



Global City Teams Challenge

June 1, 2015

Washington DC

# **REMOTELY CARING FOR VULNERABLE POPULATIONS DURING A PANDEMIC**

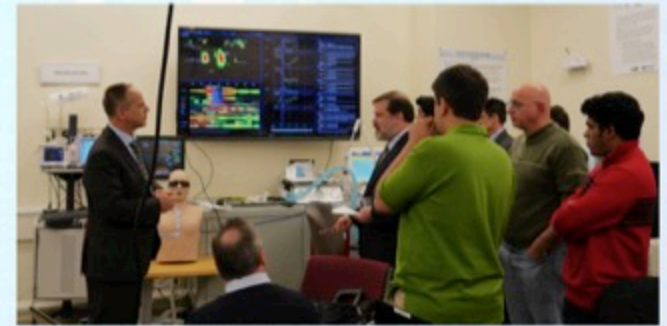
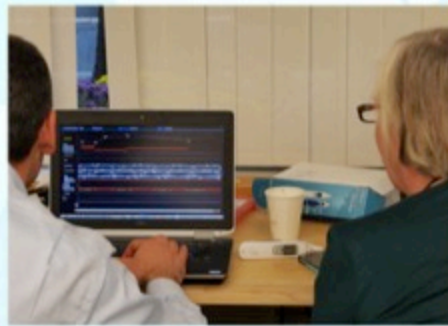
## ***A CHALLENGE IN 3 PHASES***

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

*a Challenge in 3 Phases*

## **Phase I of III**

# **Global City Teams Challenge Kickoff September 29-30, 2014**

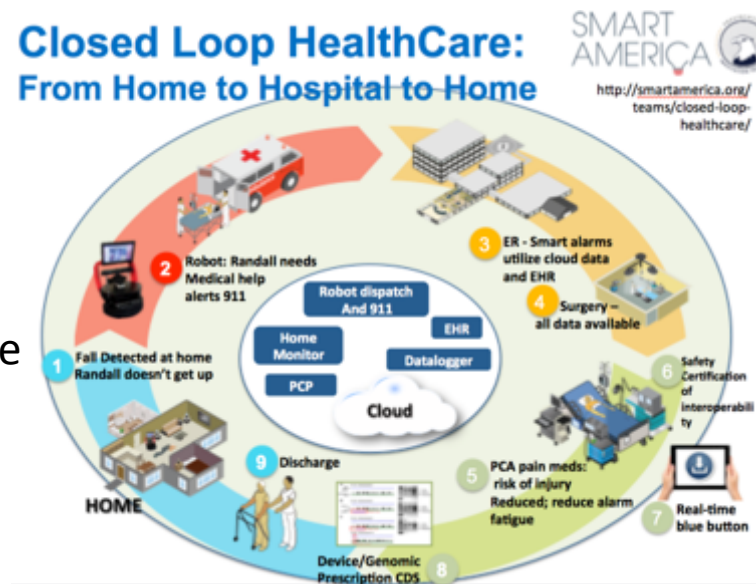
**Remotely Caring for Our Most Vulnerable  
Citizens In-Place During A Pandemic**



# 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





A grayscale electron micrograph of an Ebola virus particle. The particle is long and filamentous, with a distinct outer envelope and a darker, textured interior. It is surrounded by a grainy, light-colored background.

**Phase II / III**

**Ebola Care Medical-Technology Response**

**Oct - Nov 2014**

**OPEN MEDICAL DEVICE AND DATA INTEGRATION  
PLATFORMS TO SUPPORT  
THE MANAGEMENT OF EBOLA VIRUS DISEASE**

# PRE-hospital Quarantine



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

INSIDE ROOM



- **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

20-30 feet

CARRIER FLUID

DRUG

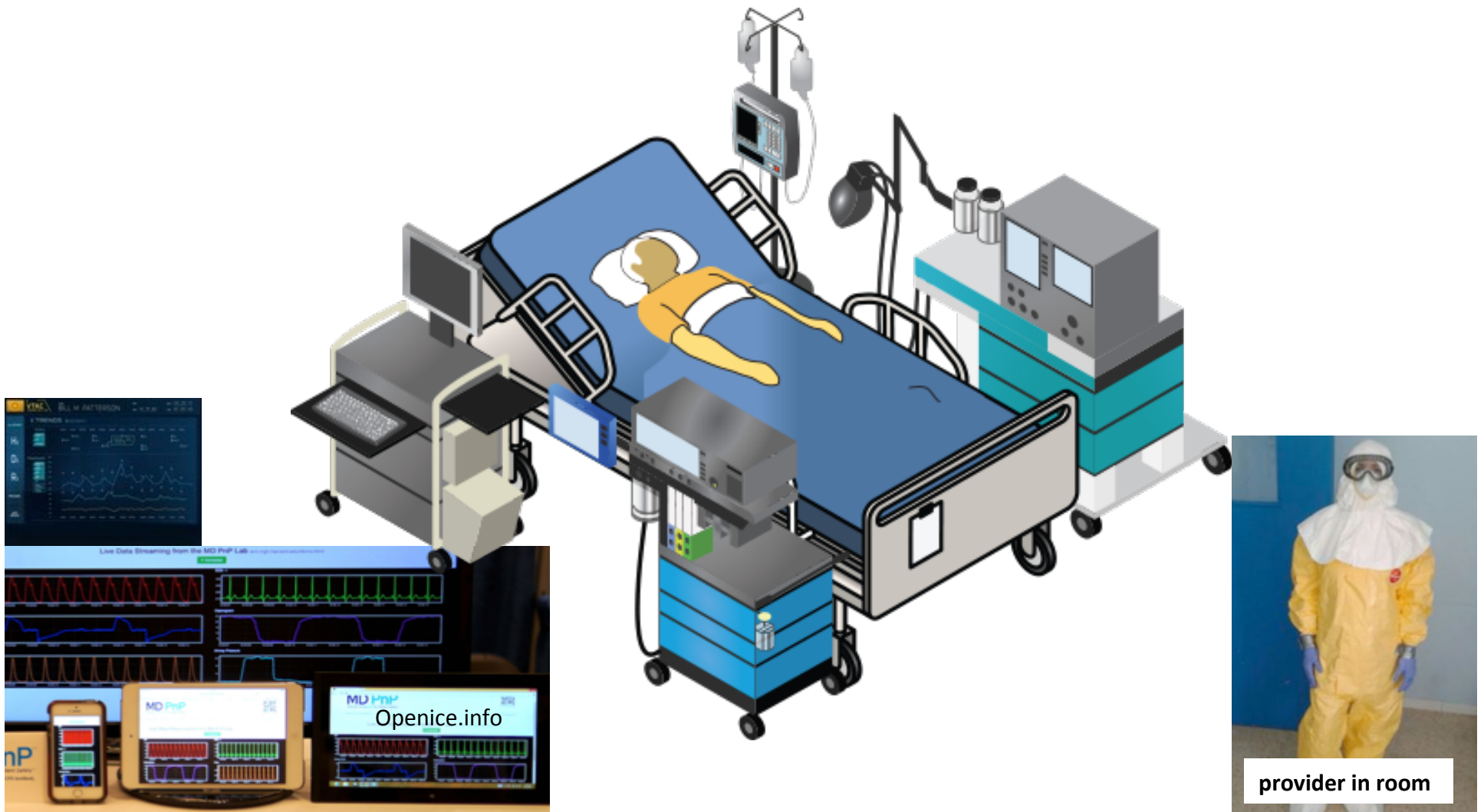
INFUSION PUMPS

OUTSIDE Patient's ROOM

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



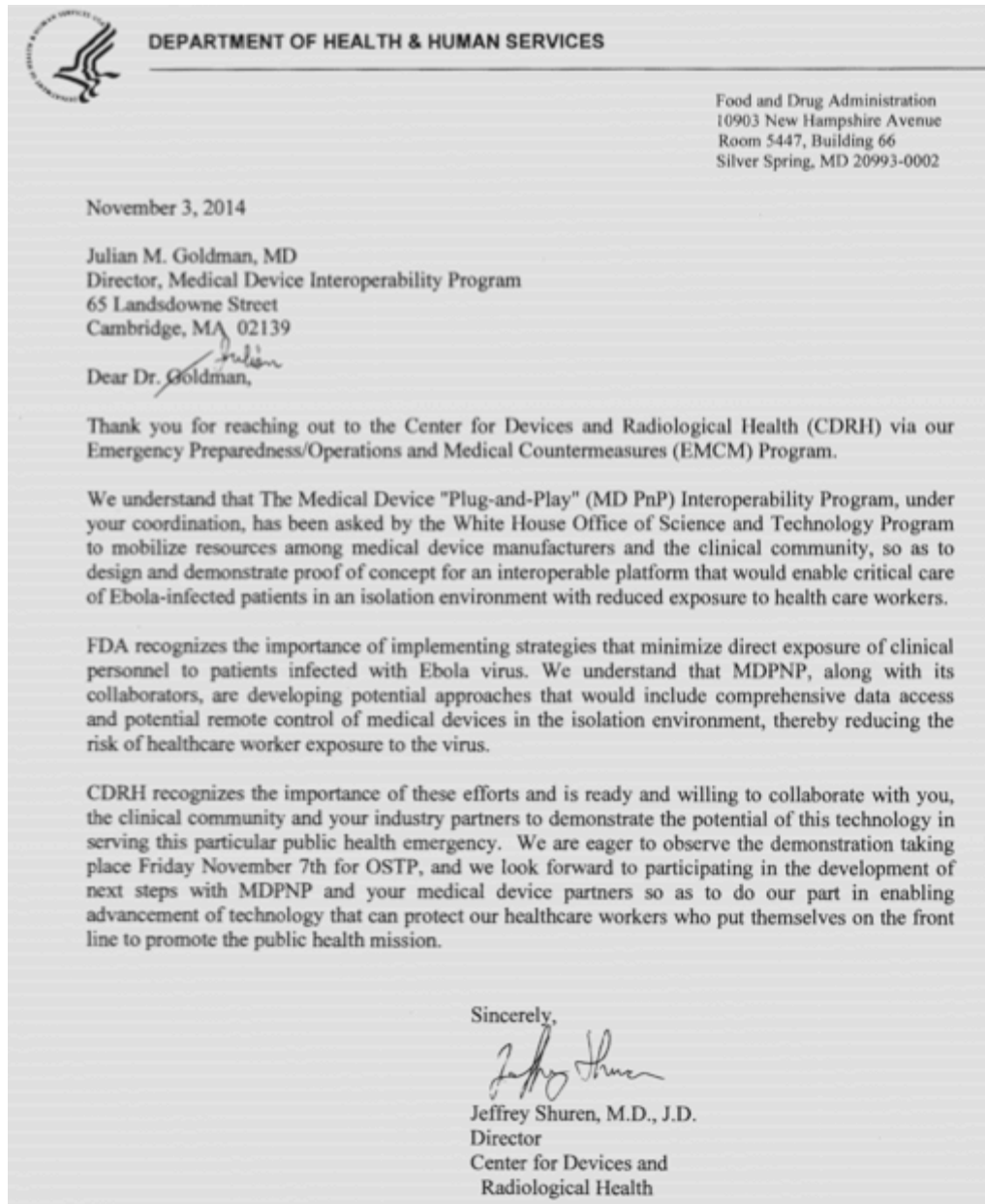
[www.mdnpn.org](http://www.mdnpn.org)

Video link

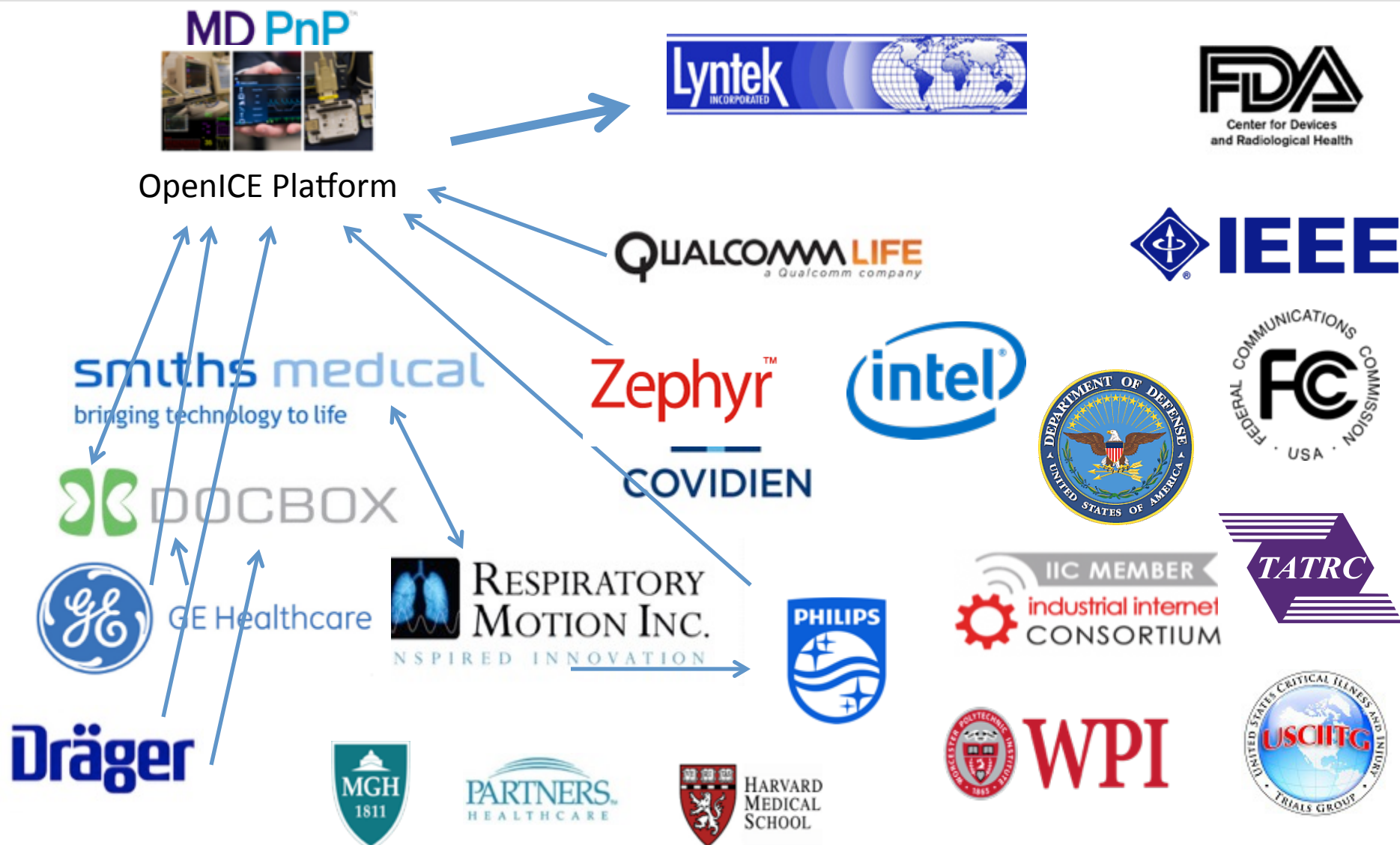
<http://www.wcvb.com/health/local-researchers-testing-remote-control-ebola-care/29586104>



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



# Ebola Project COLLABORATORS



## 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](http://www.icealliance.org)

## Virtuous Cycle of Stakeholders

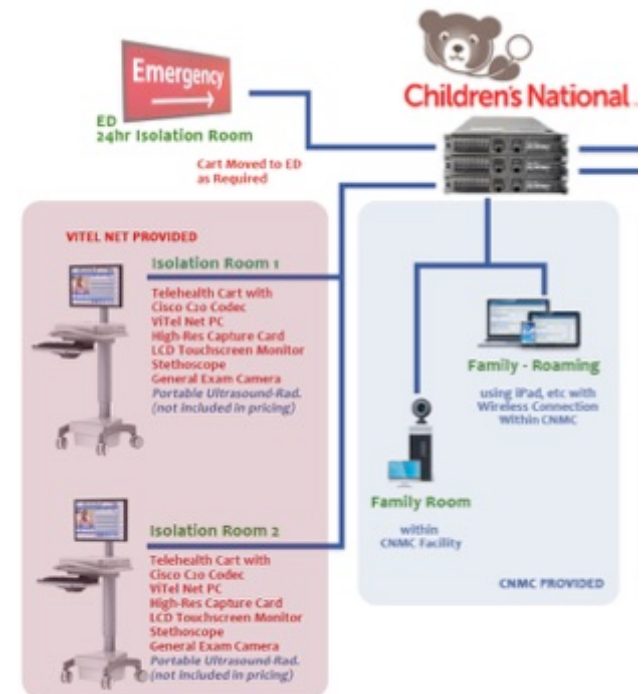




# Phase III

Incorporate new technologies  
as they become available

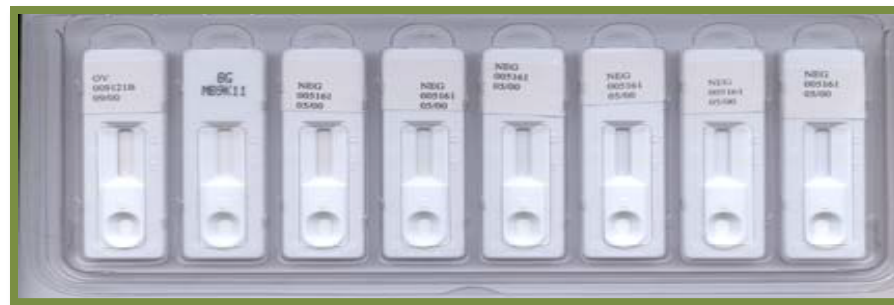
Creative approach to telemedicine ...



## 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



## Request, Perform, Interpret and Send Assay Results

**Logical Work Flow:**  
**Goal – To provide critical (chem / bio) screening lab results electronically within minutes from remote sites**

