Personal Health Management

Singapore’s National Strategy to Engage People & Communities to Achieve Better Health Outcomes

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5.2 million | life expectancy: 79 Yrs (M) 84 Yrs (F) | fertility rate (per female) : 1.15

Sources: Singapore Statistics
The holding company of Singapore’s public healthcare assets
Our healthcare system at a glance

Overall
Private & Public Mix

80%
Primary Care
Private GPs
Fee for Service

Acute Care
80%
Public Hospitals
Co-pay

90+%
LTC
Voluntary / Private
Community Hospitals
Nursing Homes
Hospices
Co-pay

Source: Ministry of Health, Singapore
Among the best in the World

Health system performance
(WHO, 2000)
6th of 191 countries

Health infrastructure
(IMD World Competitiveness Year Book, 2007)
3rd of 55 countries

Source: National Geographic citing 3 happiness databases
Challenges ahead: 2 mega trends

1. **Demographic shifts**
   - Aging population
     - 2020: 15% > age 65
     - 2050: 4th Oldest in the World

2. **Increased disease burden**
   - Chronic diseases

   Fiscal imbalances (currently 4% of GDP)
   Strained healthcare delivery systems

Source: Ministerial Committee on Ageing
National past-time
## Disease burden

<table>
<thead>
<tr>
<th>Condition</th>
<th>1998</th>
<th>2004</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prevalence among adults aged 18 to 69 years</strong>&lt;sup&gt;1&lt;/sup&gt;(%))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension&lt;sup&gt;2&lt;/sup&gt;</td>
<td>27.3</td>
<td>24.9</td>
<td>23.5</td>
</tr>
<tr>
<td>Diabetes</td>
<td>9.0</td>
<td>8.2</td>
<td>11.3</td>
</tr>
<tr>
<td>High Total Cholesterol</td>
<td>25.4</td>
<td>18.7</td>
<td>17.4</td>
</tr>
<tr>
<td>Obesity</td>
<td>6.0</td>
<td>6.9</td>
<td>10.8</td>
</tr>
<tr>
<td>Daily Smoking</td>
<td>15.2</td>
<td>12.6</td>
<td>14.3</td>
</tr>
</tbody>
</table>

**Definitions:**

- Hypertension: $\geq 140/90$ mmHg
- Diabetes: 2-hour plasma glucose during an oral glucose tolerance test $\geq 11.1$ mmol/l
- High Total Cholesterol: Total cholesterol $\geq 6.2$ mmol/l
- Obesity: BMI $\geq 30$ kg/m\(^2\)
- Daily Smoking: Smokes cigarettes at least once a day

Source: Ministry of Health, Singapore
Healthcare system transformation at macro, meso and micro levels

Source: National Personal Health Management Strategy 2011, Tikki Gee, MOH Holdings
Macro reforms: regional health systems

Jurong General Hospital (2014) 700 beds
Sengkang Hospital (2020) 500-600 Beds
Meso level reforms: care integration
Enabled by the National Electronic Health Record (NEHR)

- Community Hospital
- Polyclinics
- GP Clinics
- Acute Hospitals
- Nursing Home/Hospice
- Nursing Homes
- Rehab Centres
- Palliative Care
- National Electronic Health Record 20
- MOH HOLDINGS
Integrated care record: “one patient, one record”
NEHR : health information exchange

Salient features:

Interoperability through national & intl' standards (HL7, SNOMED-CT)

Common services:
- National health identifier
- Enterprise integration
Is the current healthcare transformation enough?

activating people & communities

“one of the greatest untapped resources in healthcare”
National PHM strategy

- To be implemented over 3 phases and 10 years starting 2011
- Evidence based: multi-jurisdictional environmental scan and systematic review of evidence (largely Cochrane, RCT strength)
What is PHM?

“Putting the person in the centre of their own health and our healthcare system”

Access

- Timely, relatable & actionable health info
- Multi-channel communications
- Choice

Partnerships

- Participatory medicine
- Trust and respect
- Public-private

Personal Responsibility

- Empowerment /self efficacy
- Care giver networks (family, friends)
- Community & volunteerism

Embedded into new models of care, education & re-engineered delivery systems

Key enablers: technology, financing and policy

Source: National Personal Health Management Strategy 2011, Tikki Gee, MOH Holdings
Activation & empowerment

“liberating & transforming data” into meaningful and useful ‘consumer’-oriented information

“Big Data”
Logitudinal, life-long

Information & communications

Providers

Patients, consumers and care givers

“timely, relatable & actionable” information

Source: National Personal Health Management Strategy 2011, Tikki Gee, MOH Holdings
"Info-structure"

National Electronic Health Record (NEHR) longitudinal data
Events summary, diagnosis, medication, allergies, immunisation registries, etc.

Personal Health Record (PHR)
("Tethered")

National Health Platform
Open Architecture & SOA

- Wellness & Prevention Apps
- Chronic Disease Management Apps
- Healthcare Services Apps
- Social & Lifestyle Apps

Source: National Personal Health Management Strategy 2011, Tikki Gee, MOH Holdings
“Open” health platform: Consumer ecosystem

Open and secure architecture to build rich and innovative applications & services

Wellness Apps
- FitnessFirst
- People’s Association
- Standard Chartered
- Singapore Tourism Board
- National Parks

Financial
- FairPrice
- Cold Storage
- Great Eastern

Incentives

Provider Apps
- Alexandra Health
- NUHS
- JurongHealth
- Health Promotion Board

National Health Platform

Research/Innovation
- Duke
- NUS
- National University of Singapore
- Nanyang Technological University

Media, Learning
- MediaCorp
- mda
- XBOX 360
- MOH Holdings
Device agnostic

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

Access
- Smartphone & Tablet
- Internet/IP TV
- Gaming consoles
- PC
- Smart Home

95% fiber coverage by mid 2012~ 1Gbps

Source: National Personal Health Management Strategy 2011, Tikki Gee, MOH Holdings
PHM content development

Knowledge

Awareness  Understanding  Internalisation  Increasing efficacy

Novice  Empowered  Expert

Health promotion  Health education & information  Participation & adherence

PHM general content
- General health information
- Static, interactive & multimedia
- Assessment tools
- Service directory
- Performance & wait times
- Health financing 101
- Triage tools

PHM advanced content
- Self-entered information
- Disease management apps
- Wellness apps
- Care plan
- Decision support
- Medication management tools
- Personal health record

PHM community content
- Expert blogs and forum
- Expert patient community
- Training management
- Certification

PHM behaviour-shaping content
- Social networks
- Care networks (care coordination)
- Health points (gamification)
- Challenges

Source: National Personal Health Management Strategy 2011, Tikki Gee, MOH Holdings
Behaviour modification

Social Network
- motivate
- encourage

Gamification
- engage
- fun factor

Professionals
- coach
- mentor

Source: National Personal Health Management Strategy 2012 (addendum), Tikki Gee, MOH Holdings
Gamification framework for Healthcare

- Adopting gaming techniques
- Applied to
  - Service design
  - Programmes
  - Applications development
- To be completed by Q3 2012

Source: Gamification Framework 2012, MOH Holdings
Obesity and physical activity example

WANG, LEEHOM

LAST 30 DAYS

- 3 activities
- 12436 kCal
- 16:49 hours

National 30 day average
- 2 activities | 9820 kCal | 10:23 hours

Check other stats

Cycling
Running

9:10 hours
1:50 hours

Status

Woot!! just did a 10K run at the d Mac(rithchie)
think i will reward myself with some nice makan!

4 days ago via iPhone

My Activities

STATUS: Completed
Verified

STATUS: Signed up

STATUS: Bootcamp
Verified

View Photos
Details
Details

Health Buzz

MOH issues seasonal flu warnings and advice vaccination

NHG Event: Orthopaedics and knee health, prevent injury
by Dr. Ho Say Liao http://www.nhg.com.sg

Peer support & motivation

Recognition/incentives

Geo strategy

Mobile updates & social network

Partnership models

Profile based pushed content
Chronic disease example

**TYPE 2, DIABETES**

**PLAN: DIET & EXERCISE**

- **WGT:** 215 lbs
- **BP:** 117/79 mmHg

**CURRENT STATUS**

- **A1C (%):** 6.8
- **BG (mg/dl):** 138

**PRIMARY DOCTOR:** Cloney, George

**CONTACT:** 65 9022 1234
gc@nuh.com.sg

**MOH HOLDINGS**

**Promotion of choice**

**Near time comms**

**Access to integrated care team**

**Simple impactful user interface**

**MY CARE TEAM**

- GP
- Com Nurse
- Dietician
- Podistrict
- Mum

**CARING FOR**

- Mum
- Dad
- Son
- GF
- Neighbor

**Groups**

- TOUCH Community Services
- Lose n WIN

**Recommended**

- **SPONSORED**
  - Broccoli: $1.20/kg
  - Diabetic Cooking for Dummies

**ILLUSTRATION**
A confluence of factors
propelling adoption

Mobility & access

148.5 %
mobile penetration

104.2 %
household broadband

Consumerism

Increased Disease Burden

Source: Infocomm Development Authority (IDA) 2011 | Neilsen
**PHM is a journey**

**PHM Strategy**

- PHM Prototype
  - Iterative, incremental improvements & barrier removals
  - Policy, Regulatory, Biz Model, Technology, Comms/Branding

**Targets:**

- FY2012
  - 1K users
  - 1 mhealth app

- FY2015
  - 500K users
  - >50 mhealth apps
  - >1 Million users
  - >100 mhealth apps

- FY2020
  - National Outcomes and OECD Targets
  - >1 Million users
  - >50 mhealth apps
  - >100 mhealth apps

**Phases**

- Trial population
  - 1a | 1b
  - POC | POV
- RHS | System-wide
  - 3 | 4
  - SYSTEM | IMPROVE

**Timeline and user network growth**

**Population size and consumer health ecosystem**
PHM iLab

- Innovation lab to co-develop with industry consumer health solutions
- Applications, devices to Med-tech
- Challenges, call for collaboration
- Open data
“Healthy living doesn’t happen at the doctor’s office.

The road to better health is paved with the small decisions we make every day”

New York Times
Thank You

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