Project ECHO: Viral Hepatitis in sub-Saharan Africa

Extension for Community Health Outcomes

Moving Knowledge Instead of Patients
Mission
• Founder: Dr Sanjeev Arora, Albuquerque, New Mexico
• To democratize medical knowledge and get best practice care to underserved people all over the world

Goals
• Develop capacity to safely and effectively treat HCV
• Develop a model to treat complex diseases in rural locations and developing countries
• Expanded into 23 countries, managing a range of chronic conditions: viral hepatitis – women’s health

Touch the lives of 1 Billion people by 2025
Four basic principles of ECHO model of care:

1. Using technology to leverage scarce resources in order to deliver the right knowledge, training and administration, to the right people, at the right time

2. Share best practices to reduce disparities of healthcare

3. Employ case-based learning to master disease complexities

4. Monitor outcomes to ensure ongoing benefit

How does ECHO work?

- **ECHO links expert specialist teams** at an academic ‘hub’ with primary care clinicians in **local communities** (the ‘spokes’)

- Together, they participate in **weekly - monthly teleECHO clinics**, which are like **virtual grand rounds**, combined with mentoring and patient case presentations

- **15 minute didactic lecture**

- The clinics are supported by multipoint telehealth video technology
  - ZOOM

- **Train doctors, nurses, pharmacists, community healthcare workers and their teams within their own communities**

- Establish learning loops
ECHO vs. Telemedicine

TeleECHO™ Clinic

- Expert hub team
- ECHO supports community based primary care teams
- Learners at spoke site
- Patients reached with specialty knowledge and expertise

Traditional Telemedicine

- Specialist manages patient remotely
Learning Loops

- Interactive learning environment
- Co-management of cases
- Learning by doing
- Learning from didactics
- Learning from each other
- Collaboration in solving problems
### HCV Case Presentation Form

**General Information/Demographics**
- **Presentation Date:**
- **Site:** Medicare Clinic
- **Clinician:**
- **Presentation ID**
- **Year of Birth:**
- **Gender:** Male, Female
- **Ethnicity:**
- **Race:** Caucasian, HCV Genotype
- **Suspected Route of HCV Transmission**
  - [ ] Recipient of clotting factor concentrates
  - [ ] Blood transfusion or solid organ transplant
  - [ ] Needlestick injury in healthcare setting
  - [ ] Hemodialysis
  - [ ] Birth to HCV-infected mother
  - [ ] Sharing contaminated personal items with HCV-infected person
  - [ ] Sex with HCV-infected person
  - [ ] Non-professional tattoo
  - [ ] Cosmetic transmission (manicure, barber, etc.)
  - [ ] Current or former injection drug user (even once)
  - [ ] Other:
- **If yes, injection drug use in the last 12 months?**
  - [ ] Yes
  - [ ] No
  - [ ] Other invasive medical procedures
  - [ ] Unknown

**Medical Diagnoses**
- **HCV Year of diagnosis:**
- **Cirrhosis**
  - Previous HCV Treatment
  - Duration of treatment in weeks:
  - Response:
- **Evidence of decompensation:**
  - [ ] Ascites
  - [ ] Variceal bleed
  - [ ] Hepatic encephalopathy
  - Liver Biopsy
  - Year:
  - Results:
- **Known extrahepatic manifestations**
  - [ ] Cryoglobulinemia
  - [ ] Vasculitis
  - [ ] Membranoproliferative Glomerulonephritis
  - [ ] Membranous Nephropathy
  - [ ] Lichen Planus
  - [ ] Porphyria Cutanea Tarda
  - [ ] B Cell Non-Hodgkin Lymphoma
  - [ ] Multiple Myeloma
- **Asthma**
- **Diabetes Mellitus**
- **Hypertension**
- **Peripheral Neuropathy**
- **Renal Insufficiency**
- **Seizure Disorder**
- **Coronary Artery Disease**
- **Autoimmune Disease**
- **Type of disease:**
  - [ ] Cancer
  - Year:
  - Type of Cancer:
  - Organ transplanted:

### Laboratory

<table>
<thead>
<tr>
<th>Basic Laboratories</th>
<th>Date</th>
<th>PT</th>
<th>INR</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBC</td>
<td>M/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WBC</td>
<td>K/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANC</td>
<td>K/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HGB</td>
<td>g/L</td>
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<td></td>
</tr>
<tr>
<td>HCT</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td>K/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESR</td>
<td>mm/hr</td>
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<td></td>
</tr>
<tr>
<td>Creatinine</td>
<td>µmol/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glucose</td>
<td>mmol/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRP</td>
<td>mg/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AST</td>
<td>IU/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALT</td>
<td>IU/L</td>
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<td></td>
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<tr>
<td>ALK Phos</td>
<td>IU/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T. Bili</td>
<td>µmol/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Bili</td>
<td>µmol/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Protein</td>
<td>g/L</td>
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**Other Essential Results**

<table>
<thead>
<tr>
<th>Date</th>
<th>Fe</th>
<th>TIBC</th>
<th>Ferritin</th>
<th>AFP</th>
<th>TSH</th>
<th>Ana</th>
<th>Other</th>
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<tbody>
<tr>
<td>[ ]</td>
<td>µg/dL</td>
<td>µg/dL</td>
<td>ng/dL</td>
<td>ng/dL</td>
<td>IU/L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HCV Genotype**

**HCV Viral Load**

**Diagnostic Tests**

<table>
<thead>
<tr>
<th>Test</th>
<th>Date</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIB-4</td>
<td></td>
<td>Final Result:</td>
</tr>
<tr>
<td>Ultrasound</td>
<td></td>
<td>Splenomegaly</td>
</tr>
<tr>
<td>Elastography</td>
<td></td>
<td>Score: kPa</td>
</tr>
<tr>
<td>Upper Endoscopy</td>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>CT/MRI</td>
<td></td>
<td>Normal</td>
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</table>
Benefits of ECHO

Regular active participation in teleECHO clinics combined with formal teaching allows the rural health care providers to progressively “specialize” and be able to manage their own patients at their place of residence

- Rapidly upscales training of local workforce
- Increases patient access to treatment
- Decreases related morbidity and mortality
- Decreases specialist clinic waiting times

2011: Veterans Health Administration adopted SCAN-ECHO (Specialty Care Access Network - Extension for Community Healthcare Outcomes):

- Chronic liver disease
- Assessed efficacy of SCAN-ECHO visit within the context of a regional cohort of 62,237 patients with liver disease from 1/6/2011 to 31/3/2015
- 513 SCAN-ECHO pts compared to 62,234 pts with no ECHO visits
  - ECHO patients were younger, rural with HCV, HBV or cirrhosis
- Matched patients with SCAN-ECHO program consultation
  - 46% less likely to die during follow-up period, HR 0.54; 95% CI 0.36-0.81; P = 0.003) compared to those with no ECHO visits
  - More likely to undergo surveillance for oesophageal varices and HCC
  - >40% patients had hepatitis C
  - Similar survival compared to traditional in-person visits

Su et al; Hepatology 2018;00:1-8
Echo Program: SSA

Implementation of supranational model in four pilot countries: South Africa, Nigeria, Ghana and Ethiopia

- Development of hub and spoke services to diagnose and treat a greater number of HBV and HCV infected individuals than are currently treated

- Provides a platform in SSA for:
  - Best-practice care for patients with complex health conditions
  - Outcomes research

By “Democratizing” knowledge and practice, we can exponentially increase local capacity to diagnose and treat the disease, in order to meet the 2030 WHO elimination targets for chronic viral hepatitis

Can be expanded to management of other chronic conditions
ECHO PROGRAM : SSA

HUBS

South Africa

• Liver clinic, Groote Schuur Hospital
• University of Witwatersrand & Donald Gordon Medical Centre

SPOKES

Liver Clinic, GSH: Start with centres already part of our referral base
• Worcester, Paarl, George, Mthatha, Port Elizabeth, East London

4 Internationally linked spoke centres

• Nigeria: The University of Lagos, Lagos (Prof Funmi Lesi)
• Ghana: Kwame Nkrumah University of Science and Technology, Kumasi (Prof Mary Afihene)
• Ethiopia: Adis Ababa University Medical School, (Prof Abate Shewaye)
• London: UCL Institute of Liver and Digestive Disease and Kings College Hospital (Prof G Dusheiko); support and guidance
The SSA ECHO Viral Hepatitis program will support:

- A series of didactic lectures and case discussions
- Clinically approved cost effective prescribing of drug treatments in accordance with local procurement policy
- Spokes at the University of Lagos, Kumasi Hospital, Ghana and Adis Ababa developing into Hubs with their own spokes
- Progressively increase the number of spokes in SA
Project ECHO programs

• Highly-regulated system of anonymizing and encrypting data and personal information to ensure data protection, confidentiality and security

• Expanded to treat other chronic conditions using the same infrastructure
  - Diabetes Mellitus and hypertension
  - Rheumatology
  - Palliative care
  - Oncology

• Already HIV ECHO programs in Namibia and Kenya

• Planned Oncology program: Kimberley Hospital, SA
### 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>
</table>
| 8-10 a.m. | **Hepatitis C**  
  • Arora  
  • Thornton | **Diabetes & Endocrinology**  
  • Bouchonville | | **Geriatrics/Dementia**  
  • Herman | **Palliative Care**  
  • Neale |
| 10-12 a.m. | **Rheumatology**  
  • Bankhurst | **Chronic Pain**  
  • Katzman | **Integrated Addictions & Psychiatry**  
  • Komaromy | | **Complex Care**  
  • Neale  
  • Komaromy |
| 2-4 p.m. | **HIV**  
  • Landiorio  
  • Thornton | | **Prison Peer Educator Training**  
  • Thornton | **Women's Health & Genomics**  
  • Curet | |
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

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Extension for Community Health Outcomes

Moving Knowledge Instead of Patients

Start-up funding from Gilead Grants Program (G Dusheiko)

• First ECHO clinic February 2019
ECHO Project : Infrastructure

Videoconferencing Hardware : HUBS

• Microphones system: 1500 USD x 13.5 = R 20 250
• Speakers system: 1000 USD x 13.5 = R 13 500
• Webcam: 1500 USD x 13.5 = R 20 250
• 2 x high definition displays/monitors: 4000 USD = R 54 000
• Computer: 1500 USD x 13.5 = R20 250
• Network: WIFI or LAN
• Videoconferencing Software: ZOOM
  ✴ Provided free from ECHO

Total : R 128 250
ECHO Project: Infrastructure

Videoconferencing Hardware: SPOKES

- Microphones system: 500 USD x 13.5 = R 6 750
- Speakers system: 1000 USD x 13.5 = R 13 500
- Webcam: 1500 USD x 13.5 = R 20 250
- 1 x high definition displays/monitors: 2000 USD = R 27 000
- Computer: 1500 USD x 13.5 = R20 250
- Network: WIFI or LAN

Videoconferencing Software: ZOOM
  ▪ Provided free from ECHO

Total: R63 450
The team structures would include:

- **Hub medical director**
  - Recruitment of spokes and management, curriculum development

- **Clinicians: Specialists (Hubs), primary healthcare clinicians (spokes)**

- **Clinical co-ordinators**
  - Manages day-to-day supervision of ECHO clinics and data collection

- **IT co-ordinators**

- **Pharmacists**

- **Social worker**

- **Nursing sisters**

- **Community health workers**