The Convergence of eHealth and Medical Devices

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Essential Health Technologies EHT
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References.

Millennium development goals related to medical devices

- Reduce child mortality (MDG 4)
- Improve maternal health (MDG 5)
- Combat HIV/AIDS, malaria, and other diseases (MDG 6)
eHealth (mHealth)

Definition

Information Technologies (mobile):

• Health service delivery
• Education
• Research
• Knowledge Translation
The Global Observatory for eHealth was established by the WHO in 2005. As its initial task, it carried out the first global survey on eHealth, and the full survey results was published in the Annual Report of the Global Observatory for eHealth in 2006.
e-health

Tele-education
Knowledge

Tele-surveillance
Pandemics
Disasters
Emergencies

Tele-management
Drugs delivery
Reference Systems
Hospital Information Systems

Telemedicine
Obstetrics/Gynecology
Dermatology
Pathology
Radiology
Diagnostics
Prevention

Society
Patients
Doctors
Nurses
Health professionals
Tele-managment
Training Course
websites

Electronic Health Record

World Health Organization

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WHO resources

- “Information Systems and Information Technology in Health (1998)” provided possible solutions in the use of advanced information systems in healthcare services.

- “Building Standard-Based Nursing Information Systems (2001)” focused on key issues of modern nursing practice and illustrates how information technology support to the implementation and use of standard-based practice can improve clinical and management nursing functions.
Thank you!

www.who.int/medical_devices
Common Information Systems in Healthcare Facilities

- Picture Archiving and Communications System (PACS)
  - Imaging Systems: CT, MRI, X-RAY
- Laboratory Information System
- Pharmacy Information System
  - Infusion Pumps
- Medical Equipment Management System
- Computerized Physician Order Entry System
- Physiological Monitoring Systems
- Accounting System
- Communications

*text in red highlights those systems with a natural connection to medical devices*
A System of Systems

PoC Integration (X73)

Enterprise Integration (HL7, DICOM, X12,...)

- LAB
- CIS
- Gateway
  - PACS
  - HIS

- Device Data Manager
- Vital Signs Monitor
- Dialysis Machine
- Infusion Pumps
- Vent
- Pulse Ox

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A Wireless Medical Systems Map

Medical Device Semantics and Communication Modalities Use Cases
IEEE 11073.x and IEEE 802.x Standards At Work
22 July 2010 Rev 4a

Use Cases (UC)
1) Home Monitoring
2) Hospital - SubAcute PoC
3) Ambulatory
4) Transport/Inter-PoC - Acute, Intensive/Critical
5) PeriOperative (ICU, OR) - Emergency
6) ER/Trauma (ETU), eg Burn Unit
7) Rescue (Ambulance/ MedEvac)
8) Ancillary (Renal, Echo, EKG, etc.)
9) Maternity/Ob (LR/DR/B)
10) Other - eg Nursing Home, MD Office/Suite

Topological Areas of Interest
- eg: Hospital

 Courtesy of J. Wittenber, Philips Medical

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Interface Definition

The ‘Interface’ is where biomedical device and clinical information ‘touch’

- Medical Device – any device which measures a physiological parameter and/or deposits some type of energy or substance to alter said physiological function or parameter

- Clinical Information System – any information system which gathers, aggregates and possibly manipulates clinical data from different systems – results in clinical information

Interoperability-“Plug and Play”

- The seamless interconnection and data flow from medical devices to clinical information systems
  - Possible medical device-to-medical device interface for closed loop feedback control
Interface Definition

To consider when interfacing medical devices and clinical information systems…

- **Clinical side**
  - Ease of use
  - Proper patient identification affiliation
  - Ability to validate accuracy of data

- **Technical side**
  - Transparent implementation procedures
  - Comprehensible maintenance and repair protocols
  - Minimize number of interfaces and potential failure points
Challenges to Widespread Adoption

Clinicians are willing to adopt the systems, but there are still concerns:

– Defining roles and responsibilities
  • Medical Device Manufacturer
  • Local Hospital Clinical Engineer
  • Information Technology Professional
  • National or Local Regulating Authorities

– Translating those roles and responsibilities to new technical support paradigms

– Building trust in the technology
  • How can the clinician trust that what is being shown on the computer is what is being measured (there is no intermediary place the information is displayed to verify as with a device now)?

– Adapting new technologies to current clinical workflow
  • Strive to enhance, not upset
Let the Presentations begin....