Upon being awarded the grant, PMS will:

- Align our overall objectives, project scope and activities with our partners in the Pilot Project;
- Establish a PMS executive project team, including the individuals above;
- Conduct detailed site surveys, and develop a plan to connect our sites in order of priority, taking into account synergies and lead times;
- Participate in network modeling activities with other grant partners;
- Participate in the development of standards for interoperability between networks, including monitoring and security;
- Assist in the development, and issuance of an RFP, as required, for network and equipment;
- Identify key points of network connectivity with our grant partners;
- Develop a detailed project plan, including specific expenditures, personnel assignment, and key milestones;
- Track and report progress both internally and to the Executive Committee.

Holy Cross Hospital

Holy Cross Hospital's (HCH) overall project will be managed by the Information Technology Director who will work with the HHC Technology Committee, Collaborative Action for Taos County Health Board of Directors, Enchanted Circle Health Outreach Board of Directors and the First Born Program Advisory Committee. Compliance oversight will be provided by the HCH Compliance Officer.

HCH's approach will be to align with our partners to complete tasks. Many tasks will be achieved by individual entities, all working in alignment with the goal of a comprehensive HIT system. We will operate from a multi-disciplinary Quality Improvement Team that includes our partners, Director of Imagining, IT Director, Rural Clinic Managers and HCH CFO. This team will be responsible for the administration of the overall grant and will provide oversight, high level prioritization, conflict resolution and status reporting. Please see Appendices (1-33).

Upon being awarded the grant, HCH will:

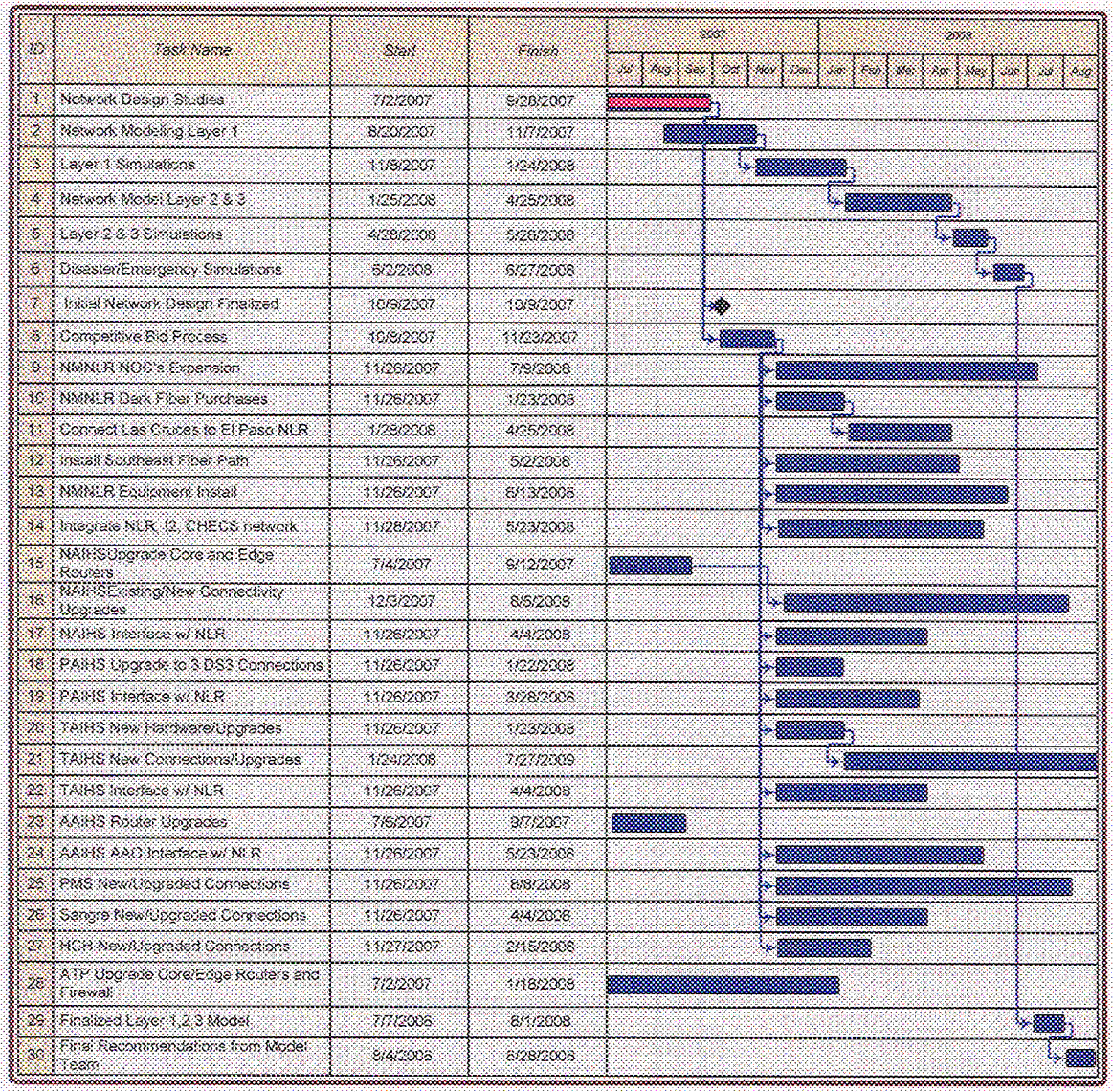
- Establish a Quality Improvement Team;
- Conduct detailed readiness site surveys and develop a plan to connect our sites by level of readiness;
- Participate in network modeling activities with other grant partners;
- Participate in the development of standards for interoperability between networks, including monitoring and security;
- Identify key points of network connectivity with our grant partners;
- Develop a detailed project plan, including specific expenditures, personnel assignment, and key milestones;
- Commence training for deployment of system;
- Track and report progress both internally and to the Quality Improvement Team.

UNM Carrie Tingley Hospital

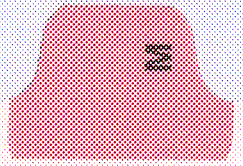
The Senior Clinician and Associate Professor of Pediatrics at the University of New Mexico Health Sciences Center Carrie Tingley Hospital will lead their participation in the Pilot Project. He will direct purchase and delivery of Web cameras and laptops and ensure adequate equipment and software are obtained; assist in identifying, initiating, and scheduling of the five new sites in both the first and second years of the project and oversee the construction, delivery, and summary of data in the use of telemedicine for each year.

Overall Timeline

TAG Overall Project Timelines



ID	Task Name	Start	Finish
1	Network Design Studies	7/2/2007	9/28/2007
2	Network Modeling Layer 1	8/20/2007	11/7/2007
3	Layer 1 Simulations	11/8/2007	1/24/2008
4	Network Model Layer 2 & 3	1/25/2008	4/25/2008
5	Layer 2 & 3 Simulations	4/28/2008	5/26/2008
6	Disaster/Emergency Simulations	5/2/2008	6/27/2008
7	Initial Network Design Finalized	10/9/2007	10/9/2007
8	Competitive Bid Process	10/8/2007	11/23/2007
9	NMNLR NOC's Expansion	11/26/2007	7/9/2008
10	NMNLR Dark Fiber Purchases	11/26/2007	1/23/2008
11	Connect Las Cruces to El Paso NLR	1/28/2008	4/25/2008
12	Install Southeast Fiber Path	11/26/2007	5/2/2008
13	NMNLR Equipment Install	11/26/2007	6/13/2008
14	Integrate NLR, I2, CHECS network	11/26/2007	5/23/2008
15	NAIHS Upgrade Core and Edge Routers	7/4/2007	9/12/2007
16	NAIHS Existing/New Connectivity Upgrades	12/3/2007	8/5/2008
17	NAIHS Interface w/ NLR	11/26/2007	4/4/2008
18	PAIHS Upgrade to 3 DS3 Connections	11/26/2007	1/22/2008
19	PAIHS Interface w/ NLR	11/26/2007	3/28/2008
20	TAIHS New Hardware/Upgrades	11/26/2007	1/23/2008
21	TAIHS New Connections/Upgrades	1/24/2008	7/27/2009
22	TAIHS Interface w/ NLR	11/26/2007	4/4/2008
23	AAIHS Router Upgrades	7/6/2007	9/7/2007
24	AAIHS AAO Interface w/ NLR	11/26/2007	5/23/2008
25	PMS New/Upgraded Connections	11/26/2007	8/8/2008
26	Sangre New/Upgraded Connections	11/26/2007	4/4/2008
27	HCH New/Upgraded Connections	11/27/2007	2/15/2008
28	ATP Upgrade Core/Edge Routers and Firewall	7/2/2007	1/18/2008
29	Finalized Layer 1,2,3 Model	7/7/2008	8/1/2008
30	Final Recommendations from Model Team	8/4/2008	8/28/2008



Financial Management Plan / Budgets

The University of New Mexico (UNM) has the depth and breadth of experience required to manage grants of significant dollar value. (UNM) has the following policies and procedures in place to assure compliance with Federal, State, and local fiscal requirements. See attached documents:

- Organizational Structure
- Chief Information Officer – Arthur B. Maccabe, PhD (Co-PI of this grant)
- Actual Current Fund Revenue - $1,224,700,000
- Actual Current Fund Expenditures - $1,070,900,000
- Contract and Grant Awards - $298,600,000
- Contract and Grant Expenditures - $13,800,000
- Financial Services – Controller Administration
- Centers and Institutes – Center for Telehealth
- US Department of Education – Designation as Hispanic-Serving Institution
- UNM History, Mission, and Organization
- Responsibility and Accountability for University Transactions
- Cost Accounting Standards
- Cost Sharing on Sponsored Projects

The Center for Telehealth and Cybermedicine Research will assure that the portion of the grant relative to funding telehealth programs will be managed appropriately. Dr. Dale Alverson, Medical Director, Regents Professor and Principal Investigator has extensive expertise in the field of telemedicine and the opportunity for costs savings through the dissemination of healthcare through telemedicine. The Center's Associate Director, Mary Ann Scott, manages the day-to-day activities of the Center. Ms. Scott has the following acquired skills applicable to the successful implementation of this project:

- over twenty years of experience with telemedicine
- expertise required for strategic planning and budget management
- successful implementation of technically complex projects
- understanding of scientific engineering and emerging technologies
- communication skills required for diverse stakeholders
- ability to foster collaboration and build strong teams
- experience with academic institutions
- experience with Federal Agencies and Laboratories
- work ethic required for day-to-day management of large projects

The University has the expertise to manage the financial interests of this diverse team of participants and assure a seamless interface for excellent work flow leading to successful implementation of targeted goals which will result in a successful pilot project for FCC – one which can become a model for the entire country.

FCC Rural Healthcare Pilot Program

	Year 1			Year 2		
Participant Name	**Budget**	**Match**	**Total**	**Budget**	**Match**	**Total**
UNM:						
CfTH	281,500	0	281,500	162,000	0	162,000
ITS / Office of the CIO	2,250,000	0	2,250,000	0	0	0
NMNLR 3 Universities	2,900,000	1,400,000	4,300,000	3,100,000	1,400,000	4,500,000
ECE	581,435	0	581,435	0	0	0
Indian Health Service						
Albuquerque Area	169,830	29,970	199,800	0	0	0
Navajo Area	1,605,000	240,000	1,845,000	625,000	170,000	795,000
SouthwestConsortium	167,620	29,580	197,200	157,420	0	157,420
Tucson Area I.H.S	192,000	28,800	220,800	130,000	19,500	149,500
Total	8,147,385	1,728,350	[illegible]	[illegible]	1,589,500	5,763,920

	Year 1			Year 2		
Participant Name	**Budget**	**Match**	**Total**	**Budget**	**Match**	**Total**
Subawards:						
Arizona Telemedicine Program	449,699	147,217	596,916	429,167	144,138	573,305
Holy Cross Hospital	85,000	12,750	97,750	20,000	3,000	23,000
PMS	1,131,400	202,500	1,333,900	673,600	158,900	832,500
Sangre de Cristo	221,850	36,153	258,003	228,660	0	228,660

Total UNM and Subawards	**10,035,334**	**2,126,970**	**12,162,304**	**5,525,847**	**1,895,538**	**7,421,385**
		17%			**26%**	

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Router for CDD, CDM	$23,500				
	Total Hardware Costs	$23,500	$0	$0	$0	$23,500
Software						
	Total Software Costs	$0	$0	$0	$0	$0
Connectivity	T I line for CDD, CDM	$18,000				
	Total Connectivity Costs	$18,000	$0	$0	$0	$18,000
Network Design	Network Design Studies	$75,000		$45,000		$120,000
	Total Network Design Costs	$75,000	$0	$45,000	$0	$120,000
Network Deployment	Project Deployment	$87,000		$72,000		$159,000
	Netwrok Engineering Deployment	$60,000		$45,000		$105,000
						$0
	Total Network Deployment Costs	$147,000	$0	$117,000	$0	$264,000
Other	Travel	$10,500				$10,500
	Materials and Supplies	$7,500				$7,500
						$0
	Total Other Costs	$18,000	$0	$0	$0	$18,000

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	New/Upgrade Fiber Switching Equipment	$1,000,000				
	Total Hardware Costs	$1,000,000	$0	$0	$0	$1,000,000
Software	**New Network Operating Center Software**	$200,000				
	Total Software Costs	*$200,000*	$0	$0	*$0*	$200,000
Connectivity	**Infrastructure Build outs, Fiber Builds**	$1,000,000				
	Total Connectivity Costs	$1,000,000	$0	$0	$0	$1,000,000
Network Design	Network Design Studies	**$50,000**				
	Total Network Design Costs	**$50,000**	$0	$0	$0	**$50,000**
Network Deployment						
	Total Network Deployment Costs	*$0*	$0	$0	$0	$0
Other						
	Total Other Costs	*$0*	$0	*$0*	$0	*$0*

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware ***UNM-$500,000, $600,000*** **NMSU-$300,000, $500,000**	Budget-Upgrades to existing equipment, new optical routers, *Switches, cabling;* Match-Optical Equipment, Routers, Switches					
	Total Hardware Costs	$1,000,000		$1,100,000		$2,100,000
Software UNM-$200,000 NMSU--0- NM Tech--0-	Budget-Enhance current Monitoring software Match-Monitor Software (Monitoring Centers at NMSU and UNM)					
	Total Software Costs	$200,000	$300,000		$200,000	$700,000
Connectivity **UNM-$500,000,** $500,000 NMSU-$550,000, $1,000,000 NM Tech-$250,000, $500,000	Budget-First year enable backbone to remote sites, 2nd year more sites Match-Percentage of NLR, 12, and Fiber and Conectivity Costs		$500,000 $200,000 $400,000	$500,000 $1,000,000 $500,000	$500,000 $200,000 $400,000	$1,500,000 $1,400,000 $1,300,000
	Total Connectivity Costs	$1,300,000	$1,100,000	$2,000,000	$1,100,000	$5,500,000
Network Design UNM-$100,000 NMSU-$100,000 NM Tech--0-						
	Total Network Design Costs	$200,000	$0	$0	$50,000	$250,000
Network Deployment UNM-$100,000 NMSU-$50,000 NM Tech-$50,000	Installation, site travel and testing					
	Total Network Deployment Costs	$200,000	$0	$0	$50,000	$250,000
Other						
	Total Other Costs	$0	$0	$0	$0	$0
	Total All Cost Categories	$2,900,000	$1,400,000	$3,100,000	$1,400,000	$8,800,000

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware						
	Total Hardware Costs	$0	$0	$0	$0	$0
Software						
	Total Software Costs	$0	$0	$0	$0	$0
Connectivity						
	Total Connectivity Costs	$0	$0	$0	$0	$0
Network Design	Netwrok Design Studies, Modeling and Simulations	$500,000				
	Disaster evaluation-netwrok impact	$81,435				
	Work in collaboration with LANL					
	Total Network Design Costs	$581,435	$0	$0	$0	$581,435
Network Deployment						
	Total Network Deployment Costs	$0	$0	$0	$0	$0
Other						
	Total Other Costs	$0	$0	$0	$0	$0

Organization Name: **Indian Health Service -Albuquerque Area**

Budget Category		Description	Year 1 Budget	'ear 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware							
Fiber Connection Between AIH and UNM		21,250					
AIH Router							
Cisco 3845	$	14,000.00					
DS3 module	$	5,000.00					
Fiber Module (need 2 modules)	$	10,000.00					
AIH Router Total		**24,650**					
AAO Router							
Cisco 3845	$	14,000.00					
DS3 Module to AIH	$	5,000.00					
DS3 Module to to Verizion	$	5,000.00					
WICs to T I Need 14 WICS (14x700)	$	9,800.00					
AAO Router Total	**$**	**28,730.00**					
8 Service Units (Need 8 Cisco 3845s)		8 x $14000 = $95,200					
Total Hardware			169,830	29,970	0	0	199,800
Total Software			0	0	0	0	0
(Total Connectivity			0	0	0	0	0
Total Network Design			0	0	0	0	0
Total Network Deployment			0	0	0	0	0
Total OtherCosts			0	0	0	0	0
		Total All Cost Categories	**169,830**	**29,970**	**0**	**0**	**199,800**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Upgrade cored and edge routing and firewall equipment first year					
	Total Hardware Costs	$855,000	$144,000	$0	$0	$999,000
Software	No software					
	Total Software Costs	**$0**	$0	$0	$0	$0
Connectivity	Seeking to cover costs of backbone and spoke private line services that are not eligible under previous USF Rural Healthcare funding restrictions that limited eligibility to rural areas					**$0**
	Total Connectivity Costs	$500,000	$57,600	$500,000	$100,000	$1,157,600
Network Design						$0
	Total Network Design Costs	**$250,000**	**$38,400**	$125,000	$70,000	**$483,400**
Network Deployment						
	Total Network Deployment Costs	$0	**$0**	**$0**	$0	$0
Other						
	Total Other Costs	$0	$0	**$0**	$0	**$0**

Organization Name: **Indian Health Service - 4 Southwest Areas - Internet 2 Connectivity**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	IHS WAN Router and Network Edge Equipment					
	Total Hardware Costs	$17,000	$3,000	$17,000	$0	$37,000
Software						
	Total Software Costs	$0	$0	$0	$0	$0
Connectivity	Circuit installation from IHS WAN to Albq Internet 2 Connector	$44,200				$44,200
	Annual charges of GigE circuit from IHS to Internet 2 Connector	$29,070		$29,070		$58,140
	Shared annual Internet2 Connector fees -Albuquerque	$34,000		$34,000		$68,000
	Shared annual Internet2 Connector fees - DC			$34,000		$34,000
	Total Connectivity Costs	$107,270	$18,930	$97,070	$0	$223,270
Network Design						
	Total Network Design Costs	$0	$0	$0	$0	*$0*
Network Deployment						
	Total Network Deployment Costs	$0	$0	$0	$0	$0
Other	Internet 2 annual membership fee	$22,100		$22,100		$44,200
	Internet 2 annual support costs	$21,250		$21,250		$42,500
						$0
	Total Other Costs	$43,350	$7,650	$43,350	$0	$94,350

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Upgrade routing and WAN network equipment in first year,					
	Total Hardware Costs	$50,000	$7,500	$50,000	$7,500	$115,000
Software	No software					
	Total Software Costs	$0	**$0**	**$0**	$0	$0
Connectivity						
Need Fiber and expanded bandwidth connectivity to San Simon and San Xavier facilities						
San Simon. $48.000 for fiber and connectivitv in first vear. $32.000 for connectivitv second vear						
San Xavier, $94,000 for fiber and connectivity in first year, $48,000for connectivity in second year						
	Total Connectivity Costs	**$142,000**	**$21,300**	**$80,000**	$12,000	**$255,300**
Network Design						
	Total Network Design Costs	**$0**	**$0**	$0	$0	***$0***
Network Deployment						
	Total Network Deployment Costs	**$0**	$0	$0	***$0***	$0
Other						
	Total Other Costs	$0	$0	$0	$0	$0
	Total All Cost Categories	**$192,000**	**$28,800**	**$130,000**	**$19,500**	**$370,300**

Organization Name: Arizona Telemedicine Program

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Upgrade cored and edge routing and firewall equipment first year Second year, additional core network upgrades and network edge device upgrades					
	Total Hardware Costs	**$231,449**	$34,717	$210,917	$31,638	$508,721
Software	No software					
	Total Software Costs	**$0**		**$0**		**$0**
Connectivity	Seeking to cover costs of backbone and spoke private line services that are not eligible under previous USF Rural Healthcare funding restrictions that limited eligibility to rural areas					
	Total Connectivity Costs	$218,250	$112,500	$218,250	$112,500	**$661,500**
Network Design						
	Total Network Design Costs	$0		$0		$0
Network Deployment						
	Total Network Deployment Costs	**$0**		**$0**		**$0**
Other						
	Total Other Costs	$0		**$0**		**$0**
	Total All Cost Categories	**$449,699**	**$147,217**	**$429,167**	**$144,138**	**$1,170,221**

Organization Name: **Holy Cross Hosptial**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Purchase New Routers/Upgrade existing					
	Total Hardware Costs	$25,000	$3,750	$0		$28,750
Software	NOC Monitoring Software					
	Total Software Costs	$15,000	$2,250	$5,000	$750	$23,000
Connectivity	Connections (T1) to 4 rural clinics					
	Total Connectivity Costs	$20,000	$3,000	$5,000	$750	$28,750
Network Design						
	Total Network Design Costs	$15,000	$2,250	$0		$17,250
Network Deployment						
	Total Network Deployment Costs	$10,000	$1,500	$10,000	$1,500	$23,000
Other						
	Total Other Costs	$0	$0	$0		$0
	Total All Cost Categories	**$85,000**	**$12,750**	**$20,000**	**$3,000**	**$120,750**

Organization Name: **Presbyterian Medical Services**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Budget-$18,000 per site – upgrades to existing equipment, new routers, Switches, cabling; second year maintenance charges at 20% Match-Hardware, maintenance second year					
	Total Hardware Costs	$686,000	$54,500	$329,200	$10,900	$1,080,600
Software	Encryption software for transmissions, $1000 per site					
	Total Software Costs	$47,000	$0	$6,000	$0	$53,000
Connectivity	$7200/site * 47 sites (average blended rate)					
	Total Connectivity Costs	$338,400	$148,000	$338,400	$148,000	$972,800
	etw Design Costs	$0	$0	$0	$0	$0
Network Deployment	Installation, site travel and testing					
	Total Network Deployment Costs	$60,000	$0	$0	$0	$60,000
Other						
	Total Other Costs	$0	$0	$0	$0	$0
	Total All Cost Categories	**$1,131,400**	**$202,500**	**$673,600**	**$158,900**	**$2,166,400**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware						
	Total Hardware Costs	$0	$2,875	$0	$0	$2,875
Software						$0
						$0
						$0
	Total Software Costs	*$0*	$0	$0	*$0*	*$0*
Connectivity	Connectivity Fees for Pecos 2000/Month (very remote area)	$24,000		$24,000		$48,000
	Connectivity Fees for one additional site TBD @ 500/Month	$6,000		$6,000		$12,000
	Connectivity for current *20* SDCCHP Telehealth Sites	$160,000		$176,000		$336,000
	Total Connectivity Costs	$190,000	$28,500	$206,000	$0	$424,500
Network Design						
	Total Network Design Costs	*$0*	$0	$0	$0	$0
Network Deployment	2xRouters (Incl Installation and setup)	$7,590				$7,590
	2x Managed Fast Ethernet Switches	$1,600				$1,600
						$0
	Total Network Deployment Costs	$9,190	**$1,379**	$0	$0	$10,569
Other	Single Point of Maintenance Contact for all 22 telehealth sites					
	Total Other Costs	$22,660	$3,399	$22,660	$0	$48,719
	Total All Cost Categories	**$221,850**	**$36,153**	**$228,660**	**$0**	**$486,663**

N

Future Sustainability

Overall sustainability of the TAG will depend upon a high volume of utilization and quality of telemedicine services that meet the defined health care needs of the rural communities, their providers and patients within the region. Continued adoption and investment in the Grid by the rural communities and the health care provider organizations will be based on perceived and demonstrable value in improved access, more effective distribution and sharing of health care services. Furthermore, objective evidence of improvements in health outcomes will justify the continued investment, as well as reimbursement by third party payers for health services provided via telemedicine over the Grid. Sharing the TAG among many stakeholders and avoiding silo systems also offers the economy of scale to assist in maintaining this network of networks. In addition, if the TAG proves to offer enhanced reliability, QoS, security, surge capacity, and appropriate redundancy that provides means for disaster recovery, local, state, and federal agencies will more likely provide additional resources and funding to maintain the Grid so that the system will be in place to meet the needs for homeland security, emergency preparedness and disaster response.

The TAG also offers cost savings to the health care system through improved sharing of resources, effective distribution and access to health services that lead to decreased travel costs for patients, families and providers. Further, this enhanced access can provide improvements in continuity of care that provides prevention of subsequent complications and more expensive health services, particularly for patients with chronic disease. Those values will lead to continued sustainability and integration of telemedicine into the health care system.

Arizona Telemedicine Program

The Arizona Telemedicine Program has budgeted for the matching funds described in the budget request. The network upgrades and enhancements that are requested will not only increase the capacity of the Arizona Telemedicine Program's role as a telemedicine network service provider, but will additionally increase security and make it more cost effective for new network members to join and connect to the network.

ATP has been in operation over 10 years and has a successful and sustainable network membership based business model already in place. These enhancements and upgrades will bolster that ATP network and position it to grow as the demand for telemedicine services increases. For purposes of this proposal, ATP has only budgeted for two initial years of the FCC Pilot program. In subsequent years, ATP expects to apply for additional infrastructure funding to further expand and strengthen its regional network through the addition of redundancy and higher speed connections to accommodate increased demands for 24/7 network telemedicine services. Each year of proposed equipment upgrades stands independently as an operational improvement to the ATP network infrastructure that can be built upon in future years. The leased line portion of the proposed budget will relieve ATP and its members from the high costs of leased line services in support of telemedicine and will potentially allow ATP to accelerate the pace of network improvements in future years of the FCC pilot program by allowing ATP to apply for funds that are now devoted to leased line costs for infrastructure improvements.

University of New Mexico Health Sciences Center Carrie Tingley Hospital
The links will be fully self-sustaining for as long as the computers, Web cameras, and software are functional. Links between sites will be maintained as part of the direct communication needs of each site. Warranty on the laptops should help cover the cost of computer failure. Funding to replace outdated equipment might be needed in the future.

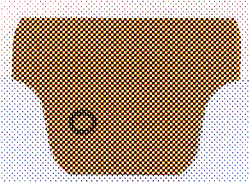
Presbyterian Medical Services
PMS' staff can absorb the support of the additional sites and services, but our biggest challenge will be the cost of ongoing maintenance charges for the network. PMS is requesting an additional $513,600 in the second year to offset hardware and network maintenance expenses. We believe we can approach sustainability of the improved network by allowing PMS to extend our service offerings and become more attractive to payers. Increasing services and encounters will raise productivity and improve our revenue and our ability to cover increased expenses related to network maintenance and connectivity. PMS will be in an improved position to respond to Pay-for-Performance (P4P) initiatives by extending the reach of our providers across our service area. A robust telehealth-enabled network will give us the ability to apply for grants, contracts, and funding to provide services such as childhood obesity counseling, diabetes, cardiovascular risk reduction, and other critical areas of treatment.

UNM, NMSU, NMIMT
The current, low speed network is already self-sustaining. We intend to purchase dark fiber and equipment with one-time, capital funding to eliminate the monthly fees for some of the existing circuits. The savings will be used to offset the increases in maintenance and long haul (e.g., 12) costs. All of the network backbone and a majority of the connected sites will use this approach. A draft business plan has been developed to recover costs of connectivity. This plan will be completed and implemented based on available capital funding for the network expansion. The new network would only lease circuits where dark fiber was not available. This lower cost approach enables us to continue the self-sustaining model. Ultimately, the ongoing costs of the network are borne by customers using the new services. Our experience has shown that rural areas will readily pay for service that they could not otherwise obtain.

Albuquerque, Navajo, Phoenix, and Tucson Areas of the Indian Health Service
Sustaining I2 access beyond the two-year pilot period is a challenge. Similar to the existing FCC Rural Health Program, the Pilot Program establishes funding support for broadband I2 access that would otherwise be unaffordable for participating IHS Areas and regional IHS/Tribal facilities. The **IHS** Southwest Telehealth Consortium will carefully monitor project development and regional improvements in access to care. Ongoing analysis will help determine the potential for continuance of regional I2 access beyond the pilot funding period. Importantly, I2 access for Southwest Tribal and IHS facilities will be standardized from the "edge" of the IHS WAN in Albuquerque and Rockville, MD. Such standardized access will offer benefit to other IHS and Tribal facilities nationally. Based on experience gained with Internet2-based network-to-network connections for enhanced telemedicine service delivery, Indian health facilities in the southwest and across the country may elect to develop a cost-sharing model that will permit project continuance beyond the pilot period.

Tucson Indian Health Service
Tucson area network will be 100% self-sustaining. I2 connectivity along with local circuit access will continue to be funded and supported beyond the two-year pilot period. Along with the existing Universal Service funded circuits, the Pilot Program establishes funding support for Internet2 access that would otherwise be extremely costly to IHS Areas and facilities. This Area IHS will monitor the project and assess improvement for enhanced access to health care resources to IHS and Tribal facilities.

UNM Center for Disaster Medicine
The UNM Center for Disaster Medicine will integrate the improvements in telehealth capacity created in this project into its overall mission. This will include continued participation in telehealth-supported education and training of health professionals in New Mexico and Arizona, funded by a broad base of local and federal sources. The increased capacity will create additional opportunities for funding for both training and emergency response by CDM.



Evaluation Plan

Analysis Approach

Historical Controls to Demonstrate Positive Change

The evaluation of the model for the network of networks will begin once the model itself has been developed and tested from a software development/modeling perspective regarding its reliability, Model development will take a significant portion of the first funding year, so the majority of the model evaluation with respect to how well it predicts the actual behavior and progress of the network and its node sites will take place towards the end of year one and during the second year of funding. It is important to note that the types of predictions the model is going to make regarding network usage, connection of new sites and changes in types of activities over the network (e.g., addition of new clinical specialties at a given site) are longitudinal in nature. They are likely to start taking place once the network of networks is in place, but actual success or failure of the various activities will only be apparent over the period of a few years.

One of the main variables we are concerned with is the number of new sites that will be added to the network as a result of the planned improvements. Each of the project participants has developed plans (as described earlier) to implement a certain number of sites during the proposed period. This can be considered the "expected" number of new sites. At the end of year 1, we can then determine exactly how many sites were successfully added to the network. This can be considered the "observed" number of new sites. The expected and observed can be compared for statistically significant differences using a Chi-Squared analysis. In this case, our goal is actually to demonstrate no significant difference between the expected and observed number of new added sites since that would mean we have reached our goal successfully. For sites that are not connected in the proposed time frame we will analyze commonalities or how they may be dissimilar. This will allow pre-planning to avert similar situations for sites proposed in year two.

In order to facilitate the evaluation of network usage, connection of new sites and changes in types of activities over the network longitudinally, we need to collect, organize and analyze historical control data on which to base our future comparisons. Therefore, during the first year of funding we will collect network use data from all of the participating sites (initial efforts have already begun). For example, most of the current sites carry out a variety of network activities including the provision of clinical consultations (i.e., telemedicine) using both store-and-forward and real time modes, educational broadcasts (i.e., continuing medical education, medical technologist training program), and various administrative activities related to these and other network activities. To form a set of baseline data, we will collect data from the previous one-year period for each site regarding the type of activities it conducts. As much detail as possible will be collected. For example, for the telemedicine consultations we will, for each site, determine the percent of real time vs. store-and-forward consultations; what clinical specialty the consults were in (e.g., dermatology, radiology, psychiatry); how long each

interaction lasted, and which physicians were involved at each site and so on. Standard summary statistics (e.g., mean, median, standard deviation, range) will be used to characterize the previous one-year baseline condition.

Since it will be important to understand the existing variability at each site, we can also carry out more advanced analyses of the data. For example, in the Arizona Telemedicine Program (ATP) we have analyzed fluctuations in case volume using a technique called Statistical Process Control (SPC). This is a technique used to evaluate whether a process, such as telemedicine case referral rates, vary within prescribed control limits. If something changes within the process, such as the implementation of a network of networks connecting a site to a host of other sites and opening up new referral paths, the analysis can track those trends and identify the points of departure from past (i.e., baseline) behavior.

Figure 1 shows the type of graphical representation that an SPC analysis can provide. It tracks the case referral behavior of one of the ATP sites over a period of almost two years. It can be seen that although there are fluctuations over time, the site referral volume stays within the two dotted lines. The dotted lines represent the accepted control limits (as a function of the standard deviation). Hypothetically, we could imagine setting up the network of networks and opening a new referral path for this site. The data points may exhibit the same minor fluctuations for a couple of months, but as the site explores the new referral potentials, their volume may suddenly increase and the data points will start to fall more and more often above the top dotted line. **We** could then develop a criterion that says if a site exhibits at least three continuous months outside of the prescribed limits, it is now operating at a new level of performance that was a result of the intervention made possible by the network of networks.

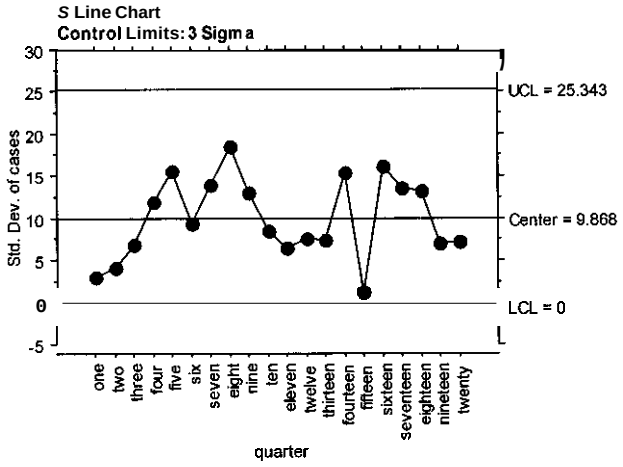


Figure 1. An example of the graphical output from SPC analysis showing how a site can vary over time without exceeding prescribed upper and lower limits of "normal" fluctuation.

Looking for points of change longitudinally will serve as one of the methods to evaluate the impact of the network of network on the participating sites' activity levels. Case referral volume is only one example of a parameter that we can evaluate. The model will serve as the basis for determining which parameters we will evaluate.

To compare the model predictions with actual site activity, we will also have to wait for the network of networks to be in place and activity to be initiated. Once this occurs, however, we can proceed to evaluate how well the model predicted the behavior at a given site. There are a number of ways to approach this analysis. The easiest one is to compare the predicted and actual parameter behaviors using Chi-Squared analysis. This compares the predicted behavior with what actually occurs and determines whether the difference between them is significant or not. In our case we would actually be trying to support the null hypothesis that there are no differences between what is predicted by the model and what happens—the model was accurate. There are more sophisticated techniques than the Chi-Squared analysis that we can use that take into account inherent correlations between the data sets rather than simply comparing the two distributions as if they were essentially independent. We will explore these methods as well to get the best characterization of agreement between the predicted and actual data as possible.

References

Krupinski **EA, Hughes AM, Barker GP, Lopez *AM*, Weinstein RS. Fluctuations in telemedicine case** volume: **correlation with personnel turnover rates.** Telemed J & **e-Health** 2003;9:369-373.