

Innovative Telementoring for Pain Management: Project ECHO Pain

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Introduction: Project ECHO Pain, the innovative telementoring program for health professionals, was developed in 2009 at the University Of New Mexico Health Sciences Center to fill considerable gaps in pain management expertise. Substantive continuing education for clinicians who practice in rural and underserved communities convenes weekly by means of telehealth technology. Case-based learning, demonstrations, and didactics are incorporated into the interprofessional program that helps to improve pain management in the primary care setting.

Method: Three different approaches were used to evaluate the program over a 3-year period: (1) evaluation of all weekly continuing medical education surveys; (2) aggregation of annual clinic data; and (3) assessment of practice change in clinicians who joined Project ECHO Pain for at least 1 year.

Results: Between January 2010 and December 2012, 136 Project ECHO Pain clinics were held, with 3835 total instances of participation, representing 763 unique individuals from 191 different sites. Sixty percent self-identified as advanced practice or other nonphysician health professional. Statistically significant improvements in participant self-reported knowledge, skills, and practice were demonstrated. Focus group analyses of 9 subjects detailed specific practice improvements.

Discussion: Project ECHO Pain is a successful continuing professional development program. The telementoring model closes the large knowledge gap in pain education seen in primary care and other settings. Expertise is delivered by implementing effective, evidence-based, and work-based education for diverse health professionals. Project ECHO Pain serves as a model for interprofessional collaborative practice.

Key Words: chronic pain, interdisciplinary, Project ECHO, interprofessional education, mentoring, innovative educational interventions, evaluation-educational intervention, community of practice/knowledge networks, workforce development/issues, workplace learning

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Introduction

Over 100 million Americans are affected by chronic pain, the most common reason for a medical visit, yet care is hindered by limited expertise.^{1,2} Programs at most major medical educational and training sites do not include a dedicated pain management curriculum.^{2,3} Because curricula are weighted less on pain management and competencies than other disease states, clinicians are not optimally prepared for the realities of practice.¹⁻³ While continuing professional development (CPD) related to pain management is offered through continuing medical education (CME), costs and travel time pose a considerable disadvantage for health professionals who serve in rural settings or single practices.¹

The 2010 report from the Army Pain Task Force calls for innovative methods of teaching pain care in military and veteran populations.³ The Institutes of Medicine 2011 report on *Relieving Pain In America*¹ echoes the call:

Enhanced continuing education and training are needed for health care professionals to address gaps in knowledge and competencies related to pain assessment and management, cultural attitudes about pain, negative and ill-informed attitudes about people with pain, and stereotyping and biases that contribute to disparities in pain care.^{1(p3.41)}

In response, new and portable curricula and competencies are being developed in medical, nursing, pharmacy and other schools for the allied health professions.^{2,4} Incorporating information technology into the delivery of curricula has strengthened CME.⁵ Innovative teaching approaches include mentoring by means of video technology and this “telementoring” has been described in the literature as a reasonable method for delivering focused CME.^{3,4,6,7} This article details a telementoring CME/CPD innovation that is a potential solution to developing chronic pain expertise among health professionals.

Project Context and Setting

New Mexico is the fifth-largest state in the United States with a relatively small population of 2 million residents⁸ who tend to be poor, minority, rural, uninsured, and medically underserved.⁹⁻¹¹ The Project for the Extension for Community Healthcare Outcomes (Project ECHO) at the University of New Mexico began in 2003 to reduce disparities and address an epidemic of viral hepatitis.¹² Results demonstrated that hepatitis C virus (HCV) care provided by primary care clinicians (PCCs) who connect to Project ECHO is as safe and as effective as that of the academic specialist.¹³

ECHO is Telementoring

Telehealth is defined as the use of electronic information and telecommunications technologies to support long-distance

clinical health care, patient and professional health-related education, public health, and health administration.¹⁴ Project ECHO uses traditional telehealth technology^{15,16} to reach a diverse group of clinicians in an educational and interactive forum of telementoring. Through this process, “force multiplication” occurs, defined by the Robert Wood Johnson Foundation as “a program, a policy, an approach to a challenge that dramatically increases—or multiplies—effectiveness or impact.”¹⁷

Project ECHO Model

Expertise is shared by utilizing telehealth technology to connect health professionals who practice in rural and underserved locations to specialists at UNM. The Project ECHO Model™ includes¹⁸:

- The utilization of tele-technology
- Adherence to best practices to reduce variation in care
- Case-based learning
- Data tracking to monitor outcomes

Building on the success of the HCV ECHO, the Chronic Pain and Headache Tele-ECHO Clinic (ECHO Pain) began in January 2009 in order to improve access to hundreds of patients on a long waiting list for the UNM Pain Center and to provide continuing education opportunities for clinicians in primary care.

Live weekly clinics are facilitated by ECHO pain specialists. Didactics presented by a variety of faculty convene for 30 minutes. Two to three ad hoc case presentations based entirely on the needs of the presenting clinician are offered by nurse practitioners, dentists, physicians, and physician assistants from rural and underserved communities. The following is an abbreviated summary of a typical case presentation:

ID 1234 is a 66-year-old male rancher from Northern New Mexico: Chief complaint is low back pain. He requests additional opioids because of worsening pain, but remains interested in other non-pharmacological modalities to relieve his pain. Past medical history includes depression, and recent sobriety from alcohol. Medications include gabapentin 600 mg tid, morphine sulphate long-acting 60 mg tid, oxycodone short-acting 10–15 mg qid prn-pain, and trazadone 100 mg at night. Patient is now asking for more oxycodone “because of the pain.” His examination reveals muscle spasm in his middle and low back, difficulty touching his toes. His straight leg raise exam is negative bilaterally.

After the presentation, facilitators summarize the case and solicit input from participants. Robust case discussion ensues, with comments from the neurologist about the differential diagnosis, from the internist on ruling out other causes of worsening back pain, and from the addiction psychiatrist about treating the patient’s depression and monitoring

aberrant behaviors. Other facilitators include myofascial specialists, clinical pharmacists, nurses, a physical therapist, and a chiropractor, who contribute to the discussion and case recommendations.

Didactics follow the curricular guidelines of the International Association for the Study of Pain¹⁹ that address the multidimensional nature of pain, pain assessment and measurement, pain management, and clinical pain conditions. Skills demonstrations illustrate how to interview the patient; the neurological, myofascial, and musculoskeletal examination; chiropractic treatment; and acupuncture approaches. Theories that support ECHO Pain's instructional approach include active engagement of the participant, relevance to the workplace, intrinsic motivation, and deliberate practice.^{20,21} Aspects of script theory emerge as the learner is given an opportunity to discuss with experts short but challenging and authentic clinical scenarios that develop critical thinking.^{22,23}

Methods

ECHO Pain objectives were to educate community and rural health care clinicians in pain management, and to expand access to specialty care in NM. In order to assess how the program met the objectives and to quantify attendance and case presentation data, a study methodology was submitted and approved by the UNM Human Research Protections Office.

Using the period between January 2010–December 2012, two forms of data were collected weekly and aggregated: (1) attendee data: total number of attendees for each year, attendee type, number of unique attendees, and the number and type of cases presented; (2) anonymous CME evaluations. Evaluation questions follow standard wording and processes required by the UNM Office of CME. The evaluation form used is available as supporting information (APPENDIX S1) in the online version of this article. Questions were rated on a 5-point scale, where 1 = “poor” and 5 = “excellent.” Ratings were dichotomized and questions individually analyzed using a chi-square goodness-of-fit test to compare number of “excellent” ratings across years from 2010 to 2012. Cramer's V was chosen as the appropriate effect size for the resulting 2 × 3 data matrix.

A third evaluation method, focus groups, was used in early 2013 to better understand clinician perspectives about ECHO Pain. Selection criterion was participation in ECHO Pain for at least 1 year. Participants were given the choice of one of two pain textbooks for their participation. Fourteen clinicians were invited to one of two 75-minute focus groups. Nine of the 14 invited clinicians agreed to participate.

Each focus group was conducted by video teleconference and included 9 questions about 5 topics:

1. Reasons for the individual's participation
2. How well case presentations, demonstrations, and didactics address their learning needs
3. The application of learning from ECHO Pain to patients in their practice
4. The impact of their participation in ECHO Pain on their clinic team
5. How, when, and if they share the knowledge and skills from ECHO Pain with others

The focus groups were facilitated by ECHO Pain evaluation staff and the medical director. Data in the focus groups were collected through audio recorders and written notes. Transcriptions and notes were reviewed, compared, and coded through thematic analysis²⁴ to identify themes; the coded data were inductively derived. For example, an illustration of the thematic coding structure includes codes for reasons for clinicians' participation in ECHO Pain. These were coded as professional learning/knowledge acquisition and application to patients.

Results

Attendance and Case Presentations

During the study period there were 3,835 total instances of participation, representing: 763 individuals, 191 sites, 29 states and the District of Columbia (DC). Ninety-three individuals presented 304 cases: 261 new and 43 follow-up. Common cases included patients with migraine headaches, low back pain, neck pain, fibromyalgia, myofascial pain syndromes, neuropathy, comorbid depression and anxiety, and addiction.

As shown in FIGURE 1, participation increased during the study period and comprised a diverse group of professionals: 42% were physicians/dentists, 19% were mid-level clinicians, 9% were other credentialed clinicians, and 30% were nurses/other. A growing number attended more than once, with more than 100 clinicians participating 5 or more times in 2012. Attendees could receive 2 continuing medical education (CME) credits per clinic, but many did not elect to do so.

The vertical bars represent unique participants per year. Each bar is segmented to illustrate percentages of participants in four categories of health professions: The top dark portion of the bar represents physicians and dentists. The next lighter portion represents nurse practitioners, physician assistants and pharmacists. The following lighter portion represents health professionals in the category of doctors of Oriental medicine, physical therapists, doctors of chiropractic, and nonprescribing mental health professionals. The lowest and lightest portion of the bar represents registered nurses and other health professionals who did not fit into any other category.

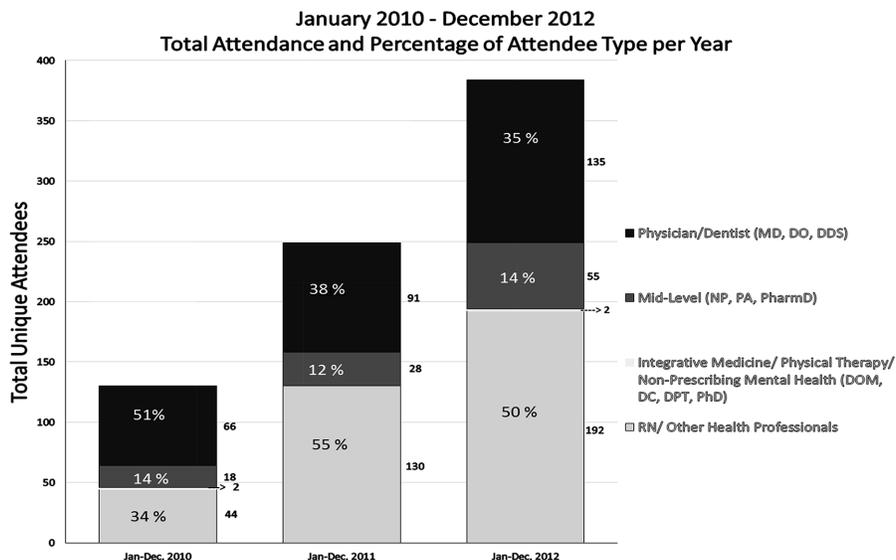
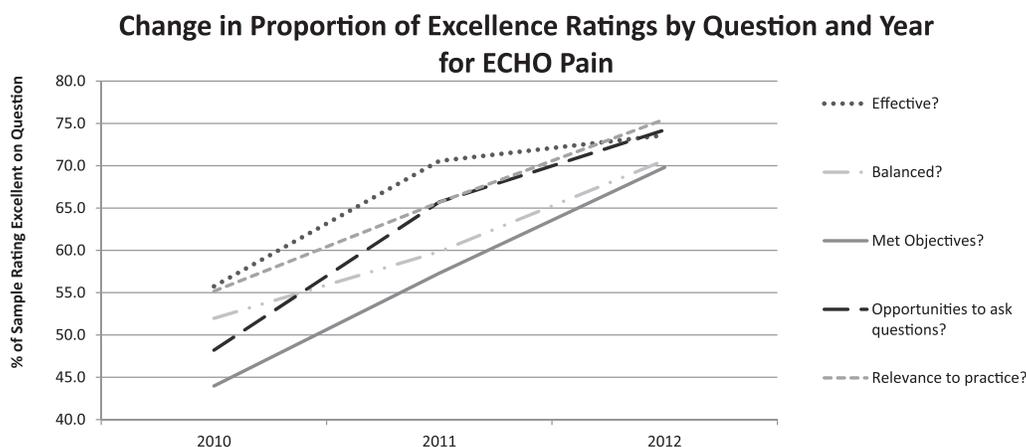


FIGURE 1. 2010–2012 Project ECHO[®] Chronic Pain and Headache Clinic Attendance Sorted by Percentage of Credentials Reported per Year



CME Rating Measure	N	DF	X ² Statistic	Cramer's V [†]	P-Value	Relative Change [‡] , 2010 vs. 2012
Effective?	755	2	13.14	0.13	0.0014	24%
Balanced?	752	2	16.76	0.15	0.0002	26%
Met Objectives?	758	2	27.58	0.19	<0.0001	37%
Opportunities to ask questions?	696	2	17.16	0.16	0.0002	35%
Relevance?	590	2	11.70	0.14	0.0029	27%

[†] A scale for interpreting the Cramer's V effect size is: 0.10 = small; 0.30 = medium; 0.50 = large.

[‡] Relative change is the proportional increase in percentage of respondents rating "Excellent"

FIGURE 2. CME Evaluation Results for ECHO Pain

Continuing Education Credits and Evaluation of CME

A total of 4,500 CME credits were issued during the study period. CME evaluation questions were rated as described in the Methods section. FIGURE 2 provides data on participants' ratings of 5 aspects of the program. Participant ratings of "excellence" increased significantly over the study period (Cramer's V > 0.10 and $p < 0.005$). Comparing rat-

ings in 2010 and 2012, proportions rating "excellence" increased by more than 20% for each question item. More than 75% of the participants also answered open-ended questions as part of their CME evaluation. Examples of common responses to the question "What did you like best about the clinic?" generated statements like "spirit of interdisciplinary collaboration," "open communication," "comfortable asking

questions,” “opportunities to participate,” “interactive,” “leadership of facilitators,” “diversity of participants,” “clinical relevance,” and “sharing of information.” Common responses to the question “What did you like least about the clinic?” generated statements like “audio connectivity not as beneficial as video,” “patient presentations too lengthy at times,” “video/audio delays related to introductions and/or technical issues.”

Each line represents the change in percentage of individuals rating an attribute of the ECHO Pain Clinic as “Excellent” for the given year. A chi-square goodness-of-fit test was used to test the overall effect size between 2010 and 2012, which was small but significant for each question. This indicates that the yearly percentage ratings of excellence are higher than expected due to chance.

Seven hundred ten participants completed anonymous CME evaluations during the study period. FIGURE 2 provides data on participants’ 5 categories ratings. Participants increased their selection of the “excellent” category significantly (Cramer’s $V > 0.10$ and $p < 0.005$).

The series of lines represent participant answers to standard UNM CME evaluation questions for ECHO Pain. The questions were on a Likert scale of 0 to 5, with 0 meaning “poor” and 5 meaning “excellent.” The N changed over the years.

The top dotted line illustrates educational effectiveness; the long dash and two dots represents how balanced the education was in terms of applicability across the health professions; the solid line illustrates the education meeting stated objectives; the darker dashed line represents adequacy of opportunities to ask questions; the lighter hash marks represent how relevant the education was to the participant’s practice.

Focus Group Results

Fourteen clinicians who participated in ECHO Pain clinic for 1 year or longer were sent an e-mail invitation to join a focus group, and 9 responded. Seven women and 2 men joined the facilitators in Albuquerque via ECHO telehealth connection. Eight were from New Mexico and one was from El Paso, Texas. Four were physicians (MD), 2 nurse practitioners (NPs), 2 physician assistants (PAs) and 1 dentist (DDS).

Reasons for Participation in ECHO Pain

Most clinicians expressed a desire to become more knowledgeable and skillful in care of patients with chronic pain as a motivating factor for their involvement in ECHO Pain.

Knowledge—I did not know the difference between dependence and addiction when I joined. (DDS)

Some clinicians described feeling “alone” or “isolated” in their care of patients with chronic pain. Involvement in ECHO Pain reduced this isolation and provided a virtual community with whom they shared questions and evidence about patients with chronic pain.

I work alone ... and am not part of a team; this is another reason for me to participate in ECHO. It is helpful to have someone to bounce ideas, concerns and questions off. (NP1)

Encouragement from the specialists about their pain care and ability to manage and treat patients and finding others like themselves in patient care were reasons many cited for their ongoing involvement.

It gives me great confidence to know that I have a resource and that I meet regularly with experts from all over the country. (PA1)

Learning from Case Presentations and Didactics in ECHO Pain

Most participants described the case presentations and didactic updates as being complementary formats; each approach was effective for learning. Most described the benefit of having both formats included for their education and the education of others including patients, clinical peers and staff.

Both formats are complementary. I use the didactic portion as reference. Case presentations reinforce the didactics and vice versa. (PA1)

They used cases they present to think about similar patient cases in their practice. Some participants used case presentations to work on challenging patient issues like changing prescriptions or incorporating other modalities in the patient’s management and treatment plan.

I’ve started using small doses of non-opioid medications based on discussion of other case presentations, to get the pain down to another level. That has helped me treat and minimize the side effects. (NP2)

Several described applying what they hear in cases presented by others to similar cases in their own practices.

Team approach is helpful to our clinic and the whole community. (MD3)

The multidisciplinary approach in ECHO Pain is very helpful. (MD2)

Applying Concepts From ECHO Pain to Their Patients

ECHO Pain helped clinician participants in many ways with patient care.

I have helped a lot of patients get off narcotics using concepts presented by others in the clinic. (MD4)

I use the medical information frequently and get EKGs before starting certain medications. I use information from psychiatry to check for depression of PTSD. I expand my differential for pain syndromes. (MD1)

I use different ways of treating pain, including the myofascial skills demonstrations. I've changed my attitude, learned how to talk and discuss things with chronic pain patients. If you ask the right questions at the right time, you find out a lot about a patient, and some of their comforts and discomforts. (MD3)

Some participants report taking notes during presentations and writing down their patients' names based on the similarity of their problems, and using the information and applying it to their patients.

I try to help them using the information I get from the cases that other people are presenting. I learn by doing, listening, watching. (MD3)

Impact of ECHO on the Clinician's Team

Participants from larger practices have too few staff, or staff who lack the desire to work with patients with significant pain. Clinicians share when they have the opportunity, but some have few staff at their local sites, and some have fewer staff with interest in patients with pain.

I'm thrilled to have another physician joining chronic pain. I exposed 2 others at our clinic—a chiropractor and a psychologist. (MD4)

No one else in my clinic was willing to work with pain patients. (PA2)

Some participants work as the sole provider in a rural practice and only occasionally have a traveling provider come to their clinic.

I discuss what I learn at ECHO with the physician when he comes in and we collaborate on the patients. . . . But I'm kind of flying solo here. (NP1)

Sharing New Knowledge

Some participants share learned information with patients.

Patients in rural New Mexico hang on to every word I say because I am essentially giving them guidance from the experts. I tell them that I am going to present your case to a team of experts at the University and their faces light up. And when I presented the recommendations from specialists about their case, they were hanging on to my every word. (PA2)

Several of the clinicians described different approaches to teaching their staff about pain and information they learn in ECHO Pain clinics. They are interested in having these practices understood and adopted by others at the clinic that provide patient care.

I discuss the information from the ECHO clinic with others at the clinic—we meet once every two weeks and it's a good opportunity for me to share information. (PA2)

I use it to learn for myself and to teach my employees, my clinical assistants what I've learned. (DDS)

Others share the didactic materials in an education folder.

I started a public folders file with hints and tips from ECHO providers as a source for our staff. It includes trigger point injections, etc. (PA1)

Clinicians participate in ECHO Pain to receive evidence-based practice knowledge, CME, and skills to incorporate in the care of patients suffering with chronic pain. Some are in solo or small practices while others are in larger settings with clinical staff. Most are professionally isolated, have limited access to local pain expertise and work with peers who view patients with chronic pain skeptically. Most describe learning from presenting cases or when they listen to cases presented by others. Some are eager to learn from experts in order to share that knowledge with their patients and staff. All describe how didactics enhance complementary learning that results in positive clinical practice change. Some say the impact on their clinic staff/teams is largely linked to the unique environment of each clinician or where they work.

Everything that I use on a daily basis has to do with things that I've learned over the course of 4 years with Project ECHO's Chronic Pain clinic. (NP1)

Some use the didactic presentations to create patient education materials or to directly teach patients or staff. They described that the case presentations bring the didactics to life.

The case presentations make the didactic information memorable and real. (NP1)

Repetition of information provided reinforcement for knowledge and skills related to medication management.

They describe learning from the multidisciplinary teams.

Discussion

Continuing education and professional development offered by ECHO Pain are shown to improve how pain is taught and managed. Evaluation provides evidence that ECHO Pain not only met CME objectives but also increased competence and improved practice at the nonspecialist level as published in other ECHO studies.^{25–30} Clinicians in rural communities obtain relevant CME at no cost and without travel.

Interprofessional (IP) collaborative practice is considered ideal by consensus from experts at medical colleges, nursing, pharmacy, dental, public health schools³¹ and by the World Health Organization as a means of improving staff satisfaction while benefitting the entire community.³² ECHO Pain serves as an innovative IP platform by enabling diverse clinicians to join in a social network that increases capacity and reduces professional isolation.

ECHO has been successfully replicated for a variety of diseases including pain in the Veteran's Health Administration (SCAN ECHO^{29,33–41}), the Department of Defense (Army Pain ECHO^{42,43}), and federally qualified health care centers.⁴⁴ The University of Washington replicated ECHO Pain in 2011 (TelePain^{4,45}). ECHO Pain has a broad reach outside of New Mexico and has been replicated in a variety of health care systems in the United States and is under development in other countries.

In future studies already in development patient outcomes will be analyzed. Applications of this model within certain replicating sites and health care systems will be investigated.

Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

APPENDIX S1: Survey

As a service to our authors and readers, this journal provides supporting information supplied by the authors. Such materials are peer reviewed and may be reorganized for online delivery, but are not copy edited or typeset. Technical support issues arising from supporting information (other than missing files) should be addressed to the authors.

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Lessons for Practice

- Telementoring through Project ECHO® develops chronic pain expertise among health professionals through continuing education.
- Professional competence and improved practice at the nonspecialist level are achieved through participation in ECHO Pain.
- ECHO Pain has been successfully replicated in federal, nonprofit, and other health care systems in the United States.

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