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Abstract

Hepatitis C virus (HCV) infection is still a major health problem throughout the world. HCV patients living in rural areas are less fortunate than their counterparts residing in populous urbanized regions. The lack of medical resources and properly trained medical personnel in rural regions make it especially burdensome for HCV patients seeking treatment. Dr. Sanjeev Arora at the University of New Mexico Health Sciences Center took initiative to resolve the issue at hand by developing a model named Project Extension for Community Health Outcomes (ECHO). ECHO connects primary care providers (PCPs), usually family medicine physicians, in local communities with specialists. ECHO providers test the efficacy of treatment given using the ECHO model vs that at academic medical centers. The ECHO model has produced promising results such that the sustained virologic response rates for both types of sites were near-equivalent. Show Me ECHO was adapted from Project ECHO to train PCPs in Missouri and equip them with the tools and skills to properly treat and diagnose HCV in a timely manner. This healthcare model can be implemented for treating other common infections and chronic diseases. Telemedicine is the direction healthcare is headed for the next several decades. It has potential to be applied in developing countries to alleviate agony and despair resulting from limited resources and lack of access to expert medical care.

Key words: Hepatitis C; Treatment; Community; Health care; Outcome; Rural; Primary care; Extension for Community Health Outcomes

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Core tip: The American Association for the Study of Liver

Diseases recommends Project Extension for Community Health Outcomes (ECHO). Project ECHO aims to move the knowledge not the patients. By bringing expertise to primary care physicians, patients from rural and underserved communities will benefit by alleviating the struggle associated with travel and appointment delays. The framework of this project can be used to manage other diseases that require specialty physician care that may not be feasible. Telemedicine represents the future of healthcare, its success will substantially reshape the healthcare delivery in developing countries and is pivotal for geographically isolated and underserved populations.

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INTRODUCTION

Hepatitis C virus (HCV) infection and its complications are still a major health problem throughout the world. There are roughly 4 million persons with a seropositive test for HCV in the United States, many of whom are even not aware of the disease and many of those who know are in a medical quandary with regards on how to access treatment^[1]. Incredible progress has been achieved regarding HCV treatment in the past decade, highlighted by an increase in HCV cure rates.

Access to proper HCV treatment and care has truly become a hurdle for millions of patients housed in rural settings because of the uneven distribution of trained medical personnel and resources to select urbanized cities. As a result, patients in rural and remote areas often find themselves at the mercy of HCV because of the shortage of medical resources at their disposal. Oftentimes, these patients have no other option but visit nearby primary care providers (PCPs) in small clinics. However, PCPs are only equipped to address basic healthcare needs which mean HCV patients are subject to subpar treatment at best^[2,3].

WHAT IS PROJECT EXTENSION FOR COMMUNITY HEALTHCARE OUTCOMES?

The University of New Mexico Health Sciences Center (UNMHSC) launched the Extension for Community Healthcare Outcomes (ECHO) model in 2003 in response to the external circumstances that burdened many rural HCV patients from successfully being treated. Dr. Sanjeev Arora, a distinguished Professor of Medicine, Division of Gastroenterology, at the UNMHSC, is the

director and founder of Project ECHO. He pioneered a new high-speed approach for providing expert healthcare to patients. Dr. Arora was distraught with the reality that there is a prevalent shortage of resources; there are thousands of HCV patients needing quality care and treatment. He chose to be proactive to instill necessary change that was long overdue. Coupled with the rapid technological advancements of the time, telemedicine progressed and ECHO was born^[3,4] and has been proven to be effective^[5-7].

The purpose of the ECHO model is to establish a working network of PCPs, psychiatrists, pharmacists, infectious disease specialists, and other healthcare professionals that can collaborate and exchange information such as patient lab results and treatment plans (Figure 1). Through a video conferencing platform, the teams are given an opportunity to inform each other of their own personal experiences and challenges to better serve the interests of HCV patients in the long run. These sessions, called Knowledge Networks, allow PCPs to acquire the critical skills necessary in treating geographically isolated HCV patients^[8].

HIT OR MISS?

Arora *et al*^[8] set up an experimental model to test HCV treatment efficacy of their newly inaugurated ECHO program. They hypothesized that any success they have had with treating patients at academic medical centers would be mirrored in remote clinics employing the ECHO model. The parameter used to measure efficacy of treatment is sustained virologic response (SVR). After a patient completes therapy, he/she is evaluated for a period of 6 mo. If the HCV does not reappear during this time, the patient has achieved SVR^[8].

Originally, 519 patients enrolled in the study from both the ECHO sites and University HCV clinics. Of these 519, 407 remained relevant for the overall SVR rates in the study. HCV patients who got at least one dose of HCV treatment were included in the analysis. Any patient without follow-up data was considered as treatment failure^[5]. The patient count was 261 and 146 at the ECHO sites and University HCV clinics, respectively. Some more patients were also discontinued from the study for not meeting specified health targets. The overall SVR was 152/261 (58.2%) and 84/146 (57.5%) for ECHO sites and the University of New Mexico HCV clinic, respectively. Therefore, the magnitude of this success supports what Arora *et al*^[8] had hypothesized early on about HCV treatment using the ECHO model. As a result, the number of ECHO sites drastically increased to around 300 nowadays^[8]. Currently, each center is collecting the SVR data on new and more effective interferon free HCV treatment to compare the outcomes.

NEW MEXICO TO MISSOURI

Missouri residents amount to a little over 6 million



Figure 1 Extension for Community Health Outcomes Model. ECHO: Extension for Community Health Outcomes.

people. About one-fourth of all Missourians inhabit rural areas of the state^[9]. Missouri residents that belong to the underserved areas of the state are oftentimes disconnected from their specialty care providers because of geographic barriers. As mentioned before, the pool of health care resources is often concentrated in large metropolitan cities, which subsequently attracts many specialty care providers to these populous areas^[3]. According to the Bureau of Health Professions, about 20% to 25% people in Missouri live in a rural community. However, the percentage of physicians caring for these communities are roughly 9% of all physicians in Missouri with a notable shortage of specialists^[10].

TARGETS OF SHOW ME ECHO MODEL

Show Me ECHO, an adaptation of the University of New Mexico School of Medicine's ECHO model, was instigated with a similar purpose: To promote accessible and affordable quality care for HCV patients in disadvantaged underserved and rural populations in Missouri with an aim to move the knowledge not the patients^[6].

Show Me ECHO model in Missouri also echoes developing PCPs expertise. By educating and empowering PCPs, it will be possible to screen, diagnose, and treat HCV in a timely fashion in remote and underserved areas. The use of telemedicine surely has that potential to bridge the gap between specialists and PCPs through an exchange of knowledge and treatment protocols which can improve the patient experience for generations to come. In addition to all of this, a health surveillance system is essential to ensure fluid interactions between patients and healthcare providers. One of Show Me ECHO project goals is to create a link between the Missouri Department of Health, Senior Services, and the Missouri Primary Care Association so that HCV cases are accurately recorded. Thus, a sound health surveillance system across Missouri will advance the timeliness of diagnosis and treatment.

IMPLICATIONS OF ECHO

The American Association for the Study of Liver Diseases recommends Project ECHO because of its success in treating HCV patients amid the adversities experienced initially by both patients and healthcare professionals^[7]. Indeed, the benefits of Project ECHO

are paramount and not limited to successful SVR rates. By bringing expertise to PCPs, patients from rural and underserved communities will benefit by alleviating the struggle associated with travel and appointment delays. Additionally, community-based health centers, rather than university clinics, are usually more suitable for rural HCV patients because PCPs are often more cognizant of their local community. Visiting the same PCP for HCV treatment reduces tensions between both patients and healthcare providers, allowing for optimal coordination in a familiar setting^[8]. Without Project ECHO, many HCV treatments would have been stymied. Show Me ECHO is on track as well to produce promising results.

ECHO model is a great Segway into healthcare in developing countries. The possibilities for introducing Project ECHO in those countries are immense because healthcare is presumably hindered by the lack of appropriate expert medical care. Telemedicine can leverage the aid and significantly alleviate the patients' sufferings.

Project ECHO is a great template for the medical field to actively embrace because of its potential to allocate specialized care needed for disadvantaged HCV patients in developing countries. The framework of this project can be used to manage other diseases that require specialty physician care that may not be feasible. Telemedicine represents the future of healthcare, its success will substantially reshape the health care delivery in developing countries and is pivotal for geographically isolated and underserved populations.

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