Project ECHO Chronic Pain: A Qualitative Analysis of Recommendations by Expert Faculty and the Process of Knowledge Translation

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Introduction: Previous studies of the same Project ECHO Chronic Pain cohort demonstrated that recommendations to primary care providers (PCPs) by expert faculty follow CDC Guidelines for Prescribing Opioids and that participating PCPs change their practice accordingly. The purpose of this study was to identify how expert faculty translates knowledge, so that PCPs can act on it.
Methods: One hundred ninety-seven PCPs from 82 practices in 14 states attended at least one Project ECHO Chronic Pain session over 10 months, hosted by a large federally qualified health center. Expert faculty was a multidisciplinary panel of six clinicians. Recommendations for 25 randomly selected case presentations were transcribed, yielding 406 discrete units of data. A thematic analysis contributed to a concept map for knowledge translation.
Results: Expert faculty addressed psychosocial issues in 40% of recommendations. Three themes represented a familiar clinical decision-making process: recommendations for treatment accounted for risk factors and patient engagement and behavior. A concept map placed the recommendations for selected cases in the first phase of the action cycle in the Knowledge-to-Action framework, where knowledge is shared but not yet acted on.
Discussion: Project ECHO Chronic Pain is an example of iterative guided practice, wherein expert faculty use published guidelines and professional experience to make recommendations for patient care to PCPs. This occurs using shared social–cultural–historical language and context consistent with social constructivist theories of learning.

Keywords: primary care, knowledge translation, chronic pain, Project ECHO

Between 10% and 15% of adults in the United States experience chronic pain on a daily basis.[1] More than 125 million (55.7% of adults) report having had pain in the previous 3 months, and 25.3 million experience daily pain.[2] Although more than half of adult patients with chronic pain are treated in primary care, primary care providers (PCPs) have concerns about the adequacy of their own expertise in treating it, especially regarding prescribing opioids and the biopsychosocial complexity that patients with chronic pain present.[3–8] The recently released Guidelines for Prescribing Opioids for Chronic Pain from the Centers for Disease Control (CDC)[9] provide guidance for the use of opioid analgesic medications. However, providers need support to apply these guidelines to specific clinical cases and to further navigate treatment options.

Disclosures: The authors declare no conflict of interest.

This study was approved by the institutional review board of Community Health Center, Inc.

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Project Extension for Community Health Outcomes (Project ECHO) is an intervention that is increasingly being used to train PCPs to care for conditions often managed by specialists,[10,11] such as chronic pain. Using a videoconference platform, Project ECHO offers regularly scheduled sessions over several months between a multidisciplinary faculty of expert specialists and a network of generalist PCPs. The sessions are described as "case-based educational experiences" that include comanagement of patients by specialists and providers, shared decision-making with other providers in the network, and didactic content,[12] (p2). Project ECHO was first developed in 2003 in New Mexico to help PCPs in rural areas manage patients with hepatitis C.[13,14] As a result of the success of that initiative, ECHO has been adopted by more than 158 organizations worldwide to build the capacity of PCPs to treat a wide range of chronic health conditions seen in primary care.

A growing body of evidence demonstrates the effectiveness of Project ECHO in improving patient outcomes and increasing knowledge among providers.[11,15–17] However, less is known about the actual content of these sessions or how the expert clinical faculty use the sessions to share specialty knowledge with generalist PCPs.

Project ECHO is a case-based educational experience. By providing iterative guided practice through videoconference, the "virtual rounds" are consistent with the signature pedagogy of medicine.[12,17] Koenig et al[18] sought to examine this further and found evidence for so-called "learning loops" in an analysis of transcripts from Project ECHO-SCAN (Specialty Care Access Network), a consultative model in the Veterans Administration. The loops represent the "serial presentation of patient cases into distinct consultation types," each with a unique structure: a full case presentation with discussion, an update on previous cases,

and a summary presentation,[18] (p.20). These authors noted that how the expert clinicians exchange knowledge with the generalist PCPs had yet to be explored.

The Knowledge-to-Action (KTA) framework may provide a conceptual model for how Project ECHO promotes the exchange of knowledge between expert faculty and PCPs.[19] Developed from a review of theories and models of planned change,[19,20] the KTA framework is a knowledge translation framework with two components: knowledge creation and action cycle. Knowledge creation is a succession of three levels of study and increasingly refined analysis: inquiry, or original research; synthesis of research findings by experts; and knowledge tools, such as practice guidelines and professional experience. The first step in the action cycle is the identification, review, selection, and application of the knowledge that is relevant to the case being presented. The clinical application of knowledge in practice includes consideration of barriers, evaluation of the effectiveness of actions taken, and monitoring.

Previous work by our group evaluating the impact of a Project ECHO focused on care of patients with chronic pain demonstrated that participants had a significantly greater increase in their knowledge about the assessment and management of pain, as well as improved confidence in treating patients with chronic pain than did a control group of providers who had not participated. Participating providers also prescribed fewer opioids and were more likely to collaborate with adjunct therapies, such as physical therapy and behavioral health, than the control group.[15] These findings suggest that knowledge is being acquired through ECHO participation and applied more broadly in clinical practice. In addition, through content analysis of ECHO session transcripts,[21] we demonstrated that the content of guidance provided by expert faculty in Project ECHO Chronic Pain aligned with the CDC Guidelines for Prescribing Opioids.[9] In the study reported here, we conducted a secondary analysis of the same transcripts to examine faculty guidance through the lens of the KTA framework.

METHODS

Details of the Project ECHO Chronic Pain intervention for this study have been previously described,[15,21] including approval for this study by the institutional review board of the sponsoring organization. The intervention consisted of two concurrent series, each of which involved twice monthly 2-hour video conference sessions over a 10-month period, between April 2016 and November 2016. In one series, practice sites enrolled as a regional cohort. The other series admitted practice sites on a rolling basis, that is, they could join at any time and still complete all didactics in a year. Data on attendance are not readily available because individual participants stepped in and out of ECHO sessions due to clinical responsibilities. All sessions were recorded and archived and made available to participating PCPs for review. In each session, between two and four deidentified patient cases were presented by PCPs and discussed with an expert, multidisciplinary panel of pain experts. Each session also included a 20-30-minute didactic teaching on a range of topics related to pain care. Recruitment for participation in the series used convenience sampling, conducted through email, phone, and informational webinars distributed to individual practices.

In total, 179 primary care medical providers from 82 different practices in 14 states attended at least one session during the two concurrent 12-month series. PCPs included internists, family physicians, family nurse practitioners, and physician assistants. The faculty for Project ECHO Chronic Pain comprised a multidisciplinary team of pain specialists from an integrative pain center. The faculty included a specialist in anesthesiology/pain medicine, behavioral health, occupational medicine, addiction medicine, Chinese medicine/acupuncture, and primary care.

Of the 67 patient cases presented over the course of the concurrent Project ECHO Chronic Pain series, 25 new cases were randomly chosen for the content analysis of the recommendations made by the expert faculty. Cases were randomized using a random number generator to select one case for each week of the study period. One of the researchers (C.B.-R.) reviewed 15 hours of recordings of the Project ECHO videoconference sessions and transcribed the recommendations provided by expert faculty verbatim for those 25 cases, yielding the 406 unique recommendations. The transcripts did not identify who among the expert faculty provided which recommendations for which case.

The authors used an inductive approach for a thematic analysis of the transcripts.[22–25]

The procedure for the thematic analysis followed the recommendations of Braun and Clarke.[23] The researchers (1) familiarized themselves with the data; (2) developed initial coding categories; (3) identified themes; (4) reviewed and refined themes; (5) defined and named themes; and (6) produced an interpretive report. The ultimate goal of thematic analysis is to construct higher-order concepts that can contribute to a theoretical structure that explains a phenomenon.[26] The researchers anticipated that themes from the analysis could be used to construct concepts that contribute to the application of the KTA framework[19,20] to Project ECHO Chronic Pain.

Two of the authors (K.M.T. and C.B.-R.) developed categories of the data separately and came to agreement on those categories and subcategories through further discussion with the third author (D.A.) over the course of several months of meetings. The categories and subcategories represented the content of the recommendations, that is, what was recommended. For example, the expert faculty might recommend physical therapy, behavioral health, or a change in medications. Themes in the transcripts were developed, reviewed, and refined through further discussion to better understand how recommendations were made.

RESULTS

The 406 unique units of data consisted of all of the recommendations made by the expert faculty for 25 cases. The number of recommendations per case ranged from 12 to 37, with an average of 16.24. The data were organized into the following four categories, each with subcategories, explained below:

1. Assessment/evaluation of pain.
2. Including and excluding nonpharmacy treatment options.
3. Pharmacological treatment options.
4. Patient engagement and education.

Assessment/Evaluation of Pain

This category includes recommendations regarding more thorough assessment of the patient's pain to better determine and evaluate a course of treatment. Subcategories included

physical examination, history of the pain, functional assessment, behavioral health assessment, comorbidities, imaging, and other tests. Mitigating risk is included as a subcategory insofar as it refers to developing a treatment plan. Table 1 includes subcategories and examples.

Including and Excluding Nonpharmacy Treatment Options

This category represents weighing nonpharmacological treatment options, both pros and cons, for individual patients, what to include and what NOT to include. In some cases, the expert panel was very direct about what not to do ("Don't refer this guy to the spine surgeon") or what to do ("This patient should get EMDR therapy [Eye Movement Desensitization and Reprocessing therapy used for post-traumatic stress disorder]."). Treatment by behavioral health specialists was often suggested in combination with other treatment modalities or in some cases using other treatments as a bridge to getting patients to agree to behavioral health treatment. We have also included in this category discussions about addressing lifestyle issues, such as diet and exercise, which can affect the effectiveness and viability of other treatment options. Table 2 includes subcategories and examples.

Pharmacological Treatment Options

This category was the largest and most straightforward in the transcripts. It included making decisions about using opioid and/or nonopioid medications and appropriate dosing/weaning of these medications. It includes discussion of risk factors that affect prescribing medications by the provider. Table 3 includes subcategories and examples.

Patient Engagement and Education

Patient engagement and education includes recommendations about involving the patient in his/her treatment, understanding the cause of pain and treatment options. Negotiating with patients to secure their engagement was important, such as refusing to prescribe opioids unless the patient follows through with other treatment options, such as behavioral health. Self-care was included in this category, and included lifestyle changes. Lifestyle/self-care in the context of Patient Engagement is different from lifestyle issues addressed in the category Including/Excluding Treatment Options. The latter is more prescriptive, a suggestion from expert to provider to involve other disciplines, such as "Work on nutrition and hydration

with him: food diary." The former is more contextual, a direct appeal to the patient to change self-care behaviors. Table 4 includes subcategories and examples.

Developing categories is the first step in qualitative thematic analysis. The next step is to determine themes, which represent patterns in the data beyond specific categories and their examples.[23] During the first phase of developing categories and subcategories, the researchers found that in 40% of the 406 units of data (162 units) of the 25 cases we analyzed, psychosocial issues were often inseparable from physical/medical issues, with a distribution of psychosocial issues ranging from 30% to 60% of the recommendations per case. These included behavioral health (references to the need for counseling, drug/alcohol misuse, or that a patient was depressed/anxious, displaying deviant behavior); insurance; lifestyle (diet, drug/alcohol misuse again, living circumstances, relationships, etc); and other factors commonly referred to as social determinants of health. That is, these issues were often difficult to separate from the more straightforward medical recommendations that were made. Moreover, the recommendations for the treatment plan accounted for these issues. Identifying themes across the four categories allowed the researchers to acknowledge the prominence of psychosocial issues in the data. The three themes were (1) treatment decisions; (2) risk; and (3) patient engagement and behavior.

Treatment Decisions

This includes the processes of assessing the patient's chronic pain, psychological health, and functional capacity; weighing treatment options; and evaluating treatment effectiveness through follow-up. These processes represent a decision-making cycle familiar to clinicians. A wide array of treatment options are considered, including physical therapy, pain specialists, surgery, behavioral health, and complementary modalities such as acupuncture. Treatment options were often suggested in combination. Working across disciplines to create a treatment team was strongly recommended, not only to improve patient outcomes but also to support the PCP.

Risk

In weighing treatment options, expert faculty addressed risk, both medical risk factors and psychosocial risk factors. Medical risk factors include comorbidities, such as thyroid disease, and lifestyle/behavior issues that add to the illness burden, such as smoking, alcohol abuse, and being overweight. In the case of

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TABLE 1.

Assessment/Evaluation

Subcategory	Examples
Physical examination	Find the scar and tap along it and see whether she gets an electrical shooting feeling down the arm. That would be a sign of nerve trapped in scar tissue.
History of pain	Do the brief pain inventory on her and follow function over time.
Functional assessment	Do an activity of daily living (ADL) screen/home evaluation once she is out of the hospital.
Behavioral health history and assessment	Get a psychologist to do a real assessment on her and the context of her pain
Imaging	Do initial evaluation: ultrasound, computed tomography, or magnetic resonance imaging.
Other tests	Check his testosterone level. Opiate use lowers T level.
Assessing comorbid conditions	You should test her for diabetes and work on controlling that—will help with some symptoms.
Mitigating risk	We send out any urine screens for the drug they are taking regardless of risk level.

TABLE 2.

Weighing Nonpharmacy Treatment Options

Subcategory	Examples
PT/occupational therapy	Get her into physical therapy (PT) and make sure you follow-up with PT after 3 visits and ask whether it is working.
Pain clinic	Talk to pain clinic about working on facets and reducing opioids AFTER that.
Surgery	Possible surgery to free nerves from (hernia) scar and embed them in oblique muscles.
Behavioral health treatment	Psychiatry is not going to resolve the problem: refer (patient) to behavioral health specialist who specializes in treating trauma.
Complementary modalities	Probably a good candidate for acupuncture: use it to address pain issues directly and bridge the gap to anxiety and behavioral health that he is resistant to.
Working across disciplines	Make contact with the psychiatrist and psychologist and talk to them: three of you as a team put together a treatment plan with limits and measurable goals.
Lifestyle issues	Address his weight (context: losing weight would decrease pressure on knees and back).

patients with chronic pain, pressing social risk factors include the possibility that patients or others will sell or misuse their medications, including the potential for overdose. Extrinsic factors can contribute to risk, such as deviant behavior among friends and family members, unsafe living conditions, and limits on what insurance will cover.

Patient Engagement and Behavior

Once a course of treatment is proposed, its success depends on patient engagement and behavior. Expert faculty recommended that providers offer explanations of the causes of pain and how medications work as a means of optimizing patient engagement in their treatment. Providers should encourage better patient self-care, such as losing weight, smoking cessation, and setting personal goals. The faculty also recommended that providers negotiate with patients to engage them in treatment, such as tying prescription medications to following other elements of the treatment plan such as attending behavioral health sessions.

Figure 1 displays the themes in the expert faculty's recommendations, wherein risk, especially psychosocial risk factors,

and patient engagement and behavior are accounted for in making treatment decisions. In this concept map, Project ECHO Chronic Pain occurs in the first phase of the action cycle in the KTA translation framework: A patient case is presented, a problem is identified, and knowledge is selected and applied to the patient case. Within this phase, faculty recommendations model a familiar clinical process—assess the patient, determine treatment, and evaluate treatment effectiveness. Moreover, the expert faculty goes beyond the CDC Guidelines for Prescribing Opioids for Chronic Pain[9,21] to draw on their knowledge and experience of how psychosocial risk factors and patient engagement and behavior shape their treatment decisions for managing chronic pain.

DISCUSSION

The results of this study have implications for preparing PCPs to manage patients with chronic pain and for Project ECHO as a mechanism of knowledge translation to that end. Faculty addressed the biopsychosocial complexity of patient cases

TABLE 3.

Pharmacological Treatment Options

Subcategory	Examples
Weaning from opioids	Once you get below the 100 micrograms of fentanyl, you can go to 72 (micrograms) every 48 (hours), or change interval—depending on what patient is comfortable with. When you get down to tiny doses, start to lengthen the interval.
Anticonvulsant medications	Optimize gabapentin and other meds before taking her off opioids.
Antidepressant/antipsychotic medications	Could give sertraline for anxiety about reducing the opioid.
Optimizing medications, by changing dosing and/or switching to other meds to accommodate patient's needs	Ask him whether the pain relief waxes and wanes with the opiates, should switch to a long-acting if the opiates are successful. Could switch to a serotonin and norepinephrine reuptake inhibitor if the opiates are not effective at all.
Side effects	Optimize the duloxetine dose. The vomiting component is difficult.
Sleep medications	Not great data on long term on sleep medications but short term until she can calm down a little: Trazodone can help. If the problem is nightmares: prazosin.
Insurance issues related to prescription coverage that affect medication choice	Consider switching him to methadone over morphine/oxycodone because it is so cheap—might be easier to present to worker's comp that way or he can pay for it himself.
	It is legitimate for him to be on 8 hours of dosing for oxycontin (primary care provider said that insurance would not cover 8 hours of dosing, only 12 hours of dosing)
	Flector patch instead of voltarin gel if covered by insurance. Otherwise, use voltarin gel 4 times a day and make sure he actually does it.
Psychosocial risk	You also cannot continue prescribing opioids if her boyfriend keeps stealing them.
	Someone with an addiction history should not be put on short-acting opioids. Put on extended release because the short-acting opioids give you the rush from the fast reaching brain.

TABLE 4.

Patient Engagement and Education

Subcategory	Examples
Education materials	Recommend book "manage your pain before it manages you" to give to patient.
Discuss reasons for pain	You need to discuss the root of the pain with the patient—tell them that it is in their nervous system and make it clear that you do not think they are crazy.
	Explain the concept of pain for psychological reasons to the patient; patient needs to see why behavioral health is important.
	Talk with her about trauma and the nervous system.
Explaining medications	Explain to patient about how the oxycodone is working as an antianxiety for her and that treating her anxiety with other things such as Lexapro is a better option.
Negotiation	Tell him he cannot get opiates unless he goes to behavioral health.
	A lot of times with people like this: the drinking and opioids and smoking are modulating a huge amount of fear and anger—finding ways to present the "carrot and stick" that frame it as giving him control is important.
	If she wants to keep taking tramadol, tie it to a functional goal like "I want to be able to specifically do this one thing I can't do without it."
Self-care	Big push: need to tell her that she needs to take care of her own basic health needs before she can manage her pain—diet, exercise, and smoking.

directly and without hesitation, not only validating participating providers' experience that pressing psychosocial issues are not easily separated from medical issues in treating chronic pain[3–8] but also by offering the insight, decision support and mastery modeling providers needed to apply new knowledge and skills to practice. This fits the definition of iterative guided practice,[30] on which Project ECHO is modeled.[12,17] For example, faculty discussed how to negotiate with patients, making prescriptions for medications contingent on patient engagement in behavioral health, a skill that guidelines cannot demonstrate.[27–29]

In Project ECHO Chronic Pain guided practice, expert faculty and the PCPs work together to make sense of the cases being presented. "Making sense" is at the heart of constructivist theories of learning, in which knowledge is constructed through interaction with, and adaptation to, social and physical contexts.[31–33] Moreover, constructivist learning is iterative, as the learner reaches increasingly sophisticated levels of understanding through a spiral of hierarchical integration of previous knowledge into new ways of thinking, a transformation achieved through experience and reflection.[32,34,35]

This spiral represents a qualitatively different internalized "learning loop,"[18] which will be different for each learner. For example, a PCP may need multiple experiences with weaning patients from opioids before feeling confident in his/her ability to do so. Addressing psychosocial issues at the same time may require a higher more integrated level of sophistication and transform that provider's practice managing chronic pain.
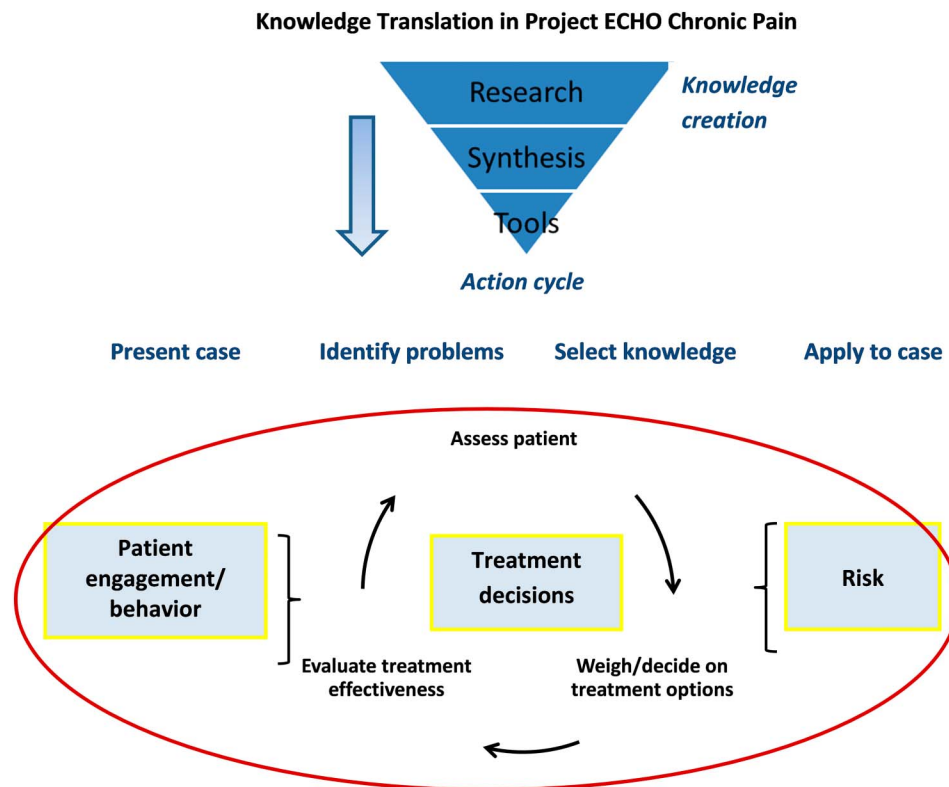

FIGURE 1. Themes in the first phase of the action cycle in the Knowledge-to-Action framework. Adapted with permission from: Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, Robinson N. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof*. 2006;26:13-2421.

It has been suggested that both the KTA framework and Project ECHO reflect social constructivist theories of learning,[13,36–39] citing Vygotsky in particular. It is useful to understand what this means. For Vygotsky,[40,41] qualitative transitions in thinking are mediated by what he referred to as cultural artifacts and activities, including language, speech, and other tools, because learning originates not in the individual but in a common social–cultural–historical context, a context that is also aspirational for the learner.[42–45] This has been described as an apprenticeship in thinking,[46] an apt description of clinical training. In other words, in Project ECHO Chronic Pain, the expert faculty and PCPs are all health care professionals, who share a sociocultural history of patient case-based learning and approach to clinical decision-making, using a common language. Moreover, the very constructs of specialist and generalist are part of the social–cultural–historical lexicon of medicine. Guided practice needs a guide.

Vygotsky's[44,45] assertion that engagement in social activity is the foundation for higher level cognitive functions has common cause with Wenger's communities of practice, which originated from an apprenticeship model.[47] Practitioners need to "learn about" and also "learn how and/or learn to be," making the case for "learning to practice" as a social and identity-building process.[31,48] However, there are subtle but important epistemological differences between social learning theories that focus on individuals in context of the social group[27,31,44,45] and theories that focus on the social group engaged in collective learning and management of knowledge.[47–51] They are not mutually exclusive, but represent different perspectives on knowledge and knowing. Project ECHO can have characteristics of both,[37,52,53] depending on what aspect of Project ECHO as knowledge translation is examined and how.

For example, a major limitation of our study is that we used transcripts of the recommendations given by the expert faculty during Project ECHO Chronic Pain sessions. We did not look beyond the ECHO sessions to examine the rest of the action cycle in the KTA framework, where the adaptation of knowledge to practice could be considered a product of a community of practice.[47,49] We also did not do a discourse analysis of the dialog that occurred during the case presentations. Such exchanges represent knowledge boundaries and have been studied with other ECHO initiatives,[54] as well as in engineering,[55] opening new paths to better understanding the transfer, translation, and transformation of knowledge within and across disciplines.

Our findings support previous assertions that Project ECHO is a case-based learning experience grounded in learning theory.[13,14,17,37] Building the capacity of PCPs to manage chronic conditions is a cognitive and social phenomenon that is iterative and interactive. How many iterations of guided practice—that is, how many ECHO sessions—are required for a learner to effectively apply knowledge is an open question and depends on the point of departure of knowledge for the learner as well as the practice setting in which that knowledge is applied and internalized. However, it is important to note that Project ECHO Chronic Pain addressed a very specific condition for which practice guidelines—and expert faculty—exist. That is, the KTA framework presumes that knowledge tools have been developed, so that they can be acted on. Whether the KTA framework is a useful framework for other Project ECHO initiatives—especially those not focused on health conditions with clinical

guidelines or those in which participants do not share a common language and approach to decision-making—is less clear.

CONCLUSION

Together, this study and our previous work[15,21] indicate that the expert faculty taps the knowledge in the CDC Guidelines for Prescribing Opioids[9] and their own experiences to make recommendations to PCPs about better management of patients' chronic pain, using a familiar clinical decision-making process in a shared social–cultural–historical context. Most importantly, our previous work[15] indicates that these same providers acted on this knowledge with greater confidence than providers who had not participated in the sessions. These results are consistent with the KTA framework and open new opportunities to use this framework in future studies of Project ECHO.

Lessons for Practice

- In Project ECHO Chronic Pain, expert faculty made recommendations using a familiar decision-making process (assess patient, weigh treatment options, and evaluate treatment effectiveness), which accounted for patient engagement in treatment and psychosocial risk factors.

- Expert faculty addressed patients' psychosocial issues in 40% of their recommendations.

- In Project ECHO Chronic Pain, case-based learning occurs in the first phase of the action cycle in the KTA framework.

- Project ECHO Chronic Pain is an example of iterative guided practice, in which participants construct knowledge in a shared social–cultural–historical language and context.

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