Industry Innovation Roadmaps

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Agenda

• Intel in Health
• Trends in Health Care
• Gaps
The Continuum of Care

Quality of Life

Cost of Care / Day

$1 $10 $100 $1,000 $10,000

Home Care
- Independent, Healthy Living
- Community Clinic
- Chronic Disease Management
- Doctor’s Office

Residential Care
- Assisted Living
- Skilled Nursing Facility

Acute Care
- Specialty Hospital
- ICU

Shift Left!
Highest quality of life, lowest cost of care

- Highest quality of life, lowest cost of care
Intel in Health

• $150B medical device market opportunity in 2005

• Our mission is to drive the digital health revolution by putting innovative, game-changing technologies and platforms into the hands of patients, their families, and healthcare providers around the world

• Current product offerings include
  – Non-FDA Mobile Clinical Assistant (MCA), Intel Reader
  – FDA cleared Intel Health Guide System
Mobile Clinical Assistant (MCA)

Integrated device that delivers quick, secure access to patient information at the point of care.
Intel Reader
The Intel Health Guide System is a purpose-built solution specially designed for elderly patients with chronic conditions.
Continua Health Alliance

- A global alliance of 228 member companies
- Creates interoperability standards (IEEE 11073)
  - For sensors, home networks, health compute platforms, and health & wellness services.
- Certification & logo programs
  - Continua Test Lab Vendor AT4 Wireless (Spain, w/VA,USA Q1-10)
- Won the 2009 American Telemedicine Association President’s Innovation Award

www.continuahealthalliance.org
End-to-end Standards Based Framework

Personal Device
- Thermometer
- Pulse Oximeter
- Pulse / Blood Pressure
- Weight Scale
- Glucose Meter
- Cardio / Strength
- Independent Living Activity
- Peak Flow
- Medication Adherence
- Physical Activity
- Electrocardiogram
- Insulin Pump

Aggregation Manager

Telehealth Service Center

Health Records

Personal Area Network (PAN) Interface
Wide Area Network (WAN) Interface
Health Record Network (HRN) Interface

Version 2 (underway)
75-85% of healthcare spending is on chronic disease management

- Health & wellness
- Disease management
- Aging independently

% of people stating “I have a chronic condition”
Trends in Health Care

**Market Forces**
- Aging population, health care economics/politics
- Fewer clinicians, increased need for nurses
- Age appropriate wellness & preventative management
  - Elders stay home longer, more active
- Consumer driven
  - Increased demand for portability, ease of use, targeted use
  - One device for many, miniaturization, form factor options
- Faster time to market demanded
- Regulatory pathway confusing and intimidating
Trends in Health Care

- **Device Technology**
  - Interoperability
  - Wireless (e.g., Bluetooth Health Device Profile)
  - Beyond vital sign devices → chemistries, rehab
  - Convergence of device technology
  - LPR (Low Power Radio) e.g., Zigbee Healthcare, Bluetooth LE (Low Energy)
  - Power auto managed
  - Battery limitations driving innovation
  - Flexible platform
  - Increased nanotechnology (e.g., targeted nanoparticles, microphage)
  - Increase in RF traffic may challenge design
Trends in Health Care

• Data Management (e.g., PHR, EMR, HIO, HIE)
  – Organized chaos
  – Basics are still undecided
    – Ownership, security, privacy, reimbursement, mobility, management, metadata, flexibility, useful sharing
    – Regional vs state vs interstate vs national
  – Government oversight
  – Funding: Private, not-for-profit, stimulus
• Competition (e.g., Dossia, Google Health)
• Open standards
• Cloud and/or grid computing
Strong Growth in Mobile Health Apps

iTunes App Store
Medical and Health & Fitness App Availability

Source: Parks Associates
© 2009-2010 Parks Associates
Mobile Health Trend - Significant Growth

Wireless Healthcare Revenue Forecast
U.S. (2009-2013)

Source: Wireless Healthcare: Analysis and Forecast
© 2009 Parks Associates
End-to-end interoperability from on/in/around body device → 
→ Mobile/desktop devices →
→ PHR → EMR → HIOs → HIEs →
→ Useful data → “accidently well to actionably well”*

(*thanks to Brigitte Piniewski, MD, PeaceHealth Laboratories)
Gaps

60-80% Preventable

Pre-Illness

Wellness

Age

0 25 65 years

Illness

Death

Community Achievable Health

Community Actual Health Expression
Gaps

• Who’s already there addressing trends
  – iNEMI (Intnl Electronics Mfg Initiative) Medical Product Sector
    – Emulator to 2021
      – PCB, assembly, package, business costs
      – Cycle time, reliability, MEMS, sensors, stacks
      – Display, memory, interconnects, substrates….
  – Continua
  – WHO, WiMax
  – ONCHIT
Gaps

• What is not being addressed in trends
  – Faster time to market, faster time to money
  – Data manipulation for actionably well
  – Sematech for Biotech
In Conclusion…

- Healthcare continues to evolve at a rapid pace with increase in consumer demand.
- When fully integrated in, on, and around the body, portability will revolutionize biotechnology and how global healthcare is approached.
- Be careful where we tread; make an impact out ahead of the curve of innovation.
Thank You
Backup
It’s a complex world out there for the healthcare consumer!

- Lab
- Web Support
- Condition Mgt.
- Specialist
- Payer
- Consumer
- PCP
- Pharmacy
- PBM

Order Results
Explanation of Benefits
Eligibility Check
Claims
Referral
Remittance Advice

Referral
Clinical Data, Messages
Credit Card Charges or Patient Statements
Care “Red Flags”

Prescription
Formulary Check
Mail Order Prescription
Claim/Formulary Check

CRN 021710
Source: J. Noble, MD
The At Home Neuromotor Test Device leads patients through a series of dexterity, tremor, and voice tests. It is an investigational device only.
Phillips Research’s iPill
• Electronically controlled drug delivery
• Microprocessor, battery, wireless radio, pump, drug reservoir

NewCare’s Intellipod™
• Multi-vital sign device
• Captures patient discomfort
• Connects to remote-care products and EMRs
Cypak’s module with battery and reminder buzzer for medication compliance

Medtronic’s esophageal stimulator and implantable drug pump for diabetes

NASA’s ENose detecting cancerous tissues at a few parts per million
Wiry Viruses: Genetically engineered viruses (left) bind zinc sulfide semiconductor particles (middle). The modified viruses look like wire (right).

*From C. Mao & C. Flynn*

Swallowable camera (*from John Hines, NASA; 2003*)