Project ECHO and Opioid Education: a Systematic Review

Courtney M. Holmes, PhD, LPC[1]
Lori Keyser-Marcus, PhD[2]
Bhakti Dave, MPH[3]
Vimal Mishra, MD, MMCi[4,5,*]

Address
[1]Department of Rehabilitation Counseling, Virginia Commonwealth University, Richmond, VA, USA
[2]Department of Psychiatry, Virginia Commonwealth University, Richmond, VA, USA
[3]Office of Telemedicine, Virginia Commonwealth University, Richmond, VA, USA
[4]Department of Internal Medicine, Virginia Commonwealth University, Richmond, VA, USA
[*,5]Division of Hospital Medicine, Virginia Commonwealth University, 1101 E. Marshall St. 1st Floor, Richmond, VA, 23298, USA
Email: Vimal.Mishra@vcuhealth.org

This article is part of the Topical Collection on *Substance Use Disorders*

Abstract

Purpose of Review The widespread incidence of morbidity and mortality associated with opioid use disorder (OUD) has resulted in a national crisis. One component of this public health epidemic includes a lack of an adequately trained healthcare workforce to provide opioid case management, prescribing, and dispensing. The Extension for Community Healthcare Outcomes (Project ECHO) is a tele-mentoring, guided practice model, which provides knowledge exchange from specialists and subspecialists to enable primary care providers and clinicians to deliver best practice care for complex health conditions like OUD. Project ECHO is considered a promising strategy to address the trained healthcare workforce shortage, especially in remote and traditionally underserved areas.
Recent Findings We conducted a systemic review of the literature to evaluate the impact of Opioid /Addiction Treatment Project ECHO programs on participant (healthcare provider) and patient outcomes. Overall, studies show increases in provider self-efficacy and knowledge gains after participation in Project ECHO. Benefits and barriers to participation

in Project ECHO clinics are discussed.

Summary Project ECHO for OUD is an effective telehealth practitioner training and support model that promotes advances in provider knowledge and self-efficacy. Further research examining evidence on cost-effectiveness, practitioner, and patient outcomes is needed.

Introduction to Opioid and Substance Use Treatment

In 2017, over 72,000 individuals died in the USA due to opioid overdose while over 2 million individuals were estimated to meet diagnostic criteria for an opioid use disorder (OUD) [1]. The staggering increase in death rates and other health complications related to the misuse of opioids has prompted the national recognition of OUD as a public health crisis. An opioid use disorder is defined as problematic use of opioid including heroin, fentanyl, and other pain-relieving drugs leading to clinically significant impairment or distress while misuse of opioids is defined as "use of a psychotropic medication without a prescription; for a reason other than as directed by a physician; or in greater amounts, more often, or longer than prescribed" [2]. Often, OUD is experienced as a comorbid diagnosis to other physical, mental, and behavioral health diagnoses, exacerbating the complexity of the treatment needs in these cases.

One component of this public health epidemic includes a lack of an adequately trained healthcare workforce to provide opioid case management, prescribing, and dispensing. Primary care providers (PCPs) who are at the forefront of caring for patients with OUD have no specialized training in treating or managing addiction [3, 4]. Medication assisted treatment (MAT) by extended maintenance on an opioid agonist such as buprenorphine is a standard of care for the treatment of opioid use disorder (OUD). As of 2016, only 4% of licensed physicians were approved to prescribe buprenorphine for opioid use disorder. Further, 47% of all US counties and 72% of rural counties lacked a buprenorphine-waivered physician [5]. Although the advent of Office-based opioid treatment (OBOT) has expanded the reach of treatment for individuals with OUD to include the primary care setting, the increase in buprenorphine-credentialed providers has fallen sharply behind the exponential growth of individuals in need of such treatment services. A number of barriers have been cited by providers. Regulatory barriers associated with securing and maintaining the buprenorphine

waiver status is perceived as excessively demanding. Additional obstacles include concerns regarding adequacy of training (and subsequent provider capacity) to treat individuals with OUDs, institutional, and collegial infrastructural supports available to clinicians, provider stigma, lack of behavioral health services/care coordination, and difficulty receiving reimbursement for services provided [6–8]. Provider time constraints, prohibiting the acceptance of additional patients, and lack of provider knowledge regarding the required training/credentialing to obtain a waiver are cited as top reasons for not receiving the waiver for prescribing buprenorphine among physicians [9]. Furthermore, a large percentage of physicians that are waivered to prescribe MAT do not prescribe buprenorphine at capacity. "At capacity" is defined as 30 patients in the first year and 100 patients in subsequent years [9]. Physicians reported a willingness to become waivered or prescribe to capacity if they were better informed of local counseling resources, were paired with an experienced provider, and had access to additional training (e.g., CME courses) related to treating individuals with OUD [9].

Several systemic and community educational models have emerged in response to the increasing demand for PCP-delivered treatment for OUD, including the Medicaid health home model, ED, and inpatient initiations of OBOT and MAT programs, online Providers Clinical Support System (PCSS), and state-specific programs in Maryland, Vermont, Massachusetts, and Oregon [10•]. The aim of a systems-based program is to connect primary care patients directly with providers trained in treating substance and opioid use disorders. Four key components are addressed to some degree within these models which are pharmacological therapy, psychosocial services, integration of care, and education and outreach [10•]. One promising model that focuses on education and outreach is Project ECHO (Extension for Community Healthcare Outcomes). Project ECHO is a program developed to promote the

workforce development for clinicians working with people with SUDs by providing ongoing support and education to clinicians when addressing the range of medical and psychiatric comorbidities that often accompany individuals presenting for SUD treatment. This paper will summarize the evidence to-date regarding the available Project ECHO programs tailored for treatment of individuals with Opioid Use Disorders (OUD).

Project ECHO is a tele-mentoring, medical education, and care delivery model, which uses hub-and-spoke knowledge-sharing networks, led by expert teams at academic medical centers who use telehealth multipoint videoconferencing to conduct virtual clinics with community providers. Every clinic involves a short didactic session given by an expert in the group that hosts the meetings (or "the hub" team), followed by case-based discussions of de-identified real cases presented by practitioners in the community (or "the spokes"). The case discussion involves conversation, suggestions, and consultation around the patient cases, including discussions of clarifying questions and

recommendations [11]. Through access to experts for medical consultation and collaboration, existing community providers can provide more specialized care, ultimately diminishing barriers that patients often face when needing treatment for chronic and complex health conditions. Primary care providers participate in didactic sessions and have ability to present cases in de-identified fashion to seek specialty input. In this guided practice model, primary care doctors, nurses, and other clinicians learn to provide skilled specialty care to patients in their own communities. The first Project ECHO clinic focused on the treatment of hepatitis C but has since grown to include a myriad of health issues such as cancer, addiction and substance use, chronic pain, palliative care, and infectious disease. Project ECHO operates more than 220 hubs for more than 100 diseases and conditions in 31 countries [12]. At its core, Project ECHO seeks to increase both the quality and quantity of trained medical providers, particularly in rural and otherwise underserved communities.

Methods

The authors searched PubMed, MEDLINE, Academic Search Complete, PsycINFO, and Project ECHO internal databases to identify results from studies targeting opioid or substance-use-focused tele-ECHO clinics. The keywords used in our search were "Project ECHO," "Project Extension for Community Healthcare Outcomes," "opioid," and or "substance use disorder." The authors limited the search to literature published from January 2007 to October 2019. Three authors (C.H, L.KM, B.D.) independently reviewed each of the identified abstracts to remove duplicates. Additional studies were identified through searches of the reference lists of reviewed articles.

PRISMA guidelines were utilized for conducting a systematic review. A total of 216 articles were originally identified pertaining to Project ECHO delivery or implementation, and 184 were screened after removing duplicates. Thirty articles were assessed for eligibility, and 15 were included in the review and met the full inclusion criteria. Full inclusion criteria included the following: (1) English-language source; (2) peer-reviewed journal article or indexed abstract; (3) published between January 2007 and October 2019; (4) qualitative or quantitative data collection; and (5) primary focus on opioid Project ECHOs. Chronic pain-focused studies were included if the treatment and management of patients who used opioids were discussed in the findings. See Fig. 1 for a complete chart.

Data were extracted by the researchers (C.H, L.KM, B.D.) Data extraction categories included the location of Project ECHO sites, author, year, population studied, disease focus, type of conferencing, schedule of sessions, study design, measures used, number of participants, and conclusions. See Fig. 1 for a visual
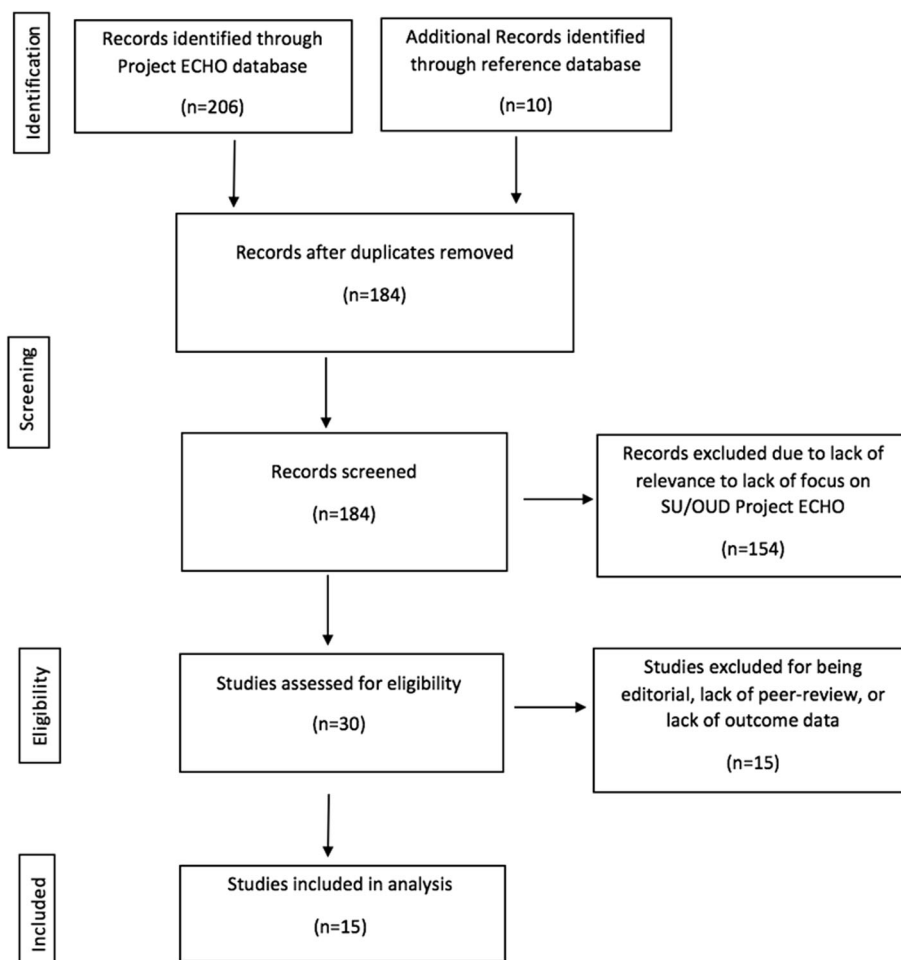
Fig. 1. Literature search and selection process for systematic review of opioid-focused Project ECHO studies.

of the process used for data classification.

As Project ECHO seeks to provide continuing education to health care providers, Moore's framework is used as a guide to evaluating the level of impact on individual practitioners and the patient community [3]. See Table 1 for an overview of the levels of Moore's framework.

Results

The systematic review of the evidence for opioid-focused Project ECHO assessed a total of 15 studies. The results are represented in Table 2. The location of the studies included the USA ($n = 8$), Ontario, Canada ($n = 4$), and India ($n = 3$). The studies located in the USA included state programs in New Mexico, New York, California, and Ohio, along with multi-state programs. Participants included a wide range of health professions including primary care providers, nurse practitioners, social workers, and pharmacists. Findings from the review noted substantial benefits to participants, including increases in provider

Table 1. Moore's evaluation framework for assessing outcomes of continuing medical education [13]

Outcome levels	Description of variables
Level 1—participation	Demographics and participation information
Level 2—satisfaction	Satisfaction related to design, implementation, instructor
Level 3—learning, declarative and procedural knowledge	Amount of learning
Level 4—competence	Application of learning to practice
Level 5—performance	What behavioral changes were made
Level 6—Patient health	How did health of target population change
Level 7—community health	How did community health status change

knowledge (from pre to post) (*n* = 11), self-reported improvements in provider self-efficacy (*n* = 7), and positive changes in provider attitude toward patients (*n* = 1). Findings suggest an overall satisfactory evaluation of Project ECHO from participants (*n* = 11). Additionally, data show that opioid-focused Project ECHOs showed an increase in the perception of community building and a reduction in professional isolation (*n* = 3). Several studies indicated that providers changed their behavior when working with patients with OUD as a result of participation in Project ECHO (*n* = 3).

Quality Assessment Results Through Moore's Framework

Out of 15 included studies, all but one reported at least one level of Moore's framework [4, 14–17, 18, 19•, 20, 21•, 22–27].

Level 1: Participation

Eleven studies reported the number of participants [4, 14, 15, 17, 19•, 22–27]. The range of participants ranged from 12 to 1079, with a mean of 163 and a median of 36. One study reported the number of participating sites (*n* = 47) rather than the number of participating individuals [16].

Level 2: Satisfaction

Eleven studies reported provider satisfaction after participation in Project ECHO sessions. These results were collected via surveys and qualitative interviews [4, 14, 15, 17, 19•, 20, 21•, 24–27]. All of these studies reported satisfaction in the post-tests and interviews. Some frequently reported barriers were lack of reimbursement, reduced the clinical time allocated to participating in the sessions, not enough time dedicated to didactic presentations, and technology issues [4, 15, 21, 26, 27]. Some limitations reported were low number of participants in some studies [4, 15, 19, 20, 26]. Some studies also reported skewed results due to participant populations [14, 25]. Some selection bias may exist as participants volunteered to participate in the ECHO clinics.

Level 3: Learning

Eleven studies reported results of pre- and post-knowledge tests completed by participants and one study reported post-test only results indicating positive

Table 2. (Continued)

Title	First author, year	Population studied	Disease focus	Type of conferencing	Schedule
Effectiveness of NIMHANS ECHO blended tele-mentoring model on integrated mental health and addiction for counselors in rural and underserved districts of Chhattisgarh, India	Mehrotra 2018	Clinical psychologists and psychiatric social workers, India	Mental health and substance use	Video conference (accessible by mobile phone) synchronous and asynchronous formats	2 h, every other week for 12 sessions
Innovative telementoring for addiction management for remote primary care physicians: a feasibility study	Rao Sagi 2018	Primary care physicians, India	Opioid, substance use	Face-to-face and video conference, synchronous and asynchronous digital formats	10 days in person training, 2-h biweekly video sessions for 1.5–2 h
Project Echo telementoring intervention for managing chronic pain in primary care: insights from a qualitative study	Carlin 2018	Family physicians, nurse practitioners, registered nurses, social workers, occupational and physical therapists, pharmacists, physicians' assistants, and other allied health workers, Ontario, Canada	Chronic pain and opioid	Face-to-face weekends, weekly video conference	Weekly video conference, periodic face-to-face residential weekend workshops
SCAN-ECHO for pain management: implementing a regional telementoring training for primary care providers	Ball 2018	PCPs working at outpatient clinics throughout the Ohio network of VHA medical centers	Chronic pain and opioid	Video conference	Weekly sessions
Army and navy ECHO pain telementoring improves clinician opioid prescribing for military patients: an observational cohort study	Katzman 2019	Physicians, advanced practice clinicians, and care teams who work with military patients	Opioid, substance use	Video conference	2-h weekly sessions, offered 46 weeks per year
Multi-model implementation of evidence-based care in the treatment of opioid use disorder in Pennsylvania	Kawasaki 2019	Primary care physicians: general internal medicine, family medicine and emergency medicine in Pennsylvania	Opioid, substance use	Video conference	Twelve, 1-h sessions, bi-weekly -DATA waiver training using ECHO platform
Implementation of the hub and spoke model for opioid use disorders in California: rationale, design and anticipated impact	Miele 2019	Primary care doctors, nurses and other physicians in California	Opioid, substance use	Video conference	1-h sessions, monthly
Expanding treatment for opioid use	Tofighi 2019	Primary care physicians from	Opioid, substance use	Video conference	16, 2-h, bi-weekly

Table 2. (Continued)

Title	First author, year	Population studied	Disease focus	Type of conferencing	Schedule	Study design	Measures	Number of participants	Level of Moore's framework	Conclusions
disorder in publicly funded primary care clinics: exploratory evaluation of the NYC health+hospitals buprenorphine ECHO program		the ambulatory care clinics in New York City, NY				Post-assessment	-Evaluation measure including quality and content of presentation; subjective experiences, suggestions for future ECHOs	Out of 120 people, 65 (54.1%) participants took part at least once 45 (75%) participated in three or more	1, 2, 3, 4, 5	-All participants reported that they would make a change in practice -high degree of acceptability of program -multiple benefits acknowledged
Technology-enhanced learning in addiction mental health developing a virtual knowledge network: NIMHANS ECHO						-A semi-structured interview every 10 sessions with five randomly selected spoke participants -pre-/post-quantitative assessment	-Interview -knowledge questionnaire	31 sessions, each with an average of 35 participants	2, 3, 4	-Being a part of a community of practice -knowledge gains
ECHO Ontario chronic pain & opioid stewardship: providing access and building capacity for primary care providers in underserved, rural, and remote communities										
Project ECHO (extension for community healthcare outcomes): a new model for educating primary care providers about treatment of substance use disorders						x	x	-Average of 147 participants per year -Since January 1, 2010, 654 unique participants attended at least 1 clinic – 285 attended more than 1 session	2	-Increase in buprenorphine-waivered physicians -over 950 cases presented in ECHO sessions
Evaluation of American Indian health service training in pain management and opioid substance use disorder						Pre-/post-assessment	-KnowPain 12 attitude survey - knowledge measure -self-efficacy measure -two open-ended questions	1079 participants	1, 3, 4	-Significant knowledge gain -significant increase in self-efficacy
Improving pain care with project ECHO in community health centers						Quasi-experimental, pre-/post-intervention, with comparison group -focus groups	-KnowPain 50 knowledge survey -attitude about pain	Intervention ($n = 10$) control ($n = 10$)	1, 3, 4, 5	-Significant knowledge gains by intervention group -significant change in attitudes compared with control group

Table 2. (Continued)

Title	Study design	Measures	Number of participants	Level of Moore's framework	Conclusions
					-practice changes (less prescribing of opioids to manage pain) -increase in referrals to behavioral health by intervention group
Building provincial mental health capacity in primary care: an evaluation of a Project ECHO mental health program	Pre-/post-assessment	-Self-efficacy measure -engagement in ECHO -knowledge measure -professional isolation -satisfaction with ECHO	131 participants	1, 2, 3,4	-Significant increase in knowledge gains -near significance in self-efficacy -overall positive satisfaction
Evaluation of an innovative tele-education intervention in chronic pain management for primary care clinicians practicing in underserved areas	Pre-/post-assessment	-KnowPain 12 knowledge survey -self-efficacy measure -satisfaction with ECHO	119 participants	1, 2, 3, 4	-Significant increase in self-efficacy/confidence -significant increase in knowledge gains -overall satisfaction with ECHO
Effectiveness of NIMHANS ECHO blended tele-mentoring model on integrated mental health and addiction for counselors in rural and underserved districts of Chhattisgarh, India	pre-/mid-/post-assessments	-Knowledge survey -self-efficacy measure -satisfaction with ECHO	12	1, 2, 3, 4, 5	-Increase in knowledge -significant increase in self-efficacy -overall satisfaction with ECHO
Innovative telementoring for addiction management for remote primary care physicians: a feasibility study	pre-/mid-/post-assessments	-Knowledge survey -self-efficacy measure -satisfaction with ECHO	36 participants	1, 2, 3, 4	-Significant increase in knowledge gains -significant increase in self-efficacy -overall satisfaction with ECHO
Project Echo telementoring intervention for managing chronic pain in primary care: insights from a qualitative study	Qualitative focus groups	(1) The experience of participating in ECHO sessions, (2) personal "takeaways," or valued lessons, (3) sharing of knowledge acquired, (4) perceived benefits or drawbacks of the ECHO model	37 participants, 6 groups (n = 222)	1, 2, 3, 4	Themes; (1) challenges of managing chronic pain in primary care; (2) increase in knowledge; (3) the diffusion of knowledge gained through ECHO to participants' colleagues and patients; (4) generation of a sense of community; and

Table 2. (Continued)

Title	Study design	Measures	Number of participants	Level of Moore's framework	Conclusions
SCAN-ECHO for pain management: implementing a regional telementoring training for primary care providers	-pre-/post-assessment -qualitative interviews	-Knowledge survey -self-efficacy measure	25	1, 2, 3, 4, 5	(5) disadvantages associated with participating in ECHO; -Significant increase in knowledge gains -significant increase in self-efficacy -improved patient care (self-report)
Army and navy ECHO pain telementoring improves clinician opioid prescribing for military patients: an observational cohort study	Observational cohort study comparing ECHO participant sites with non-ECHO sites	Analyzed number of prescriptions and prescribing behaviors	47 army and 33 navy sites	6	-Decline in opioid prescribing -decline in dosing -decline in opioid-using patients
Multi-model implementation of evidence-based care in the treatment of opioid use disorder in Pennsylvania	-Post-test after each session	Survey targeting: -knowledge -isolation -ability to provide patent care -satisfaction with ECHO -relevance of ECHO to practice	20	1, 2, 3, 4	-Increase in knowledge -decrease in isolation -increase in confidence to provide treatment (self-report) -overall satisfaction with ECHO
Implementation of the hub and spoke model for opioid use disorders in California: rationale, design and anticipated impact	x	x	On average 30–50 each session	x	x
Expanding treatment for opioid use disorder in publicly funded primary care clinics: exploratory evaluation of the NYC health+hospitals buprenorphine ECHO program	-Pre-/post-test	-Knowledge survey -self-efficacy measure -satisfaction with ECHO	17 (participants were encouraged to attend 10 out of 16 trainings—only 53% complied)	1, 2, 3, 4	-Minimal improvements in knowledge -increase in self-efficacy -minimal increase in waivered physicians -low attendance rate

findings [4, 14, 15, 17, 19•, 20, 22–27]. These studies discussed the overall improvement of baseline knowledge of topics discussed during sessions. Many of these studies conducted initial needs assessments to evaluate what topics are of interest and necessary to learn for participants [4, 24, 26]. All studies used multiple-choice post-tests to evaluate change in knowledge as a result of participation in the ECHO sessions. Self-report of knowledge can contain inherent bias, which is a limitation.

Level 4: Competence

Twelve studies reported self-efficacy or self-confidence of participants who participated in Project ECHO sessions [4, 14, 15, 17, 19•, 20, 22–27]. Competence was evaluated using either multiple-choice or semi-structured interview methods. All studies reported increases in self-efficacy after attending sessions. Some study participants noted increased knowledge of resources and a sense of community for OUD treatment providers [15, 17, 20, 23, 24]. Self-report data of self-efficacy or confidence can contain inherent bias, which is a limitation.

Level 5: Performance

Four studies focused on the impact of Project ECHO on delivery of outpatient care [14, 15, 23, 26]. Two of the studies reported an increase in communication with specialty care providers and provided examples of how these interactions informed changes in patient care practices [14, 15]. One study described the impact of ECHO case study presentations on subsequent improvements in patient care [26] while another discussed the impact that participation in ECHO had on increased referrals to behavioral health [23].

Level 6: Patient Health

One study directly correlated patient outcomes to participation in Project ECHO sessions by evaluating the overall number of opioid prescriptions, MME dosages per patient, the number of co-prescribed opioids and benzodiazepines, and the percent of opioid users [16]. This study compared data from sites that participated in Project ECHO and those that did not. This was an observational cohort study to determine systemic effects on patient health as a result of site-based participation in Project ECHO clinics. It was noted that although both the control and experimental groups had declined, a sharper decline existed for those participating in Project ECHO.

This study recognizes the limitations that the decreases observed in ECHO participating sites can also be attributed to changes in policy and guidelines for reduction in opioid prescriptions. Other limitations to this study were the skewed results towards men and active duty patients, the inability to analyze individual patient and provider data, specific reasons for declines in MME doses, opioid prescriptions, and number of co-prescriptions.

Level 7: Community Health

There were no studies that addressed the change in the health status of a community due to provider behaviors directly affected by participation in Project ECHO. However, a concomitant decline in total drug overdose deaths was noted in one study after the institution of a year-long tele-ECHO project focused on chronic pain and addiction [16, 23]. Three studies indicated an

increase in DATA-waivered physicians as a result of participation in Project ECHO, which may ultimately lead to a positive change in community health [17, 19•, 21•].

Discussion

To the best of our knowledge, this is the first systemic review of published literature on outcomes of Opioid Project ECHO programs. Opioid education-focused Project ECHO outcomes are predominantly limited to levels 1 through 4 of Moore's framework representing evaluation on participation, satisfaction, self-reported learning, and competence. Most studies report improvement in self-efficacy, knowledge, and attitudes toward patients with OUD while reporting a decrease in feeling of professional isolation. A study noted reductions in co-prescribing of benzodiazepines due to participation in Project ECHO. Another study noted concomitant declines in total drug overdose deaths after a year-long tele-ECHO project focused on chronic pain and addiction. Three Project ECHO focused on SUDs in New Mexico, New York, and Pennsylvania showed an increase in the number of buprenorphine-waivered following ECHO implementation. Given the current health epidemic in the lack of trained medical providers to manage opioid use and misuse, these findings highlight an important opportunity for the healthcare field. Opioid-focused Project ECHO also bridges a significant need for primary care clinicians to be paired with an experienced provider for guided practice, learn about local counseling resources, and receive CME courses on OUD.

An inherent limitation of the current review is the small number of studies available on this topic. Several studies suffered from selection bias, and none used a randomized control methodology. Although the current review utilized extensive search methods, the studies represented here could suffer from publication bias. This review highlighted a need for more research on tele-ECHO clinics focused on OUD which has been identified by other researchers [3]. An extensive amount of data exists on other types of ECHO projects. Few opioid Project ECHO programs have evaluated provider, patient, community, and cost-related outcomes, which is a critical area of future research. Opioid-focused Project ECHO is one of several systems-based approaches focused on education and the development of a skilled workforce. Other models to support workforce development, connect providers, and enhance patient treatment include PCSS, state-based models (Vermont, Maryland, Massachusetts, Oregon), and other models that integrate behavioral health (e.g., Medicaid health home model). However, widely generalizable data on education, provider, patient, and cost outcomes are not available. Future research to determine superiority or inferiority of a particular model over others relative to context should be evaluated. Clinicians conducting and participating in Project ECHO engage with tele-ECHO clinics during business hours, which results in loss of revenue for them and their practices. The lack of financial incentives is a significant concern for initial and continued participation [21]. For improvement in overall delivery and sustainability of opioid- and substance use-focused Project ECHO clinics, incentives for academic medical centers as well as providers presenting at Project ECHO clinics need to be evaluated.

With the intensifying need for trained providers in opioid and substance use treatment, this type of tele-ECHO clinic would benefit from more research to show the benefit for both provider and patient in order to ensure continued funding and sustainability.

Conclusion

Project ECHO for opioid use disorder has the potential to build an expert workforce, improve access to expert specialist care in isolated communities, disseminate information in a timely manner, increase current and relevant medical knowledge, reduce health disparities, promote evidence-based and high-quality care for complex conditions, create a community of practice, and increase job satisfaction in providers. Few studies have been published to date regarding the impact of OUD-specific tele-ECHO clinics on provider and patient. Given the documented need for highly trained providers and range of comorbid conditions that prevail in patients with OUD and SUD, the dissemination and provision of Project ECHO focused in this area should be a priority.

Funding Information

Compliance with Ethical Standards

Conflict of Interest
C. M. Holmes declares that he has no conflict of interest. L. Keyser-Marcus declares that she has no conflict of interest. B. Dave declares that he has no conflict of interest. Vimal Mishra declares that he has no conflict of interest.

Human and Animal Rights and Informed Consent
This article does not contain any studies with human or animal subjects performed by any of the authors.

References and Recommended Reading

Papers of particular interest, published recently, have been highlighted as:
• Of importance

1. Association AP. Opioid use disorder. 2019. Available from: https://www.psychiatry.org/patients-families/addiction/opioid-use-disorder/opioid-use-disorder

2. Association AP. Diagnostic and statistical manual of mental disorders. 5th ed. Arlington: American Psychiatric Association; 2013.

3. Zhou C, Crawford A, Serhal E, Kurdyak P, Sockalingam S. The impact of project ECHO on participant and patient outcomes: a systematic review. Acad Med. 2016 Oct;91(10):1439–61.

4. Rao Sagi M, Chand P, Murthy P, Komaromy M, Arora S. Innovative telementoring for addiction management for remote primary care physicians: a feasibility study. Indian J Psychiatry. 2018;60(46):1–6 Available from: www.indianjpsychiatry.org.

5. Christie GC, Kennedy CPJ, Madras B. The president's commission on combating drug addiction

and the opioid crisis roster of commissioners. Pres Commun. 2019. Available from: https://www.whitehouse.gov/sites/whitehouse.gov/files/images/Final_Report_Draft_11-15-2017.pdf.

6. Netherland J, Botsko M, Egan JE, Saxon AJ, Cunningham CO, Finkelstein R, et al. Factors affecting willingness to provide buprenorphine treatment. J Subst Abus Treat. 2009 Apr;36(3):244–51.

7. Andrilla CHA, Coulthard C, Patterson DG. Prescribing practices of rural physicians waivered to prescribe buprenorphine. Am J Prev Med. 2018;54(6):S208–14. https://doi.org/10.1016/j.amepre.2018.02.006.

8. Haffajee RL, Bohnert ASB, Lagisetty PA. Policy pathways to address provider workforce barriers to buprenorphine treatment. Am J Prev Med. 2018;54(6):S230–42.

9. Huhn AS, Dunn KE. Why aren't physicians prescribing more buprenorphine? J Subst Abuse Treat. 2017 [cited 2019 Oct 13];78:1–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28554597.

10.• Korthuis PT, McCarty D, Weimer M, Bougatsos C, Blazina I, Zakher B, et al. Primary care–based models for the treatment of opioid use disorder. Ann Intern Med. 2017;166(4):268–78.
A comprehensive overview of various primary-care based models to treat OUD.

11. Furlan AD. Project ECHO demonopolizes knowledge from expert specialists in academic centres to healthcare professionals in rural areas. Univ Tor Med J. 2019;96(2):38–40.

12. Project ECHO: our story. 2019 [cited 2019 Jul 15]. Available from: https://echo.unm.edu/about-echo/ourstory.

13. Moore DE Jr, Green JSGH. Achieving desired results and improved outcomes: integrating planning and assessment throughout learning activities. J Contin Educ Heal Prof. 2009;29(1):1–15.

14. Chand P, Murthy P, Gupta V, Kandasamy A, Jayarajan D, Sethu L, et al. Technology enhanced learning in addiction mental health: developing a virtual knowledge network: NIMHANS ECHO. Proc - IEEE 6th Int Conf Technol Educ T4E 2014. 2014;(December):229–32.

15. Ball S, Wilson B, Ober S, Mchaourab A. SCAN-ECHO for pain management: implementing a regional telementoring training for primary care providers. Pain Med (United States). 2018;19(2):262–8.

16. Katzman JG, Qualls CR, Satterfield WA, Kistin M, Hofmann K, Greenberg N, et al. Army and navy ECHO pain telementoring improves clinician opioid prescribing for military patients: an observational cohort study. J Gen Intern Med. 2019;34(3):387–95.

17. Kawasaki S, Francis E, Mills S, Buchberger G, Hogentogler R, Kraschnewski J. Multi-model implementation of evidence-based care in the treatment of opioid use disorder in Pennsylvania. J Subst Abuse Treat. 2019;106(August):58–64. https://doi.org/10.1016/j.jsat.2019.08.016.

18. Miele GM, Caton L, Freese TE, McGovern M, Darfler K, Antonini VP, et al. Implementation of the hub and spoke model for opioid use disorders in California: rationale, design and anticipated impact. J Subst Abuse Treat. 2019;(July):1–6. https://doi.org/10.1016/j.jsat.2019.07.013.

19.• Tofighi B, Isaacs N, Byrnes-Enoch H, Lakew R, Lee JD, Berry C, et al. Expanding treatment for opioid use disorder in publicly funded primary care clinics: Exploratory evaluation of the NYC health+hospitals buprenorphine ECHO program. J Subst Abuse Treat. 2019 Nov;106:1–3.
A good example of ECHO format with wide range of results for adressing the OUD crisis.

20. Dubin RE, Flannery J, Taenzer P, Smith A, Smith K, Fabico R, et al. ECHO Ontario chronic pain & opioid stewardship: providing access and building capacity for primary care providers in underserviced, rural, and remote communities. In: Studies in Health Technology and Informatics. IOS Press; 2015. p. 15–22.

21.• Komaromy M, Duhigg D, Metcalf A, Carlson C, Kalishman S, Hayes L, et al. Project ECHO (Extension for Community Healthcare Outcomes): a new model for educating primary care providers about treatment of substance use disorders. Subst Abus. 2016;37(1):20–4.
Summary of the impact Project ECHO can have by engaging providers using case based learning to help patients with SUD and becoming buprenorphine waivered.

22. Katzman JG, Fore C, Bhatt S, Greenberg N, Salvador JG, Comerci GC, et al. Evaluation of American Indian health service training in pain management and opioid substance use disorder. Am J Public Health. 2016;106(8):1427–9.

23. Anderson D, Zlateva I, Davis B, Bifulco L, Giannotti T, Coman E, et al. Improving pain care with project ECHO in community health centers. Pain Med (United States). 2017;18(10):1882–9.

24. Sockalingam S, Arena A, Serhal E, Mohri L, Alloo J, Crawford A. Building provincial mental health capacity in primary care: an evaluation of a project ECHO mental health program. Acad Psychiatry. 2018;42(4):451–7.

25. Furlan AD, Zhao J, Voth J, Hassan S, Dubin R, Stinson JN, et al. Evaluation of an innovative tele-education intervention in chronic pain management for primary care clinicians practicing in underserved areas. J Telemed Telecare. 2018;0(0):1–9.

26. Mehrotra K, Chand P, Bandawar M, Rao Sagi M, Kaur S, et al. Effectiveness of NIMHANS ECHO blended telementoring model on Integrated Mental Health and Addiction for counsellors in rural and underserved districts of Chhattisgarh, India. Asian J Psychiatr. 2018;36:123–7.

27. Carlin L, Zhao J, Dubin R, Taenzer P, Sidrak H, Furlan A. Project ECHO telementoring intervention for managing chronic pain in primary care: insights from a qualitative study. Pain Med (United States). 2018;19(6):1140–6.

Publisher's Note