

US Department of Health and Human Services Assistant Secretary of Preparedness and Response (ASPR)

Building Health Resiliency Technologies

Philip Ferro, PhD, MS
Director of Special Projects, ASPR

11 April 2013
FDA Advisory Committee: Device Good Manufacturing Practice Advisory Committee



Background



Purpose:

To present an example of how the USG (HHS/ASPR, FDA, FEMA) is working together to enhance Public Health.

ASPR Role in USG:

To lead the nation in preventing, preparing for, and responding to the adverse health effects of public health emergencies and disasters.

What are Health Resiliency Technologies?:

Technologies that allow individuals to continue to use their durable medical equipment (DME – includes medical devices powered by electricity, such as oxygen concentrators, ventilators) during prolonged power outages.

- Sensor/signaling devices on DME
- Universal batteries that can be utilized by all DME devices
- Batteries that do not rely on electricity to be charged

The Team: External Entrepreneur:
Frank Sanborn

Internal Entrepreneurs:
Nicole Lurie - Assistant Secretary for Preparedness and Response
Phil Ferro - Director of Special Projects, ASPR
Stacy Elmer – Special Advisor, ASPR, CTO
Ted Okada – Chief Technology Officer, FEMA
Desiree Matel-Anderson - Chief Innovation Advisor, FEMA



The Problem

During disasters and prolonged power outages many individuals that are dependent on electrically powered durable medical equipment (DME) such as oxygen concentrators, ventilators, and intravenous infusion pumps are unable to charge and operate their equipment while at home and often resort to shelters unequipped to handle them or to emergency care facilities for power or to re-charge their DME .



PHOTO: JOHN TORIGOE/ONN



Multiple systems failures contribute to the problems DME dependent patients experience during disasters

DME populations not identified

Location of individuals and devices unknown

No access to individual or **device status**

No **alternative power** for devices

Shelters **not equipped** to handle individuals with medical needs

Lack of **communications tools**

Lack of viable **communications infrastructure**





We are working on several components of an integrated approach in parallel

POPULATION LOCATION & IDENTIFICATION

* Develop Smart DME prototype device in-house and utilize challenges and competitions



* Identify populations using CMS data



* Industry adoption of Smart DME

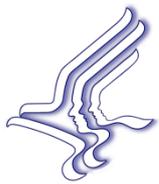


* Pilot with States and locals



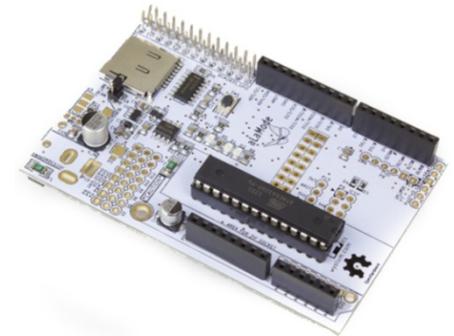
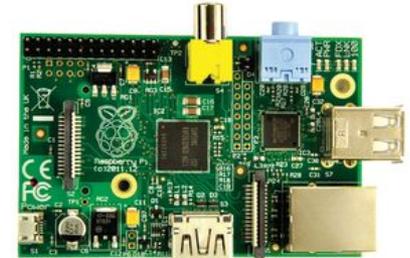
Relative Progress





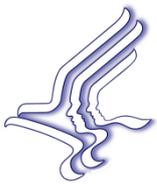
- **Hardware**

- Raspberry Pi
- Alamode (arduino shield)
- GPS
- GSM modem
- ZigBee with Wi-Fi, HTTP Server
- Expandable ZigBee Slot
- External Wi-Fi (USB)
- Portable Oxygen Concentrator – Energy Level
- Other Sensors (wireless or wired)



- **Software**

- Linux (raspberry pi)
- Arduino (custom per application)



Community Innovation Challenges

- **Challenges**

- Amateur Radio Integration
- Community Mesh Network Software (HacDC)
- DME Security
- Wireless Emergency Alerts (formally CMAS)
- Social Media Applications

- **Maker Blog**

- Create a bill of materials
- Instructions
- Source Code

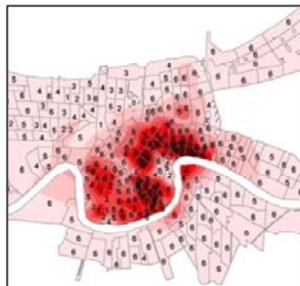


COMMUNICATION INFRASTRUCTURE

- * MBAN, Wi-Fi, Cellular, Amateur Radio, Mesh Networks



- * Formal platforms to Inform



COMMUNICATION TOOLS

- * Competitions, Challenges, Code-a-thons and Make-a-thons to support community Innovation



- * And for social media applications for individual and communities





RESILIENCE

- ★ Response infrastructure



- ★ Device & Information security and privacy



POWER

- ★ Partnerships with power & utility companies



- ★ Energy solutions for patients & communities

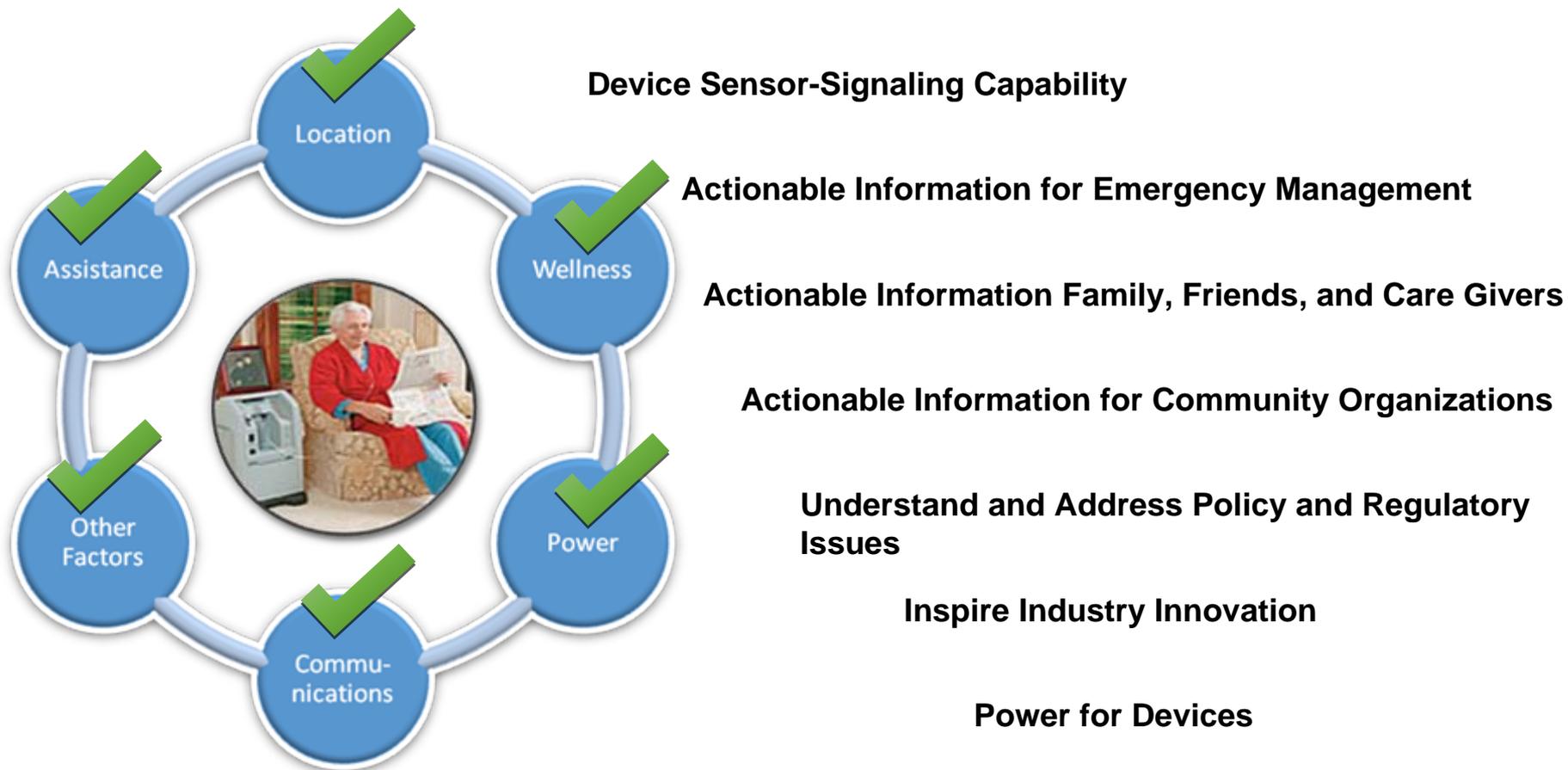


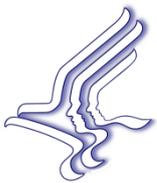
Relative Progress

○ Planning ◐ In-Progress ● Complete



Goal is a fully integrated system



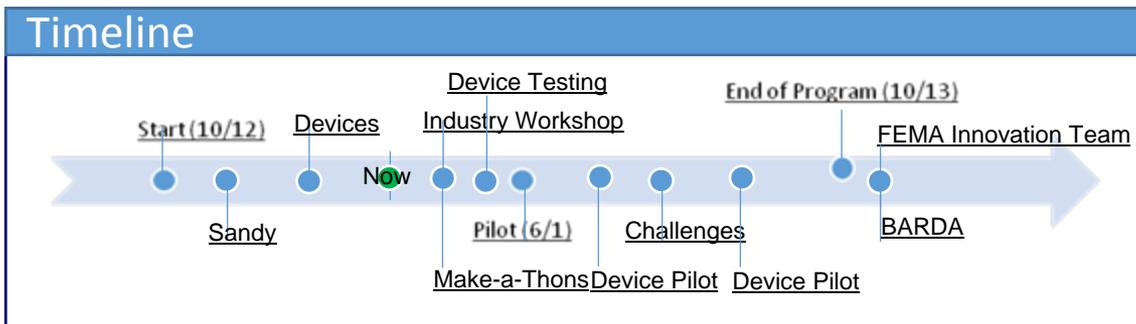


Looking Ahead

An eco-system that enables the needs of individuals dependent on life sustaining DME to be identified, located, assessed, and addressed



Industry and Whole of Community Support





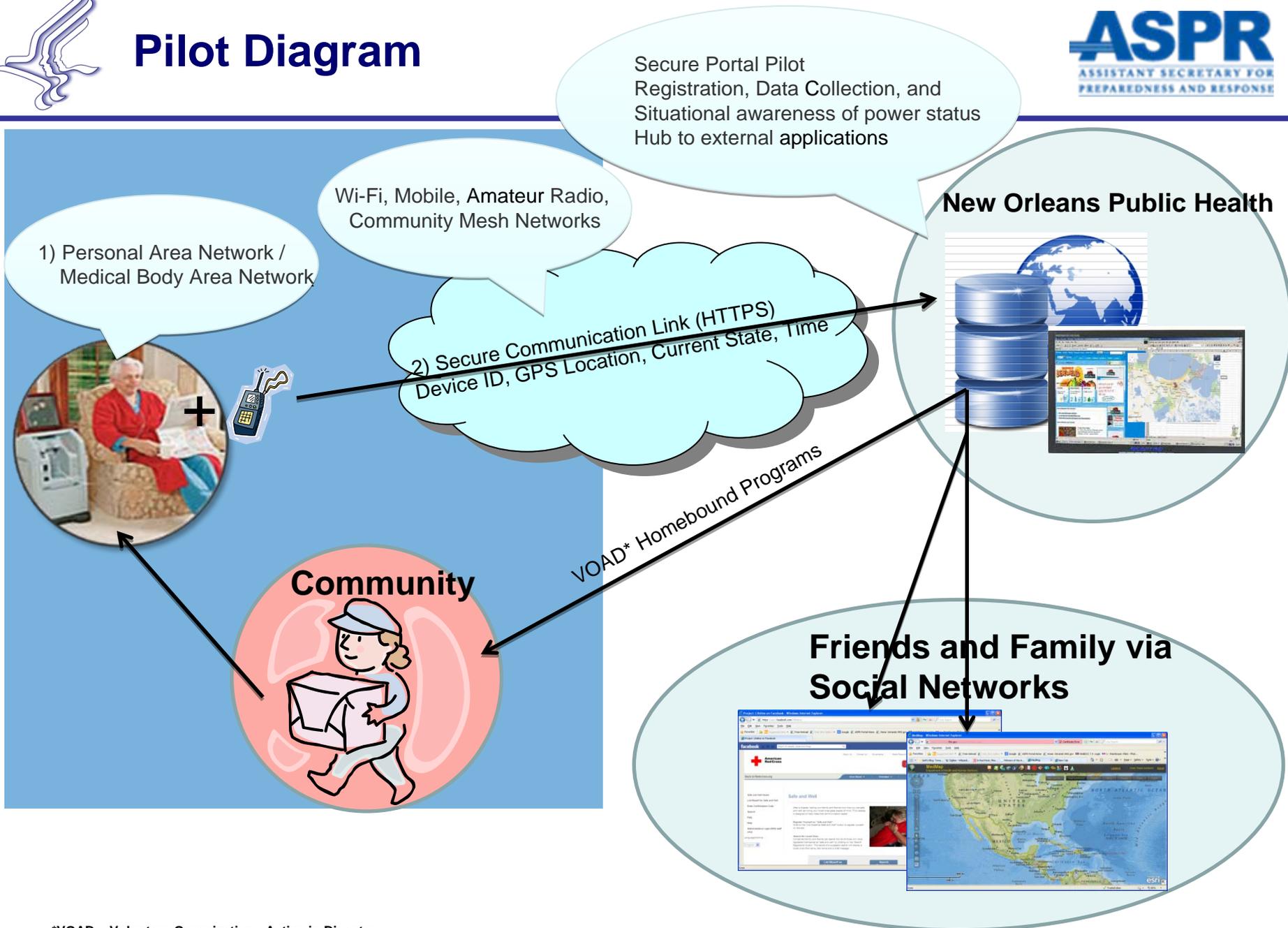
Thank you!



Appendix



Pilot Diagram



*VOAD = Voluntary Organizations Active in Disaster