

Grant Final Report

Grant ID: 5UC1HS015135

Project ECHO: Extension for Community Healthcare Outcomes

Inclusive Dates: 09/30/04 - 08/31/08

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Abstract

Purpose: Project Extension for Community Health care Outcomes (Project ECHO), involves a partnership of academic medicine, public health offices, corrections departments, and rural community clinics dedicated to providing best practices and protocol-driven specialty health care in rural areas.

Scope: Project ECHO's weekly scheduled telemedicine clinics, hosted by UNM HSC specialists in the areas of hepatitis C, use existing telemedicine pathways and internet-based access to provide community healthcare practitioners the opportunity to present cases which are discussed among the network participants to jointly reach treatment decisions.

Methods: This particular form of case-based learning called "learning loops", allows community providers to learn from the experience of co-managing patients with specialists and their peer providers around the state. In these case-based learning clinics, partners rapidly gain deep domain expertise in HCV as they collaborate with university specialists in hepatology, infectious disease, psychiatry, and substance abuse in co-managing their patients.

Results: Provider outcome data demonstrated increased provider knowledge, self-efficacy in treating HCV patients, decreased professional isolation and enhanced professional satisfaction. Preliminary patient outcome data analysis confirms co-managed HCV treatment by rural providers is as safe and effective as treatment delivered in an academic medical center HCV clinic. Expansion of this telehealth model to other chronic, complex diseases is underway..

Key Words: Hepatitis C, HCV, Telehealth, Chronic Disease Management, Community Based Participatory Research, Case-based learning, learning loops

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Final Report

Purpose

The University of New Mexico Health Sciences Center (UNM HSC) has developed an innovative and widely applicable model to provide safe and effective treatment for patients with chronic, common and complex diseases who do not have direct access to specialty healthcare providers. This knowledge-on-demand model is called Project ECHO – Extension for Community Healthcare Outcomes. Conceived as a means to treat hepatitis C (HCV) infected patients in New Mexico’s rural communities and prison system, Project ECHO assists in diagnosing and successfully treating many other chronic illnesses and conditions. Project ECHO connects urban medical center disease experts with rural general practitioners and community health representatives over a telehealth network. This enables them to effectively treat patients on site who would otherwise have to travel to urban healthcare facilities for specialty treatment. Project ECHO will expand access to treatment for patients infected with Hepatitis C through an extensive program of provider education, training, and support as well as create a model of care in New Mexico and nationally which is applicable to the care of other complex diseases such as heart failure, diabetes and asthma. This model focuses on the principles of case-based learning and disease management using the telemedicine infrastructure and internet-based technologies to co-manage patients in community-based practices using best practice treatment protocols for complex diseases. A central database is used to track outcomes. The ultimate goal of Project ECHO is to provide the same level of healthcare to rural patients with chronic diseases as can be obtained in an urban setting. A secondary goal is to provide healthcare practitioners in rural communities with a level of interaction and support commensurate with their urban counterparts to enhance their technical competence and decrease their feelings of professional isolation.

Project ECHO’s weekly, regularly scheduled telemedicine clinics, hosted by UNM HSC specialists in the areas of hepatitis C, use existing telemedicine pathways and internet-based access to provide community healthcare practitioners with the opportunity to present cases which are discussed among the network participants to jointly reach treatment decisions. This particular form of case-based learning is called “learning loops” in which community providers learn from the experience of co-managing patients with UNM HSC specialists and their peer providers around the state. Over time, these learning loops create deep domain knowledge among the rural providers to afford state-of-the-art care in underserved areas for these major health problems. This educational and treatment model is applicable to diseases that fit the following criteria:

- Common in the population;
- Have serious health consequences;
- High societal cost without treatment;
- Management is complex and changing rapidly;

- Effective treatment with specialty input improves outcomes

Hepatitis C is a perfect example of a disease that requires knowledge and skill to treat beyond what the average rural general practitioner possesses. With serious side effects, it is the rare rural practitioner who feels qualified to administer the necessary treatment protocols. Project ECHO provides rural practitioners with the safety net to treat their patients properly. Under the guidance of the state’s Hepatitis C expert, rural practitioners who participate in the Project ECHO telemedicine network are able to prevent problematic treatment side effects like drug toxicity because they will report results of tests such as blood counts at the weekly telemedicine sessions. Providers are then advised about adjustments to patient medications and what related symptoms to observe for. They receive “best practices” information on how to treat their patients, without untold hours of personal research and uncertainty about what exact steps to follow. As a result, rural practitioners are able to treat patients locally who previously had to travel to very limited openings with disease specialists or went untreated. Project ECHO has direct, measurable impact on the safety of patients in HCV treatment programs and improve on the quality of care they receive while undergoing treatment. The most exciting aspect of Project ECHO is that it has enormous potential to improve patient safety and quality of care in a wide range of chronic diseases. It does not change the patient’s current healthcare relationship in any way. In fact, providing primary care health practitioners with the ability to safely and effectively treat a wider array of diseases and conditions is the best and most affordable intervention in rural communities where certain chronic diseases have reached epidemic levels. Project ECHO articulated six milestones to be achieved and continue beyond the AHRQ grant term. The objectives encompass patient outcomes, provider outcomes, program development and telehealth infrastructure and health information technology.

These milestones are:

Table 1. Milestones

| Milestone | Description |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Milestone #1 | Co- management of ECHO Hepatitis C patients by partnering urban specialists with community physicians. |
| Milestone #2 | Develop and expand access to treatment for Hepatitis C and eventually other complex diseases (diabetes, asthma, etc.) by building treatment capacity in New Mexico among rural medical providers. |
| Milestone #3 | Create a model for treatment of complex, chronic diseases in rural and/or underserved populations in New Mexico. |
| Milestone #4 | Provide extensive healthcare professional no-cost education through use of telemedicine technologies. |
| Milestone #5 | Patient and Provider Outcomes Program |
| Milestone #6 | Expansion of Telehealth access/infrastructure |

These milestones guided the development and expansion of Project ECHO resulting in increased rural provider partner participation in the co-management of Hepatitis C patients, expanded the model to include other chronic complex diseases, provided a dynamic program evaluation loop utilizing systematic provider questionnaire completion, annual provider meeting survey dissemination and tracked patient screening and treatment outcome data.

Scope

New Mexico, the nation's fifth largest state, is richly diverse in its geography, economy, people and culture. The state population of 1.83 million in 121,356 square miles is 44.7% non-Hispanic white, 42.1% Hispanic, 9.5% Native Americans, and 3.7% other. Minorities make up over half the population in the state. New Mexico has the largest concentration of Hispanics and the second largest concentration of American Indian/Native Alaskans in the country. New Mexico's 17.7% poverty rate compared to 11.7% nationally led the nation in both the years 2000 and 2001. Nearly a quarter of New Mexicans lack health insurance. New Mexico has more deaths from liver-related cancers than any other state (2002) and the highest rate of chronic liver disease and cirrhosis deaths in the nation (1997). Chronic liver disease, cirrhosis, and hepatocellular cancer are three of the main outcomes of untreated Hepatitis C.

Estimates of future Hepatitis C morbidity, mortality, and costs in the United States were used to calculate health care costs for New Mexico¹. The Centers for Disease Control (CDC) and the New Mexico State Department of Health estimate 32,000 patients with Hepatitis C in the state. Hepatitis C related deaths in New Mexico from year 2010 to 2019 are: From Chronic Liver Disease (Cirrhosis) – 1966; from Liver Cancer – 322; total deaths attributable to Hepatitis C – 2288. Years of life lost estimated at 37,000.

Cost estimates for a ten year period from 2010 to 2019 are: Direct costs for care of patients with Cirrhosis and Liver Cancer - \$127 million; costs of premature death, morbidity, and disability from Cirrhosis and Cancer - \$895 million; total costs - \$1.022 billion. The above estimates are conservative and do not include any costs for doctor visits and monitoring patients prior to the development of Cirrhosis. These estimates also do not address costs associated with Cirrhosis, Liver Cancer, and related deaths and disabilities prior to 2010 or after 2019. The full financial impact of Hepatitis C related deaths over the next 30 years could easily exceed \$2.5 billion. Treatment permanently cures Hepatitis C in 50% to 80% of patients and prevents future complications of Hepatitis C such as Cirrhosis, need for Liver transplantation and Liver Cancer. Eradication of infection also reduces the reservoir for transmission to other patients.

Hepatitis C infection is strongly associated with intravenous drug use and patients must be drug and alcohol free in order to pursue drug therapy treatment options. New Mexico has an estimated 15,000 to 24,000 current drug injectors. This figure is growing and IV drug injectors become infected with Hepatitis C within one to two years of their first injection. Therefore, it is important to partner Hepatitis C treatment regimens with drug and alcohol abuse treatment programs.

According to the National Institute on Drug Abuse, acquisition of Hepatitis C is very rapid among new IV drug users, with approximately 45-70% becoming infected within the first 6 months. Among experienced IV drug users, the virus is widespread (more than 80%) in some areas. The information obtained from treatment providers in Northern New Mexico and in Albuquerque indicates that 85-90% of those receiving opioid replacement therapy are Hepatitis C positive.

Today cure rates are 45%-70% with the use of injection therapy for a 6-18 month period and the intensive management of side effects. The only current treatment (drug therapy with Interferon and Ribavirin) of Hepatitis C involves severe side effects, including:

- Moderate to severe depression in 35% of the patients on Interferon treatment which needs to be actively managed to prevent suicide attempts;
- All patients on Ribavirin develop hemolysis, a breakdown of the red blood cells. The average drop is 2.5 grams hemoglobin in a range of 1-5 grams;
- Patients on Interferon develop neutropenia, a decrease in white blood cells and thrombocytopenia, a decrease in platelet count which needs active surveillance to prevent serious infections or bleeding. Some patients require hematopoietic growth factors for management of bone marrow toxicity.

Intensive patient education on side effect management and support is required during treatment since patients experience severe flu-like symptoms, headaches, nausea, anxiety, and restlessness. Without adequate support the adherence rate is low. Preliminary data from our Hepatitis C Clinic suggest that the lack of adherence to the drug regimen is infrequently due to intolerance of the medication. Of the last 80 patients managed by our disease management team, only three have dropped out of the program due to drug intolerance, with a preliminary adherence rate of 96%. Access to treatment is limited due to a shortage of medical specialists in liver disease and the lack of trained nursing support to care for patients.

There is no vaccine to prevent HCV infection, so prevention efforts must rely on behavioral techniques. Continued drug use causes more rapid progression of the disease and continues to be the main source of transmission of the disease. While harm reduction efforts such as needle exchange programs have been implemented in New Mexico, there are still communities that do not provide opioid detoxification or opioid replacement programs. These issues need to be addressed if we are to encourage IV drug users to change their behavior. The continued use of alcohol by infected persons (even those who are not substance abusers) causes rapid progression of the disease. Thus, Hepatitis C is a serious medical consequence of drug abuse that needs to be considered when care is provided.

Because of the population's proximity to the UNM Health Sciences Center, many of the infected individuals in Albuquerque are being monitored or receiving treatment. That is not the case in rural areas of New Mexico where resources are scarce. All or parts of 32 of New Mexico's 33 counties are designated as Medically Underserved Areas (MUAs) by the federal Department of Health and Human Services (DHHS). In addition, 14 counties are designated as Health Professional Shortage Areas (HPSAs) for primary care physicians. These designations reflect the ongoing challenge of providing adequate health services to many rural and frontier areas in New Mexico. Only 20% of New Mexico's licensed physicians practice outside of urban areas and very few of these physicians are medical specialists in complex diseases.

Given the geographic size of New Mexico, the sparse population, and the shortages and maldistribution of health care providers, the significant numbers of New Mexicans infected with Hepatitis C (HCV) is of great concern to the state Department of Health. In an unprecedented collaboration among the state's Departments of Health and Corrections, the Indian Health Service, the Community Health hospitals and clinics in rural areas, and the state's only

Academic Health Sciences Center, an effective solution to treating Hepatitis C has been developed.

Methods

The patient outcomes aspect of this project was a prospective cohort study to demonstrate the safety and efficacy of the ECHO model-based treatment for Hepatitis C in rural communities in comparison to an academic medical center clinic-based treatment. The purpose of the study was to show that Hepatitis C treatment through ECHO is as safe as therapy given through the UNM Hepatitis C Treatment Program. Participation was determined by available technology. Randomization by patient, provider or site was not feasible. Participants were patients selected by primary care physicians from fourteen community based clinics and seven Department of Corrections facilities and the control group was patients at University of New Mexico (UNM) Liver Clinic. Principal endpoints were non response to treatment at 6-12 weeks, significant adverse events (SAE) requiring cessation of treatment, completion of treatment and sustained viral response. Data analysis included univariate tests of group differences and multivariate logistic regression.

The project's impact on provider knowledge, self-efficacy in treating complex health conditions, provider learning and barriers to treatment was assessed through intensive written surveys administered at baseline and repeated every six months. The provider outcome evaluation and project evaluation methods included development of a relational data base to track the number, the kind and length of training provide to health care providers involved in Hepatitis C training through Project ECHO.

Results

With this initial funding from AHRQ, Project ECHO has successfully developed a robust system to provide specialty healthcare to rural populations throughout the State of New Mexico. Due to the unique promise of this model in responding to disproportionate rates of Hepatitis C in the state, the New Mexico Legislature allocated additional project start-up support in 2004 and has continued annual funding of many of the program's operating costs. The Project ECHO model has received international recognition through the Robert Wood Johnson Foundation and the Ashoka Changemaker's competition for Disruptive Innovations in Health and Health Care (<http://www.changemakers.net/en-us/node/1036>) as one of three winning entries out of 307 world-wide applications in the Ashoka Changemaker's competition for Disruptive Innovations in Health and Health Care. Throughout the course of the grant each of the six delineated milestones realized significant progress.

Milestone #1: Co-Management of ECHO Hepatitis C Patients by Partnering Urban Specialists with Community Physicians

There have been 5993 patient consultations via the 318 HCV telehealth clinics, with community providers presenting patient cases to receive expert support and co-management. This has included clinical evaluation and screening to determine and promote patient readiness, with periodic review of cases that are not treatment-ready to ensure appropriate linkage to other services. As a result, 563 patients have begun a 6-18 month treatment regimen. Two hundred thirty one patients have completed treatment with a Sustained Viral Response. Most of the consultations served patients from ethnic/racial minority groups (71% of patients from rural health centers and 74% of those in prison.). An average of 12 rural providers participate weekly in each HCV clinic.

Milestone #2: Develop and Expand Access to Treatment for Hepatitis C and Eventually Other Complex Diseases (Diabetes, Asthma, etc.) by Building Treatment Capacity in New Mexico among Rural Medical Providers

As a result of the success of the Project ECHO HCV clinic, the following telehealth clinics have been initiated by Project ECHO

1. Rheumatology Telehealth Clinic:
 - Number of telehealth clinics- 70
 - Number of patient presentations- 334
2. Integrated Addiction/Psychiatry Telehealth Clinic:
 - Number of telehealth clinics - 106
 - Number of patient presentations – 357

The co-morbidity of HCV and addiction/psychiatric disorder demonstrated in case presentations during HCV ECHO clinic became the springboard for the creation of this telehealth clinic. In addition to weekly addiction/psychiatric telehealth clinics, rural physicians have been recruited through educational presentations and individual visits, and have become trained and certified in the administration of buprenorphine for the treatment of opioid addiction. The providers receive enriched teleconference support with a structured educational curriculum, and case-based presentations for management of addiction and co-occurring psychiatric and medical disorders.

1. Gestational Diabetes/High Risk Pregnancy Telehealth Clinic:

- Number of telehealth clinics - 41
- Number of patient presentations - 37

2. Cardiac Risk Reduction Telehealth Clinic:

- Number of telehealth clinics -40
- Number of patient presentations – 55

3. Pulmonary Telehealth Clinic

- Number of telehealth clinics – 10
- Number of patient presentations – 4

4. HIV Telehealth Clinic:

- Number of telehealth clinics - 7
- Number of patient presentations – 18

5. Occupational Medicine Clinic

- Number of telehealth clinics – 3
- No patient presentations

The initial format for this telehealth clinic has been educational presentations by specialists in Occupational Medicine to build a knowledge base among providers. The next phase is development of patient presentations by Project ECHO partner providers and building the network of providers.

1. Chronic Pain Clinic:

- Number of telehealth clinics: 8
- Number of patient presentations: 11

Neurology and psychiatry specialists provide telehealth case consultation and co-management of patients with chronic pain and headache issues.

Milestone #3: Create a Model for Treatment of Complex, Chronic Diseases in Rural and/or Underserved

The ECHO HCV clinic's 21 participating agencies across New Mexico that have become HCV Centers of Excellence. They include Federally Qualified Health Centers (FQHC), the New Mexico Department of Health (NMDOH) including a health office near the Mexican border, Indian Health Service, and private practice physicians who serve low-income communities. The New Mexico Department of Corrections also operates sites at eight prisons. With the addition of the expansion of Project ECHO to include telehealth clinics in other complex chronic diseases (detailed in Milestone #2) best practice protocols and rural provider partnerships are being developed.

Milestone #4: Provide Extensive Healthcare Professional No-Cost Education through Use of Telemedicine Technologies

To date, 5,993 hours of Continuing Medical Education (CME) and Nursing Continuing Education Units (CEUs) have been issued to community-based primary care providers participating in the HCV telehealth clinic. Project ECHO specialists and staff have provided over 500 hours of clinical training and Grand Round presentations at rural sites. In addition Project ECHO's other telehealth clinics provide continuing medical education at each weekly clinic.

Milestone #5: Patient and Provider Outcomes Program

Patient Outcome Program: Interim Data Analysis. Two hundred ninety-nine subjects have completed the hepatitis C trial of Project ECHO, a cohort study comparing the efficacy and safety of Hepatitis C treatment in ECHO sites (rural and prisons) with the University of New Mexico Hepatitis C clinic. Their mean (\pm SD) age was 43.4 ± 10.1 years, 60.9% were women, and 59.5% were members of a minority group. Incidence of liver disease was 18.7%. Depression was documented in 37.8 % of the patients. Genotype 1 was the most serotype (60.2%). The viral load (log base 10) prior to treatment was 5.95 ± 0.95 .

Patient Outcome Program: Outcomes of Treatment. Of 299 subjects now off treatment, 15.7% did not have a response and treatment was stopped, 9.4% had a significant adverse event (SAE) terminating therapy, 2.3% were lost to follow-up, 2.7% had intolerable side-effects, 4.4% withdrew, 5.7% were non-adherent, and 59.9% completed a full course. Of the 179 subjects completing treatment, 98 (55.1%) have reached 6-months of follow-up with a sustained viral response (i.e. cure of Hepatitis C) was found in 98.

No differences were found in the non response rate between ECHO sites and University clinic (18.4% versus 13.6%, respectively; $P=NS$). Because therapy is discontinued at 12 weeks in non-responders, SAE and treatment completion rates were calculated only in responders ($n=227$). The SAE rate was significantly lower for ECHO sites than the University (5.4% versus 17.7%, respectively; $P=0.001$). This difference was due to a very low SAE rate among prisoners (1.7%). No differences were found in the proportion of ECHO versus University patients completing therapy (59.6% versus 60.4 %, respectively; $P=NS$) or in the proportion of patients free of virus

at 6 months (53.9% versus 57.1%; P=NS). Patient enrollment in study ended November 17, 2008. Hepatitis C treatment is lengthy and some patients may remain on treatment for eighteen months. Preliminary analysis of patient data indicate Hepatitis C patients treated by providers participating in Project ECHO receive care as safe and effective as those treated in an academic medical center HCV clinic. Continuing education regarding importance of data collection and data input continues to be an intricate component regarding patient outcomes.

Provider Outcome/Program Evaluation. The project's impact on provider knowledge and self-efficacy in HCV treatment has been evaluated through intensive written surveys administered at baseline and repeated after every six months of participation in ECHO. Evaluation results have demonstrated the effectiveness of ECHO, while also leading to program improvements in this innovative model. Twenty-five direct care providers participating in the Project ECHO HCV Telemedicine Clinics rated their knowledge skills or competence during the Annual Meetings in 2006 and 2007, comparing their skills and abilities today to their skills prior to their participation in Project ECHO (see Appendix A for ratings). Two published studies of the ECHO model, (noted at the end of this report), demonstrate that Project ECHO increased provider knowledge and self-efficacy in managing hepatitis C (Appendix A). As a result, the ECHO HCV clinic has become the "gold standard" of a robust and fully developed implementation of the model.

Milestone #6: Expansion of Telehealth Access/Infrastructure

Project ECHO Partnerships and Information Technology (IT) Infrastructure. Project ECHO currently partners with the UNM HSC Department of Internal Medicine, nine prisons in the NM Department of Corrections (DOC), Indian Health Service (IHS) hospitals, the NM State Health Department (DOH), and Federally Qualified Health Centers in locations across the State.

Partner Agencies/ Areas Served.

- Federally Qualified Health Centers in New Mexico: (Communities clinics participating in Project ECHO include) Albuquerque, Farmington, Las Vegas, Las Cruces, Truth or Consequences, Silver City, Portales, Espanola, Gallup, Hobbs, Roswell, Lovington, Pecos, Cerrillos, Pojoaque, Edgewood and Carlsbad
- Department of Health of New Mexico Region 5: Las Cruces
- Indian Health Services: Shiprock, Santa Fe
- Department of Corrections: Santa Fe, Los Lunas, Las Cruces, Roswell, Grants, Santa Rosa, and Hobbs

Through the purchase and installation of two Network Video Teleconferencing Bridge MCU units, ECHO has the capacity to link with video to 40 sites at one time. A Polycom RMX2000 Bridge was purchased specifically for ECHO and is dedicated to the project. The New Mexico Department of Corrections demonstrated its commitment to this collaboration by purchasing a second bridge to link its nine facilities across the state.

Video-conferencing facilities include high quality video and audio for clinical telemedicine consultations with the capability to encrypt traffic thus minimizing the risk of unauthorized access to protected health information. These tools allow providers to interact as if they were holding a case conference in a single room, rather than in multiple locations around the state. For diagrams of Project ECHO's Video Teleconference Network, the Department of Correction's Infrastructure, and the Health Choice Network Primary Case Association Infrastructure, see Appendix C. Existing community partners all have been equipped with needed video equipment and Internet access to connect with Project ECHO telehealth clinics and video educational materials.

iHealth Electronic Clinical Management Tool. Real-time remote entry and access to patient-specific information is needed for co-management and during consultative clinics. An outside vendor, Infosys Technologies, Inc., completed a new web-based clinical management database, iHealth (Trademark application pending), in May 2008. This allows all partners to access information even from remote sites, with HIPAA-compliant controlled access to protect confidentiality. Clinical personnel from Echo Partner Sites continued to receive iHealth instruction. This database will ultimately be utilized by all ECHO Partner Sites which treat Hepatitis C patients.

Utilizing the experience acquired both in-house and at the Partner Sites, development has begun on enhancing *iHealth*. This upgrade is on schedule to be released during the first quarter of FY2009. Enhanced functionality will include customized reporting and a new data flow sheet module. By presenting patient medical information in a specific format, the flow sheet will help facilitate the management of patients with complex diseases. Training of the ECHO partners continued with ECHO personnel traveling throughout the state to familiarize users with the application and its benefits. Response from the partner sites continues to be positive. Information obtained through this training was included on the first major upgrade to the software.

Web-based video conference recording and viewing capabilities are being implemented, and a video library is being created to allow 24 hour educational training access for our health care partners. Those providers unable to participate in "live" telehealth clinics will have web-based access to taped clinics.

The challenges facing rural providers and their health care teams in New Mexico are numerous. In addition to feelings of isolation, rural providers also face a lack of financial resources, time limitations, small practice groups in relation to population served, lack of access to specialty services, high physician turnover and inability to find adequate provider coverage. Other provider barriers include the lack of resources to develop physicians and nurses knowledgeable about chronic complex disease treatment; the difficulties of Hepatitis C treatment, including side effects, length of treatment, motivation for treatment (6-12 months) and potential for treatment dropout. There is a shortage of funds and shortage of specialty expertise. Project ECHO continues to address these barriers by bringing access to specialty services, best practice protocols, expanding the scope of practice of physician assistants, pharmacists, nurses and nurse practitioners, and reducing professional isolation of healthcare providers in rural areas, positively impacting health care delivery in New Mexico.

Complex and chronic health conditions require expertise from multiple medical specialties to implement best practices. Some health issues also require experts from other disciplines such as behavioral health, pharmacology, or even the legal field. Most rural areas cannot afford the

broad range of disciplines and specialty medical training needed to deliver best practice care for even a small number of complex and chronic health conditions, due to limited funding, provider turnover, high provider to patient ratios, lack of health insurance, and lack of provider willingness to live in rural areas. It is not feasible to provide a full range of specialty care in outlying areas using current strategies. As a result, patients must travel to urban areas and academic medical centers and face major barriers such as long travel distances and extended time away from work and family.

These underserved patients are likely to be less familiar and comfortable in a large urban medical center, compared with providers in their own community, which may make them reluctant to seek timely follow-up or be compliant with care. Local community-based health centers and other providers are often the most culturally appropriate and accessible choices, with the benefit of ongoing trust and relationships with patients. Therefore, these can be ideal places to deliver complex care if they can access the needed expertise.

Given financial and systems barriers, broader access can only be achieved through innovative strategies and technology such as the ECHO Model that allow rural, frontier, and/or underserved areas to tap centralized expertise. By providing consultation and case-based learning using an inter-disciplinary team at an academic medical center, this model responds directly to key unmet needs. It also helps to reduce challenges that have prevented rural health systems from adopting current research and best practices into their care.

Project ECHO Telehealth Infrastructure (Map of ECHO sites and Figures 1-3)

Map of Echo sites

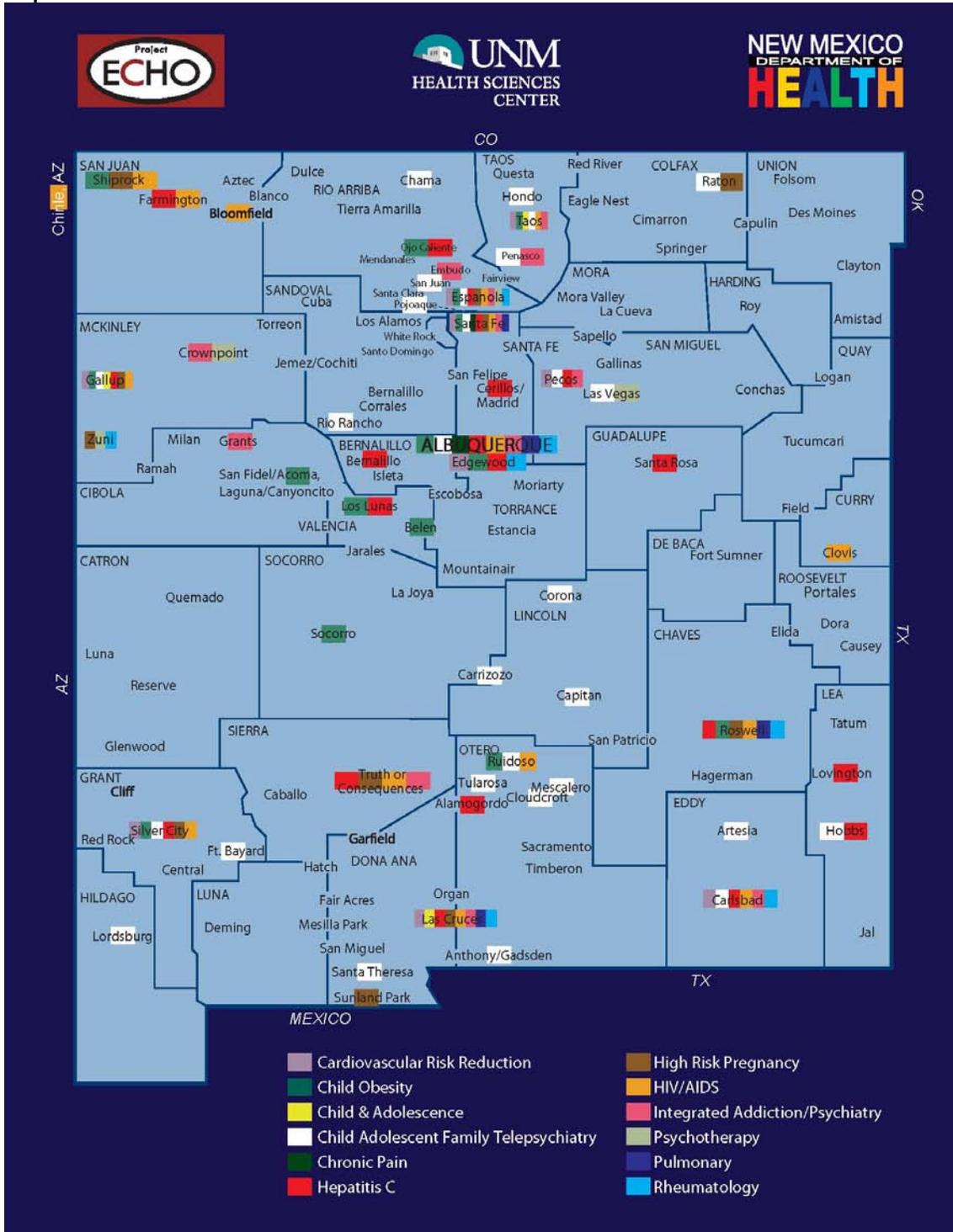


Figure 1. Project ECHO video teleconference network

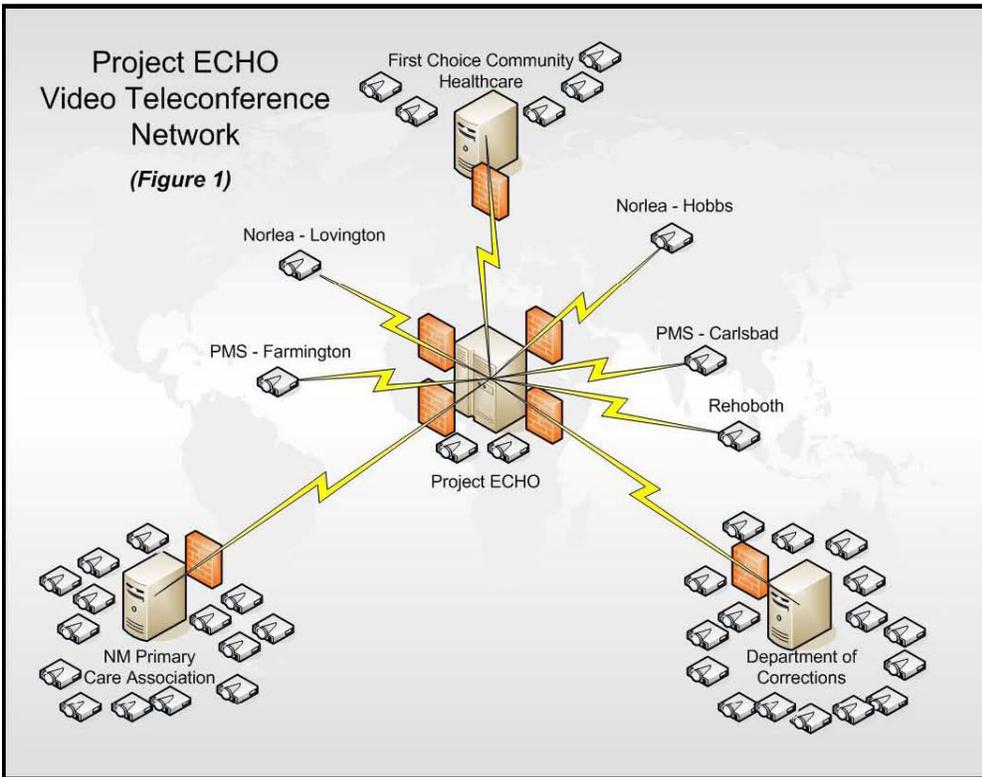


Figure 2. New Mexico Health Choice Network primary care association

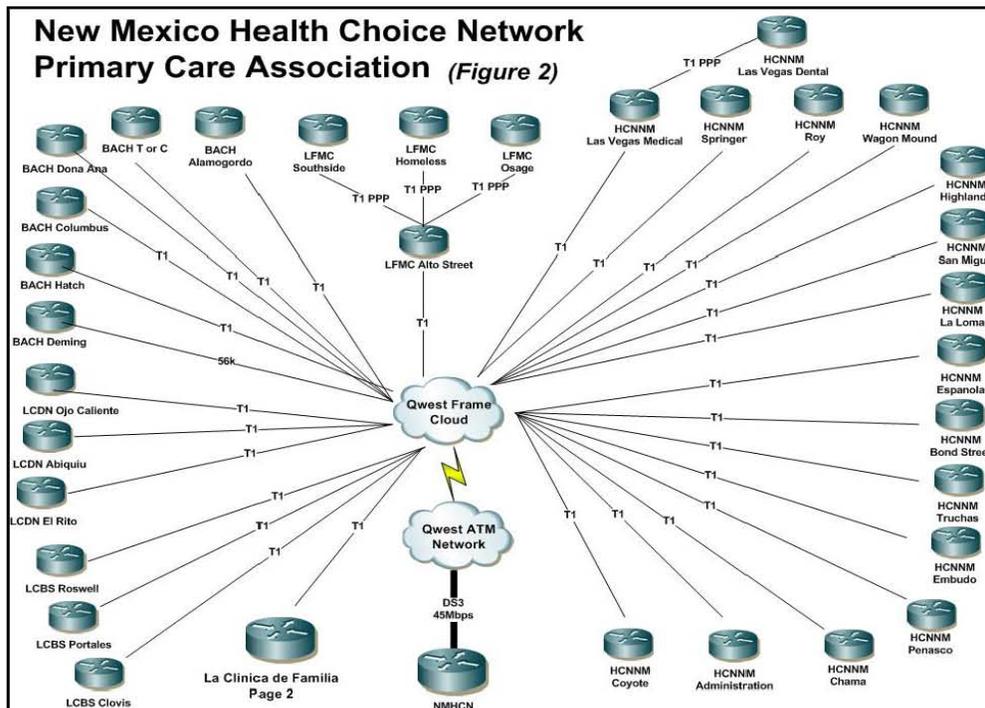
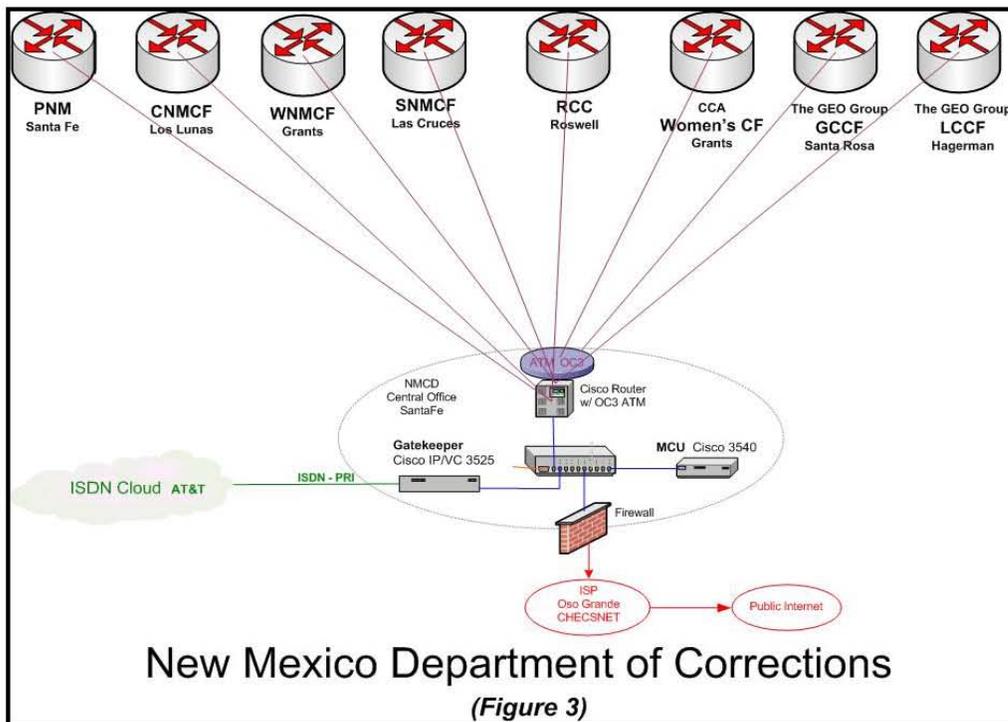


Figure 3. New Mexico Department of Corrections



Project ECHO Partner Community Sites

- Ben Archer Health Center, Truth or Consequences, New Mexico
- Carlsbad Family Health, Carlsbad, New Mexico
- New Mexico Department of Health, Public Health Division, Region 5 Las Cruces, New Mexico
- El Centro Family Health Center, Las Vegas, New Mexico
- El Centro Family Health Center, Espanola, New Mexico
- El Pueblo Health, Bernalillo, New Mexico
- Farmington Community Health Center, Farmington, New Mexico
- Hidalgo Medical Services, Silver City, New Mexico
- Lea County Health Center, Lovington, New Mexico

- Indian Health Services, Santa Fe, New Mexico
- Eastern New Mexico Family Residency Program, Roswell, New Mexico
- La Casa Family Health Clinic, Clovis, New Mexico, Portales, New Mexico
- Southern New Mexico Family Residency Program, Las Cruces, New Mexico
- La Clinica de Familia, Las Cruces, New Mexico
- Montana Indian Health Services, Poplar, Montana
- Pecos Medical Center, Pecos, New Mexico
- Ortiz Mountain Health Center, Cerrillos, New Mexico

Project ECHO Partner Community Sites

- Rehoboth McKinley, Christian Health Care Services, Gallup, New Mexico
- Pojoaque Primary Care, Pojoaque, New Mexico
- Indian Health Services, Shiprock, New Mexico
- First Choice Community Healthcare/Mountain @ Valley Regional Health Center, Edgewood, New Mexico
- First Choice Community Healthcare/South Valley Clinic and North Valley Clinic, Albuquerque, New Mexico
- New Mexico Department of Corrections, Santa Fe, Los Lunas, Las Cruces, Roswell, Grants, Santa Rosa, Hobbs

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