Remotely Caring for Vulnerable Populations during a Pandemic

a Challenge in 3 Phases

Team Leads: Julian Goldman and Betty Levine
Remotely Caring for Vulnerable Populations during a Pandemic

Our GCTC project demonstrates the transformational power of open, integrated, medical device and HIT platforms to automate detection, triage, and treatment of individuals affected by a pandemic, as applied to an Ebola Virus Disease (EVD) use case.

See http://mdpnp.org/ebola.html for more information
Phase I of III

Global City Teams Challenge Kickoff
September 29-30, 2014

Remotely Caring for Our Most Vulnerable Citizens In-Place During A Pandemic
Proposed Project

- Automate aspects of detection, triage, and treatment in the face of pandemic
- Provide early detection of onset of disease; remote support of local treatment by less-skilled caregivers

Based on lessons learned in the SmartAmerica challenge
Ebola Care Medical-Technology Response

Oct - Nov 2014

OPEN MEDICAL DEVICE AND DATA INTEGRATION PLATFORMS TO SUPPORT THE MANAGEMENT OF EBOLA VIRUS DISEASE
Need for rapid implementation of innovative solutions:

- Detect clinical signs of disease onset with new sensors and data fusion
- Information on evolution of symptoms (phenotype)
- Point-of-care lab tests
- Data dashboards
- Build on open platforms
In Hospital/ICU

- Personnel must be protected from infection
- Data dashboards essential
- 20 minutes to don/doff PPE -> unsafe delays
Challenges to Manage Patients in Isolation Environments: Data access, Intravenous Fluid management, Ventilation

• Ventilator adjustments are performed by Respiratory Therapists or other trained staff
• 20-minutes don/doff time would occupy all staff time

Intravenous Fluid Example:
IV fluid flow = 100 ml/min
Begin new medication outside of room:
20 Minute delay for the new medication dose to reach the patient

IV flow analysis Courtesy of R. Peterfreund, MD PhD, MGH
Remote data access, remote device control, resource tracking, to enable more timely care, reduced exposure, and improve monitoring.
Project Timeline: Oct 17-Nov 6, 2014

• Over 20 days, 20 organizations collaborated to demonstrate these concepts

• Culminated in a 3-day hackathon and public demonstrations
Medical Device Interoperability Lab
at Mass General Hospital / Partners HealthCare

www.mdpnp.org
Video link

http://www.wcvb.com/health/local-researchers-testing-remote-control-ebola-care/29586104
Participation of the US FDA CDRH was a powerful incentive for medical device manufacturers to explore innovative medical technology solutions, especially those benefiting from interoperability between manufacturers.
Formation of the ICE Alliance to enable collaboration and innovation

The ICE Alliance is a non-profit program committed to establishing healthcare environments that are safe, secure, and interoperable.

Note: The ICE Alliance is hosted by the IEEE-ISTO

www.icealliance.org
Phase III

Incorporate new technologies as they become available

Creative approach to telemedicine ...
Point-of-care Chem/Bio Screening Testing

- Rapidly reads and interprets FDA approved medical tests
- Rapidly reads and interprets DoD environmental tests
- Information and results can be transmitted and incorporated into the Military Electronic Health Record
Logical Work Flow:

Goal – To provide critical (chem / bio) screening lab results electronically within minutes from remote sites.

Request, Perform, Interpret and Send Assay Results

Receive Request for Patient X Test

Perform and Analyze Patient X Test

Send Results of Patient X Test To Nett Warrior Phone (electronic health record)

Results Sent To MC-4 App & Incorporated into Patient X Medical Record

Medic Generates Request for Patient X Test

Send Results of PaGent X Test To NeWarrior Phone (electronic health record)

Smart Colorimetric Assay Reader (Smart C A R) cloud enabled EHR

Smart Colorimetric Assay Reader (Smart C A R) cloud enabled EHR

Logical Work Flow:

Goal – To provide critical (chem / bio) screening lab results electronically within minutes from remote sites.

MC-4

Smart Colorimetric Assay Reader (Smart C A R) cloud enabled EHR

MC-4

Smart Colorimetric Assay Reader (Smart C A R) cloud enabled EHR

Logical Work Flow:

Goal – To provide critical (chem / bio) screening lab results electronically within minutes from remote sites.