The mission of Project ECHO® is to expand the capacity to provide best practice care for common and complex diseases in rural and underserved areas and to monitor outcomes.

Supported by New Mexico Department of Health, Agency for Health Research and Quality, New Mexico Legislature, the Robert Wood Johnson Foundation and the GE Foundation.

Hepatitis C

Over 170 Million Carriers Worldwide, 3-4 Million new cases/year

- Estimated number is greater than 28,000
- In 2004 less than 5% had been treated
  - 2,300 prisoners were HCV positive (~40% of those entering the corrections system), none were treated
- Highest rate of chronic liver disease/cirrhosis deaths in the nation; 25% higher incidence than the next highest state
- Ten times more prevalent than HIV

New Mexico

Source: WHO 1999
Hepatitis C

Treatment

**Good** news ...
- Curable in 70% of cases

**Bad** news ...
- Severe side effects:
  - anemia (100%)
  - neutropenia >35%
  - depression >25%
- No Primary Care Physicians treating HCV

Rural New Mexico

Underserved Area for Healthcare Services

- 121,356 square miles
- 2.08 million people
- 47% Hispanic
- 10.2% Native American
- 19% poverty rate compared to 14.3% nationally
- 21% lack health insurance compared to 16% nationally
- 32 of 33 New Mexico counties are listed as Medically Underserved Areas (MUAs)
- 14 counties designated as Health Professional Shortage Areas (HPSA's)

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.

Partners

- University of New Mexico School of Medicine Department of Medicine, Telemedicine and CME
- NM Department of Corrections
- NM Department of Health
- Indian Health Service
- FQHCs and Community Clinics
- Primary Care Association
Methods

- Use Technology (multipoint videoconferencing and Internet) to leverage scarce healthcare resources
- Disease Management Model focused on improving outcomes by reducing variation in processes of care and sharing “best practices”
- Case based learning: Co-management of patients with UNMHSC specialists (learning by doing)
- HIPAA compliant web-based database to monitor outcomes

What is Best Practice in Medicine

- Algorithm
- Check Lists
- Process
- Wisdom Based on Experience

Hepatitis C

Steps

- Train physicians, mid-level providers, nurses, pharmacists, educators in HCV
- Train to use web based software — “iHealth”
- Conduct telemedicine clinics — “Knowledge Network”
- Initiate co-management — “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
**Hepatitis C**

**Technology**

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

**How well has model worked?**

- 500 HCV TeleECHO™ Clinics have been conducted
- >5,000 patients entered HCV disease management program

**CME’s/CE’s issued:**
- Total CME hours 52000 hours at no cost for HCV and 12 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</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 (1.3) (&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)

<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>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>

(continued)

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.


### Clinician Benefits

(Data Source; 6 month Q-5/2008)

<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>
</tbody>
</table>
Project ECHO®
Annual Meeting Survey

<table>
<thead>
<tr>
<th>N=17</th>
<th>Mean Score (Range 1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project ECHO® has diminished my professional isolation.</td>
<td>4.3</td>
</tr>
<tr>
<td>My participation in Project ECHO® has enhanced my professional satisfaction.</td>
<td>4.8</td>
</tr>
<tr>
<td>Collaboration among agencies in Project ECHO® is a benefit to my clinic.</td>
<td>4.9</td>
</tr>
<tr>
<td>Project ECHO® has expanded access to HCV treatment for patients in our community.</td>
<td>4.9</td>
</tr>
<tr>
<td>Access, in general, to specialist expertise and consultation is a major area of need for you and your clinic.</td>
<td>4.9</td>
</tr>
<tr>
<td>Access to HCV specialist expertise and consultation is a major area of need for you and your clinic.</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Outcomes of Treatment for Hepatitis C Virus Infection by Primary Care Providers

Results of the HCV Outcomes Study

Hepatitis C

Objectives
• To train primary care clinicians in rural areas and prisons to deliver Hepatitis C treatment to rural populations of New Mexico
• To show that such care is as safe and effective as that given in a university clinic
• To show that Project ECHO® improves access to Hepatitis C care for minorities

Participants
• Study sites
  ➢ Intervention (ECHO)
    ➢ Community-based clinics: 16
    ➢ New Mexico Department of Corrections: 5
  ➢ Control: University of New Mexico (UNM) Liver Clinic
• Subjects meeting inclusion/exclusion criteria
  • Community cases seen by primary care physicians
  • Consecutive University patients
Hepatitis C

Study Design

- Prospective cohort study
  - Participation determined by available technology
  - Randomization by patient, Clinician, or site not feasible
- Advantages
  - Uniform eligibility criteria
  - Standardized treatment
  - Prospective measurement of end-points
- Limitation: groups unbalanced with respect to patient covariates

Principle Endpoint

Sustained Viral Response (SVR): no detectable virus 6 months after completion of treatment

Developing New Standards of Practice

- 407 hepatitis C patients met inclusion and exclusion criteria
  - Age: 43.0 ± 10.0 years
  - Men: 63.3%
  - Minority: 65.2%
  - Genotype 1: 57.0%
  - Log10 viral load: 5.89 ± 0.95
  - Treatment sites
    - UNMH: 146
    - ECHO site: 261

Treatment Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>ECHO</th>
<th>UNMH</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<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

Hepatitis C

Conclusions

• Rural primary care Clinicians deliver Hepatitis C care under the ages of Project ECHO® that is as safe and effective as that given in a University clinic.
• Project ECHO® improves access to hepatitis C care for New Mexico minorities.

ECHO Model is Cost Effective

• In 60 Percent of Patients treated for HCV the model was cost savings
• Overall Cost per Discounted Quality of Life Year Gained was less than 3500 dollars

AASLD Presentation Washington DC
November 2013

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
**Force Multiplier**

Use Existing Community Clinicians

- Specialists
- Primary Care
- Physician Assistants
- Nurse Practitioners

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

**Successful Expansion into Multiple Diseases**

<table>
<thead>
<tr>
<th>Time</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-10 a.m.</td>
<td>Hepatitis C</td>
<td>Diabetes &amp; Endocrinology</td>
<td>Geriatrics/Palliative</td>
<td>Complex Care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8-10 a.m.</td>
<td>Arora</td>
<td>8-10 a.m.</td>
<td>Thornton</td>
<td>8-10 a.m.</td>
</tr>
<tr>
<td>10-12 a.m.</td>
<td>Rheumatology</td>
<td>Chronic Pain</td>
<td>Integrated Addictions &amp; Psychiatry</td>
<td>10-12 a.m.</td>
<td>Chronic Care</td>
</tr>
<tr>
<td></td>
<td>Bankhurst</td>
<td>10-12 a.m.</td>
<td>Katzman</td>
<td>10-12 a.m.</td>
<td>Complex Care</td>
</tr>
<tr>
<td>2-4 p.m.</td>
<td>HIV</td>
<td>HIV</td>
<td>Prison Peer Educator</td>
<td>2-4 p.m.</td>
<td>Noale</td>
</tr>
<tr>
<td></td>
<td>2-4 p.m.</td>
<td>Iandiorio</td>
<td>2-4 p.m.</td>
<td>Thornton</td>
<td>2-4 p.m.</td>
</tr>
</tbody>
</table>

**Integrated Addictions and Psychiatry Clinic**

- Focus on treating opiate addiction (heroin, pain pills) with psychosocial support + effective medication
- Only 32 physicians in New Mexico certified to prescribe Buprenorphine in 2007
- Trained/certified 225 physicians statewide in use of buprenorphine/Suboxone, 274 total clinicians trained
Increasing Gap

"Expanding the Definition of Underserved Population"

Chronic Disease Management is a Team Sport

<table>
<thead>
<tr>
<th>Force Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Disease Management is a Team Sport</td>
</tr>
<tr>
<td>Primary Care</td>
</tr>
<tr>
<td>Diabetes and Cardiac Risk Reduction</td>
</tr>
</tbody>
</table>
Community Based Care for Cardiac Risk Factor Reduction was more Effective than Enhanced Primary Care

Why is a CHW Intervention Effective?
- Live in Community
- Understand culture
- Appreciate economic limitations of patient and know community resources available to patient
- Often know family and can engage other social resources for patient
- Spend more time with patient

ECHO CHW Training
- CHW Specialist Training
  - CREW: Diabetes, Obesity, Hypertension, Cholesterol, Smoking Cessation, Exercise Physiology
  - CARS: Substance Use Disorders
  - ECHO Care™: Complex Multiple Diagnoses
- Prison Peer Educator Training

Specialty CHW Program
- Use low-cost technology to take specialty training to CHWs, Promotoras, CHRs, Medical Assistants where they live
- Narrow Focus — Deep Knowledge
- Standardized Curriculum
  - 3 Day Onsite
  - Webcam/Weekly Video Based Clinics
    - Diet
    - Exercise
    - Smoking Cessation
    - Motivational Interviewing
    - Gentle Nudges
    - Finger Stick
    - Foot Exam
  - Ongoing support via knowledge networks
  - Part of Disease Management Team
  - Warm Handoff
Community Health Workers in Prison
The New Mexico Peer Education Program

Graduation Ceremony of First Cohort
The New Mexico Peer Education Program

Potential Benefits of ECHO Model™ to Health System

- 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
  - Demonopolize Knowledge
    - 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
ECHO Replication in US:

- University of Washington (HCV, Chronic Pain, HIV, Addiction)
- University of Chicago (Hypertension, Breast Cancer, ADHD, Childhood Obesity)
- Department of Defense – Worldwide Initiative (Chronic Pain)
- Veteran’s Administration Health System – 11 Regions (Chronic Pain, Diabetes, Heart Failure, HCV, Women’s Health, Nephrology)
- University of Nevada (Diabetes/Cardiovascular Risk Reduction, Sports Medicine, Thyroid & Diabetes, Antibiotic Stewardship, Mental Health, Rheumatology)
- University of Utah (HCV, Advanced Liver Care)
- University of South Florida, ETNC, and Florida/Caribbean, AETC (General HIV, Adolescents/Pediatrics, HIV/HCV Co-Infection, Psychiatry & HIV, Spanish Language HIV)
- Harvard, Beth Israel Deaconess Medical Center (HCV, Gerontology – ECHO AGE)
- St. Joseph Hospital and Medical Center – Arizona (HCV)
- Community Health Center, Inc. – Connecticut (HIV, HCV, Chronic Pain, Opioid Addiction – Buprenorphine)
- UNM: Envision NM (Childhood Overweight Medical Management, Pediatric Nutrition, Psychiatry, Asthma/Pulmonary)
SCAN-ECHO Spread in VHA-300 CBOCs

ECHO Replication Sites Worldwide:

- Maulana Azad Medical College – New Delhi, India (HIV)
- Institute of Liver and Biliary Sciences – New Delhi, India (HCV)
- ECHO India – Mumbai, Chandigargh, & Lucknow (Autism)
- Uruguay (Liver Disease)

Big Data Ties it All Together

The ECHO Team
Awards for ECHO Team

- Excellence in Clinical Research Award, University of New Mexico Health Sciences Center, 2012
- “Outcomes of Treatment for Hepatitis C Virus Infection by Primary Care Providers” New England Journal of Medicine, named one of the Most Influential Research Articles of 2012 by the Robert Wood Johnson Foundation, 2012
- 21st Century Awards for Best Practices in Distance Learning from the United States Distance Learning Association (USDLA), 2010
- ASHOKA Fellowship for Social Entrepreneurship, 2009
- Lemelson Fellow for Using Technology to help Humanity, 2009
- Leadership in Distance Learning Program Administration Award from the United States Distance Learning Association (USDLA), 2009
- eHealth Initiative Award: “Transforming Care Delivery at the Point of Care,” 2008

Use of multipoint videoconferencing, best practice protocols, co-management of patients with case based learning (the ECHO model) is a robust method to safely and effectively treat common and complex diseases in rural and underserved areas and to monitor outcomes.

For more information please contact
Erica Harding
eharding@salud.unm.edu