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Program Description

Project ECHO: Building capacity to manage complex conditions in rural, remote and underserved areas

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Abstract

There is a need to bring specialized medical expertise to rural and remote areas. Project ECHO offers a method to move knowledge from specialists in academic centres using videoconference, case-base learning, and best-practices knowledge sharing. Ontario has implemented ECHO since 2014 and has demonstrated favourable outcomes among primary care clinicians.

Keywords: Chronic illness, mental health, pain, primary care, rural health

Résumé

Le besoin existe de transférer l'expertise médicale spécialisée dans les régions rurales et éloignées. Le projet ECHO est une méthode de transfert des connaissances des spécialistes des centres universitaires à l'aide de vidéoconférences, d'apprentissage basé sur les cas et de partage des pratiques exemplaires. L'Ontario a lancé le projet ECHO en 2014 et le projet a donné des résultats favorables chez les cliniciens de première ligne.

Mots-clés: Maladie chronique, santé mentale, douleur, soins de première ligne, santé rurale

INTRODUCTION

People in rural and remote areas have difficulty accessing specialty care because specialists are highly concentrated in large cities.[1] Many disadvantaged patients living in underserved areas fail to receive needed care because they cannot afford travelling long distances.[2] Efforts to recruit and retain specialists in these regions face significant obstacles. New approaches are needed to ensure that people in rural and remote areas receive the same quality of care as those in more densely populated regions.[2] One solution to this problem is for specialists to share their knowledge and skills with primary care providers (PCPs), training them to deliver effective specialised care for chronic disorders.

Project extension for community healthcare outcomes (ECHO) is a unique educational model that does just this. In ECHO, an academic hub of specialists works with PCPs via video conferencing. The specialists provide brief didactic lectures and

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the PCPs present cases from their practices to facilitate case-based learning. In contrast to other pedagogical models, ECHO is designed for bidirectional teaching between the specialists and PCPs, and it may be an effective method to increase the scope of practice of rural generalist physicians. This paper describes the ECHO model, discussing its strengths and weaknesses.

PROJECT ECHO: A UNIQUE EDUCATIONAL MODEL

ECHO[1] was developed in New Mexico in 2004 by Sanjeev Arora, a hepatologist, during a period when the state had the highest per-capita rate of viral hepatitis in the US, and there was a need to deliver high-quality care to rural, underserved and socially disadvantaged populations.[3,4] Currently, there are ECHOs for more than 65 complex conditions around the world including mental health in adults and children,[5] hepatitis C,[6] HIV,[7] substance use disorders,[5] diabetes and endocrinology,[8] geriatrics,[9] chronic pain,[10,11] autism,[12] multiple sclerosis[13] and palliative care[14] The ECHO model has also been used for non-medical education in topics such as training people in rural government offices to do continuous quality improvement.[15]

Project ECHO combines several medical education methods to enhance PCP care. It uses videoconferencing to connect groups of PCPs from rural or urban areas with an academic or tertiary care interprofessional specialist hub on a regular schedule [Figure 1].[7] In this way, a group identity is created that fosters inter-professional learning. ECHO proposes that we should move knowledge, not people, because the best care is local care. The mission of Project ECHO is to expand the capacity of PCPs to provide best practice care for common, complex or chronic diseases in rural and underserved areas and to monitor outcomes.

ECHO clinics also combine didactics with case-based learning. Sessions typically begin with a brief didactic from a hub specialist, with embedded case material. This is followed by one or many real de-identified case presentations. These cases are presented by ECHO participants and are drawn from their own practice. The PCPs ask clarifying questions and make recommendations, as do the specialists. The core operating principle

Figure 1: Picture of an extension for community healthcare outcomes session.

is that every participant at the ECHO clinic has expertise to share, whether it is knowledge of the regional culture affecting medical care or the latest evidence-based treatment. There is a culture of 'all teach, and all learn'.[16] Rural generalists have an opportunity to increase their scope of practice by attending ECHO sessions in various topics of medicine. This may improve physician's job satisfaction, retention in rural areas and self-efficacy. Project ECHO's model of medical education and care management empowers clinicians to provide enhanced care for more people, right where they live.

THE FOUR PILLARS OF EXTENSION FOR COMMUNITY HEALTHCARE OUTCOMES

The four pillars of ECHO are: (1) using videoconference technology to leverage scarce healthcare resources, (2) specialists sharing best practices with PCPs, (3) case-based learning and (4) continuous monitoring of program outcomes.

Videoconferencing

ECHO breaks down the walls between specialty and primary care by conducting regular videoconferencing sessions that connect remote practitioners who present their de-identified patients to an academic ECHO expert interprofessional team that provides guidance to enable the practitioners to treat their patients themselves. The ECHO model has the potential to improve patients' access to specialty care by increasing primary care clinicians' capacities. The

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ECHO model is not the same as telemedicine, where the main goal is to improve access using technology to allow specialists to deliver care directly to patients by videoconferencing.

Sharing best practices

ECHO provides a channel, whereby specialist mentors can share best practices with local clinicians to reduce variation in care to improve outcomes. ECHOs increase clinicians' capacities to deliver specialty treatments by engaging these clinicians where they live through a continuous learning process. Moreover, the facilitation process used in ECHO clinics breaks down the barriers between the specialists and PCPs. In an environment of equal status and mutual respect, partners learn from the specialists and vice versa, as well as the PCPs learning from each other. The goal of the ECHO clinic is that PCPs will be answering questions for each other with materials or with insights that they have learned several weeks before.

The ECHO model also uses the concept of Force Multiplication via the hub and spoke design. The goal is that by learning through interaction with a hub, spokes will evolve to become centres of excellence and start providing specialist care to their geographical region [Figure 2]. Participants in the ECHO Ontario Chronic Pain and Opioid Stewardship program used a variety of ways to disseminate the ECHO knowledge to non-participating colleagues: several engaged in 'corridor consultation' or passing on knowledge informally to a colleague, while others used a more systematic approach (e.g., distribution of materials) to share the idea with a second clinic in a different location [Figure 2].[17]

Case-based learning

ECHO uses a case-based learning process to develop specialty expertise among PCPs. Many medical education models employ a purely didactic approach, which does not resemble the supervised apprenticeship approach characteristic of medical training. During ECHO sessions, de-identified cases from the PCPs (the 'spokes') are sent securely to the ECHO clinic (the 'hub') using standardised intake forms, and specialists can preferentially triage the most complex cases presented to be seen face-to-face at their academic centre. For example, the pain specialists in the hub will expedite patients at higher risk of opioid-related complications. After the case discussion, the hub members prepare a summary with all the recommendations and community resources that are relevant to the case discussed. The summary is sent not only to the person who presented the case, but also to all participants in that session, so they can generalise the learning.

Continuous outcome monitoring

ECHOs continuously monitor their program outcomes. The monitored outcomes are typically self-reported effects on ECHO participants. Physicians, nurses, nurse practitioners, physician assistants and pharmacists who participate in these programs report increased knowledge, empathy and self-efficacy in dealing with these chronic conditions.[18] Patient outcomes of the ECHO viral hepatitis program (i.e., sustained viral response), published in the New England

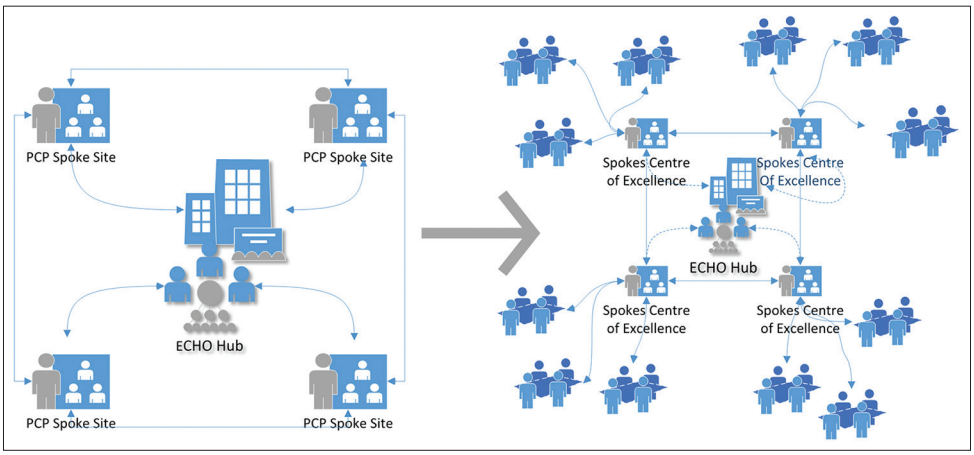

Figure 2: Concept of force multiplication.

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Journal of Medicine,[4] were identical in the rural/prison communities compared to academic clinics and demonstrated less serious adverse events in the rural and prison communities.

EXTENSION FOR COMMUNITY HEALTHCARE OUTCOMES AND CLINICIAN ENGAGEMENT

ECHO does not charge clinicians to participate. However, participation does require time during which they could be earning by seeing patients. So why do they participate? For healthcare professionals working in rural communities, the main benefits of participating in ECHO include: no-cost continuing medical education, professional interaction with colleagues and access to specialists.

Patients living in rural, remote and underserved areas receive best practice care without having to travel to urban centres to see a specialist. Specialists who live far from the patient will frequently have little information about the culture and healthcare resources of the communities where these patients live. Instead, specialists serve as mentors and colleagues sharing their medical knowledge and expertise with local PCPs. Specialists also learn during the sessions because the recommendations are generated by the whole community attending a session. ECHO serves as a community of practice where PCPs receive support and develop the skills they need to treat a particular condition.[19]

The results of six focus groups conducted with spokes from the ECHO Ontario Chronic Pain and Opioid Stewardship reported that being in ECHO led to improvement in clinical knowledge and skills in patient–provider interaction.[17] Participants also reported passing the knowledge they gained through ECHO to their colleagues and patients. Finally, they said that ECHO provided them with a sense of community. The main disadvantages of being in ECHO were the amount of time allocated to the didactic versus case presentations, time constraints for participation in the weekly sessions and some issues around the virtual connection.

DISCUSSION

Efforts to help PCPs enhance their diagnosis and treatment competencies of complex disorders are not new. The most frequently used educational model is the specialist-centred lecture or workshop. [20] This model has been demonstrated to increase PCP comfort and confidence in their skills.[21] However, it rarely leads to sustained practice change.[22] Based on pedagogical research, suggestions for improvement to this model are to provide small group learning settings, make the learning interactive and to find ways to make it personal and relevant to learners, e.g., using cases for illustration.[23]

Another strategy is the distance-expert consultation model. Instead of providing a workshop or lecture, a PCP connects to a tertiary care expert for a consultation, usually by phone. In addition to enabling a PCP to move forward with an individual patient, the distance-expert consultation model aims to 'build PCP capacity' to manage more complex cases over time through repeated learning on a case-by-case basis. For example, Massachusetts, Washington and New York all have large scale programs for psychiatric child and adolescent phone consultation.[21,24,25] These programs have demonstrated provider satisfaction with phone consultations. Only the Washington program studied practice change. Using Medicare and pharmacy claims data, they demonstrated that easily accessible phone consultation increased the care provided to foster care youth and increased the population rate of prescription of attention-deficit hyperactivity disorder medications. A variant of the consultation model is e-consult, in which the specialist answers a clinical question by E-mail. E-consults have been shown to be effective in saving patient costs of travel to specialists and decreasing referrals for tertiary care assessments.[26]

Formal education and phone consultation are the most common methods for enhancing PCP care for complex disorders. However, their effects on long-term practice change have been disappointing, although the effects of distance consultation may be better.

Project ECHO, in contrast to other pedagogical models, uses bidirectional teaching between the specialists and PCPs that may also be an effective way to increase a rural generalist physician's scope of practice. It is also a platform that enables regular contact with colleagues who are facing similar challenges and finding potential solutions to complex cases, i.e., a community of practice.

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Limitations of ECHO

Several limitations of the ECHO model should be acknowledged. Although ECHO is committed to monitoring its outcomes, in practice, it is difficult for an ECHO to identify changes in how its participants deliver care or how those clinicians' patients are functioning. This means that whereas there are plentiful data indicating that clinicians find the ECHO experience satisfying, there are few rigorous tests of whether it benefits patients. In addition, there are important predictions of the ECHO model which have not been tested. For example, ECHO should reduce wait times in specialty clinics by improving access for the most complex patients who most need tertiary interprofessional care. To our knowledge, however, this has never been tested.

In addition, ECHO is not a panacea for access to specialty care, nor does it claim to be. ECHO seeks to be a force multiplier for specialist skill in the care of chronic illnesses, by transferring skills from specialist to PCPs. However, this will not work in regions that suffer from an acute shortage of PCPs. A recent study of Saskatchewan and Alberta showed that some rural areas had both significantly fewer PCPs/1000 residents and higher proportions of residents aged 65 years or older, indicating that these regions likely had higher demands for health services.[27,28] Similar problems are likely to be prevalent in Ontario and other parts of Canada. In general, it is likely that many of the areas that suffer from shortages of specialists likewise suffer from shortages of PCPs. This suggests that ECHO would be most effective in the context of a program that also increased rural access to primary care.

There are several issues concerning ECHO that should be explored in future research. It would be helpful to establish a detailed map of patient accessibility to specialty care and then examine whether ECHO is succeeding in recruiting participants from those underserved areas. We also need additional tests of whether physician practice actually changes after participation in ECHO and of whether patients benefit when their doctors participate in ECHO.

CONCLUSIONS

ECHO is a movement to demonopolise knowledge and amplifies local capacity to provide best practice care for underserved people all over the world. The ECHO model is committed to addressing the needs of the most vulnerable populations by equipping communities with the right knowledge, at the right place, at the right time.

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REFERENCES

1. Toguri C, Jong M, Roger J. Needs of specialists in rural and remote Canada. Can J Rural Med 2012;17:56-62.
2. Brundisini F, Giacomini M, DeJean D, Vanstone M, Winsor S, Smith A. Chronic disease patients' experiences with accessing health care in rural and remote areas: A systematic review and qualitative meta-synthesis. Ont Health Technol Assess Ser 2013;13:1-33.
3. Arora S, Geppert CM, Kalishman S, Dion D, Pullara F, Bjeletich B, *et al.* Academic health center management of chronic diseases through knowledge networks: Project ECHO. Acad Med 2007;82:154-60.
4. Arora S, Thornton K, Murata G, Deming P, Kalishman S, Dion D, *et al.* Outcomes of treatment for hepatitis C virus infection by primary care providers. N Engl J Med 2011;364:2199-207.
5. 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;42:451-7.
6. Marciano S, Haddad L, Plazzotta F, Mauro E, Terraza S, Arora S, *et al.* Implementation of the ECHO® telementoring model for the treatment of patients with hepatitis C. J Med Virol 2017;89:660-4.
7. Arora S, Kalishman S, Dion D, Som D, Thornton K, Bankhurst A, *et al.* Partnering urban academic medical centers and rural primary care clinicians to provide complex chronic disease care. Health Aff (Millwood) 2011;30:1176-84.
8. Colleran K, Harding E, Kipp BJ, Zurawski A, MacMillan B, Jelinkova L, *et al.* Building capacity to reduce disparities in diabetes: Training community health workers using an integrated distance learning model. Diabetes Educ 2012;38:386-96.
9. Bennett KA, Ong T, Verrall AM, Vitiello MV, Marcum ZA, Phelan EA. Project ECHO-geriatrics: Training future primary care providers to meet the needs of older adults. J Grad Med Educ 2018;10:311-5.
10. Katzman JG, Comerci G Jr., Boyle JF, Duhigg D, Shelley B, Olivas C, *et al.* Innovative telementoring for pain management: Project ECHO pain. J Contin Educ Health Prof 2014;34:68-75.
11. Dubin RE, Flannery J, Taenzer P, Smith A, Smith K, Fabico R, *et al.* ECHO Ontario chronic pain and opioid stewardship: Providing access and building capacity for primary care providers in underserviced, rural, and remote communities. Stud Health Technol Inform 2015;209:15-22.
12. Mazurek MO, Brown R, Curran A, Sohl K. ECHO autism. Clin Pediatr (Phila) 2017;56:247-56.
13. Johnson KL, Hertz D, Stobbe G, Alschuler K, Kalb R, Alexander KS, *et al.* Project extension for community healthcare outcomes (ECHO) in multiple sclerosis: Increasing clinician capacity. Int J MS Care 2017;19:283-9.
14. Arora S, Smith T, Snead J, Zalud-Cerrato S, Marr L, Watson M, *et al.* Project ECHO: An effective means of increasing palliative care capacity. Am J Manag Care 2017;23:SP267-SP271.
15. AMCHP. Quality Improvement in Maternity Care via Project

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ECHO; 2017. Available from: http://www.amchp.org/programsandtopics/BestPractices/InnovationStation/ISDocs/IS_Project%20ECHO.pdf. [Last accessed on 2019 Jun 05].
16. Arora S, Thornton K, Komaromy M, Kalishman S, Katzman J, Duhigg D. Demonopolizing medical knowledge. Acad Med 2014;89:30-2.
17. 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 2018;19:1140-6.
18. 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;1-9:1357633X18782090.
19. 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;91:1439-61.
20. Kroenke K, Taylor-Vaisey A, Dietrich AJ, Oxman TE. Interventions to improve provider diagnosis and treatment of mental disorders in primary care. A critical review of the literature. Psychosomatics 2000;41:39-52.
21. Gadomski AM, Wissow LS, Palinkas L, Hoagwood KE, Daly JM, Kaye DL. Encouraging and sustaining integration of child mental health into primary care: Interviews with primary care providers participating in project TEACH (CAPES and CAP PC) in NY. Gen Hosp Psychiatry 2014;36:555-62.
22. Benthem GH, Heg RR, van Leeuwen YD, Metsemakers JF. Teaching psychiatric diagnostics to general practitioners: Educational methods and their perceived efficacy. Med Teach 2009;31:e279-86.
23. Rideout M, Held M, Holmes AV. The didactic makeover: Keep it short, active, relevant. Pediatrics 2016;138. pii: e20160751.
24. Hilt RJ, Barclay RP, Bush J, Stout B, Anderson N, Wignall JR. A statewide child telepsychiatry consult system yields desired health system changes and savings. Telemed J E Health 2015;21:533-7.
25. Sarvet B, Gold J, Bostic JQ, Masek BJ, Prince JB, Jeffers-Terry M, *et al*. Improving access to mental health care for children: The massachusetts child psychiatry access project. Pediatrics 2010;126:1191-200.
26. Liddy C, Moroz I, Keely E, Taljaard M, Mark Fraser A, Deri Armstrong C, *et al*. The use of electronic consultations is associated with lower specialist referral rates: A cross-sectional study using population-based health administrative data. Fam Pract 2018;35:698-705.
27. Shah TI, Bell S, Wilson K. Spatial accessibility to health care services: Identifying under-serviced neighbourhoods in Canadian urban areas. PLoS One 2016;11:e0168208.
28. Shah TI, Milosavljevic S, Bath B. Determining geographic accessibility of family physician and nurse practitioner services in relation to the distribution of seniors within two Canadian Prairie provinces. Soc Sci Med 2017;194:96-104.

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