Project ECHO® (Extension for Community Health Outcomes)

Sanjeev Arora, MD, MACP
Distinguished Professor of Medicine (Gastroenterology/Hepatology)
Director of Project ECHO®
Department of Medicine
University of New Mexico Health Sciences Center

Tel: 505-272-2808
Fax: 505-272-6906
sarora@salud.unm.edu
@ProjectECHO
UNMProjectECHO
At ECHO, our mission is to democratize medical knowledge and get best practice care to underserved people all over the world.

Our goal is to touch the lives of 1 billion people by 2025.
Moving Knowledge Instead of Patients and Providers
70 million in the world infected with HCV

In New Mexico estimated number was greater than 28,000 in 2004. By 2017, 53,000 patients have tested positive for HCV antibody.

In 2004 less than 5% of patients in NM had been treated.

- 2,300 prisoners were HCV positive (~40% of those entering the corrections system), none were treated
Goals of Project ECHO

Develop capacity to safely and effectively treat HCV in all areas of New Mexico and to monitor outcomes.

Develop a model to treat complex diseases in rural locations and developing countries.
The ECHO Model

A. Amplification – Use Technology to leverage scarce resources

B. Share Best Practices to reduce disparity

C. Case Based Learning to master complexity

D. Web-based Database to Monitor Outcomes

Copyright © ECHO Institute
Steps

- Train physicians, physician assistants, nurse practitioners, nurses, pharmacists, educators in HCV.

- Train to use web-based software — iECHO & ECHO Health®

- Conduct teleECHO™ clinics — “Knowledge Networks”

- Initiate case-based guided practice — “Learning Loops”

- Collect data and monitor outcomes centrally

- Assess cost and effectiveness of programs
Benefits to Rural Clinicians

- No cost CMEs and Nursing CEUs
- Professional interaction with colleagues with similar interest
  - Less isolation with improved recruitment and retention
- A mix of work and learning
- Access to specialty consultation with GI, hepatology, psychiatry, infectious diseases, addiction specialist, pharmacist, patient educator
ECHO model is not ‘traditional telemedicine’. Treating Physician retains responsibility for managing patient.
Technology

- Videoconferencing Hardware
- Videoconferencing Software
- Video Recording System
- You Tube-like Website/Archive
- **ECHO Health** – Electronic Clinical Management Tool
- **iECHO** – Electronic TeleECHO Clinic Management Solution

Copyright © ECHO Institute
How well has model worked?

- 600 HCV teleECHO Clinics have been conducted
- >6,000 patients entered HCV disease management program

**CME’s/CE’s issued:**
- Total CME hours 79000 hours at no cost for HCV and 19 other disease areas
## Project ECHO Clinicians
### HCV Knowledge Skills and Abilities (Self-Efficacy)

scale: 1 = none or no skill at all 7= expert-can teach others

<table>
<thead>
<tr>
<th>Community Clinicians N=25</th>
<th>BEFORE Participation MEAN (SD)</th>
<th>TODAY MEAN (SD)</th>
<th>Paired Difference (p-value) MEAN (SD)</th>
<th>Effect Size for the change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to identify suitable candidates for treatment for HCV.</td>
<td>2.8 (1.2)</td>
<td>5.6 (0.8)</td>
<td>2.8 (1.2) (&lt;0.0001)</td>
<td>2.4</td>
</tr>
<tr>
<td>2. Ability to assess severity of liver disease in patients with HCV.</td>
<td>3.2 (1.2)</td>
<td>5.5 (0.9)</td>
<td>2.3 (1.1) (&lt;0.0001)</td>
<td>2.1</td>
</tr>
<tr>
<td>3. Ability to treat HCV patients and manage side effects.</td>
<td>2.0 (1.1)</td>
<td>5.2 (0.8)</td>
<td>3.2 (1.2) (&lt;0.0001)</td>
<td>2.6</td>
</tr>
</tbody>
</table>

(continued)
### Project ECHO Clinicians

**HCV Knowledge Skills and Abilities (Self-Efficacy)**

<table>
<thead>
<tr>
<th>Community Clinicians N=25</th>
<th><strong>BEFORE Participation MEAN (SD)</strong></th>
<th><strong>TODAY MEAN (SD)</strong></th>
<th><strong>Paired Difference (p-value) MEAN (SD)</strong></th>
<th><strong>Effect Size for the change</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Ability to assess and manage psychiatric co-morbidities in patients with hepatitis C.</td>
<td>2.6 (1.2)</td>
<td>5.1 (1.0)</td>
<td>2.4 (1.3) (&lt;0.0001)</td>
<td>1.9</td>
</tr>
<tr>
<td>5. Serve as local consultant within my clinic and in my area for HCV questions and issues.</td>
<td>2.4 (1.2)</td>
<td>5.6 (0.9)</td>
<td>3.3 (1.2) (&lt;0.0001)</td>
<td>2.8</td>
</tr>
<tr>
<td>6. Ability to educate and motivate HCV patients.</td>
<td>3.0 (1.1)</td>
<td>5.7 (0.6)</td>
<td>2.7 (1.1) (&lt;0.0001)</td>
<td>2.4</td>
</tr>
</tbody>
</table>
Cronbach’s alpha for the BEFORE ratings = 0.92 and Cronbach’s alpha for the TODAY ratings = 0.86 indicating a high degree of consistency in the ratings on the 9 items.

<table>
<thead>
<tr>
<th>Community Clinicians</th>
<th>BEFORE Participation MEAN (SD)</th>
<th>TODAY MEAN (SD)</th>
<th>Paired Difference (p-value) MEAN (SD)</th>
<th>Effect Size for the change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Competence (average of 9 items)</td>
<td>2.8* (0.9)</td>
<td>5.5* (0.6)</td>
<td>2.7 (0.9) (&lt;0.0001)</td>
<td>2.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Not/Minor Benefits</th>
<th>Moderate/Major Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced knowledge about management and treatment of HCV patients.</td>
<td>3% (1)</td>
<td>97% (34)</td>
</tr>
<tr>
<td>Being well-informed about symptoms of HCV patients in treatment.</td>
<td>6% (2)</td>
<td>94% (33)</td>
</tr>
<tr>
<td>Achieving competence in caring for HCV patients.</td>
<td>3% (1)</td>
<td>98% (34)</td>
</tr>
<tr>
<td></td>
<td>Mean Score (Range 1-5)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>Project ECHO® has diminished my professional isolation.</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>My participation in Project ECHO® has enhanced my professional</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>satisfaction.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaboration among agencies in Project ECHO® is a benefit to</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>my clinic.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project ECHO® has expanded access to HCV treatment for patients</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>in our community.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access, <strong>in general</strong>, to specialist expertise and consultation is a major area of need for you and your clinic.</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>Access to <strong>HCV specialist</strong> expertise and consultation is a major area of need for you and your clinic.</td>
<td>4.9</td>
<td></td>
</tr>
</tbody>
</table>
Outcomes of Treatment for Hepatitis C Virus Infection by Primary Care Providers

Results of the HCV Outcomes Study

## Treatment Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>ECHO</th>
<th>UNMH</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 261</td>
<td>n = 146</td>
<td></td>
</tr>
<tr>
<td>Minority</td>
<td>68%</td>
<td>49%</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>SVR* (Cure) Genotype 1</td>
<td>50%</td>
<td>46%</td>
<td>ns</td>
</tr>
<tr>
<td>SVR* (Cure) Genotype 2/3</td>
<td>70%</td>
<td>71%</td>
<td>ns</td>
</tr>
</tbody>
</table>

*SVR=sustained viral response

Disease Selection

- Common diseases
- Management is complex
- Evolving treatments and medicines
- High societal impact (health and economic)
- Serious outcomes of untreated disease
- Improved outcomes with disease management
Bridge Building
Pareto’s Principle

- Chronic Pain
- Rheumatoid Arthritis + Rheumatology Consultation
- Substance Use and Mental Health Disorders

UNM HSC | State Health Dept | Private Practice | Community Health Centers

Copyright © ECHO Institute
<table>
<thead>
<tr>
<th>Force Multiplier</th>
<th>Use Existing Community Clinicians</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specialists</strong></td>
<td><strong>Primary Care</strong></td>
</tr>
<tr>
<td><strong>Chronic Pain</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Rheumatoid Arthritis + Rheumatology Consultation</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Substance Use and Mental Health Disorders</strong></td>
<td><strong>Nurse Practitioners</strong></td>
</tr>
<tr>
<td>MON</td>
<td>TUE</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Rheumatology</td>
<td>HBV</td>
</tr>
<tr>
<td>• Bankhurst</td>
<td>• Thornton</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Bone Health</td>
</tr>
<tr>
<td>• Burgos</td>
<td>• Lewiecki</td>
</tr>
<tr>
<td>Cardiology</td>
<td>Crisis Intervention for Community Policing Agencies</td>
</tr>
<tr>
<td>• Achrekar, Anderson &amp; Yatskowitz</td>
<td>• Duhigg</td>
</tr>
<tr>
<td>Reproductive Health</td>
<td>Seizures and Spells</td>
</tr>
<tr>
<td>• Singh</td>
<td>• Imerman</td>
</tr>
</tbody>
</table>
**Project ECHO: Views of Participating Providers, Health Workers, And Educators**

1 = Strongly Disagree, 5 = Strongly Agree

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through the Project ECHO telehealth clinics, I am <strong>learning best-practice care</strong> in chronic disease.</td>
<td>4.68</td>
</tr>
<tr>
<td>I am <strong>connected with peers</strong> in the ECHO telehealth clinic whose opinion I respect for professional advice and consultation.</td>
<td>4.55</td>
</tr>
<tr>
<td>I learn with guidance from Project ECHO academic specialists in chronic disease management whose knowledge and skills I respect.</td>
<td>4.73</td>
</tr>
<tr>
<td>I am <strong>connected to and respected by the academic specialists</strong> in the ECHO telehealth clinic in which I participate.</td>
<td>4.4</td>
</tr>
<tr>
<td>I am <strong>developing my clinical expertise</strong> through participation in Project ECHO.</td>
<td>4.48</td>
</tr>
<tr>
<td>After gaining expertise in the clinical diseases addressed in Project ECHO, I am comfortable teaching others what I have learned.</td>
<td>4.33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient Benefit</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>My participation in Project ECHO benefits patients under my care whom I co-manage with ECHO specialists.</td>
<td>4.45</td>
</tr>
<tr>
<td>The patients under my care whom I co-manage with ECHO specialists receive best-practice care.</td>
<td>4.43</td>
</tr>
<tr>
<td>My participation in Project ECHO benefits the patients under my care whom I do not co-manage with ECHO specialists.</td>
<td>4.19</td>
</tr>
<tr>
<td>I apply what I have learned about best practices through Project ECHO to all of my patients with similar chronic diseases.</td>
<td>4.45</td>
</tr>
<tr>
<td>I feel comfortable applying the principles I learned from Project ECHO to other patients in my practice with similar chronic disease, independently, without presenting them on the network.</td>
<td>4.23</td>
</tr>
</tbody>
</table>

2:1 Matched Cohort Study

11 nursing homes received ECHO intervention. Matched with 22 controls

Residents in ECHO Age facilities were 75% less likely to be physically restrained

Residents were 17% less likely to be prescribed antipsychotics

University of Rochester experts in geriatric psychiatry help train and mentor primary care clinicians in NY.

Since 2014, 500 clinicians have participated in their ECHO project funded by AHRQ.

There was a 20% reduction in ED visits.

24% reduction in overall costs.
513 patients who had a liver SCAN-ECHO visit were found within the cohort. Patients who had completed a virtual SCAN-ECHO visit were more likely younger, rural, with more significant liver disease, and evidence for cirrhosis. Propensity adjusted mortality rates using Cox Proportional Hazard Model showed that a SCAN-ECHO visit was associated with a hazard ratio of 0.54 (95% CI 0.36-0.81, p = 0.003) compared to no visit.

Peer Reviewed Publications n=116

% of peer-reviewed publications (N=116)

- Provider Learning: 73%
- Quality of Care: 19%
- Access to Care: 15%
- Workforce Issues: 13%
- Efficiency and Cost Barriers: 5%
- Implementation: 5%
- Science: 5%
ECHO Publications by Moore’s Outcome Levels

- Participation
- Satisfaction
- Learning
- Competence
- Performance
- Patient Health
- Community Health
ECHO Hubs and Spokes: State of New Mexico
Cumulative number of buprenorphine-waivered physicians per million population in traditionally underserved zip codes in NM versus US

Currently there are 1582 Zip Codes in the US with the following characteristics:
1) Rural (less than 1,000 people per sq mile.)
2) More than 50% of people identify themselves as American Indian or Alaska Native, Asian American, Black or African American, Hispanic or Latino, or Native Hawaiian/Other Pacific Islander.
3) The average household income is less than $52,250.

10,629,084 people reside in these zip codes, with 784,455 of those living in NM. There are 479 licensed providers residing within these zip codes, 110 within New Mexico.
“Hub-lets” provide specialist teams.

**ECHO Shared Services Model**

- Opioid ECHO U. of Washington
- Opioid ECHO Billings Clinic
- Supporting Hub at ECHO Institute
- Opioid ECHO U. of New Mexico
- Opioid ECHO Western New York
- Opioid ECHO Boston Medical Center

**Supporting hub** leads development of curriculum and provides IT, evaluation, and admin support, and participant recruitment for all hubs.
Half are medical providers, and one third are behavioral health providers.

**PARTICIPATION**

*Year one*

- 355 participants from 147 HRSA-funded health centers

HRSA-funded National Opioid ECHO Program
What The Mind Does Not Know The Eye Cannot See

“Expanding the Definition of Underserved Population”
Potential Benefits of the ECHO Model

- Quality and Safety
- Rapid Learning and best-practice dissemination
- Reduce variations in care
- Access for Rural and Underserved Patients, reduced disparities
- Workforce Training and Force Multiplier
- Improving Professional Satisfaction/Retention
- Supporting the Medical Home Model
- Cost Effective Care- Avoid Excessive Testing and Travel
- Prevent Cost of Untreated Disease (e.g.: liver transplant or dialysis)
- Integration of Public Health into treatment paradigm

Democratize Knowledge
ECHO Hubs and Spokes: State of New Mexico
Army and Navy Pain Management ECHO Clinics

**Army ECHO Hubs:** Regional Health Command-Europe (RHC-E) – Landstuhl, Germany | Regional Health Command-Central (RHC-C)-Joint Base San Antonio-Brook Army Medical Center – TX | Regional Health Command-Pacific (RHC-P)-Tripler Army Medical Center – HI | Regional Health Command-Atlantic (RHC-A) – Ft. Bragg, NC

**Belgium:**
- Brussels
- Supreme Headquarters Allied Powers Europe (SHAPE)

**Germany:**
- Grafenwoehr
- Hohenfels
- Katterbach
- Landstuhl Regional Medical Center (LRMC)/FHC
- LRMC/IMC
- LRMC/FHC
- Stuttgart
- Wiesbaden
- Vilseck

**Italy:**
- Livorno
- Vicenza

**Japan:**
- Camp Zama

**South Korea:**
- Camp Casey
- Camp Humphreys
- Camp Carroll
- Camp Walker
- Bhan Algod Army Community Hospital/22nd Combat Support Hospital

**Arizona:**
- Fort Huachuca

**California:**
- Fort Irwin

**Colorado:**
- Colorado Springs

**Georgia:**
- Fort Benning

**Hawaii:**
- Schofield Barracks (Family Medicine and Troop Medical Clinic)
- Adult Medicine Patient Centered Medical Home (PCMH) Tripler
- Family Medicine PCMH Tripler
- Warrior Outreach PCMH
- VA Pain Clinic

**Kansas:**
- Fort Leavenworth
- Fort Riley

**Kentucky:**
- Fort Knox

**Louisiana:**
- Fort Polk

**Maryland:**
- Fort Meade

**Missouri:**
- Fort Leonard Wood
- White Sands Missile Range

**New Mexico:**
- Fort Bliss

**New York:**
- Fort Drum
- West Point

**North Carolina:**
- Fort Bragg

**Ohio:**
- Fort Mc亨ry

**Oregon:**
- Fort Hood

**Puerto Rico:**
- Camp Garcia

**Rhode Island:**
- Camp Warfield

**South Dakota:**
- Fort Meade

**Texas:**
- Joint Base San Antonio-Bedford Army Medical Center

**Virginia:**
- Fort Lee
- Joint Base Langley-Eustis

**Washington:**
- Madigan Army Medical Center

**Navy ECHO Hubs:** Navy Medicine East (NME)- Naval Medical Center (NMC) Portsmouth, VA | Navy Medicine West (NMW)- Naval Medical Center San Diego (NMCSD), CA

**Belgium:**
- Brussels
- Supreme Headquarters Allied Powers Europe (SHAPE)

**Germany:**
- Grafenwoehr
- Hohenfels
- Katterbach
- Landstuhl Regional Medical Center (LRMC)/FHC
- LRMC/IMC
- LRMC/FHC
- Stuttgart
- Wiesbaden
- Vilseck

**Italy:**
- Livorno
- Vicenza

**Japan:**
- Camp Zama

**South Korea:**
- Camp Casey

**Arizona:**
- Fort Huachuca

**California:**
- Fort Irwin

**Colorado:**
- Colorado Springs

**Georgia:**
- Fort Benning

**Hawaii:**
- Schofield Barracks (Family Medicine and Troop Medical Clinic)
- Adult Medicine Patient Centered Medical Home (PCMH) Tripler
- Family Medicine PCMH Tripler
- Warrior Outreach PCMH
- VA Pain Clinic

**Kansas:**
- Fort Leavenworth
- Fort Riley

**Kentucky:**
- Fort Knox

**Louisiana:**
- Fort Polk

**Maryland:**
- Fort Meade

**Missouri:**
- Fort Leonard Wood
- White Sands Missile Range

**New Mexico:**
- Fort Bliss

**New York:**
- Fort Drum
- West Point

**North Carolina:**
- Fort Bragg

**Ohio:**
- Fort McHenry

**Oregon:**
- Fort Hood

**Puerto Rico:**
- Camp Garcia

**Rhode Island:**
- Camp Warfield

**South Dakota:**
- Fort Meade

**Texas:**
- Joint Base San Antonio-Bedford Army Medical Center

**Virginia:**
- Fort Lee
- Joint Base Langley-Eustis

**Washington:**
- Madigan Army Medical Center

**New Hampshire:**
- BHC Portsmouth NH
- Navy Safe Harbor

**Virginia:**
- NMC Portsmouth (Case Management, Pain Clinic, Physical Medicine) | BHC-Oceana | Tricare Prime Clinic (TPC) Chesapeake | TPC Virginia Beach | 63rd Medical Group-Langley
Comprehensive Approach to Good Health and Wellness in Indian Country Awards (DP14-1421PPHF14)**/22 awards

**These awards are financed solely by Prevention and Public Health Funds.
Key: ECHO Hub Type (136)
- Superhub (6)
- Hub (121)
- U.S. DoD Hub (6)
- U.S. VA Hub (9)

Key: US State Shading
- ECHO impact (44)
- Awaiting ECHO impact (6)
ECHO Hubs and Superhubs: Global

Key: ECHO Hub Type (215)
- Superhub (11)
- Hub (199)
- U.S. DoD Hub (7)
- U.S. VA Hub (9)

Key: Country Shading
- ECHO impact (31)
- Awaiting ECHO impact (139)
The “ECHO Act” (Expanding Capacity for Health Outcomes Act)  
Passed House/Senate by unanimous vote, November-December 2016  
Signed into law by President Barack Obama, December 2016

Asks the Secretary of Health and Human Services to study the impact of Project ECHO on:

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Mental and substance use disorders, chronic diseases and conditions, prenatal and maternal health, pediatric care, pain management, and palliative care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workforce</td>
<td>Implementation of public health programs, including those related to disease prevention, infectious disease outbreaks, and public health surveillance</td>
</tr>
<tr>
<td>Public Health</td>
<td>Health care workforce issues, such as specialty care shortages and primary care workforce recruitment, retention, and support for lifelong learning</td>
</tr>
<tr>
<td>Rural and Underserved Populations</td>
<td>Delivery of health care services in rural areas, frontier areas, health professional shortage areas, and medically underserved areas, and to medically underserved populations and Native Americans</td>
</tr>
</tbody>
</table>
U.S. Senate

Utah
- Hatch (R)

Hawaii
- Schatz (D)

Texas
- Burgess (R)

California
- Matsui (D)

Washington
- Sen. Maria Cantwell (D)
- Sen. Patty Murray (D)

Wyoming
- Sen. John Barrasso (R)

Montana
- Sen. Steve Daines (R)
- Sen. Jon Tester (D)

Louisiana
- Sen. Bill Cassidy (R)

Massachusetts
- Sen. Elizabeth Warren (D)

Minnesota
- Sen. Al Franken (D)

Mississippi
- Sen. Roger Wicker (R)

New Mexico
- Sen. Martin Heinrich (D)
- Sen. Tom Udall (D)
- Rep. Michelle Lujan Grisham (D)

Oklahoma
- Sen. James Inhofe (R)

Tennessee
- Sen. Lamar Alexander (R)

Texas
- Sen. John Cornyn (R)
- Rep. Kay Granger (R)

Virginia
- Sen. Mark Warner (D)
The ECHO Team
What Makes ECHO Work?

Community of Practice (Social Network)
Joy of Work
Mentor/Mentee Relationship
Movement Building Vs. Organization Building
De-monopolizing Knowledge
Knowledge Expansion
Force Multiplication
Team Based Care
Task Shifting
Interprofessional Consultation
Guided Practice

Team Based Care

Technology