

HealthCare IT Challenges

IEEE Health IT Standards Study Group

April 4, 2005



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3/29/2006

PARTNERS

HEALTHCARE SYSTEM



BRIGHAM AND
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MASSACHUSETTS
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Faulkner Hospital



Welcome...



Spaulding Rehabilitation Hospital



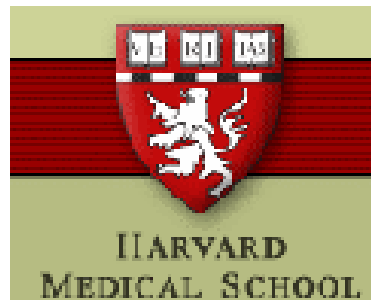
Center for Integration of Medicine and Innovative Technologies



Beth Israel Deaconess
Medical Center

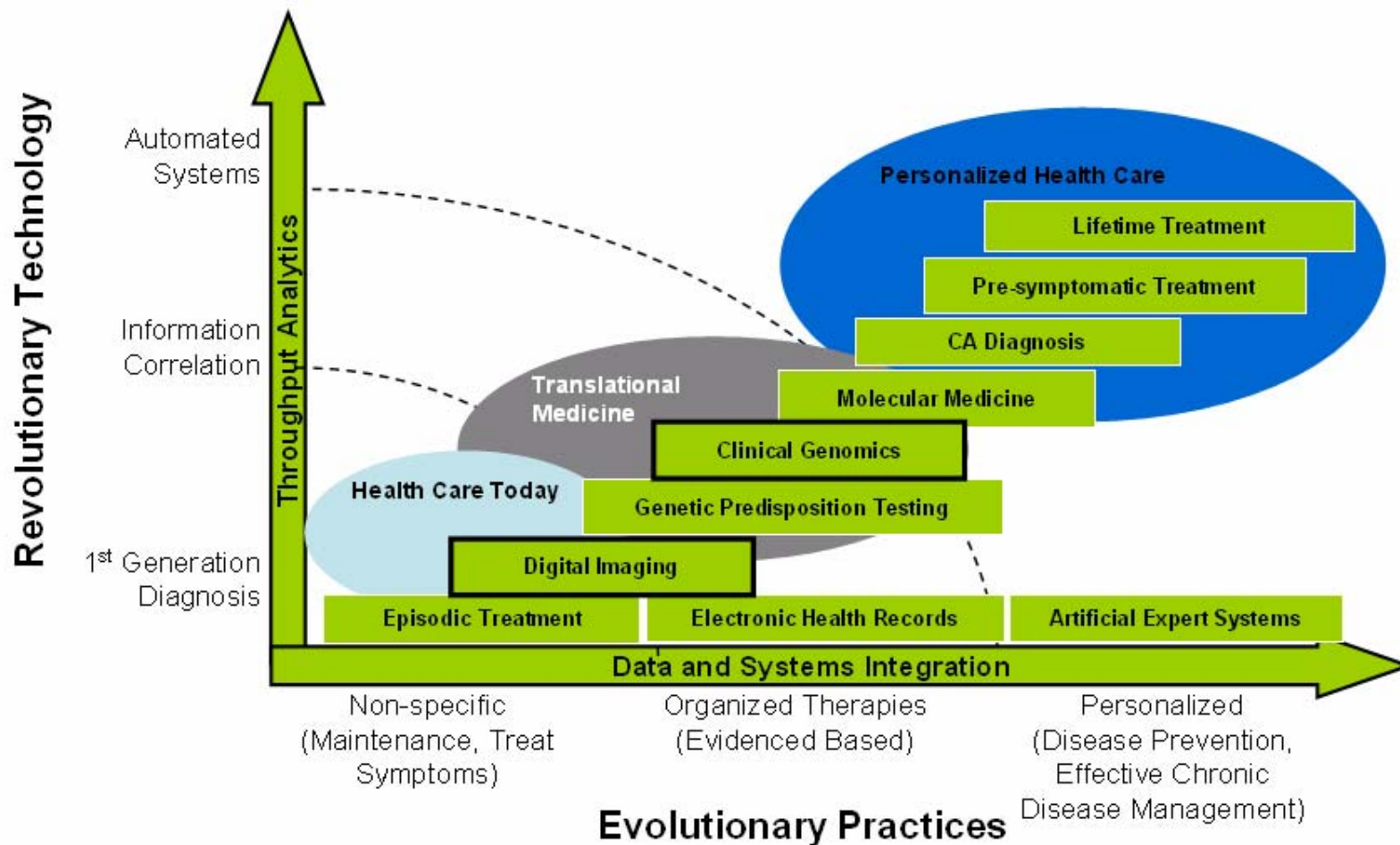


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The Evolution and Transformation of Medical Practice



Why Computerize?

New York Times, February 19, 2005

Health Industry Under Pressure to Computerize

By STEVE LOHR

DALLAS, Feb. 17 - Dr. David J. Brailer, the federal official who is trying to prod the nation's health care system into the computer age, has delivered a warning to the health care industry: take steps soon to make it happen or the government will probably impose a solution.

Regulation of Medical Devices

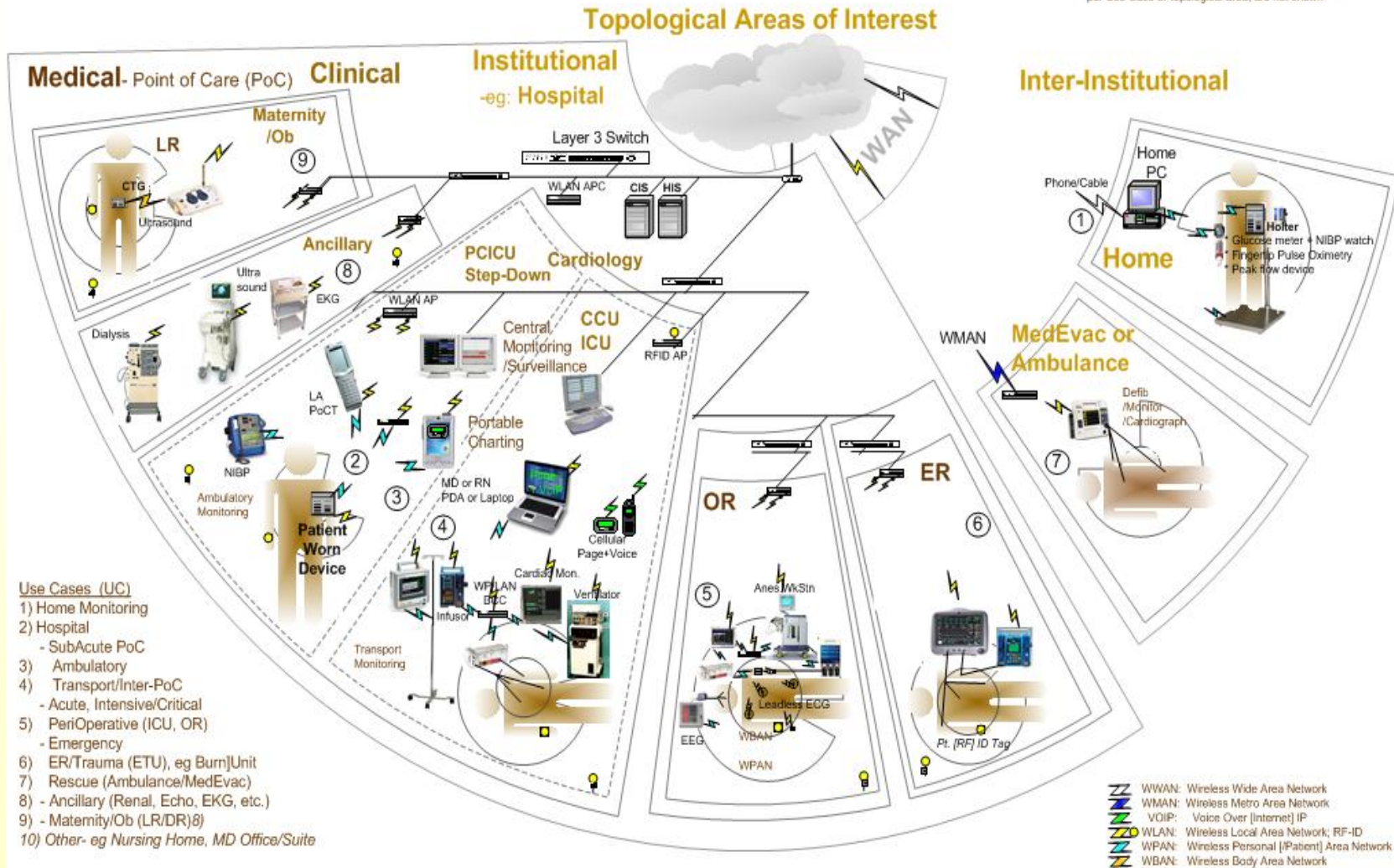
"Do not let us mistake necessary evils for good."
C.S. Lewis

IEEE 1073 Point of Care Medical Device Communication Standards

- Work underway includes:
 - ◆ Standard for Medical Device Communications – Medical Device Data Language (MDDL) Medical Device Specializations - Infusion Device, Vital Signs Monitor, Ventilator, Pulse Oximeter, Defibrillator, ECG, Blood Pressure, Temperature, Airway Flowmeter, Cardiac Output, Capnometer, Hemodynamic Calculator, Pulmonary Calculator, Respirator, Scale
 - ◆ The RF wireless technologies working group (P1073.0.1.1) has been actively developing a technical report on the use of RF networks for medical device communications.

IEEE p1073.0.1.1
 Use Cases - Overview
 31Aug04 Rev 3b

Note:
 1) Drawings are intended to be representative of devices; do not take literally!!
 2) Scaling factors, eg number of AP's or PWD's, etc., per Use Case or topological area, are not shown



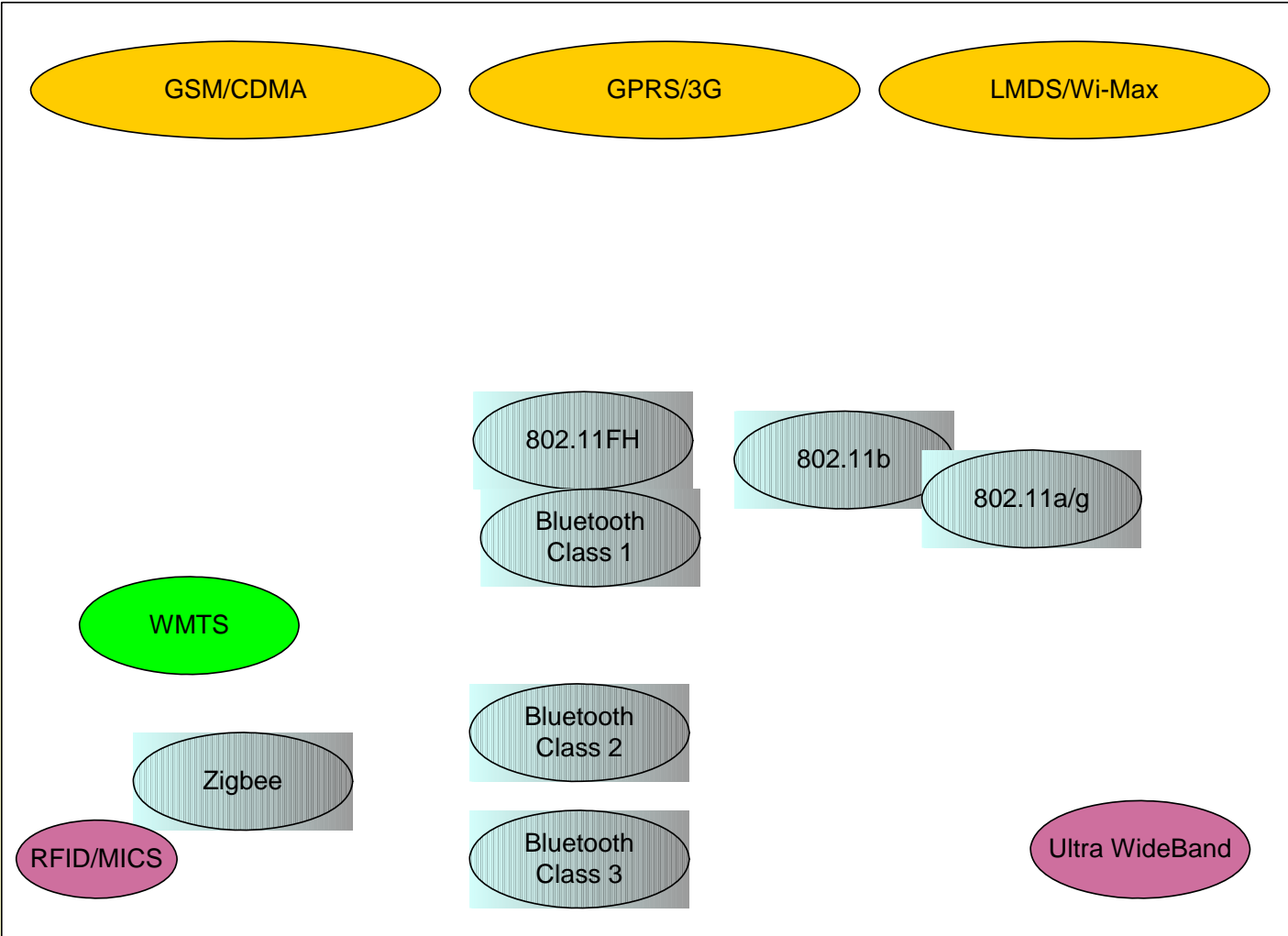
FCC (IC) Services Utilized

- ISM (Industrial, Scientific, **Medical**)
- **WMTS (Wireless Medical Telemetry Service)**
- PLMRS (Private Land Mobile Radio Service)
 - ◆ Public Safety
 - ◆ **Bio-medical Telemetry**
 - ◆ Industrial/Business
 - ◆ Private Land Mobile Paging
 - ◆ Radiolocation
- Paging
- MURS (Multi-Use Radio Service)
- FRS (Family Radio Service)
- GMRS (General Mobile Radio Service)
- **MICS (Medical Implant Communications Service)**
- Part 15 Unlicensed RF Devices
 - ◆ **Medical Telemetry**
 - ◆ RFID
 - ◆ **Spread Spectrum**
 - ◆ U-NII (Unlicensed National Information Infrastructure)
 - ◆ UWB (Ultra WideBand)
 - ★ **Medical Imaging**
- Cellular Radio Service
- SMRS (Specialized Mobile Radio)
- AWS (3G) - Advanced Wireless Services Spectrum
- PCS (Personal Communications Service)
- Amateur Radio
- Private Operational Fixed Microwave

Wireless Application Map

- Text
- Graphics
- Internet
- HiFi Audio
- Streaming Video
- Digital Video
- Multi-Channel Video

Long Range



LAN

PAN

Wireless Medical Telemetry Service

- WMTS has specific frequencies allocated
 - ◆ Co-primary with Radio Astronomy from 608-614 MHz
 - ★ Must coordinate with Radio Astronomy
 - ★ No protection from TV36 or TV38 stations
 - ◆ Co-primary in 1395-1400, 1427-1429.5 MHz, (1429-1431.5 MHz – US only)
 - ★ No protection from Automated Meter Reading (AMR) or Subscriber Radio Services (SRS)
- Different WMTS protocols have caused interference

Important Unanswered Questions:

- How many medical devices must I connect to the IS LAN before the IS LAN itself becomes a medical device?
 - ◆ Current regulations don't always address issues of connecting medical devices to the LAN.
 - ◆ Who determines the overall system reliability?
 - ◆ Who assumes risk for integration?

Important Unanswered Questions: (Cont.)

- Is it wise to base enterprise healthcare (and other life-critical) needs on standards written for consumer devices?
 - ◆ COTS devices don't always work in medical environments.

Important Unanswered Questions: (Cont.)

- If connectivity is the goal, how do I ensure life-critical alarms get through?
 - ◆ Under 802.11e the Access Categories are:
 - ★ Voice <10ms Latency
 - ★ Video <100ms Latency
 - ★ Best effort \leq This is where medical alarms fall
 - ★ Background
 - ◆ Polled / scheduled service HCCA (Hybrid Controlled Channel Access) protocol not used.

Important Unanswered Questions: (Cont.)

- Why doesn't 802.1x and 802.11i go far enough?
 - ◆ Security is needed:
 - ★ Within the wired LAN
 - ★ Within the wireless LAN
 - ★ Within medical systems themselves

Important Unanswered Questions: (Cont.)

- Who is addressing the following overall issues?
 - ◆ Systems validation
 - ◆ Integrated Healthcare Enterprise

Contact Information

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