# Democratizing Knowledge to Improve Care for the Underserved: Project ECHO

**Sanjeev Arora, Kumud Rai, Sunil Anand**

## THE ECHO STORY

Launched in 2003, at the University of New Mexico Health Sciences Center, Project ECHO (extension for Community Healthcare Outcomes) grew out of a need for rural and underserved patients in New Mexico, USA to have better access to specialty care. While treating patients with the hepatitis C virus (HCV), Project ECHO Director and founder, Dr Sanjeev Arora, recognized that the volume of patients needing specialized HCV care in his clinic far exceeded capacity. In addition, many patients had to travel very long distances to access care, resulting in lost work time and income, and travel costs. These obstacles negatively affected patient care, compliance and outcomes, as patients would often delay seeking care (and experience increased complications) or not seek treatment at all.

In response, Dr Arora developed a solution to the problem of inadequate access to specialty care. Using technology and clinical management tools, he developed Project ECHO, an innovative learning platform designed to dramatically expand specialty expertise in traditionally underserved areas.

This low-cost, high-impact intervention is accomplished by linking expert interdisciplinary specialist teams located at academic medical centres (hubs) with healthcare workers in rural and underserved areas through teleECHO clinics, where experts mentor and share their expertise via case-based learning, enabling primary care clinicians to develop the ability to treat patients with complex conditions in their own communities. The ECHO model is not telemedicine where the specialist assumes the care of the patient, but instead a guided practice model where the primary care clinician retains responsibility for managing the patient.

## MECHANICS OF THE ECHO MODEL

The model is based on 4 key principles:

- Use of technology (multipoint videoconferencing and the internet) to leverage scarce healthcare resources in a telementoring modality

- Dissemination of clinical best practices across disparate care sites to reduce disparities

- Case-based learning, so that learners receive guided practice and support from a multidisciplinary expert team and master issues of complexity

- Evaluation of outcomes

In addition to these four key principles, the ECHO model focuses on an all teach – all learn model, whereby the hub and the spoke or primary care clinicians are members of the same team and all learn from each other. The ECHO model fosters peer-to-peer mentoring and creates a cross pollination of idea sharing and mentoring among the different spoke sites. This is achieved through: a) case-based learning, b) knowledge networks, and c) learning loops. Knowledge networks consist of regularly scheduled teleECHO clinics that bring together expert inter-disciplinary specialists and community-based partners. At the spoke sites, each clinician presents their cases following a prescribed algorithm and case presentation form. The multidisciplinary team of experts at the hub site, which usually includes a disease specialist(s), pharmacist, and behavioral health expert, and the spoke participants discuss the case and share their recommendations. Partners learn best practices through learning loops in which they are mentored to treat diverse patients in real world situations and practice. Over time, these learning loops create deep knowledge, skills and self-efficacy. Many studies have shown the value of the ECHO model in improving physician satisfaction, particularly among rural and isolated clinicians, as they feel less isolated and more connected to the community of practice.

The goal of the ECHO model is to create 'force multiplication', to logarithmically improve the capacity to deliver specialty care—up to 10 to 100 times more capacity. Project ECHO provides the right knowledge at the right place at the right time, allowing millions of people access to specialty they otherwise would not have access to.

## EVALUATION AND IMPACT OF THE ECHO MODEL

Project ECHO believes that tracking and evaluation of project results is critical. ECHO regularly evaluates teleECHO clinic attendance and uses pre- and post-surveys to evaluate participant learning, self-efficacy, and satisfaction with the ECHO model as a learning and community building tool, along with a few key patient metrics. A prospective cohort study published in the New England Journal of Medicine (June 2011), comparing treatment of HCV at the University of New Mexico clinic to treatment by primary care clinicians in rural New Mexico, demonstrated that treatment for HCV using the ECHO model is as safe and effective as treatment at an academic medical centre. Since then 45 publications have been published and document the value of ECHO

**Fig. 1: Global Map of ECHO Replication Sites as of 10/1/16**

## ECHO SPREAD

Project ECHO has established a technical assistance arm that supports the replication of Project ECHO programs around the world. Replication is achieved by enabling partners to create ECHO hubs, in which sites or spokes connect through teleECHO clinics, gaining specialty expertise and knowledge. Project ECHO supports rapid global scaling of the ECHO model by providing robust training in the best practices for replication, which includes monthly Introduction, Orientation and Immersion training sessions and many other outreach events that are offered at the ECHO Institute in Albuquerque, NM, USA, http://echo.unm.edu/start-an-echo/orientation-events/ .

Currently, the ECHO Institute conducts teleECHO clinics for over 20 conditions such as chronic pain, integrated addictions and psychiatry, rheumatology, HIV, complex care, epilepsy, tuberculosis (TB), bone health, and endocrinology. ECHO is being adopted as an effective model for capacity building and care delivery all over the world by leading academic medical centres and international organizations. At this juncture, there are 93 hub replication partners globally, including 60 sites in the U.S., and an additional 28 programs operating in 16 countries, covering 50 distinct complex conditions.

## ECHO IN INDIA

The ECHO Model is quickly spreading throughout India and the ECHO India Trust office has been established, under the directions of Drs Sunil Anand and Kumud Rai to provide support to Indian partners. A brief summary of the work of each of the Indian replicating partners has been included below.

## NATIONAL INSTITUTE FOR MENTAL HEALTH AND NEUROSCIENCES (NIMHANS) – BANGALORE, INDIA

NIMHANS currently runs four teleECHO clinics for mental health and drug addiction, mental health care during pregnancy and postpartum, and the road to recovery for patients with substance use disorders. They are also running a special clinic for the State of Bihar, which connects 9 district hospitals and will soon be expanding to include 22 additional district hospitals to address addiction and mental health. To date, NIMHANS has trained a total of 1,000 doctors and 440 allied healthcare workers.

## INDIAN NATIONAL ASSOCIATION FOR THE STUDY OF THE LIVER (INASL)

INASL operates a teleECHO clinic from the Postgraduate Institute of Medical Education and Research Chandigarh (PGIMER) in support of the Punjab Government's elimination of HCV program. This teleECHO clinic connects a total of 22 district hospitals and over the last four months has registered and begun treatment for 12,000 new patients.

## INSTITUTE OF LIVER AND BILIARY SCIENCES (ILBS) – NEW DELHI, INDIA

The ILBS has a long-running ECHO for primary care clinicians for liver diseases and currently runs two clinics: one on liver diseases, and a second that connects 10 medical colleges across India to train physicians in how to treat liver diseases.

## KARUNA TRUST – BANGALORE, INDIA

The Karuna Trust is utilizing the ECHO model with

Community Health Workers (CHWs) to teach primary care clinicians and CHWs throughout their seven large hospitals and dozens of community health clinics.

## POST GRADUATE INSTITUTE OF MEDICAL EDUCATION AND RESEARCH (PGIMER) – CHANDIGARH, INDIA

PGIMER has recently launched an HCV and HCB teleECHO clinic, and has received both funding and a collaborative agreement from the state of Punjab to recruit and enable Punjabi primary care clinicians into this liver care teleECHO clinic. The PGI Chandigarh teleECHO clinic connects 14 different prisons in Punjab to the Department of Hepatology at PGI Chandigarh.

## MDT TB PROGRAM (MUTLI-DRUG RESISTANCE PROGRAM AT DELHI)

The ECHO India Trust office is planning a program to connect four Drug Resistance TB Centres to 25 District TB Officers, State Tuberculosis Officers, the New Delhi TB Centre and the Central TB Division to conduct a teleECHO clinic for the management of MDR TB. Additionally, a new clinic will be started around the Control Access Program for Bedaquiline (new TB drug) that will include: the National Institute of research in Tuberculosis, Chennai; Government Medical College, Guwahati; Sewrie /KEM Hospital Mumbai; BJ Medical College, Ahmedabad; National Institute of Tuberculosis and Respiratory Diseases, New Delhi; and Rajan Babu Institute of Pulmonary Diseases and Tuberculosis, New Delhi.

More than 15 additional programs are planned and will launch within the coming year to include cancer, diabetes, cervical cancer prevention and many other areas. Additionally, an introduction, orientation and immersion training will be held in India in November for those signed partners.

## REFERENCES

1. Arora S, Kalishman S, Dion D, Som D, Thornton K, Bankhurst A, Boyle J, Harkins M, Moseley K, Murata G, Komaramy M. Partnering urban academic medical centers and rural primary care clinicians to provide complex chronic disease care. *Health Affairs* 2011; 30:1176-84.

2. Arora S, Kalishman S, Thornton K, Dion D, Murata G, Deming P, Parish B, Brown J, Komaromy M, Colleran K, Bankhurst A. Expanding access to hepatitis C virus treatment—Extension for Community Healthcare Outcomes (ECHO) project: disruptive innovation in specialty care. *Hepatology* 2010; 52:1124-33.

3. Arora S, Thornton K, Komaromy M, Kalishman S, Katzman J, Duhigg D. Demonopolizing medical knowledge. *Academic Medicine* 2014; 89:30-2.

4. Arora S, Thornton K, Murata G, Deming P, Kalishman S, Dion D, Parish B, Burke T, Pak W, Dunkelberg J, Kistin M. Outcomes of treatment for hepatitis C virus infection by primary care providers. *New England Journal of Medicine* 2011; 364:2199-207.

5. Chand P, Murthy P, Gupta V, Kandasamy A, Jayarajan D, Sethu L, Benegal V, Varghese M, Komaromy M, Arora S. Technology Enhanced Learning in Addiction Mental Health: Developing a Virtual Knowledge Network: NIMHANS ECHO. InTechnology for Education (T4E), 2014 IEEE Sixth International Conference on 2014 Dec 18 (pp. 229-232). IEEE.

6. Hariprasad R, Mehrotra R. Cancer Screening Program Using Technology Assisted Learning. *Journal of Global Oncology* 2016; 2(3 suppl):23s-.

7. Zhou C, Crawford A, Serhal E, Kurdyak P, Sockalingam S. The Impact of Project ECHO on Participant and Patient Outcomes: A Systematic Review. *Academic Medicine* 2016; 91:1439-61.