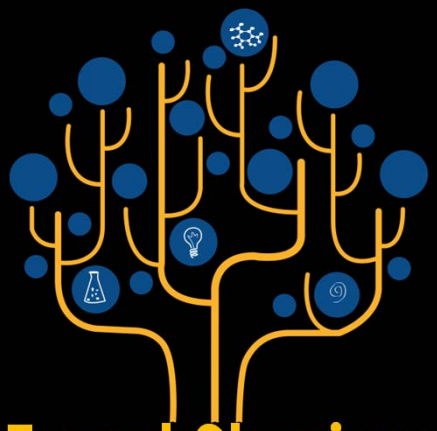


Evolution of Smart Healthcare with IoT and Sharing Data

Clube Ng

CEO, eHealth Research Institute Ltd

Co-opted Board Member, eHealth Consortium

Chairman, ILPS, Smart City Consortium

23 June 2018

eHealth Research Institute Ltd. ***eHRI****, an Health Technology R&D & Deployment private company*

eHealth Consortium. ***eHC****, a NGO co-found by Dr CP WONG in 2005*

Asia eHealth Research Network, AeHIN, a NGO supported by WHO, cover 45 Asian countries & 800 members

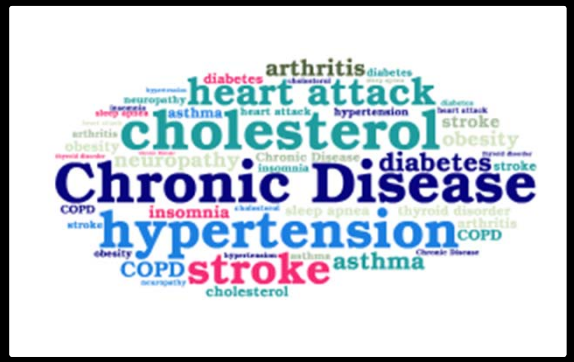
Smart City Consortium, a NGO found in Nov 2015 to facilitate smart city and smart living development

Problems

Aging Population

24%
aged over 65 by 2034[1]

Long-term Care



100K *dementia*
1M *diabetes by 2025[2]*

Increasing Demand

2009/10: 4.5M+ & 6M+ (A&E & inpatient)
2016/17: 6M+ & 7.5M

Limited Resource

Medical professionals Shortage
- A shortage of 250 doctors & 700 nurses at any time

Overcrowding in Public Hospital
- Occupancy rates in wards between 110% to 130% during peak flu season

Traditional Model

Curative

Hospital & Clinic

Doctor

New Model

Healthcare delivery empowered by:

WE ARE HERE

eHealth

sHealth

electronic Health Record (eHR)

Hospital & clinic based

mobile technologies

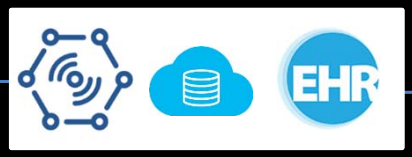
Personal based

innovation technologies e.g. IoT, Big Data, Blockchain, AI

Personal, Home, Hospital and Community based

Smart Healthcare

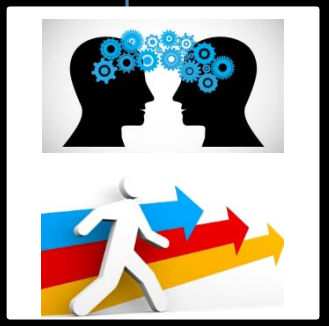
IoT & Data Intelligence



Mobile & Medical Devices, Health System

Healthcare team formed by patient, family & professionals

Healthcare delivery in Home, Hospital, Clinic & Community



Knowledge-sharing with Preventive & Predictive Actions

IoT in Healthcare

Real-time Monitoring, Alert & Interoperable Actions for Health

Turn Data to Intelligence

Health Data

Medical History
Medication
Treatment
Vital Measurement
Cognitive Ability

Behavioral Data

Social Activity
Physical Activity
Diet
Stress
Occupation

Standardization
HL7, ICD10

Analytics
Health AI

Actionable Insights

Health Data & Big Data

Evidence-based

Static

Small Scale

Structured

Veracity ~ Uncertainty

Velocity ~ Streaming & Real-time

Volume ~ Scale of Data

Variety ~ Unstructured, Different forms

Health Data Protection

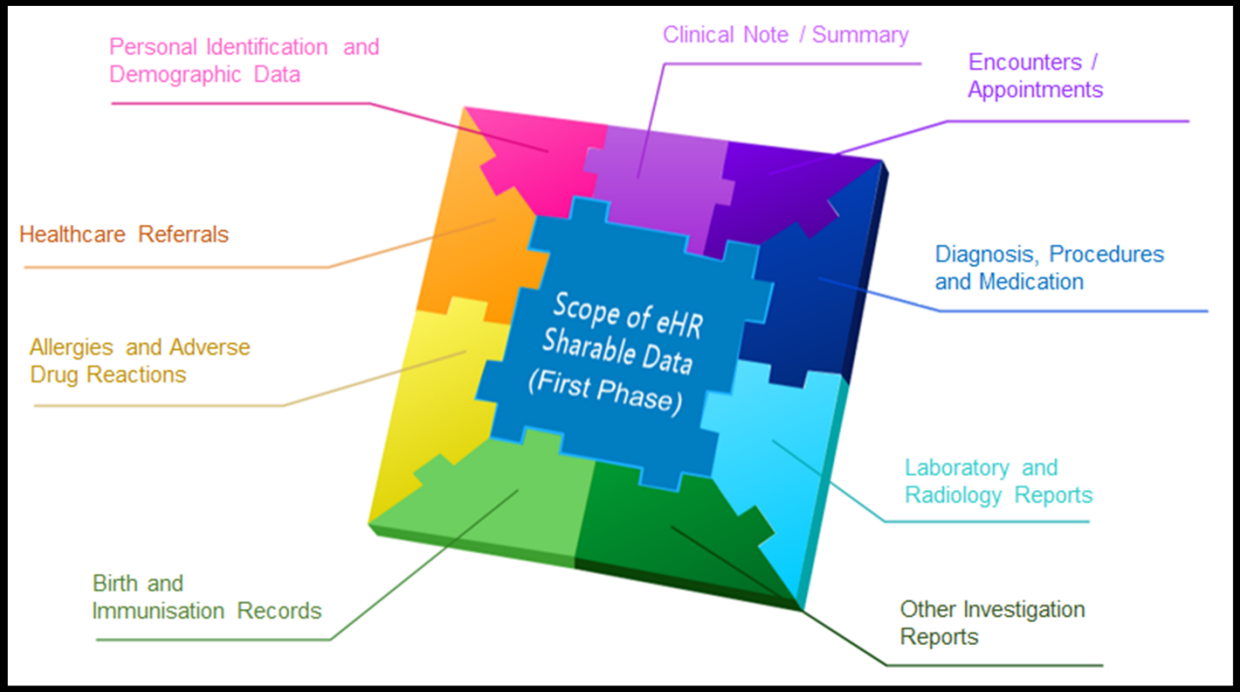
醫健通 ehealth 香港特別行政區政府 HKSAR GOVT

Electronic Health Record Sharing System Ordinance (Cap 625, Dec 2015)

Use for improvement of health, research & statistics, and disease control and surveillance

Use of Non-identifiable Data – Apply to Commissioner for the Electronic Health Record

Data Sharing in eHRSS



9 sharable data upload to eHRSS

Data from eHRSS most for viewing only

Incentives for Interoperable Data **NEED**

HA CMS III

Develop by HA software developers since 1990

55,000 clinical users in 42 hospitals

800 modules

280TB clinical data

10M+ transactions

CMS IV: 5Ps
Patient Centred, Paperless, Protocol Driven, Closed Loop & Personalised

Core functionalities:

- Mobile Clinical Solutions
- Clinical Decision Support
- Inpatient Medication
- Clinical Inbox
- Generic Clinical Documentation
- Clinical Workflow & Operational Intelligence
- Pharmacy Management & Dispensing System
- Radiology & Imaging
- Laboratory Information
- Infection Control Support
- Community-based Care Support
- Public-Private Shared Care Support

Self-Caring Technologies

Health Mirror

Sleep Sensor

Nutrition Scanner

Non-invasive Glucose Checker

Smart Pill Box

Continuous Glucose Monitoring

Health Applications

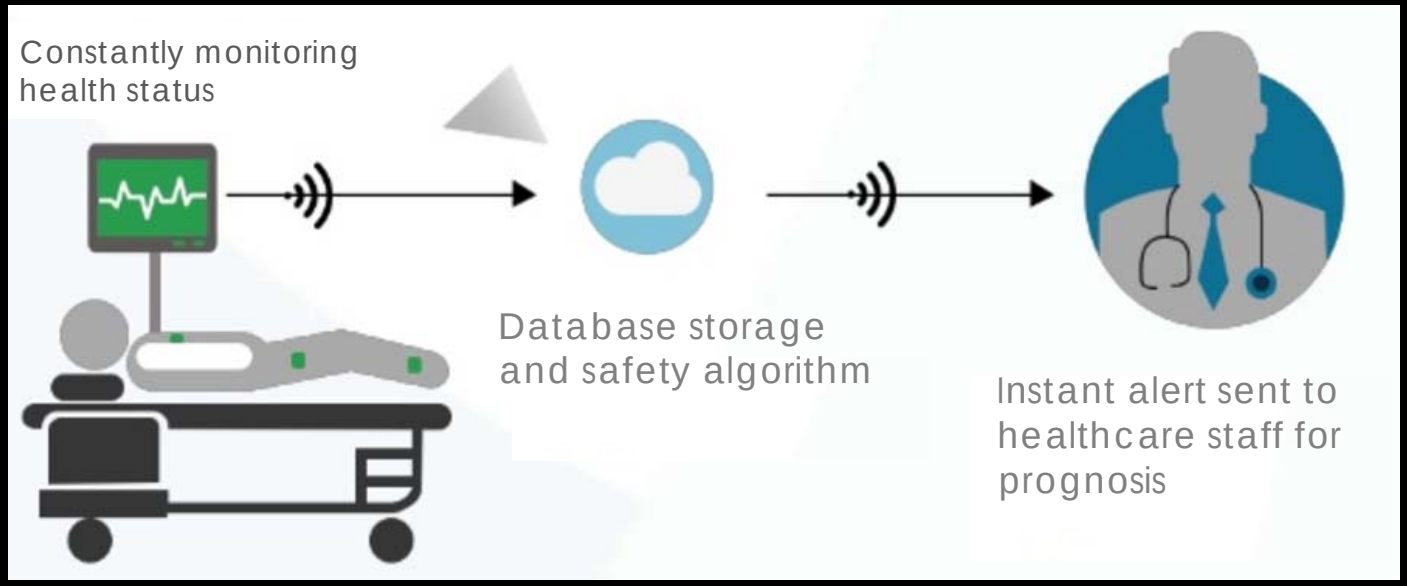
Elderly Centre

- Elderly Health System
- Stress Monitoring
- Therapy Result Measurement
- Social Activities
- Diet Management
- Chronic Disease Management

Hospitals

- Hospital Management System
- Clinic Management System
- Equipment Tracking
- Real-time Patient Monitoring
- Product Recalls
- Prevent Medication Error
- Smart Alert System

Real-time vitals monitoring



Remote Patient Monitoring

- Remote Medical Consultation & Advice
- Chronic Disease Management

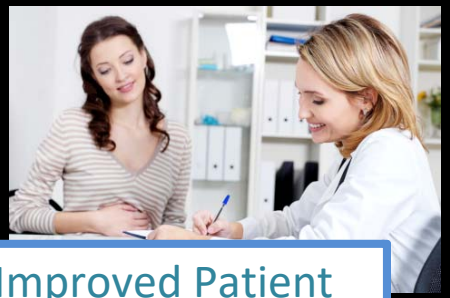
In-home Aged Care

Samsung & Deakin University Collaboration

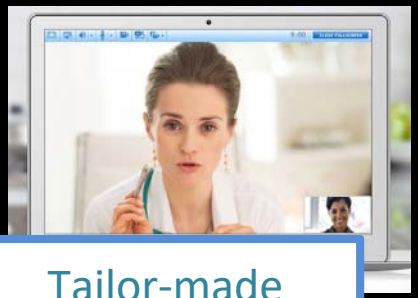
In 2016, Korean Samsung announced an in-home aged care trial in partnership with Deakin University, named Holly Smart Home Project.

The new monitoring device, known as Holly, uses IoT & an algorithm to learn the habits of the elderly in their own home through discreet vibration, motion, temperature and humidity sensors placed around the house, which are empowered by IoT technology. Once those behaviors are registered, it can look for irregularities and alert care providers if needed.

Benefits

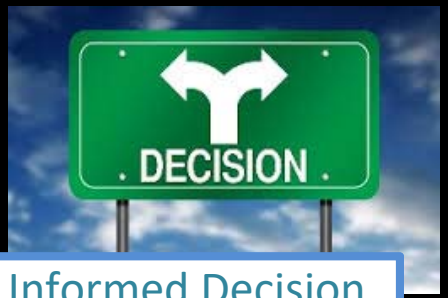


Improved Patient Engagement

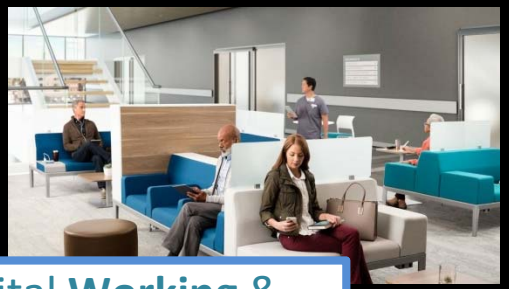


Tailor-made Health Service

Better Long-term Care

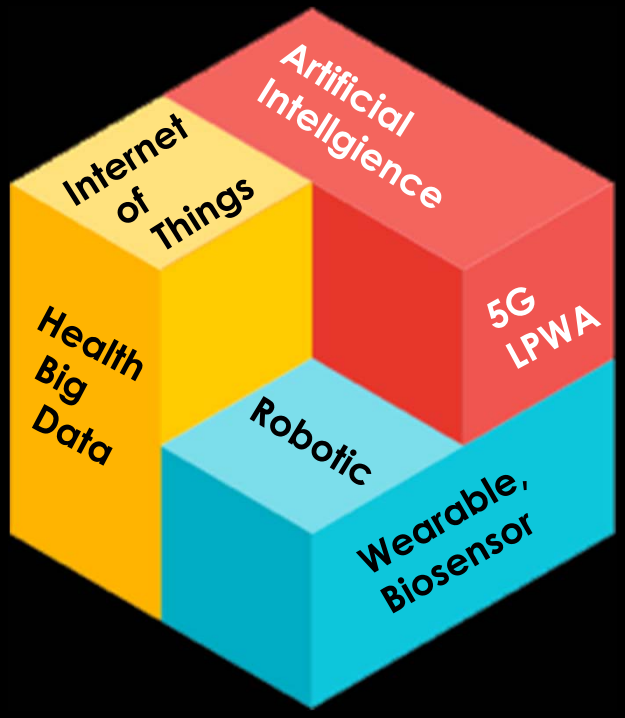


Informed Decision Making



Better Hospital **Working** & Service Environment

Opportunities

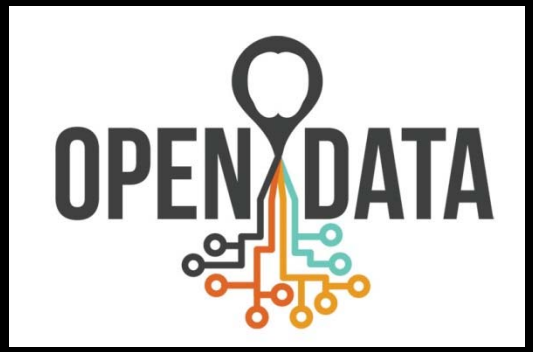


Smart Healthcare:

- Intelligent Decision support (More than Alerts for Allergy, DD Interaction, G6PD Deficiency, Long-term high dose steroid)
- Predictive medicine & care
- Preventive & Collaborative Care
- Virtual care delivery & Gamification
- CMS IV – 5Ps + Data Intelligence & Patient-Industry Collaboration

Patient and healthcare team are **ONE JUDGE**

Look Ahead



More OPEN & INTEROPERABLE for sharable Health Data

HA Data Collaboration Hub
Open for Industry

More **COLLABORATE** for segmented Healthcare services

Best Health Data Practice for:

- Interoperability
- Safety
- Ownership
- Accessibility
- Controllability

Co-build a Smarter Healthcare ecosystem. Thank You