 25 patients accrued treatment benefits, financial benefits, psychological benefits, and improved health outcomes.

In 1998, VMMC broadcast 31 group patient sessions to the clinics. These covered such areas as psychology, exercise, injury prevention, and pain management basics.

Treatment Benefits. Staff at VMMC and the remote clinics reported that the telemedicine system provides patients in the remote areas a level of expertise and continuity of care not typically available to them. It allows the local physical therapist to participate in the consultation with the specialist, which provides the physical therapist with more information about the case than the specialist's notes and diagnosis. The treatment in the local clinic then more closely follows that which the specialist prescribes. This is particularly important for follow-up care and with a patient population that often receives irregular care.

One provider commented that more contact between patient and specialist leads to more compliance in treatment routines. However, there has been no evidence that patient

compliance with the treatment was improved through the project. But regular contact between providers in remote clinics and at VMMC has allowed the specialists to know what the rate of patients' compliance with treatments are, something that was difficult to do prior to the TIIAP project. Another provider noted that the teaming approach between the therapist and specialist has encouraged better compliance by playing a "good cop – bad cop" scenario; the therapist felt that the specialists have an easier time playing a stronger role in stressing the importance of completing exercises and activities and taking medications and that the doctors may command more respect, and thus compliance, than physical therapists.

Providers do acknowledge that touching patients is always preferable to looking at them, or even watching a local provider touch them. Rehabilitation therapists and physical therapists rely on their hands to diagnose and provide treatment. While they know telemedicine is not the same, they accept that this care is very good for many patients and better than no care at all.

Financial Benefits. For the 13 patients seen by the end of the third quarter of the project, staff calculated that they saved a combined 156 driving hours, up to \$1,820 in hotel costs, and the pain and discomfort of 12 hours of travel (4 buses and 1 ferry) for each. For a patient's evaluation and one follow-up appointment at VMMC, the Washington State Worker's Compensation typically pays \$13,137 for mileage reimbursement, meal reimbursement, and hotel accommodations. These fees were avoided completely by using the telemedicine system.

Psychological Benefits. Many of the benefits to patients cannot be quantified. Most of the patients have lived in rural areas for all of their lives. One patient talked about the stress of traveling to the city where there are so many cars, traffic lights, and one-way streets that she makes her husband drive her. Many rural residents are really frightened to visit a city and stay overnight, and many older patients simply would not go. In addition, the system allows patients' families to be a part of their treatment. This is particularly important for chronic pain patients who must rely on the support of their families and communities in overcoming the pain and working through their treatment.

Health Outcomes. Each of the 25 patients showed some gain through participating in the program. Doctors recommended changes in medication management for 18 patients, including changes in dosages, combinations of prescriptions, and antidepressant therapy. Fifteen patients were referred to local physical therapists for supervised exercise programs at the clinics or instruction in a home program. These included strengthening and flexibility exercises and proper

work positioning and lifting techniques. Six patients were referred to VMMC's 4-week pain management on-site treatment program; typically, about half of all evaluations result in referral to the treatment program. Staff suggest that only a quarter were referred because the patient population was a particularly complex group to rehabilitate.

Other outcomes included two patients encouraged toward retirement, three given permanent partial disability status, four found to be work-ready, and two encouraged to obtain surgical consultation. Staff assume that if they had not used the teleconsultation system, these patients would not have had these outcomes unless they traveled to Seattle.

Five of the six patients referred to the VMMC on-site treatment program completed treatment during the grant period. Of these, three have returned to full-time work, one is work-ready and awaiting placement, and one retired. The final patient is seen for follow-up tele-visits but does not expect to return to work. All six met the program goals for flexibility, target heart rate, and physical capacity level, and performance on body mechanics testing and walking speed was optimal or 100 percent expectancy.

Other Community Members. Patients have since requested to use the telemedicine service for other health care needs, including dermatology, pediatrics, and oncology. Some patients travel over an hour from Port Angeles to Forks to use the system rather than traveling 3-4 hours to Seattle to VMMC. The Neah Bay and La Push clinics have experimented using the system for administrative tribal meetings unrelated to health care.

Prior to the grant there was one T-1 line out to the Olympic Peninsula. Now there are five, and ISDN technology is positioned to take over all telecommunications. One respondent attested to the value of this change to the entire community in bringing them closer to the cultural revolution going on elsewhere. He attributed some it to VMMC's TIIAP grant for seeding the ideas with the telephone companies.

Impact on Grant Recipient and Project Partners

VMMC. Both VMMC and the remote clinics reported that the telemedicine project has improved the health care they provide. They are able to provide a continuity of care not otherwise possible. And they believe this has led to better patient health outcomes. The staff at

VMMC are very proud of their project; one commented that they successfully implemented a project that technically never should have been able to work.

Project staff felt it was significant that following the grant, VMMC created a new position in the Physical Medicine and Rehabilitation Department. The grant project manager is now the Corporate Relations Liaison responsible for enhancing service provision to employers via telemedicine. She indicated that VMMC management feels strongly enough about the potential applications of the technology that they should market it vigorously. She advocates for the teleconsultation system as a possibility for any company and has current efforts to establish contracts with companies for the PMP and a neurological outpatient program.

FCH. FCH was able to leverage the network developed through the TIIAP project to receive a 3-year, \$540,000 grant from the U.S. Department of Health and Human Services, Health Resources and Services Administration, Office of Rural Health Policy to develop the Olympic Peninsula Comprehensive Telemedicine Network. This award was attributed in part to successes of and lessons learned by the TIIAP project. FCH saw the TIIAP project as developmental both from a technological perspective and in easing providers toward comfort in using teleconferencing to provide care.

FCH staff also commented that the project has changed the way the hospital does business, other than health care, with the other remote clinics and VMMC. E-mail is highly utilized by administrators for communications, and while they prefer visual contact when possible, e-mail communications have made contacting extremely busy people much easier.

Replication

During the grant period, and more so afterward, project staff have been working with employer groups to replicate the system elsewhere. The Objective Medical Assessment Corporation (OMAC) in Washington coordinates panels of specialists to conduct examinations of patients as a final stage of the insurance claims process. OMAC is hoping to use teleconsultation for this task through clinics in eastern Washington, which is also sparsely populated. They are currently working to install their own T-1 lines to link with VMMC specialists to assist with consultations.

Staff have also begun conversations with Boeing's medical staff to implement a similar system. Boeing is technologically ready to begin, but downsizing and budgets are still an issue. They will be issuing an RFP for on-site therapy, and VMMC intends to respond.

G. Lessons Learned and Recommendations for Other Communities

VMMC staff are quite sure their project was successful in that it demonstrated the feasibility and advantages of a remote, teleconsultation health care system. They feel that VMMC is just beginning to tap the market for telemedicine. Staff indicated that they would conduct the grant project again, given some of the things they learned through the grant. They had no reservations in recommending that other medical centers try a similar project.

One respondent was not as optimistic about the project's future, commenting that at the beginning of the grant VMMC was perched ahead of the wave with teleconferencing for health care provision. Now, the respondent said, hospital management is not as "gung ho" as it once was. The leadership of the medical center included the review of the VMMC telemedicine programming as part of an overall effort in reviewing programs to enhance its financial position. They have determined it is in their best interest to provide teleconferencing to the satellite clinics and to reduce the level of non-reimbursed telemedicine activity. There is both support and interest in providing telemedicine service that is reimbursed.

Thus, while the PMP remains at the leading edge, there are some questions about the future. However, this respondent also commented that with the lessons the project learned and with some stability in staffing and funding, the project should be done again. With some better planning, in terms of both coordination and technology, the success might have come sooner. The respondent suggested that a telemedicine project may be better run as a self-sustaining program than as a grant project because users may have seen it as a longer-term project worthy of receiving more time and energy.

As has happened with many TIIAP projects, and technology projects in general, staff noted that the project needed more planning, equipment, staff, and training than they expected. Other critical lessons learned by the project include the following:

Every Project Needs a Champion with Muscle, Who Then Can Motivate Remote Champions. With projects that require staff other than those of the grant recipient to do much of the work to get going, motivated people are key. VMMC found that having a project

director that was both invested in the telemedicine aspects of the project and able to work with hospital management was critical. In his absence, the future of the project is not as clear.

Having champions at each local site is critical to promoting the project and to keeping accurate and updated data on project implementation, especially with autonomous sites. Project staff felt that when everyone was invested in the project, the results included better data on provider hours in clinical practice and record review.

Project staff felt they did not do enough to motivate remote staff, although they found that a stable central staff can overcome disruption in continuity of service created by loss of key remote staff. They also felt that communication between central and remote staff was not as smooth as it might have been. Such simple items as a phone and fax number list, they said, would improve communication.

Partners Should Make an Upfront Commitment to Use the System. With such a big learning curve, once people develop the technical skills and become comfortable with using the system, its uses will expand beyond the original, intended purpose. Committed staff, they believe, would create their own uses that the initial program design may not have conceptualized.

Project Coordination Should Be Budgeted for Remote and Central Sites. Project staff acknowledged that it is difficult to get commitment from remote staff when there is no monetary compensation for their clinics, especially since time is at a premium at these locations. Accordingly, the budget for project coordination should not be wholly located with the central site; remote staff time for coordination should be built into the budget.

In Cross-Cultural Situations, Project Staff Must Know the Target Group. Project staff realized that health care in Native American communities differs from that in other communities, and they stressed the importance of knowing these kinds of issues upfront. VMMC identified the probable influence of cross-cultural factors prior to beginning treatment using the Tele-Network system and consulted with several local area providers to positively integrate this education into the project. The focus of this effort was to promote increased awareness of Native American patient care expectations. For future projects, they would identify personnel to support the projects and bridge cultural gaps.

They cautioned against having a limited target population, however. In hindsight, they would have expanded their geographic region to include a more diverse population and include both Native Americans and a larger white population.

Providers Should Receive a Sufficient Amount of Training. By working with providers to show them what cases the teleconsultation system is appropriate for, there will be greater buy-in and use of the system. Non-users should be targeted in particular. Providers would also benefit from training in marketing strategies. Providers should receive more technical training, such as in using x-ray screens, document stands, and audio adjustments.

Technical Equipment Should Be Tested Weekly. Project staff found that weekly testing dramatically reduced down-time on the systems. They also noted that it would be helpful to have technical or management information staff located at each site. Another option would be having registered nurses with technical skills and aptitudes who can do more to help remote physicians in using the system.

H. Summary and Conclusions

The Remote Pain Management project represents a viable system for teleconsultation for other rural areas where patients must travel to urban medical centers for treatment. While there were initial problems with the technologies used, VMMC staff and consultants designed a hybrid T-1/ISDN system that solved a major problem with the physical infrastructure in the western Olympic Peninsula. It is likely that other rural areas face similar connection incompatibilities between urban ISDN access and rural T-1 access. The problems discovered and solutions developed for this project are important ones for other areas to consider.

VMMC articulated a critical health need in remote areas around the country. There are undoubtedly other rural regions that could benefit from such a system, and these extend far beyond pain management. All project staff responded that the application areas for teleconsultation are as broad as the field of medicine in general. That this project resides in the pain management and rehabilitative medicine areas is important for those fields, but does not limit the applications of teleconsultation.

VMMC and the remote clinics also learned some important lessons on gaining buy-in from remote providers and patients. While VMMC's system may not yet have the buy-in from the

remote clinics to expand its user base, the problems they faced may not be as difficult for other projects to address if they do so early on in their projects' development.

Finally, through VMMC's project and on-going advancements in the field, reimbursement for teleconsultation is being addressed in a practical manner. VMMC has made important steps and involved key stakeholders in developing systems of insurer reimbursement for teleconsultations. Significantly, as a result of the project, VMMC has created a new position in its staffing structure. The Corporate Relations Liaison is responsible for enhancing service provision to employers via telemedicine and marketing the potential applications of the technology in general. This step and VMMC's project as a whole represents an important foot in the door for telemedicine across the country.