# **Innovation in Healthcare**

### The Singapore National Health Portal

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# Introduction

This presentation provides a summary of the innovation in healthcare happening in Singapore. It will cover;

- The objectives of the Singapore government will be explained, in context of the in2015 vision & the health eco system
- The solution chosen to be adopted, expanding on the tools, techniques & standards used
- How the Consumer/Citizen will be engaged via a methodology Data/Information/Knowledge/Wisdom (DIKW) model
- Example screenshots of the application showing how imagery, content, on-line behavioural change tools & an inter connected personal health record can be brought together to achieve powerful results

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# Singapore National Health Portal ("NHP")

# **NHP** Objectives

In line with iN2015 Healthcare Vision:

- To facilitate the concept of Active and Individualised Health Management amongst Singaporeans
- To empower individuals through access to personal health information, risk profiling tools, targeted education materials, tools for trending & analysis
- To offer access to **longitudinal Personal Health Records** for individuals (i.e. healthy, at risk, or diseased), caregivers and healthcare providers
- To bring about a revolutionary change in medical encounters, from one that is episodic to one that is continuous
  - an important pre-requisite for prevention and early detection of illnesses, which ultimately leads to a significant reduction of medical costs
- It is envisioned that the sharing of personal health information by individuals with family physicians will also enable better clinical decisions thereby improving the overall quality of healthcare services



### Singapore Healthcare Ecosystem Overview

## Government

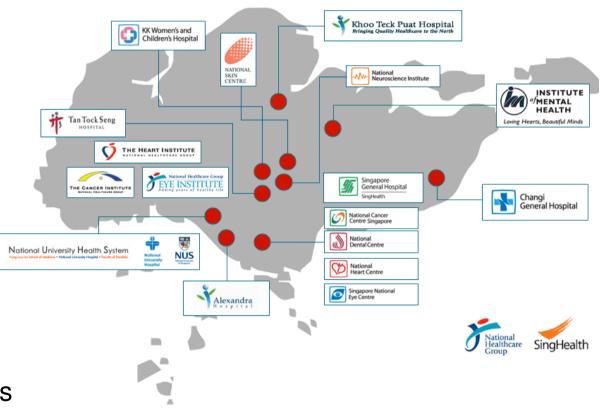
• MOH, MOHH (IHIS), HPB

## **Public Providers**

- Clusters: NHG, SingHealth, AH
- From Primary Care (Polyclinics) to Secondary Care & Hospitals

### **Private Providers**

- GP's
- Parkway Health, Raffles Medical, SATA, etc



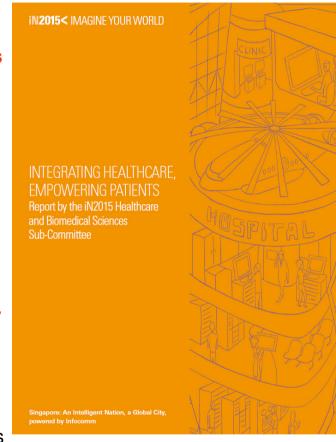
# Singapore's iN2015 Healthcare Vision Overview

#### Key Drivers / Issues in Healthcare Sector

- Ageing population, increased burden of chronic conditions (diabetes, hypertension, high cholesterol, stroke)
- Rising public **demand** / **expectation for quality healthcare**
- Current fragmented, uncoordinated healthcare services
- Very rapid advances in infocomms, medical science, tech

#### Will lead to

- Shift in focus of healthcare system, from reactive treatment of advanced-stage disease to proactive prevention, early detection, health promotion, wellness care
- Shift from provider-centric, fragmented care delivery to a moreintegrated, patient-centred system of delivery
- Shift towards more consistent widespread application of evidence-based medicine / best practice
- Greater role for individuals to manage their own health
- Greater flow of data to research sector towards developments that will improve clinical care and outcomes



#### <u>Goal</u>

Accelerate sectoral transformation through infocomm-enabled personalised healthcare delivery system to achieve high quality clinical care, service excellence, cost-effectiveness & strong clinical research

# Singapore's iN2015 Healthcare Vision

Targetted Outcomes include:

### Well-integrated Quality Healthcare

 Standards-based info network, enable right-siteing (treatment at best point-of-care), incl @home / remote monitoring and administer care where cost-effective

### **Cost-effective Healthcare Services**

 Clinical decision support systems for more consistent, evidencebased, best practice care. Reduced test duplications, medical errors, etc

## Greater ability of public to manage their health

 Home infocomm systems allow individual access to accurate relevant health info incl e-PHR, personalised alerts, provider interaction (incl make / change appointments), wellness promotion, understanding and management of health issues (esp chronic / longitudinal conditions) through providing personalised education and health management tools, telehealth monitoring / care, etc

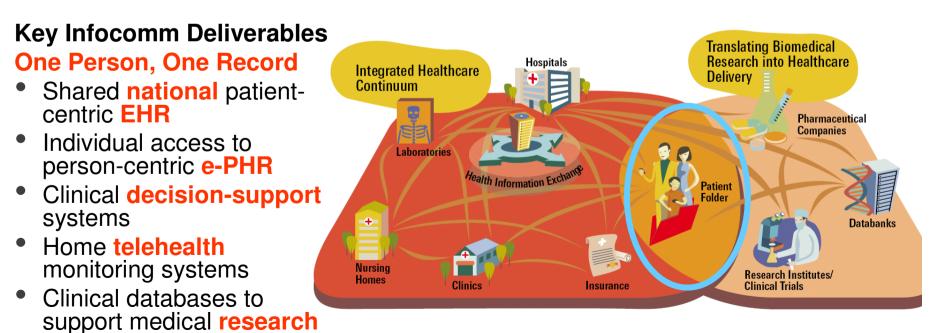
# Singapore's iN2015 Healthcare Vision

#### **Strategies / Programmes**

Enable integrated healthcare services

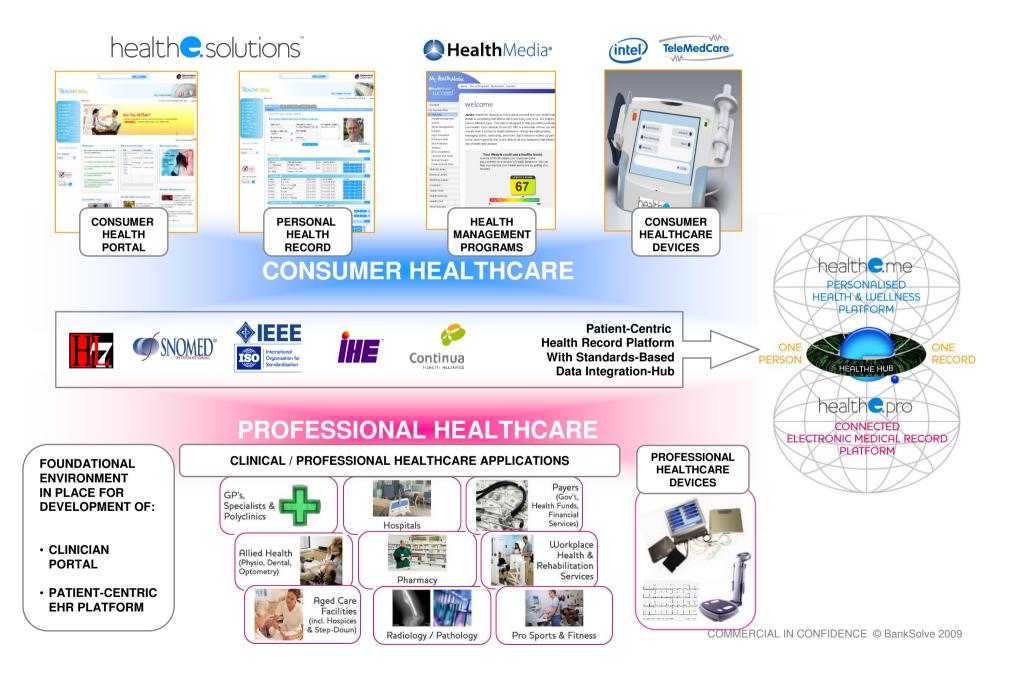
- <u>Health Information Exchange</u> e-Enable seamless secure health info data exchange across healthcare ecosystem
- Integrated Healthcare Continuum e-Enable processes and linkages across healthcare ecosystem

Enable integration between healthcare and biomedical research / science



# **Solutions Platform**

# Healthcare Technology Solutions



# Healthcare Informatics Standards

#### Conforms to latest Healthcare Informatics Standards

at a data level, not interface

#### **Clinical Standards**

- Practice Guidelines
- AU Red Book, MOH guidelines

#### **Messaging Standards**

- HL7v3, 2.x,1.x
- CDA/CCD

#### **Enterprise Terminologies Standards (ETS)**

- SNOMED, ICD9, ICD10, LOINC, etc
- Semantic Interoperability; translate across multiple ETS
- Translated SNOMED into consumer friendly language

#### **Integration Standards**

- IHE
- Continua

#### **Technical standards**

- ADF JSF (Java Server Faces), AJAX
- JSR-168 Portlet compliant
- Service Oriented Architecture Development Platform
- Web Service enabled application, Application As Service
- Business Process Execution Language

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# Summary

## **Core Platform**

- Secure Portal & Health Record engine
- Accelerated, cost-effective, risk-mitigated
- Supports interoperability & integration
- Oracle technology environment

# Connectivity

Fast, cost-effective integration to:

- Consumer Health Management app's
- Clinical Healthcare / Payer app's
- Devices (telehealth-ready Plug 'n' Play)

# **Customisation-Ready**

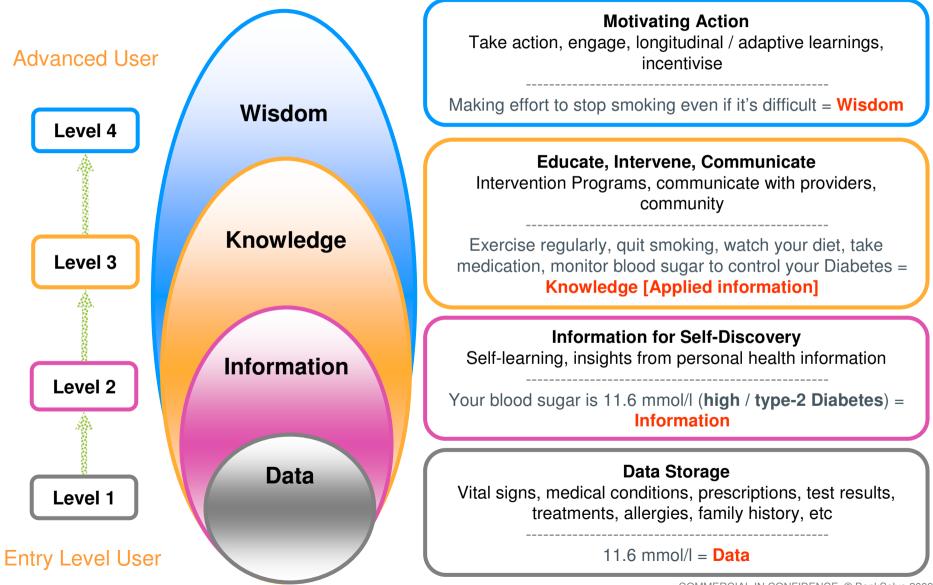
 Fast, cost-effective configuration, tailoring, implementation



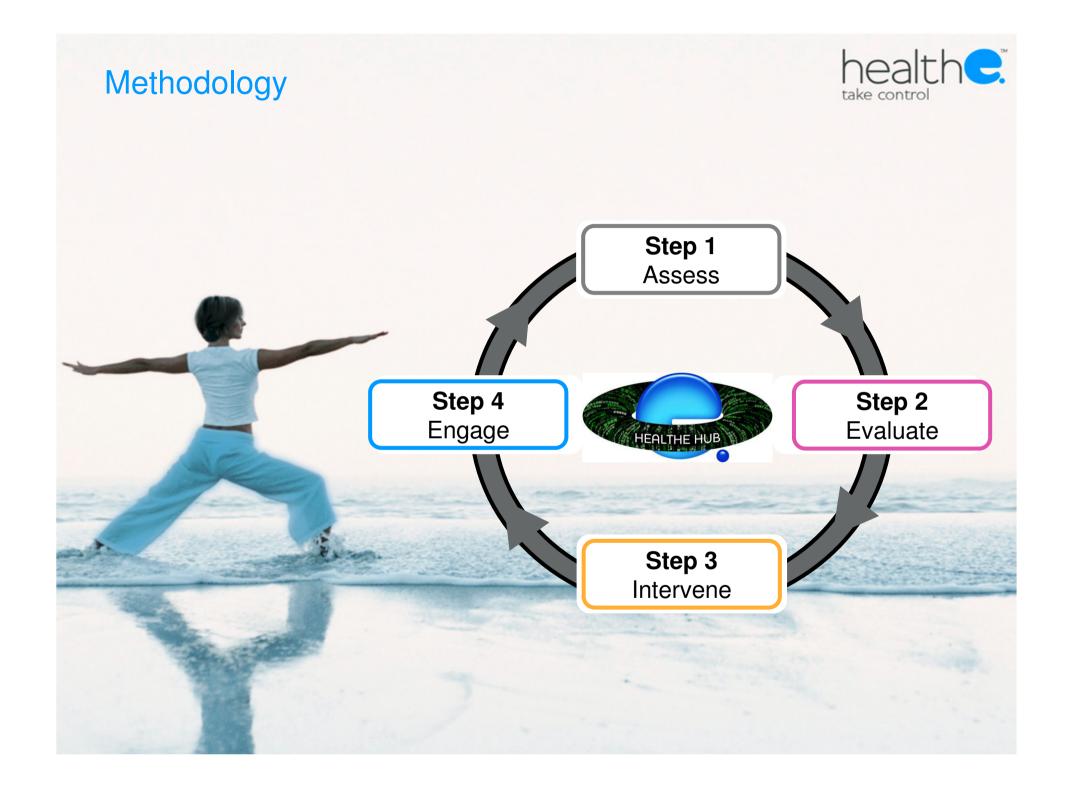




# Consumer Health Management Approach



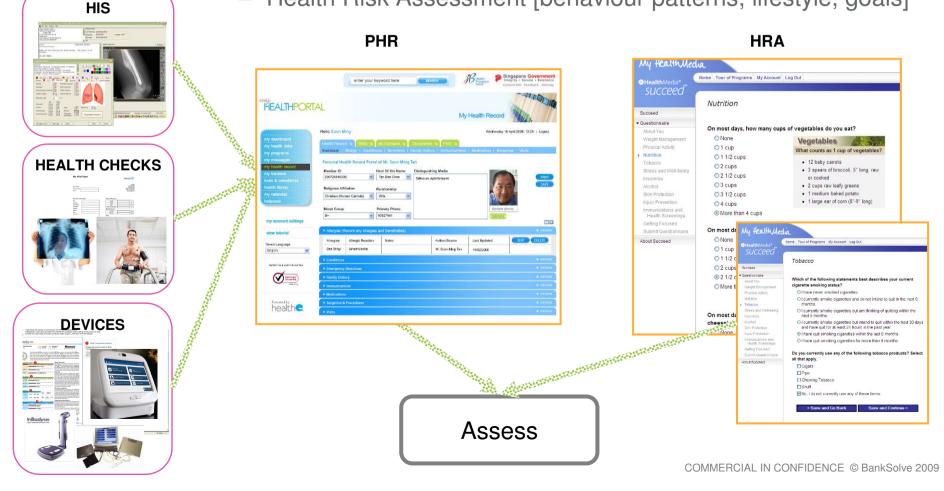
COMMERCIAL IN CONFIDENCE © BankSolve 2009



## Step 1 Assess

#### DATA

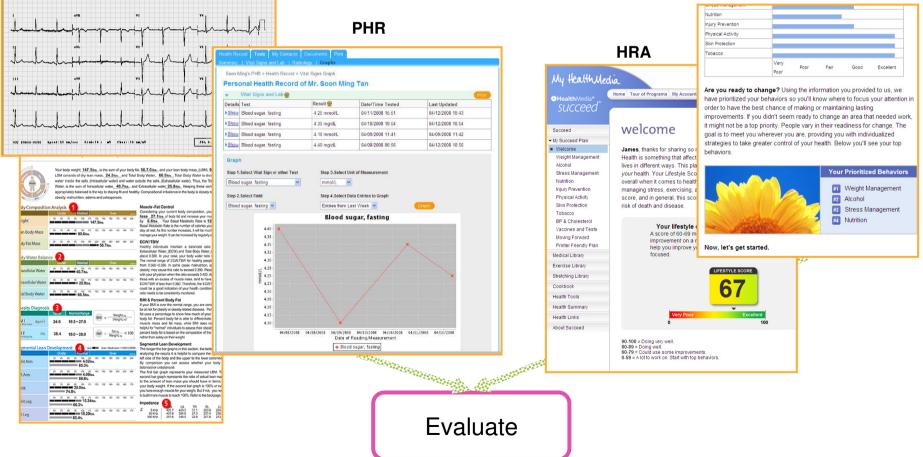
- Establish Health Profile
  - PHR data [HIS, screening, devices, user-entered]
  - Health Risk Assessment [behaviour patterns, lifestyle, goals]



## Step 2 Evaluate

#### INFORMATION

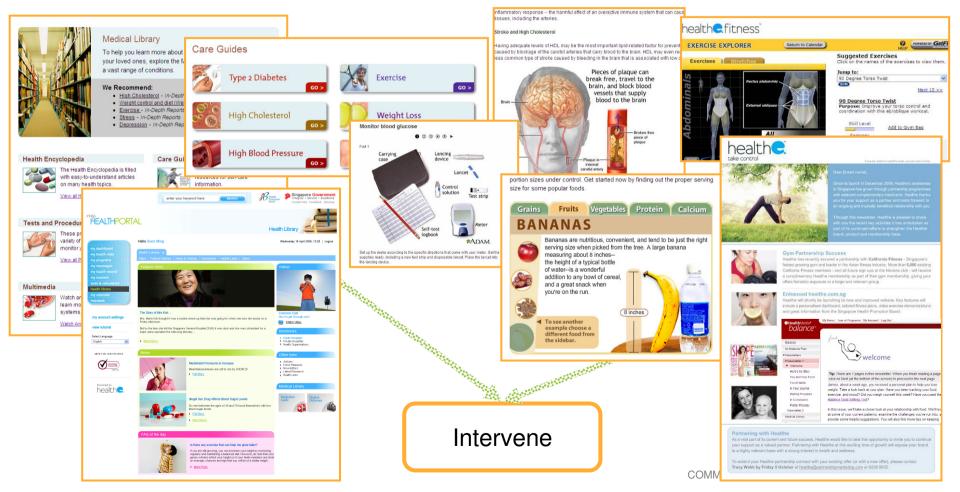
- Analyse Health Profile
- Personalised Health & Wellness Overview



## Step 3 Intervene

### **KNOWLEDGE**

- Personalised Health Intervention Programs
- Tailored Educational Content



# Step 4 Engage

Hello Soon Ming

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Hi Soon Ming

This is a

reminder of

11am, Wed 2

April 2008 with Dr Tan

90

(SGH)

your next appointment at

Calendar - Month of April

(1)

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View by List | View by Calenda

## WISDOM

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Appointment

- Engagement
- Intelligent Personalisation engine
- Alerts / Calendar / Reminders

Calendar

Upcoming Events

Wednesday 16 April 2008, 13:28 | Logout

26

• Web 2.0 Community tools

Reminders

• Incentives / Health Scorecard KPI's

Women's Health Message Board HealthBoards.com Message Boards > Health Issues > Women's Health

SO tired and don't know why!

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Threads in Board

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54

Click here to post a new message

No Health Insurance -- any ideas? (10 1 2 3)

Am i pregnant or is it just my period coming?

Problems with Thermal Ablation (E 1 2)

The Abortion Issue >>> Make sure to read this

Bacterial vaginosis, hydrogen peroxide and lactobacillus



# **Consumer Health Management**

**Platform Overview** 

#### **Healthe Me Platform**

- Interactive Portal
- Customised Dashboard
- PHR / XHR engine
- Personalised Experience
- Rich Demographics Database (Personal, Health, Behaviour)
- Educational Content
- Intelligence & Web 2.0 in development

### Tailored to Client **Requirements**

- Integrate portlet applications & data
- Personalised Offerings
- Admin enabler
- Commercial hub incl claims
- Population Analytics

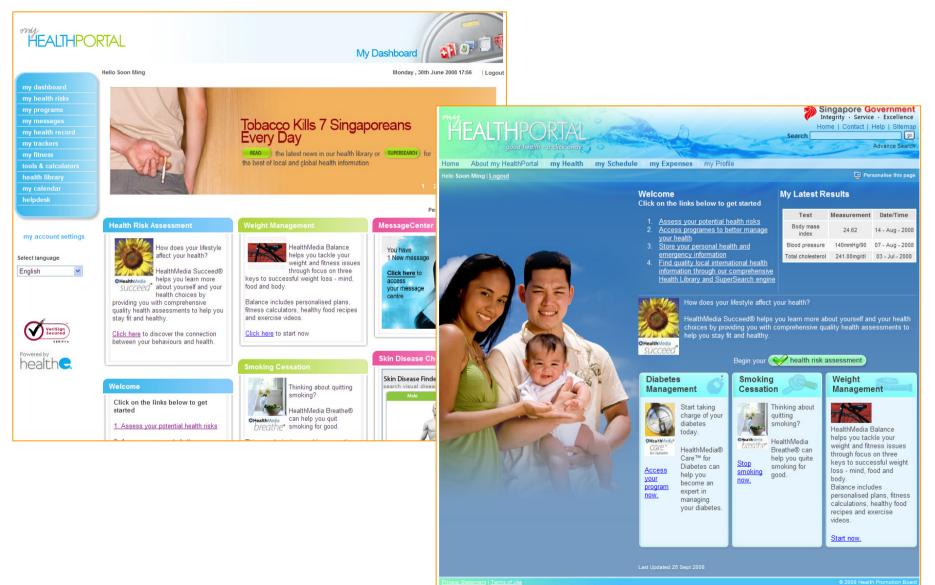




- **Health Management Platform** • Open, Standards-Based architecture
- Oracle Technology Environment
- Secure & Scalable
- Foundation for future development

# **Consumer Health Platform**

#### **Customisable Dashboard**



## Consumer Health Platform Core PHR Engine

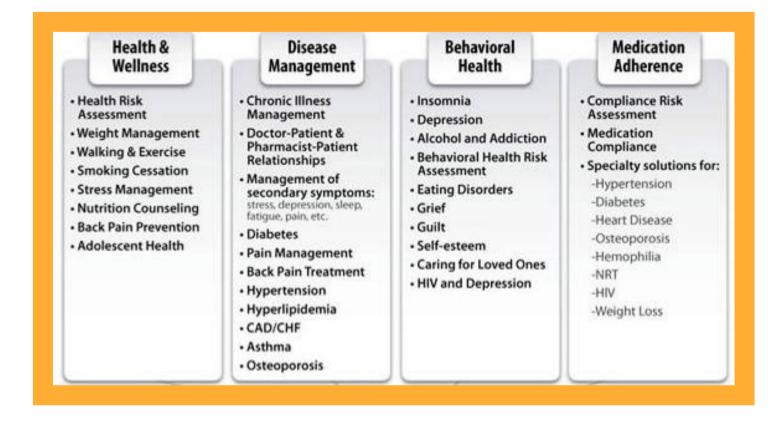
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## **PHR Features**

- Family history
- Medical Conditions
  - Allergies
  - Vital Signs (Lab tests, DI, Devices)
  - Visits, Events, Surgeries, Interventions
- Medications
- ICE data & Emergency Directives
- Document / Image Lockbox
- Contact Management
- Demographics
- Record Access Control
- Print PHR / ICE reports

# **Consumer Health Platform**

#### Integrated Health Management Programs



# Engaging. Scalable. Effective.

Highly-tailored health interventions with interactive tools-delivered to your entire population.

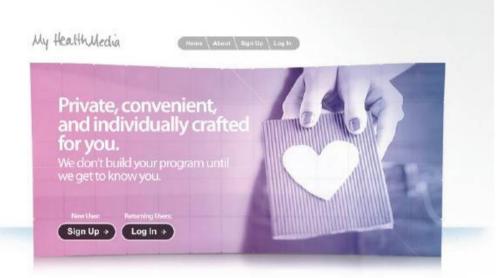


# Web Content

# Web Interventions

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#### John,

Being able to live a full and active life despite your health issues is obviously important to you. Your **HealthMedia® Care™ for Your Health plan** is complete with the skills you need to successfully manage your condition. You'll find skills like staying motivated and confident when times get tough and knowing the right questions to ask your health care provider - skills to help you remain in control.

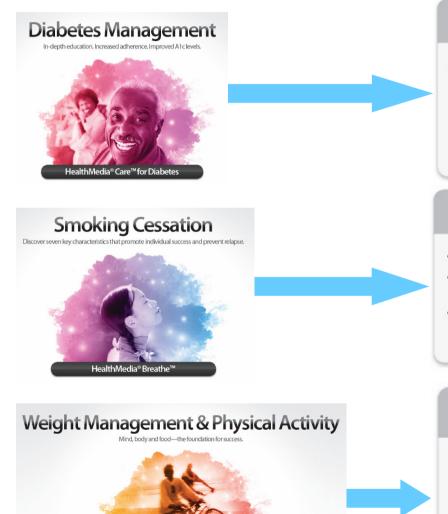
Your Personalized Plan >

# This Is An Intervention

Modify / Change Undesirable Health Behaviour



## HealthMedia Evidence-Based. Proven Outcomes



HealthMedia® Balance

#### **UNMATCHED OUTCOMES**

- A1c numbers dropped 1.36 points from 7.26 to 5.90 at 180 days
- ·73% improved their medication habits
- 83% said they are able to better communicate with their health care provider
- Productivity savings of \$1,000/year per participant

#### UNMATCHED OUTCOMES

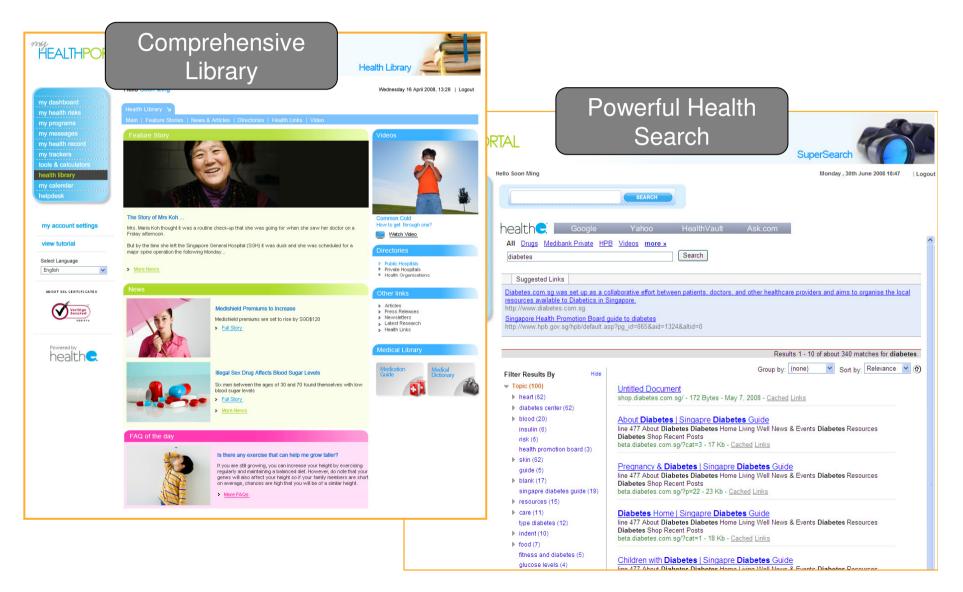
- 53% quit smoking
- A Breathe formulized random control trial showed a 19%
   Intent-to-Treat quit rate
- 92% of participants who quit smoking indicated they were Confident, Very Confident, or Extremely Confident they could remain quit

#### **UNMATCHED OUTCOMES**

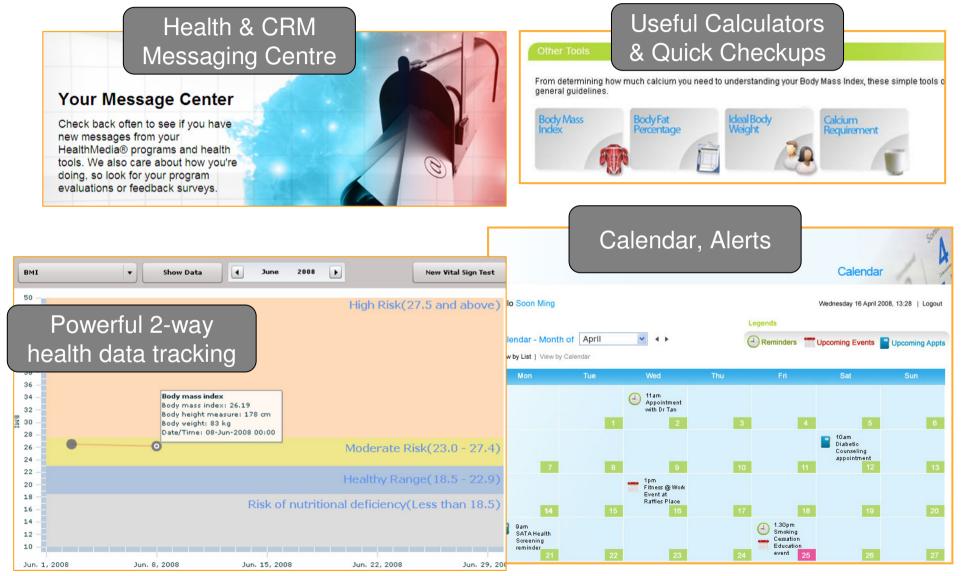
- 55% of participants lost weight
- 29% with a BMI 30+ lost at least 5% of their body weight
- 45% increased their physical activity habits
- Productivity savings of \$970/year per participant

# **Consumer Health Platform**

#### **Quality Educational Content**



## Consumer Health Platform Other Features



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