Current Status of e-Health Applications in Emerging Home Network Technology and Need of its Standardizations

Yun Sik Kwak

Kyungpook Nat'l Univ Sch Med, Daegu, Korea

ISO/TC 215, Health Informatics

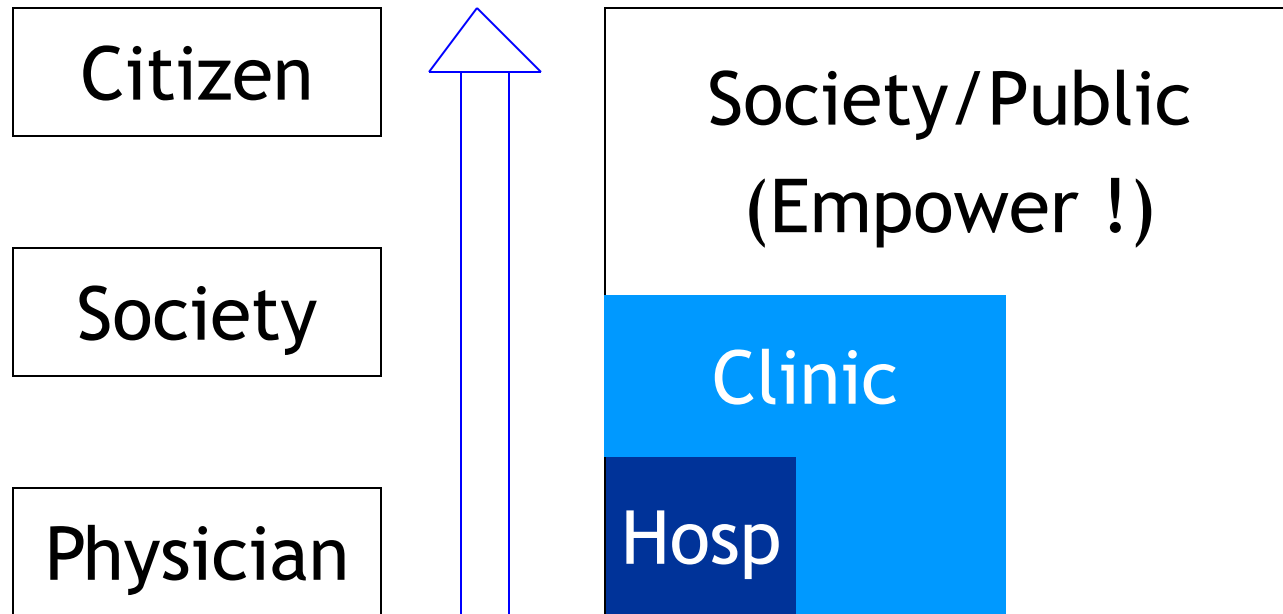# U-Health Systems

Rationale

Life Saver :
Right Information at Anytime and Anyplace and Any Device and Any Line
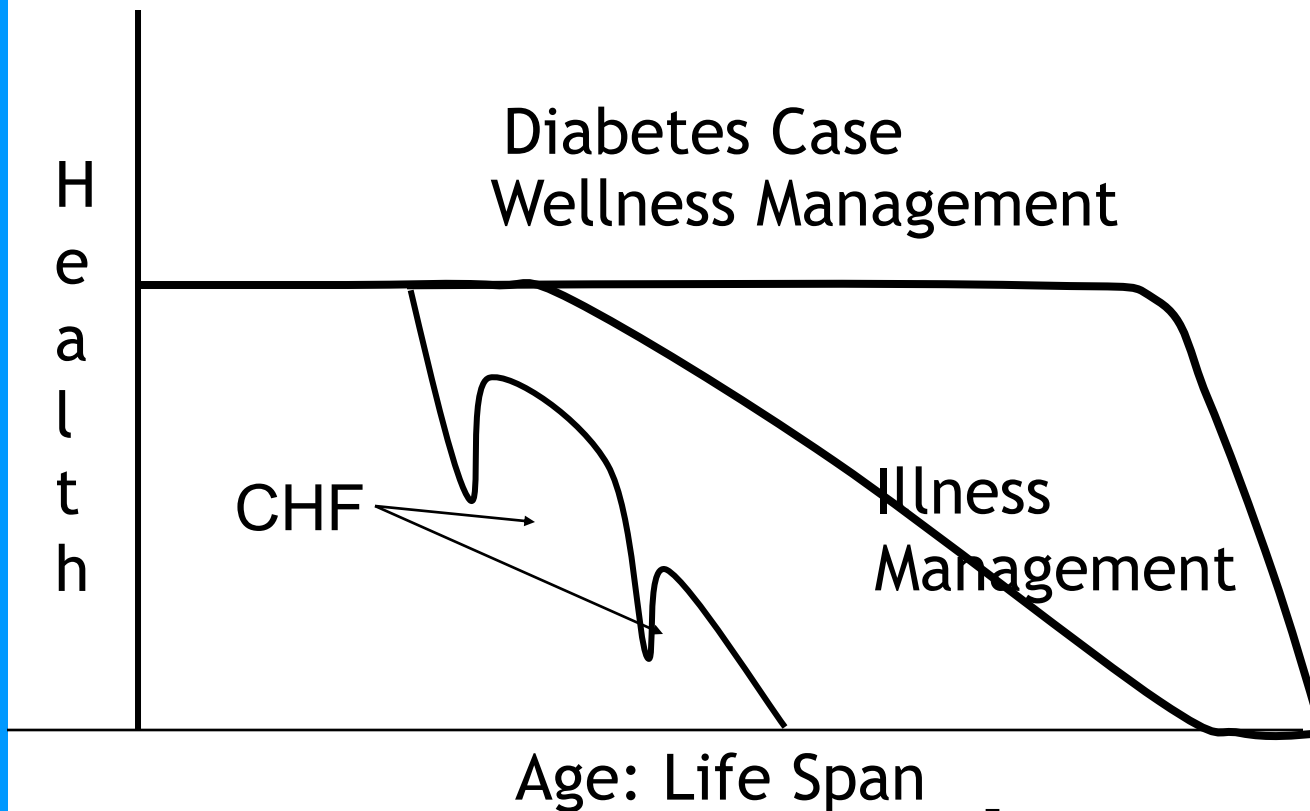
(Ubiquitous : u-Health)

Benefits of Health Informatics

Level of Benefits

Citizen

Society

Physician

Society/Public
(Empower !)

Clinic

Hosp

Health Care Models

ITU-T

H
e
a
l
t
h

Diabetes Case
Wellness Management

CHF

Illness
Management

Age: Life Span

[Cited from SK Mun]

U-Health : Home Health Monitoring

o   Chronic disease management

    - High Blood Pressure

    - Diabetes Mellitus

    - Chronic Heart Disease

    - Pre-natal Care

    - Hypercholesterolemia

    - Drug Dispensing Management System

    - Emergency Alert

U-Health : Home Health Monitoring (2)

o   Hospital Based Home Care

o   Physical Fitness

-   Body Strength Management

-   Body Weight Control

-   Health Monitoring Screenings

-   Child Development Monitoring

-   Prognosis Monitoring

-   Emergency Alert

Customer Management Program (Customer Focused)

o Birthday Card with Health Reminder

o Test Results with its Interpretations

o Vaccination Reminder

o Medication Directives and

  Drug Information

o Appointment Reminder

o Seasonal Disease Information and

  Epidemic Alerts

dates

Devices for u-Health

o Portable Bio-sensor Analyzers

o ECG

o Blood Pressure Measuring Devices

o Vital Sign check

o Fetal Heart Sound Monitor

o Exercise Monitoring Device

o Body Weight & Height Measuring Dev.

o Wearables

o Diet Analyzing Device

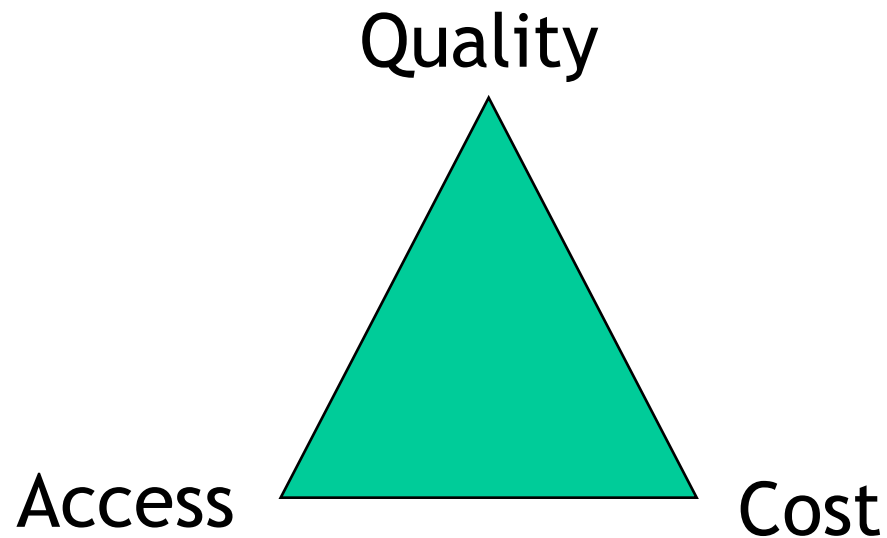o PDA, Mobile phone, etc

dates

Role of Technology

o Set of tools to be used

o Who should use it?

o What is the cost of it's use?

o Whose cost is it?

o How can a stand alone technology be integrated into routine healthcare system?

o There are many disconnects.
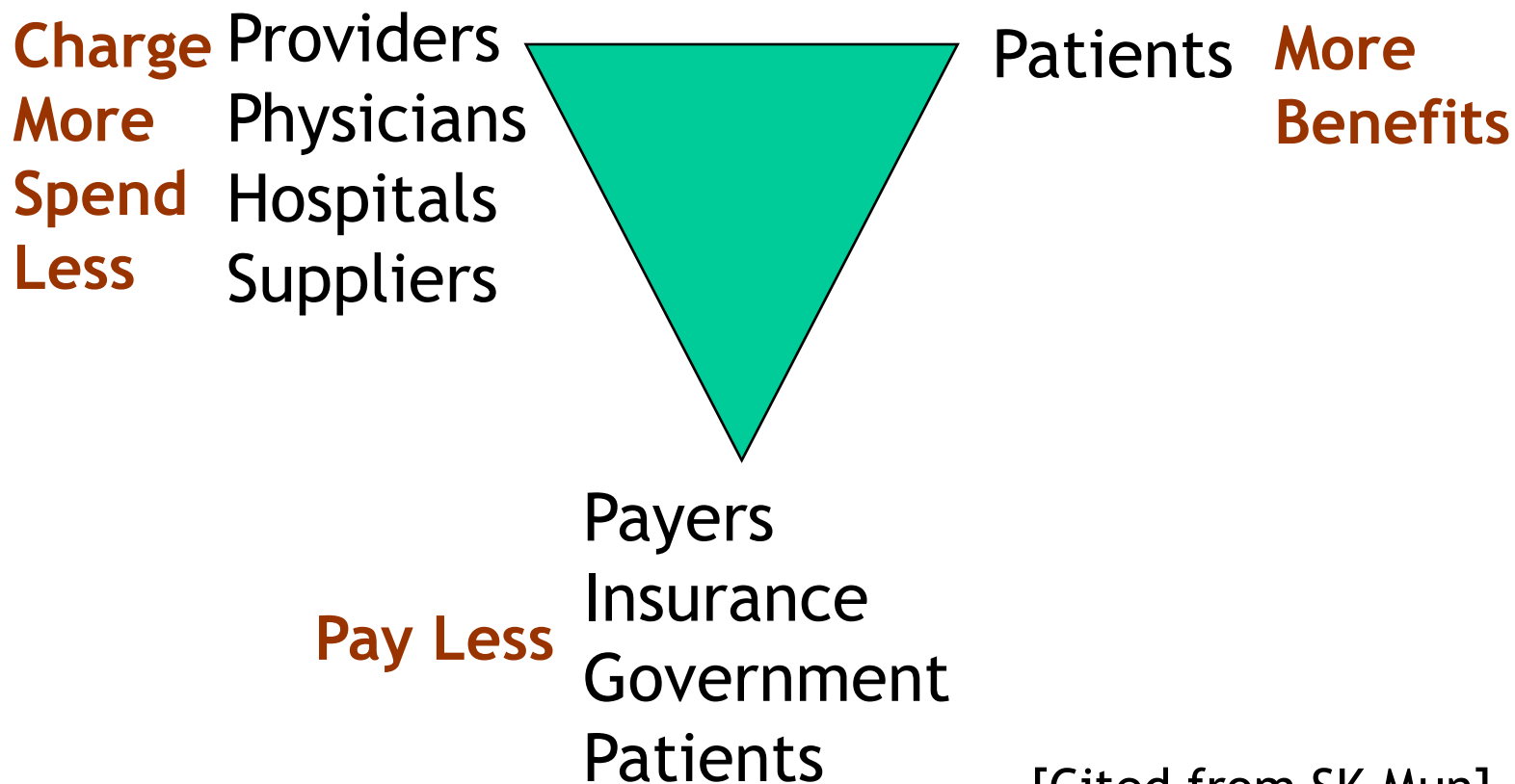
[Cited from SK Mun]

dates

Role of Technology

Quality

Access

Cost

[Cited from SK Mun]

dates

Balancing and Competing
Where does your technology fit?

Charge
More
Spend
Less

Providers
Physicians
Hospitals
Suppliers

Patients

More
Benefits

Pay Less

Payers
Insurance
Government
Patients

[Cited from SK Mun]

dates

In Closing

o Healthcare is a highly complex business of multiple competing processes

o Stand alone technology will not be useful

o Technology insertion requires proper business model

o Who will pay for the use of technology?

[Cited from SK Mun]

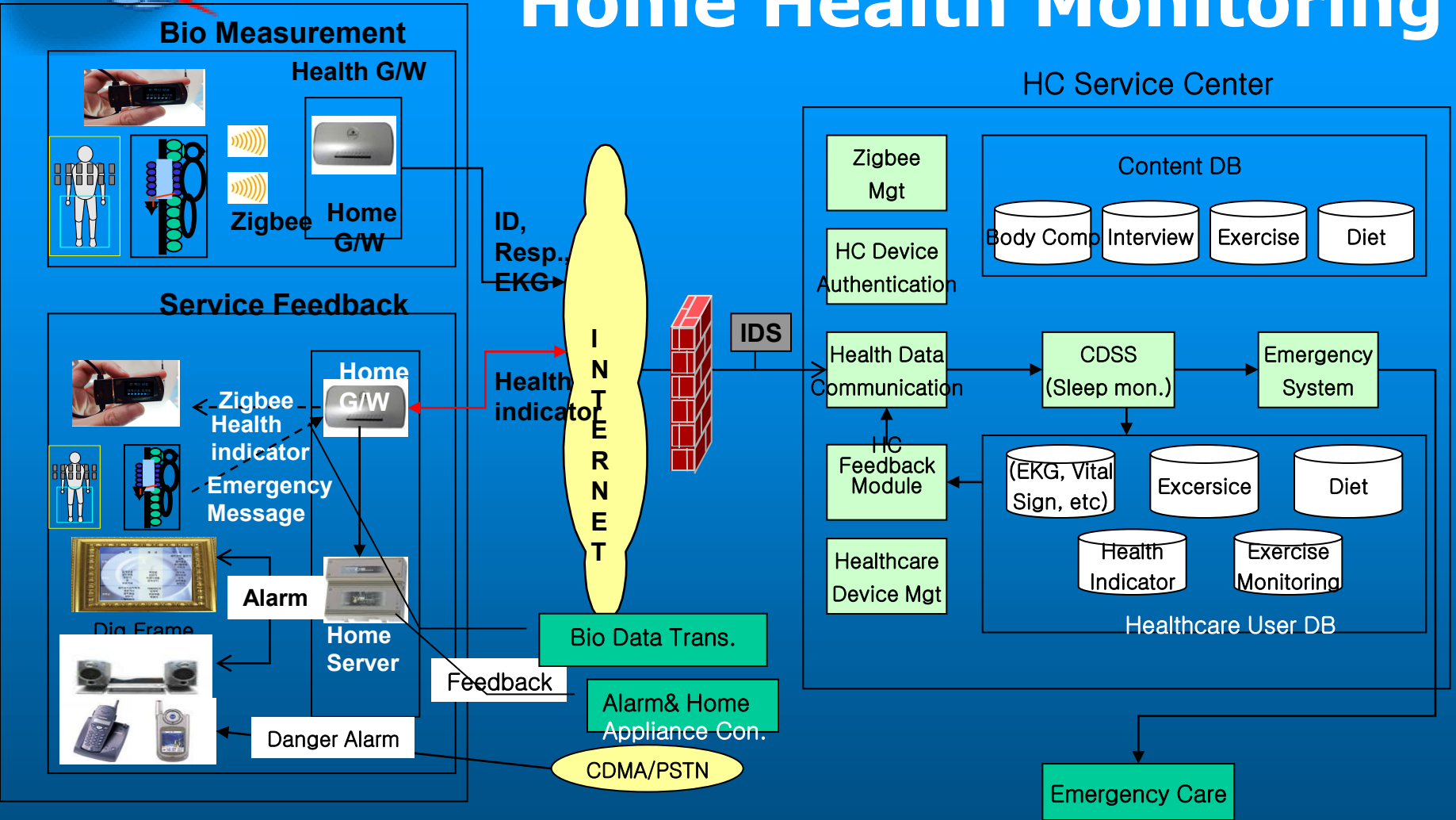# Business Model for Home Health Monitoring

Scenario

o Communicate patients directly to care provider – do not work well

o Citizens (Patients) initiate service via business service center; service center screens results of health monitoring; in case clinical care is needed, service center will then connect patients to care providers.

Home Health Monitoring

In Closing

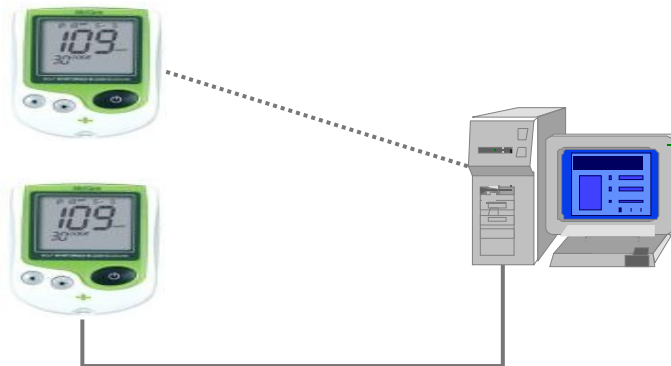o e-Health (u-Health) is an important component of emerging Home Network Technology.
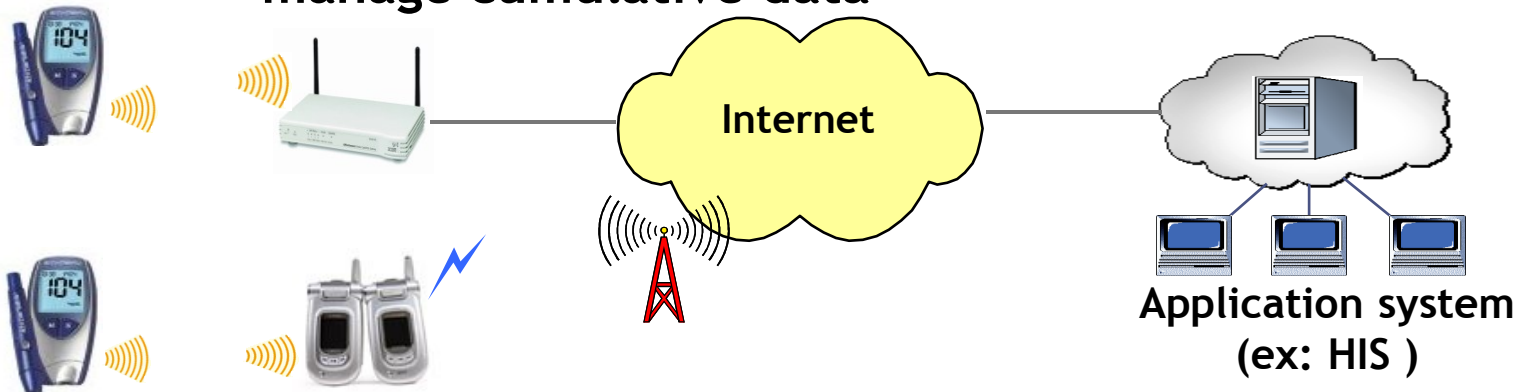
dates

Glucose measurement result message & transmission protocol

Current Methods of Glucometer Data Management

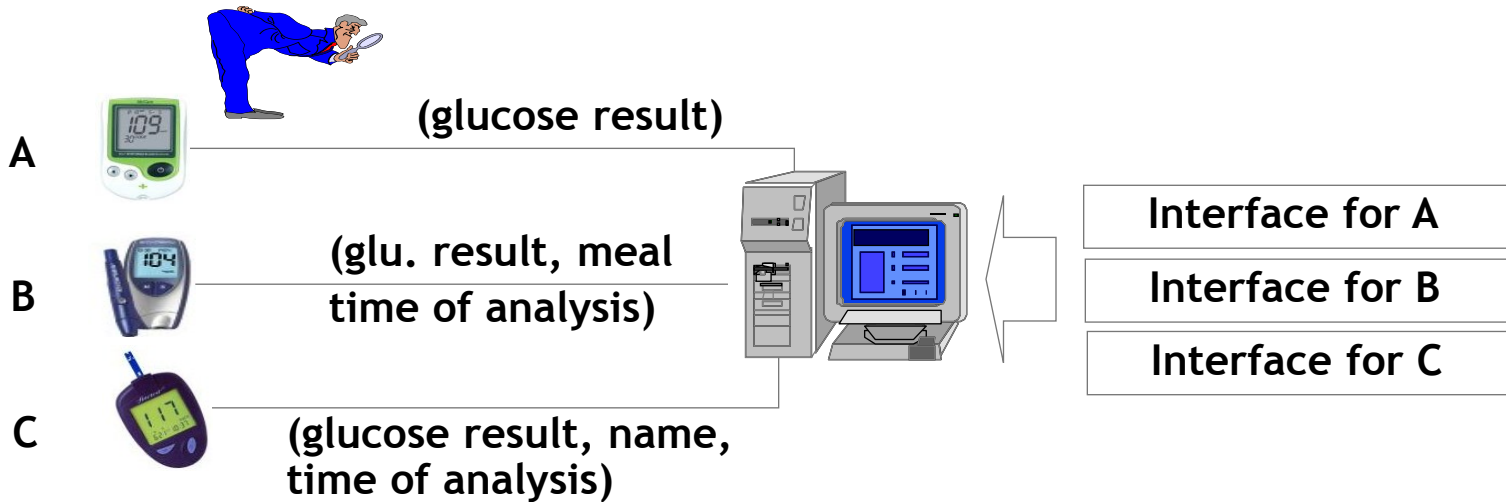TYPE 1 : RS232-C or Ir transmission – upload blood glucose results from glucometer to PC.

TYPE 2 : UWB (Bluetooth) or phone line – transmit glucose results from glucometer to remote server and manage cumulative data
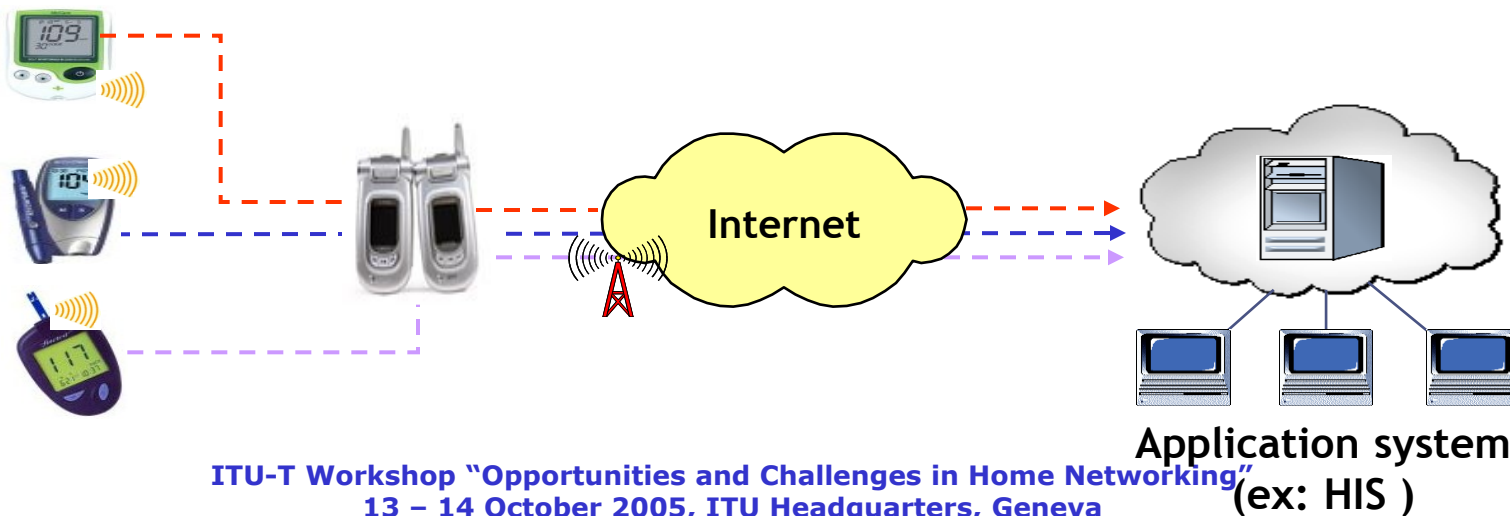

Internet

Application system (ex: HIS)

Issues

- **Different data content depending on device**

A   (glucose result)

B   (glu. result, meal time of analysis)

C   (glucose result, name, time of analysis)

| Interface for A |
| Interface for B |
| Interface for C |

- **Different transmission protocol depending on manufacturer**

Internet

Application system (ex: HIS)

Standard Mode

❑ Standardized upload
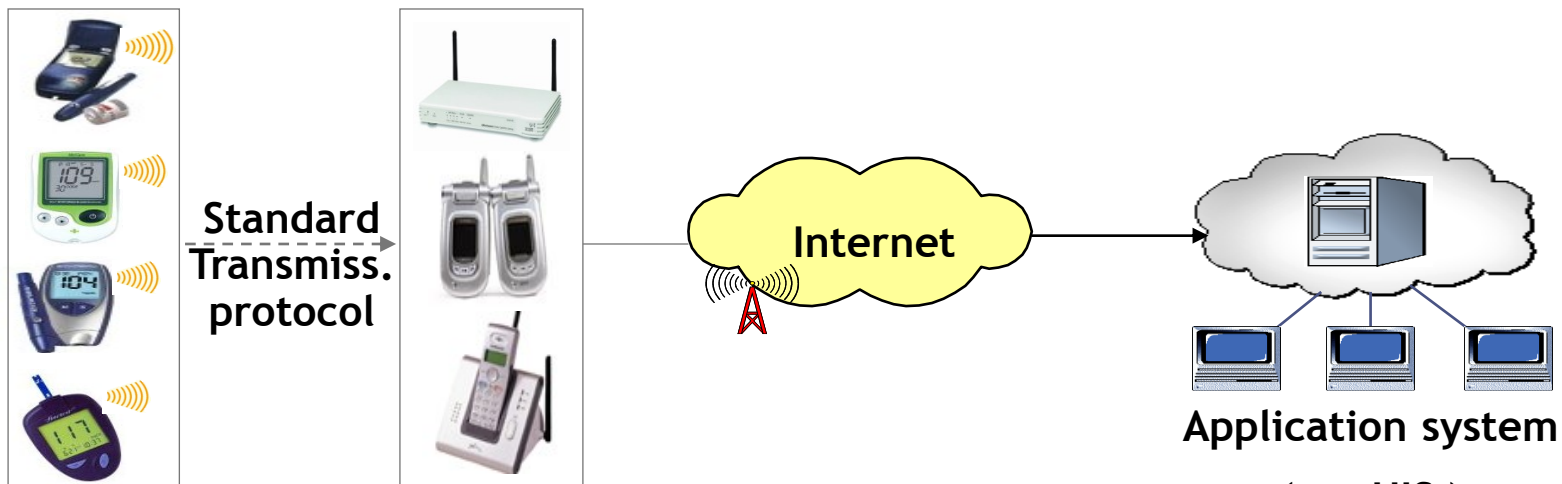
Standard message

Standard message

Standard message

Glucose data mgr

❑ Transmission method

Standard Transmiss. protocol

Internet

Application system

(ex: HIS)

Effects of Standardization

- ❑ **User**
  - - Platform free and device free : seamless interoperable
- ❑ **Manufacturer**
  - - Reusability of S/W and platform

internet

🔴 Re-useable part

Application system
(ex: HIS)

dates
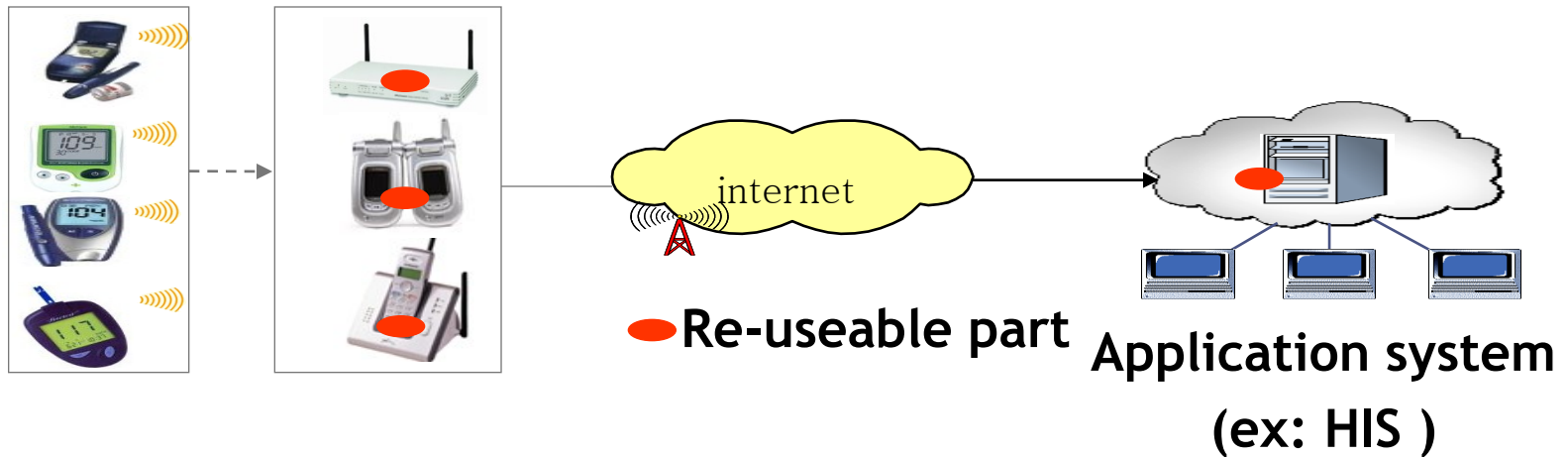
Message Format for Glucose

Header	Body	Tail

Requirement	Fields	Length (bits)	Description
Mandatory field	result	10	- Glucose value [mg/dL]
	year	7	- Analysis year, - Device value plus 2000
	month	4	- Analysis month, - mm
	day	5	- Analysis day, - dd
	hour	5	- Analysis time, - hh
	minutes	6	- Analysis minute
Optional field	temperature	6	- Body temperature
	stress	1	- With stress 1, without stress 0
	exercise	1	- After exercise 1, before exercise 0
	meal	1	- After meal 1, before meal 0
	Plasma (serum)	1	- Basis for sample reference value
	Extension field	Variable length	- Blank for future use

dates

Need of Standards for e-Health Application of Home Network

What Standards ?

o Interoperability

- Device Interface (IEEE,ISO/TC 215, CEN/TC251 jointly developing)
- Data Transmission Protocol
- Document (HL7 Clinical Document Architecture : CDA- XML based)
- Security
- Terminology Codes
- Integrate documents to Electronic Health Records

dates