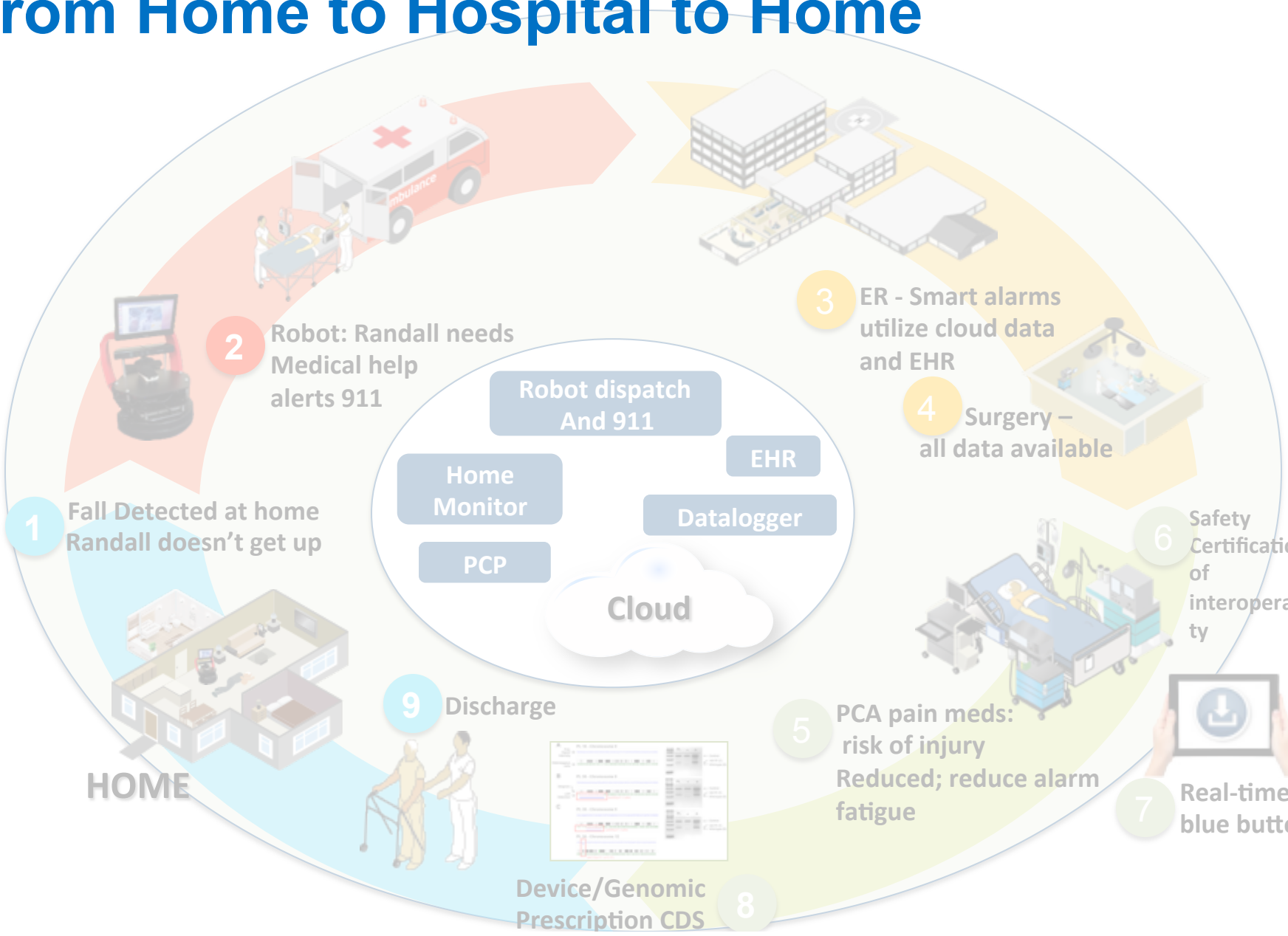
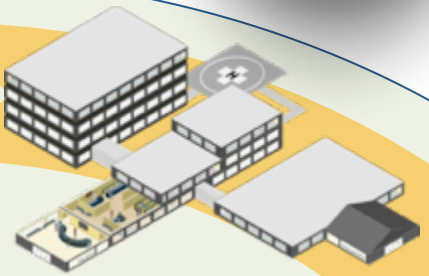
Closed Loop HealthCare:
From Home to Hospital to Home



CLOUD



2 Robot: Randall needs Medical help alerts 911

3 ER - Smart alarms utilize cloud data and EHR

4 Surgery – all data available

Robot dispatch And 911

EHR

Home Monitor

Data logger

PCP

Cloud

1 Fall Detected at home Randall doesn't get up

6 Safety Certification of interoperability

HOME

9 Discharge

5 Pain meds: Reduce risk of injury and false alarms

7 Real-time blue button

Device/Genomic Prescription CDS 8

NOTE:

this graphic depicts a mix of current and planned capabilities.

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PRESIDENTIAL INNOVATION FELLOWS

Fall Detection and analysis …
Can change the course and outcome of the event

CLOUD

Motion Sensors

Floor Sensors

Bed Sensor

Fall Detection – Kinect

1 **Fall Detected at home Randall doesn't get up**

2 **Robot dispatch performs triage alerts 911**

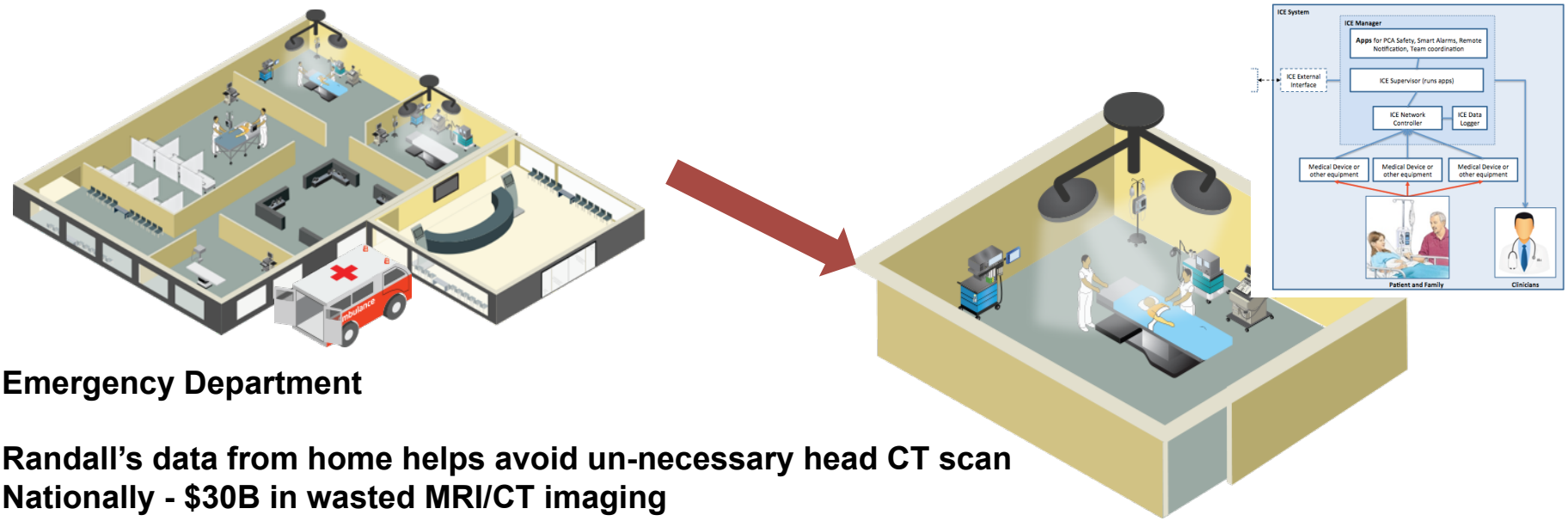
3 **911 dispatch**

SMART AMERICA

PRESIDENTIAL INNOVATION FELLOWS

Hospital has standards-based “Integrated Clinical Environment”. Enables full data interchange, device coordination, closed-loop control, black box recorder … “IoT for Health Care”

ICE Architecture
ASTM F2761

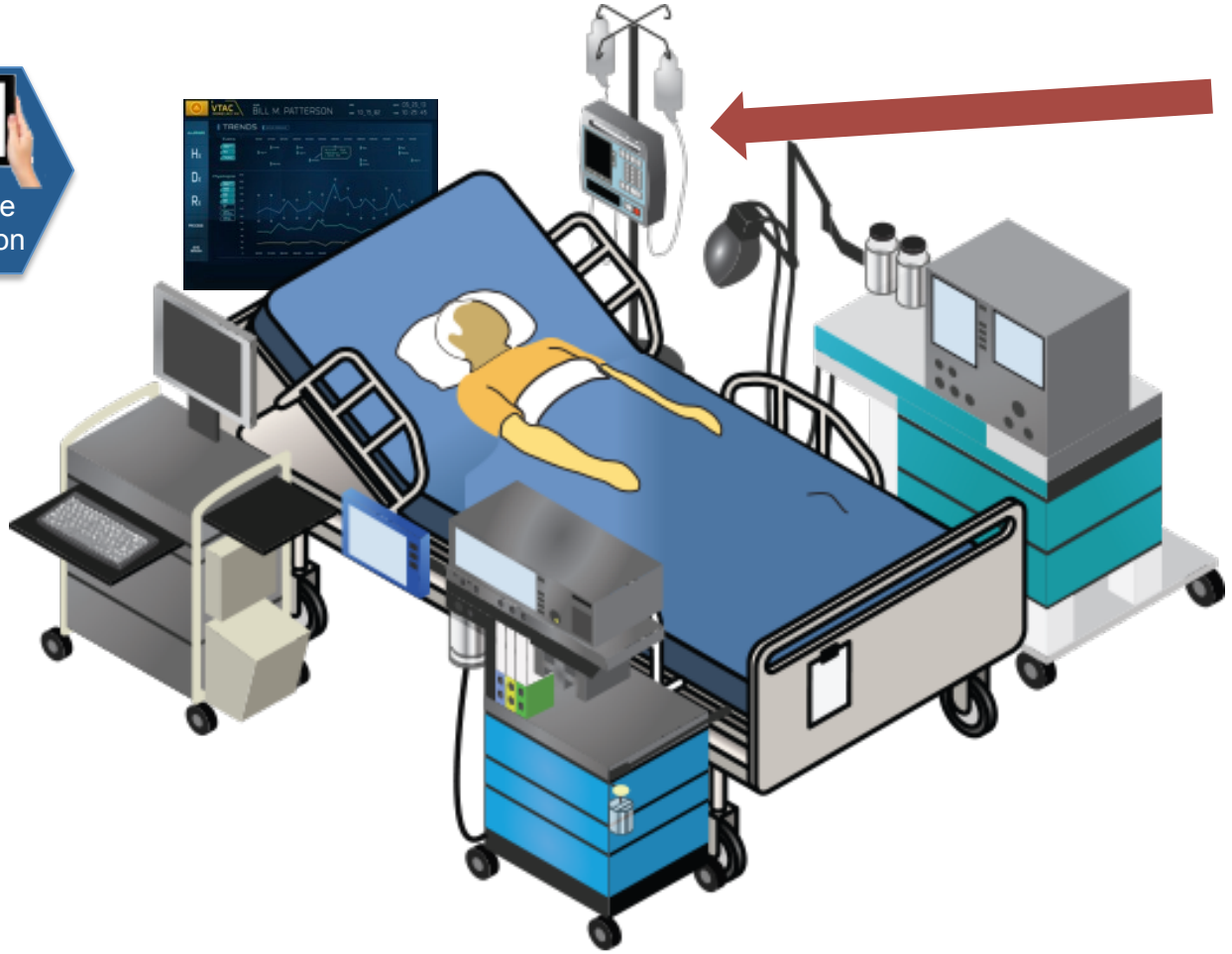


Emergency Department

Randall’s data from home helps avoid un-necessary head CT scan
Nationally - $30B in wasted MRI/CT imaging
$2,000 each head scan. Radiation equivalent to 30 chest x-rays

- Retrieving data from remote EHR
- Starting Safe Pain Management system
- Transferring all clinical data to OR for emergency surgery
- Genomic basis for fall identified – medication adjusted

Reduce false alarms will reduce alarm fatigue
Safer, more effective pain control
Real-time blue button data available to family and staff



Pain Medication-related Injuries Could be prevented with Medical CPS:

- Over 6000 patients severely injured/killed each year
- Up to $145M impact
- Untreated pain
- PREVENTABLE!

Safe Interoperability enabled by MCPS

Patient is discharged … to a smarter home

CLOUD

Bathroom/ Toilet Floor Sensor

Motion Sensors

Bed Sensor

Fall Detection – Kinect

Auto Light Control

Capsule Robots

Real-time blue button

Wearable sensors

home Gait Analysis – Kinect

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SmartAmerica EXPO – June 11, 2014 Washington DC Convention Center

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Development & Demo at the MGH/MD PnP Lab, Cambridge, MA March 2014