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")

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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

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Singapore Healthcare Ecosystem
Overview

Government

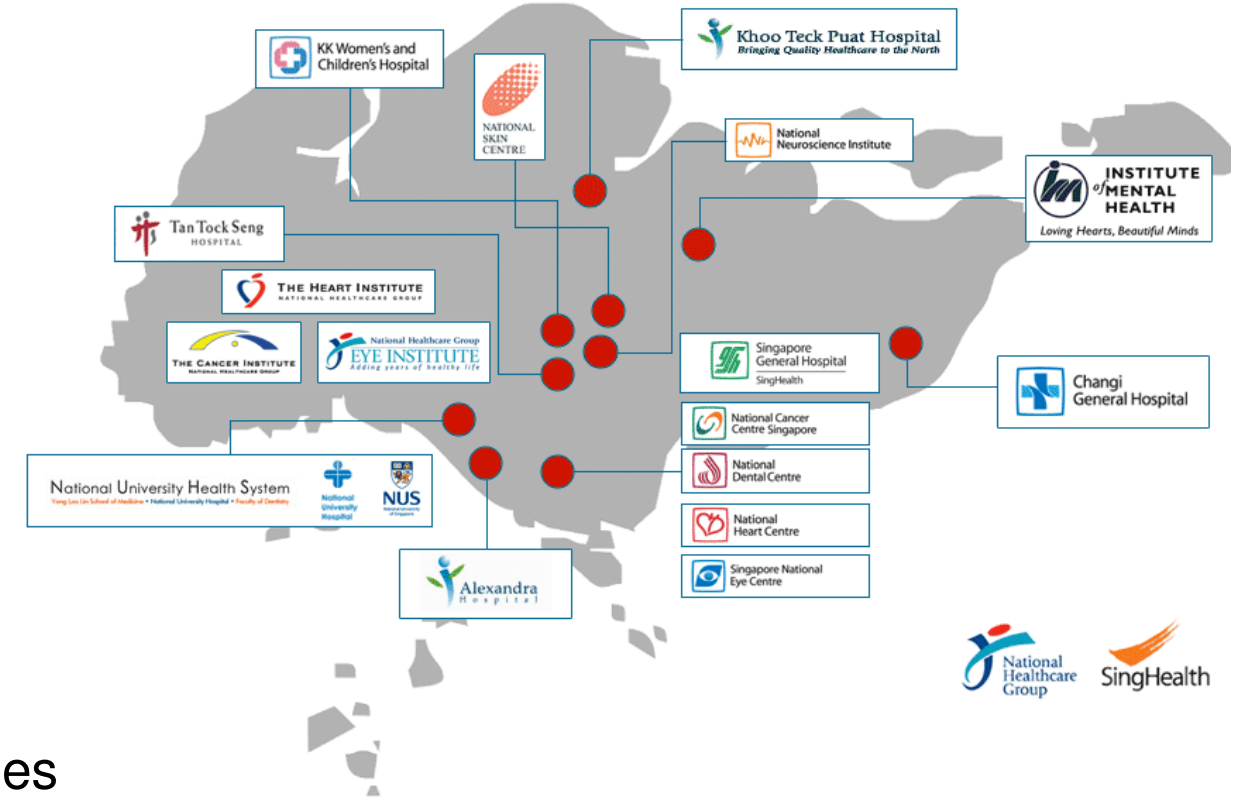
- MOH, MOHH (IHIS), HPB

Public Providers

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

Private Providers

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



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Singapore's iN2015 Healthcare Vision

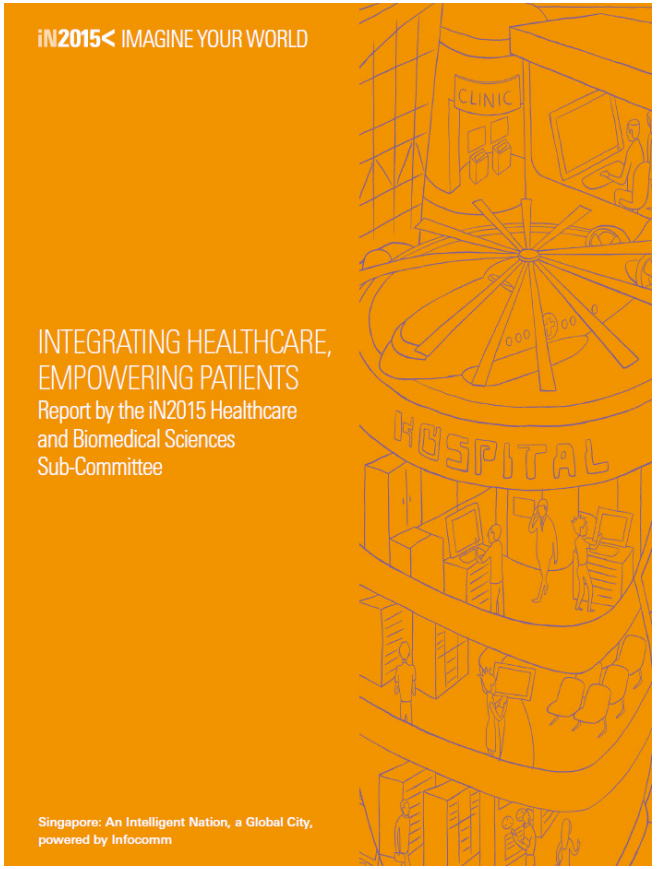
Overview

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 **more-integrated, 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



Goal

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

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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, evidence-based, 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

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Singapore's iN2015 Healthcare Vision

Strategies / Programmes

Enable integrated healthcare services

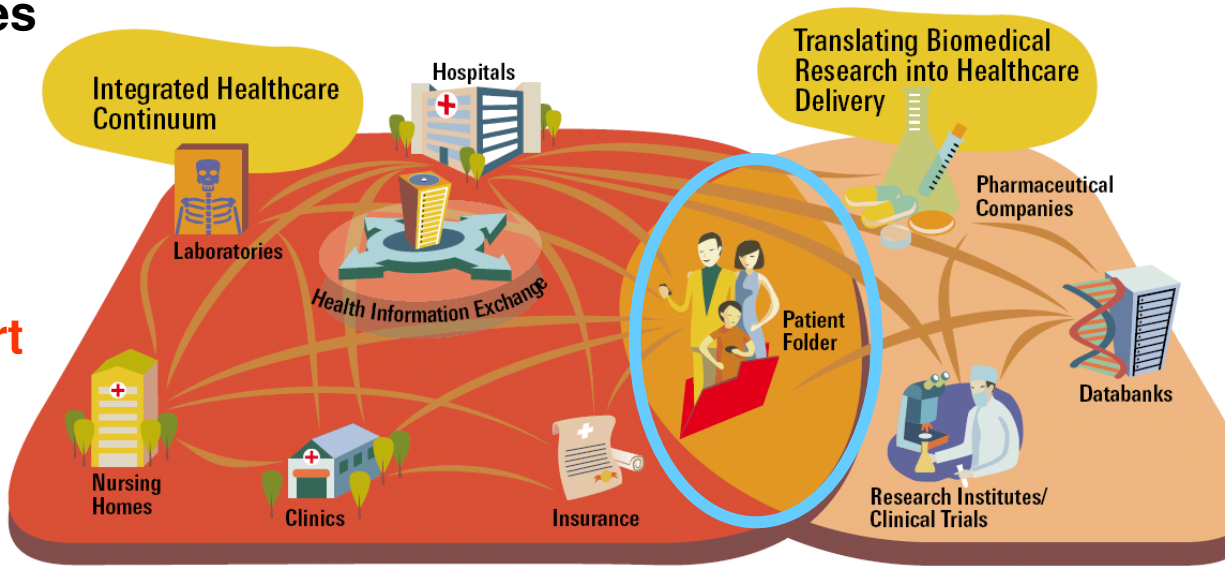
- Health Information Exchange – **e-Enable seamless secure health info data exchange across healthcare ecosystem**
- Integrated Healthcare Continuum – **e-Enable processes and linkages across healthcare ecosystem**

Enable integration between healthcare and biomedical research / science

Key Infocomm Deliverables

One Person, One Record

- Shared **national** patient-centric **EHR**
- Individual access to person-centric **e-PHR**
- Clinical **decision-support** systems
- Home **telehealth** monitoring systems
- Clinical databases to support medical **research**



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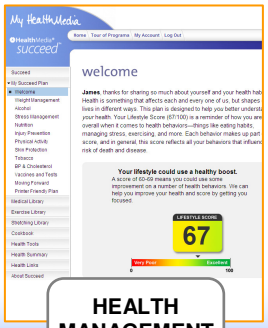
Healthcare Technology Solutions

healthe.solutions™

CONSUMER HEALTH PORTAL

PERSONAL HEALTH RECORD

HealthMedia®



HEALTH MANAGEMENT PROGRAMS

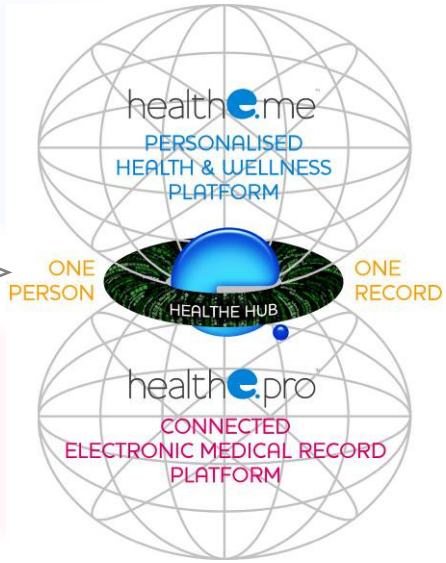
intel TeleMedCare

CONSUMER HEALTHCARE DEVICES

CONSUMER HEALTHCARE

HL7 SNOMED® INTERNATIONAL IEEE ISO International Organization for Standardization IHE Continua HEALTH ALLIANCE

Patient-Centric Health Record Platform With Standards-Based Data Integration-Hub



PROFESSIONAL HEALTHCARE

FOUNDATIONAL ENVIRONMENT IN PLACE FOR DEVELOPMENT OF:

- **CLINICIAN PORTAL**
- **PATIENT-CENTRIC EHR PLATFORM**

CLINICAL / PROFESSIONAL HEALTHCARE APPLICATIONS

PROFESSIONAL HEALTHCARE DEVICES

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Healthcare Informatics Standards

Conforms to latest Healthcare Informatics Standards
at a data level, not interface

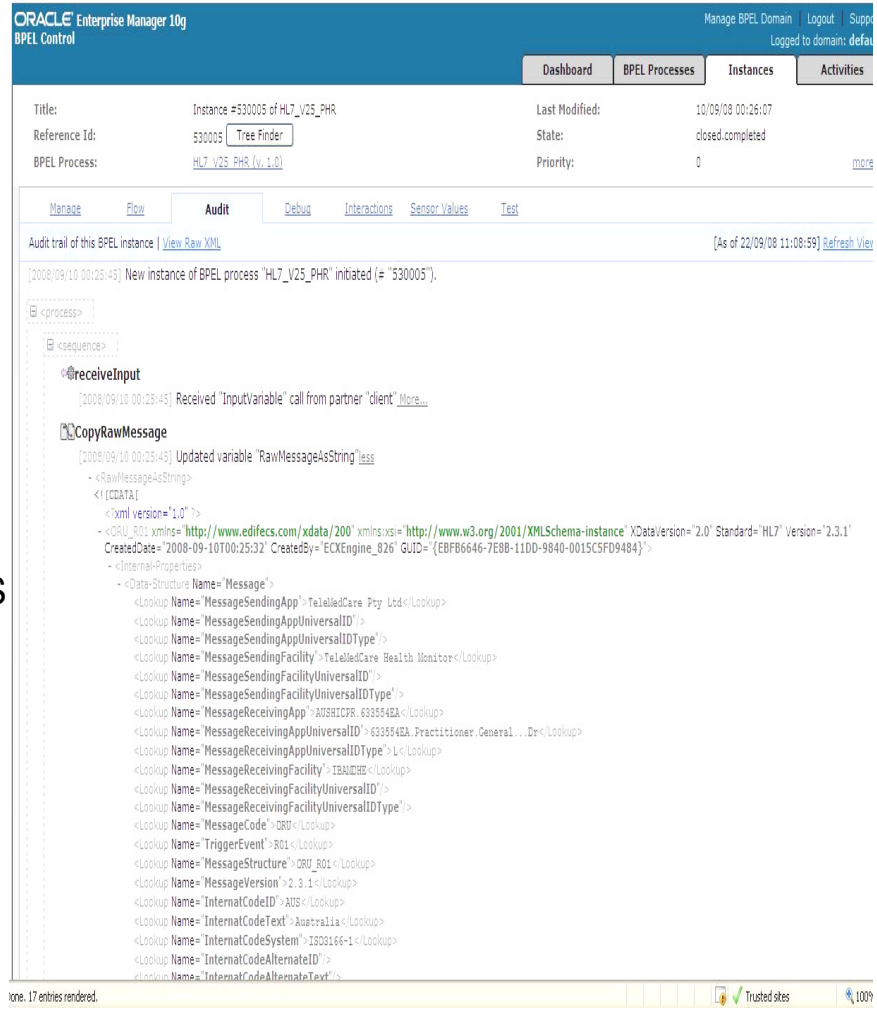
Clinical Standards
- Practice Guidelines
- AU Red Book, MOH guidelines

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

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Consumer Health Management

Approach

Advanced User

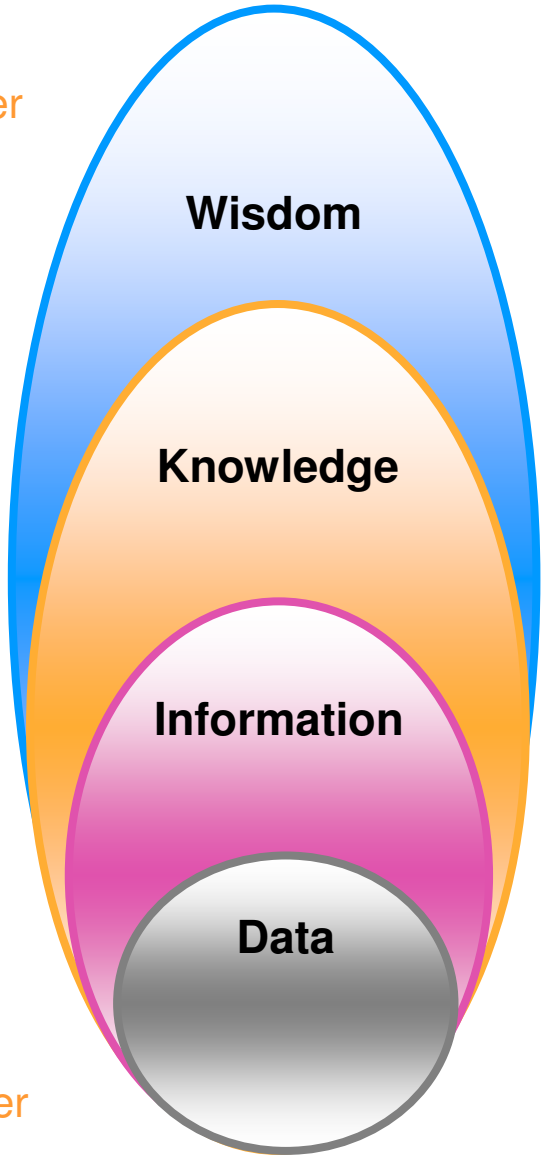
Level 4

Level 3

Level 2

Level 1

Entry Level User



Motivating Action
Take action, engage, longitudinal / adaptive learnings, incentivise

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Making effort to stop smoking even if it's difficult = **Wisdom**

Educate, Intervene, Communicate
Intervention Programs, communicate with providers, community

Exercise regularly, quit smoking, watch your diet, take medication, monitor blood sugar to control your Diabetes = **Knowledge [Applied information]**

Information for Self-Discovery
Self-learning, insights from personal health information

Your blood sugar is 11.6 mmol/l (**high** / **type-2 Diabetes**) = **Information**

Data Storage
Vital signs, medical conditions, prescriptions, test results, treatments, allergies, family history, etc

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11.6 mmol/l = **Data**

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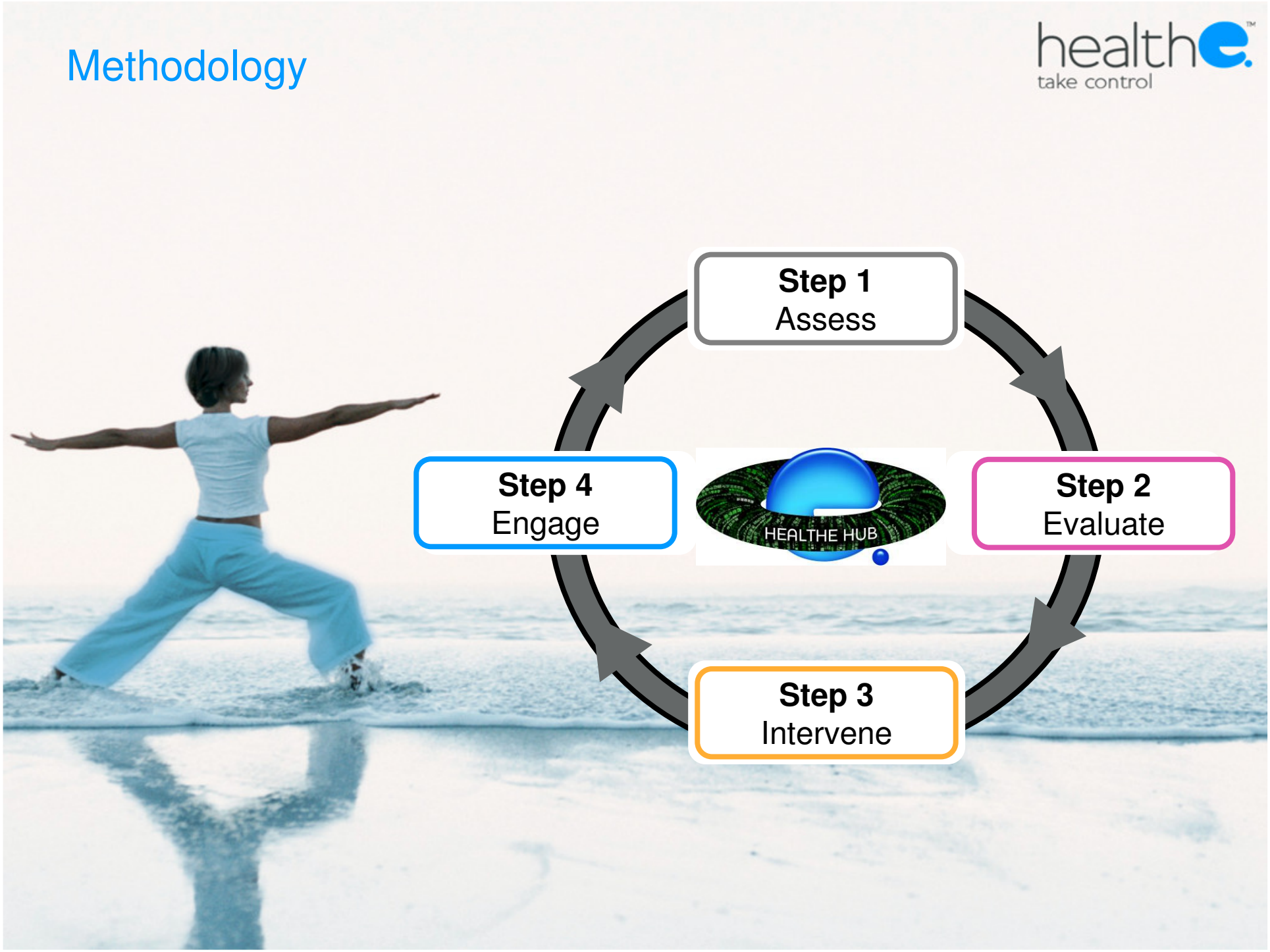
Methodology

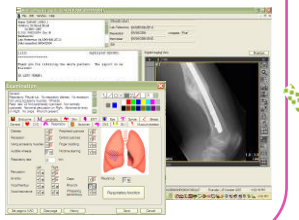


Step 1
Assess

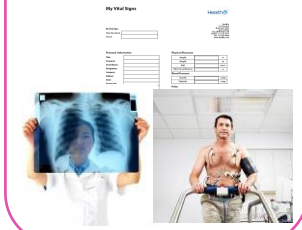
DATA

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

HIS

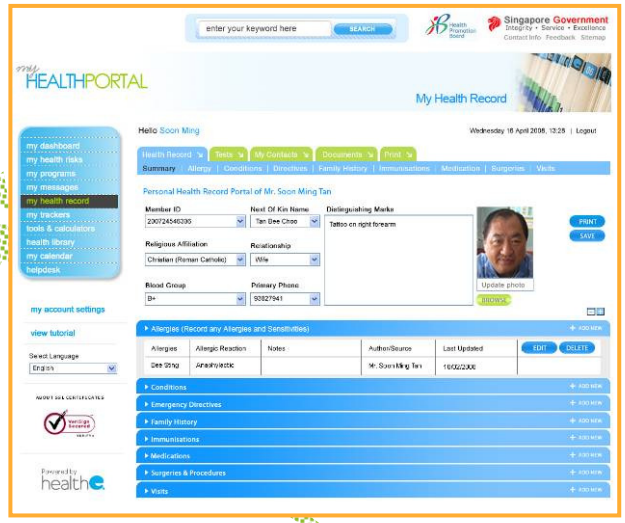


HEALTH CHECKS

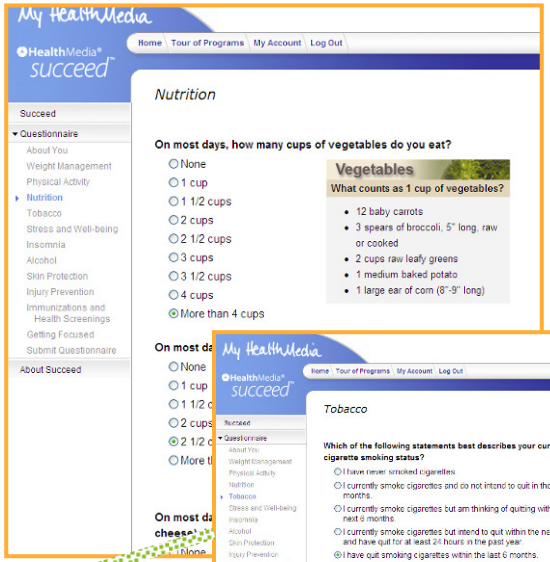


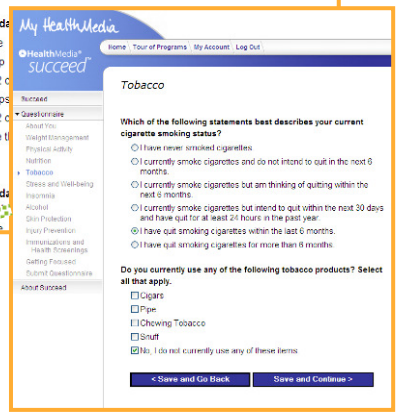
DEVICES

PHR



HRA





Assess

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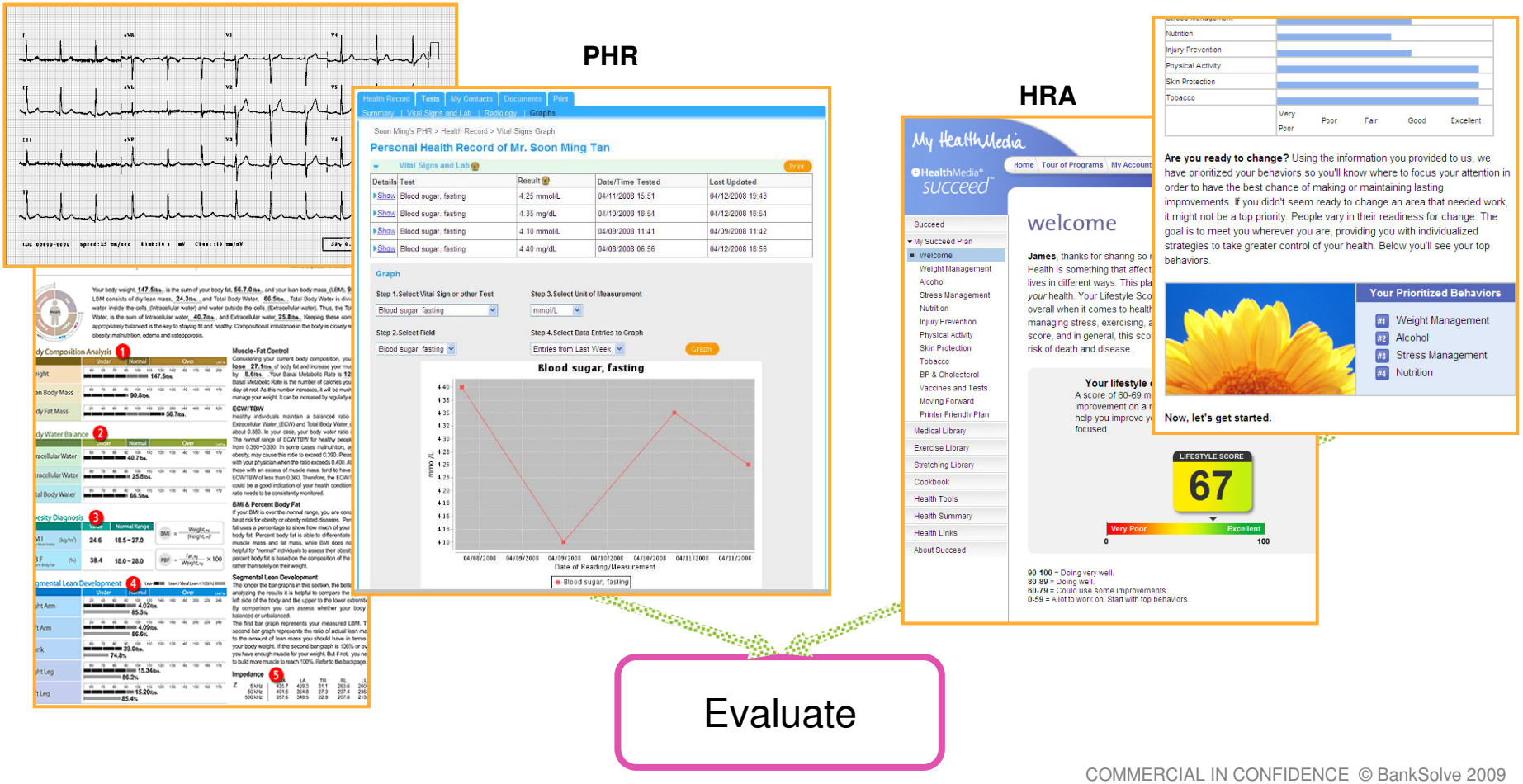
Step 2
Evaluate

INFORMATION

- Analyse Health Profile
- Personalised Health & Wellness Overview



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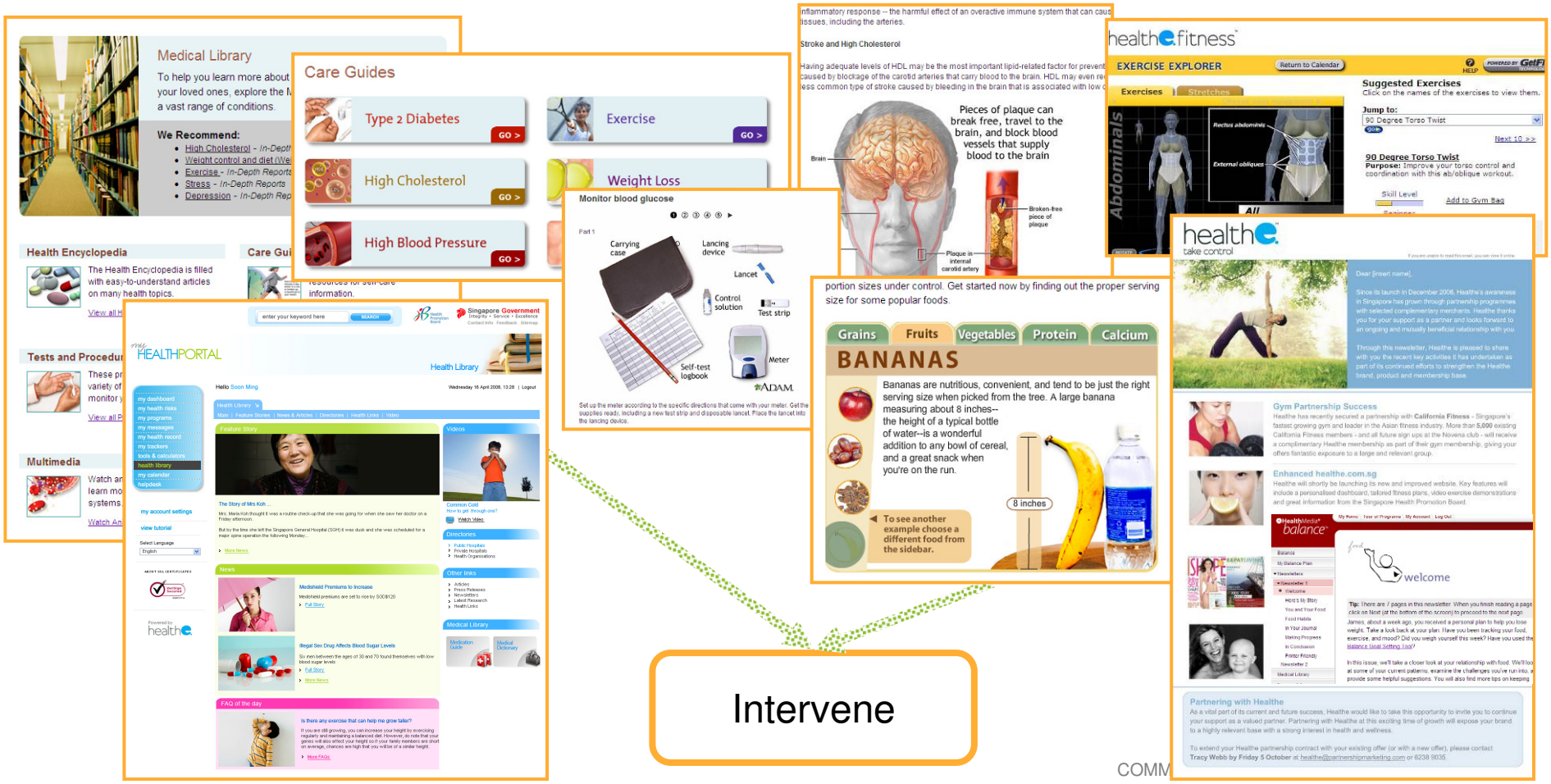
Step 3
Intervene

KNOWLEDGE

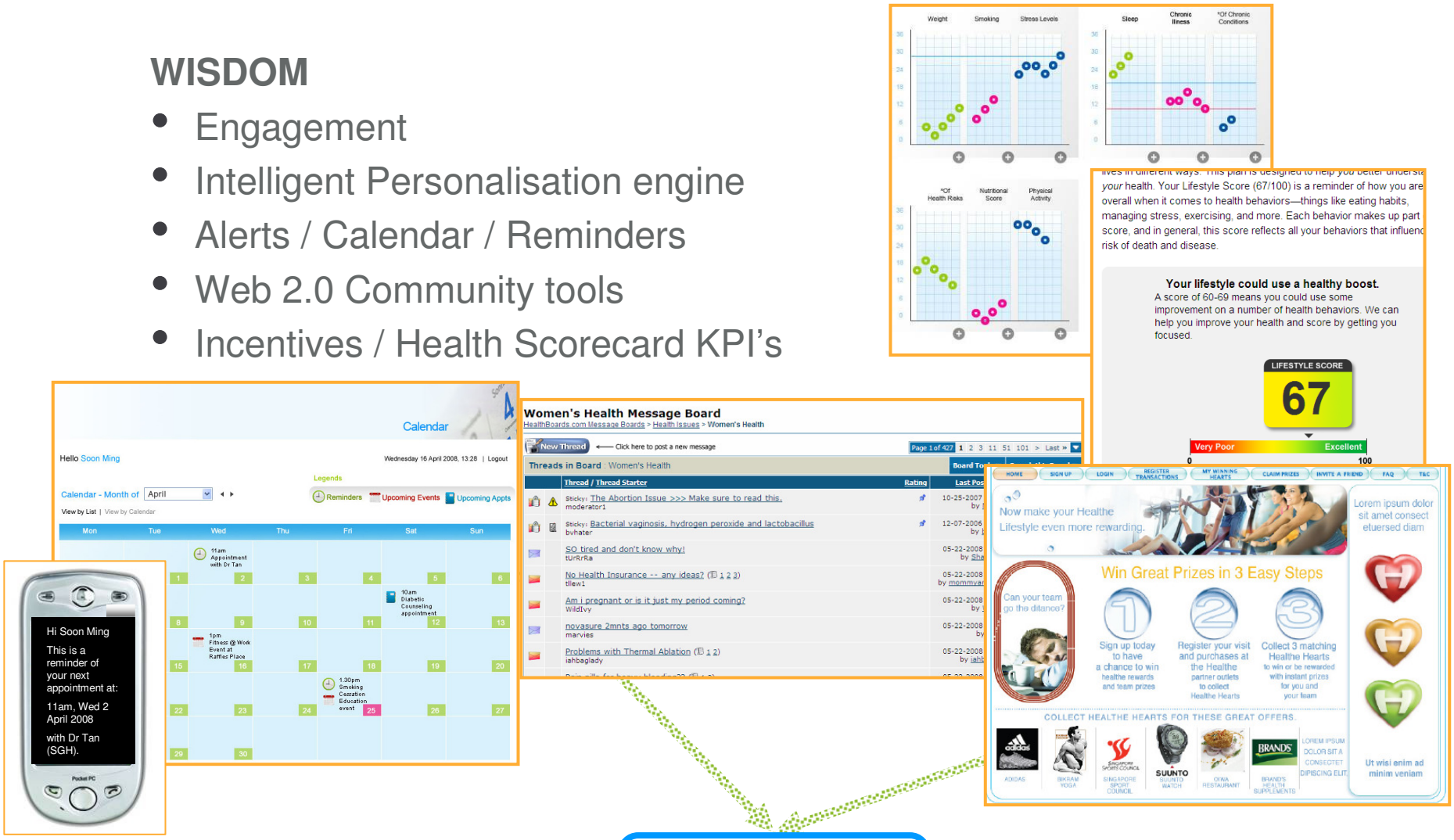
- Personalised Health Intervention Programs
- Tailored Educational Content



Step 4
Engage

WISDOM

- Engagement
- Intelligent Personalisation engine
- Alerts / Calendar / Reminders
- Web 2.0 Community tools
- Incentives / Health Scorecard KPI's



Engage

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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

Health Management

- HRA + BHIP's incl:

HealthMedia® nourish™

HealthMedia® relax™

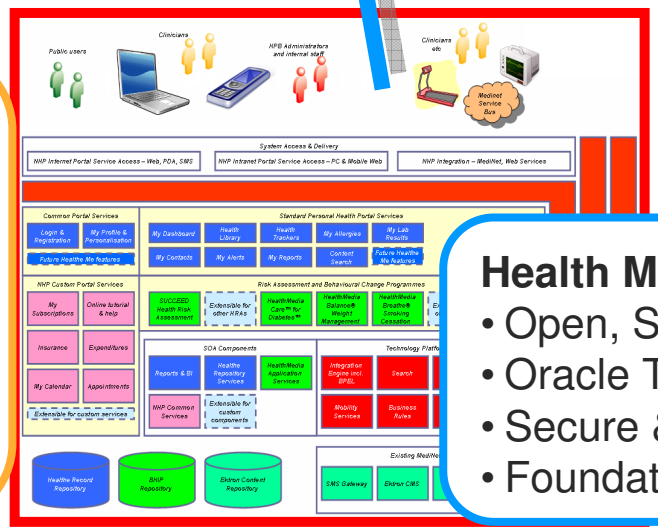
HealthMedia® breathe™

HealthMedia® care™ For Your Health

HealthMedia® balance™

Tailored to Client Requirements

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

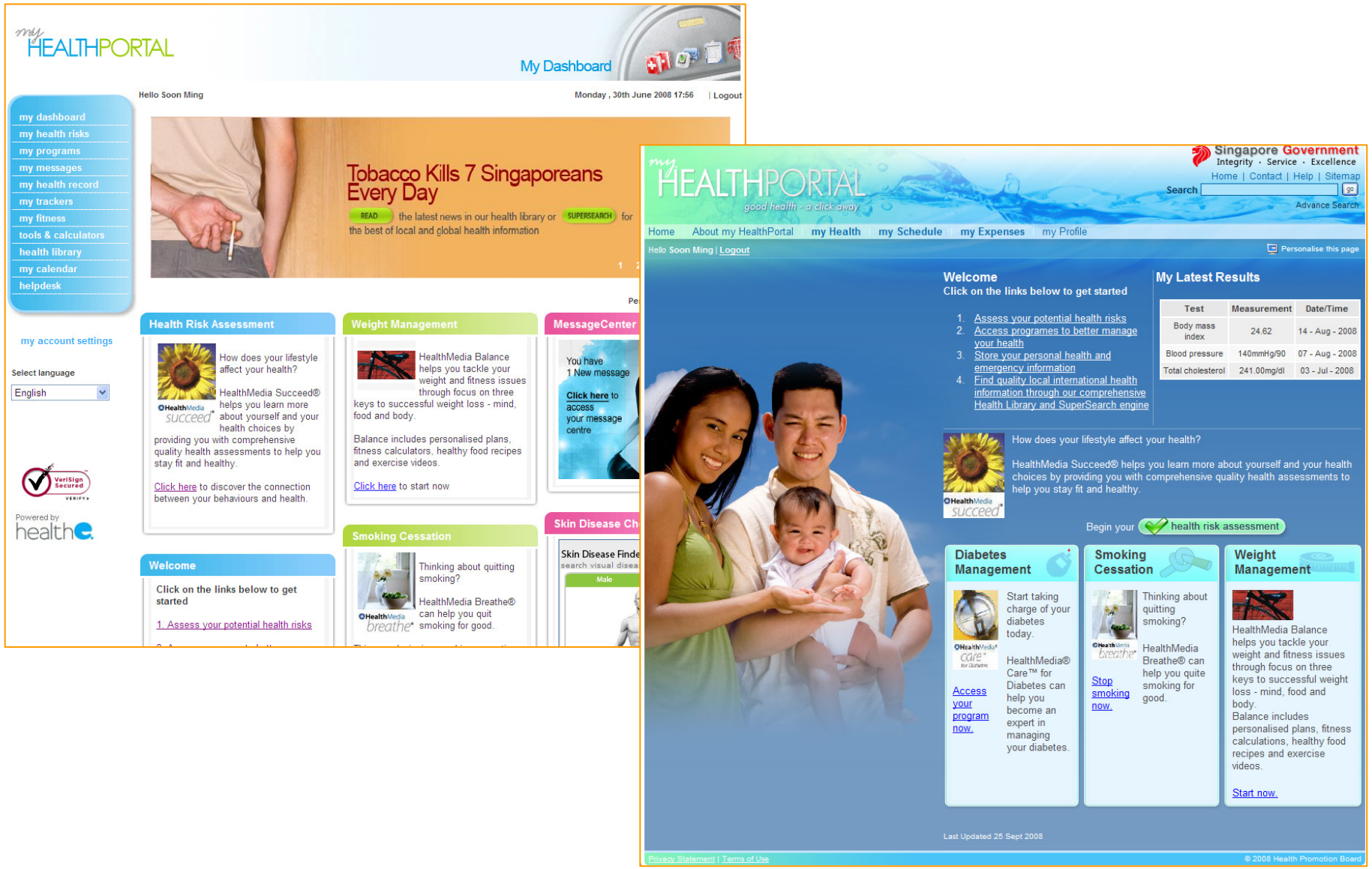


Health Management Platform

- Open, Standards-Based architecture
- Oracle Technology Environment
- Secure & Scalable
- Foundation for future development

Consumer Health Platform

Customisable Dashboard



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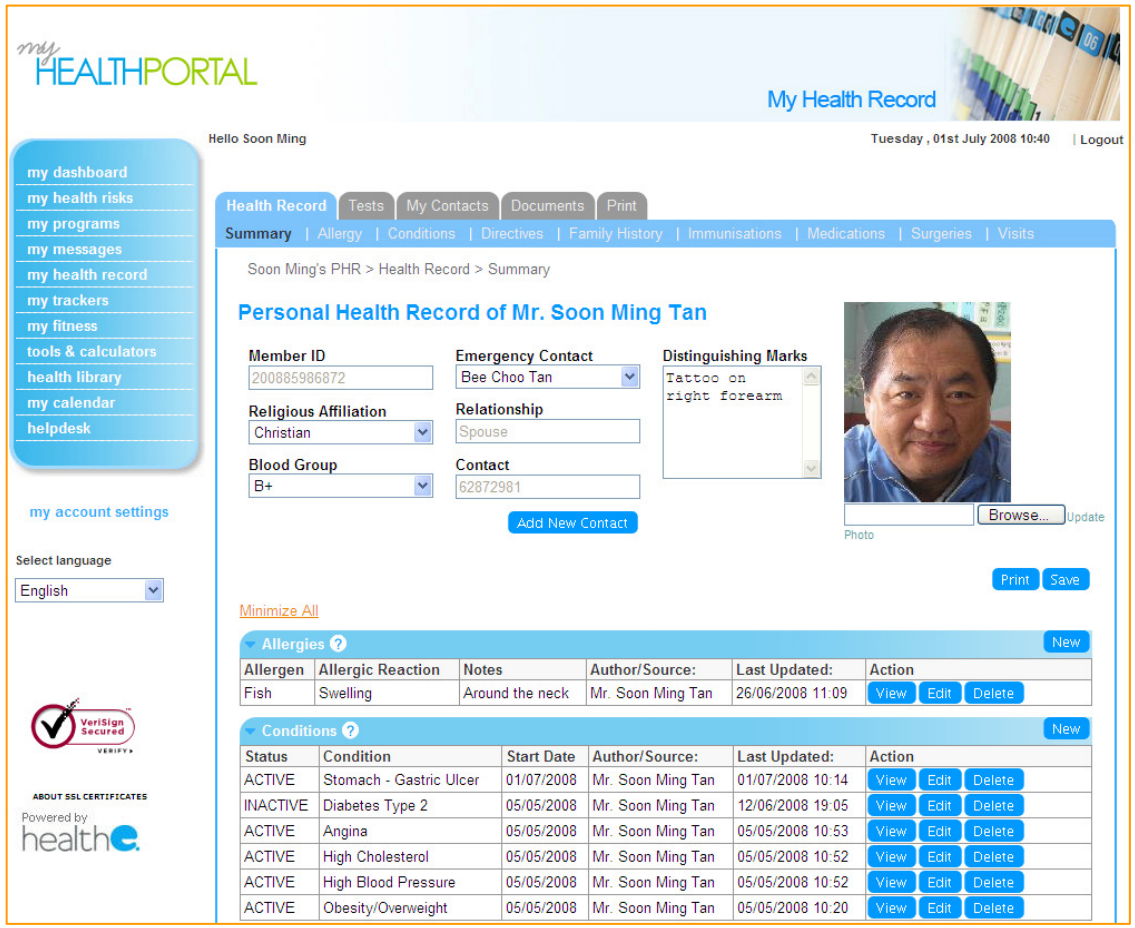
Consumer Health Platform

Core PHR Engine



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

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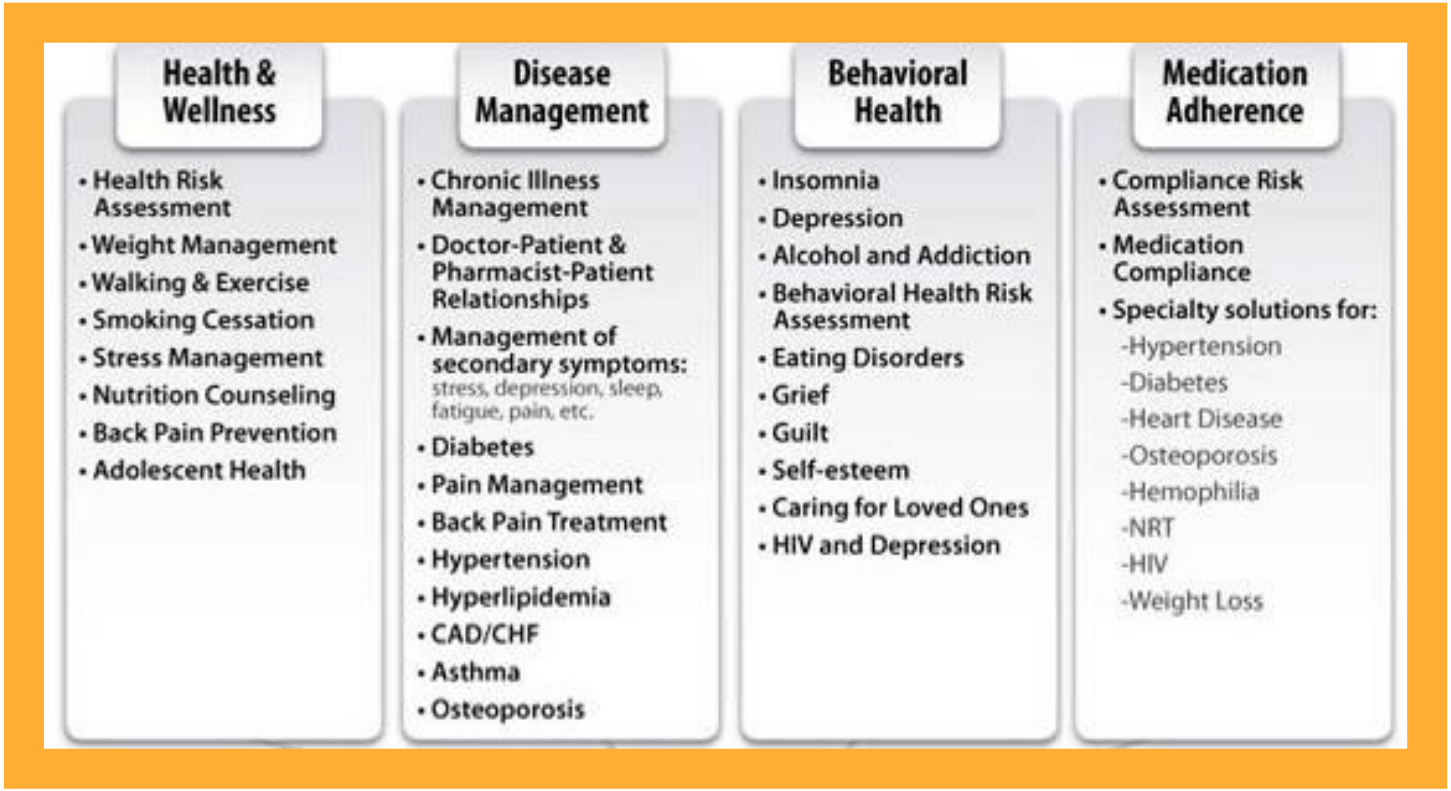
Consumer Health Platform

Integrated Health Management Programs



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Engaging. Scalable. Effective.

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

Web Interventions

- HealthMedia® Succeed™
- HealthMedia® TeenSucceed™
- HealthMedia® Balance™
- HealthMedia® Breathe™
- HealthMedia® Nourish™
- HealthMedia® Relax™
- HealthMedia® Overcoming™ Insomnia
- HealthMedia® Overcoming™ Depression
- HealthMedia® Care™ for Your Health
- HealthMedia® Care™ for Diabetes
- HealthMedia® Care™ for Your Back
- HealthMedia® Care™ for Pain
- HealthMedia® Overcoming™ Binge Eating

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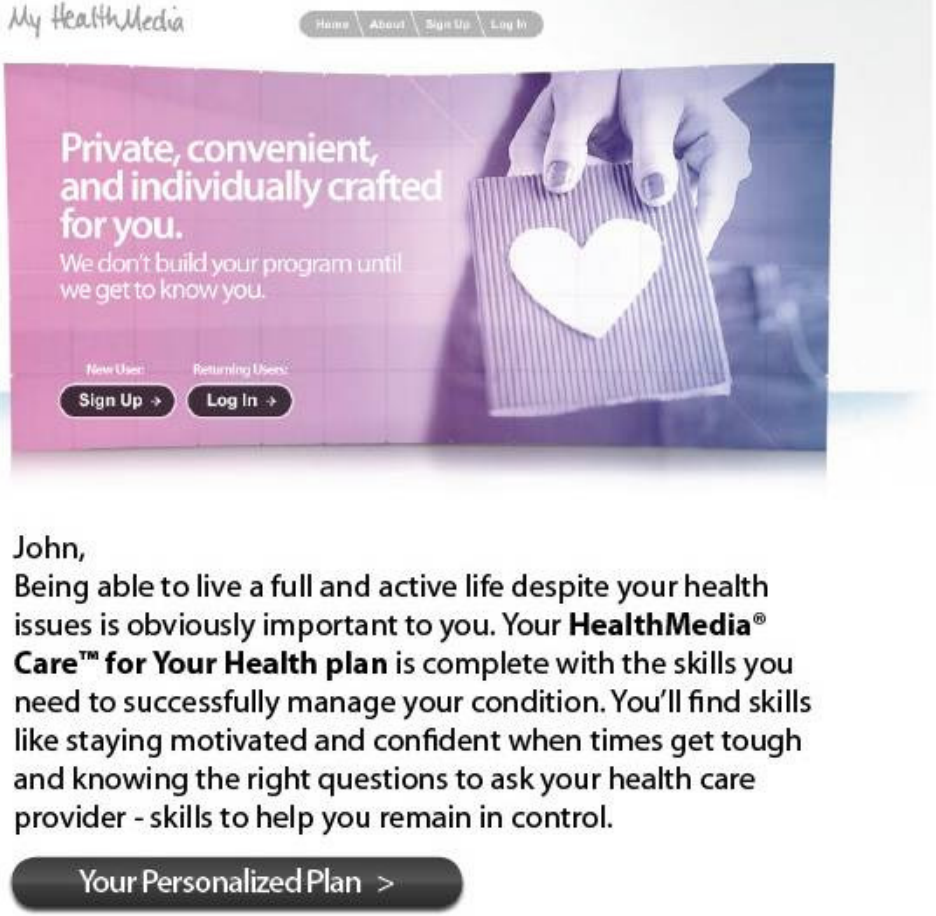
Web Content ≠ Web Interventions



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This Is An Intervention

Modify / Change Undesirable Health Behaviour

1 Effective Engagement

2 Assessment

An assessment to understand a person's unique **needs, motivation, confidence,** and **change barriers.**

3 A Structured Action Plan

- Establish an **emotional connection**
- Uniquely **tailored to each individual**
- Longitudinal
- Follows **proven clinical guidelines**
- Incorporates **proven behavioral science models**
- Offers tools and resources

4 Quantifiable Outcomes Measures

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HealthMedia

Evidence-Based. Proven Outcomes

Diabetes Management

In-depth education. Increased adherence. Improved A1c levels.

HealthMedia® Care™ for Diabetes

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**

Smoking Cessation

Discover seven key characteristics that promote individual success and prevent relapse.

HealthMedia® Breathe™

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

Weight Management & Physical Activity

Mind, body and food—the foundation for success.

HealthMedia® Balance™

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**

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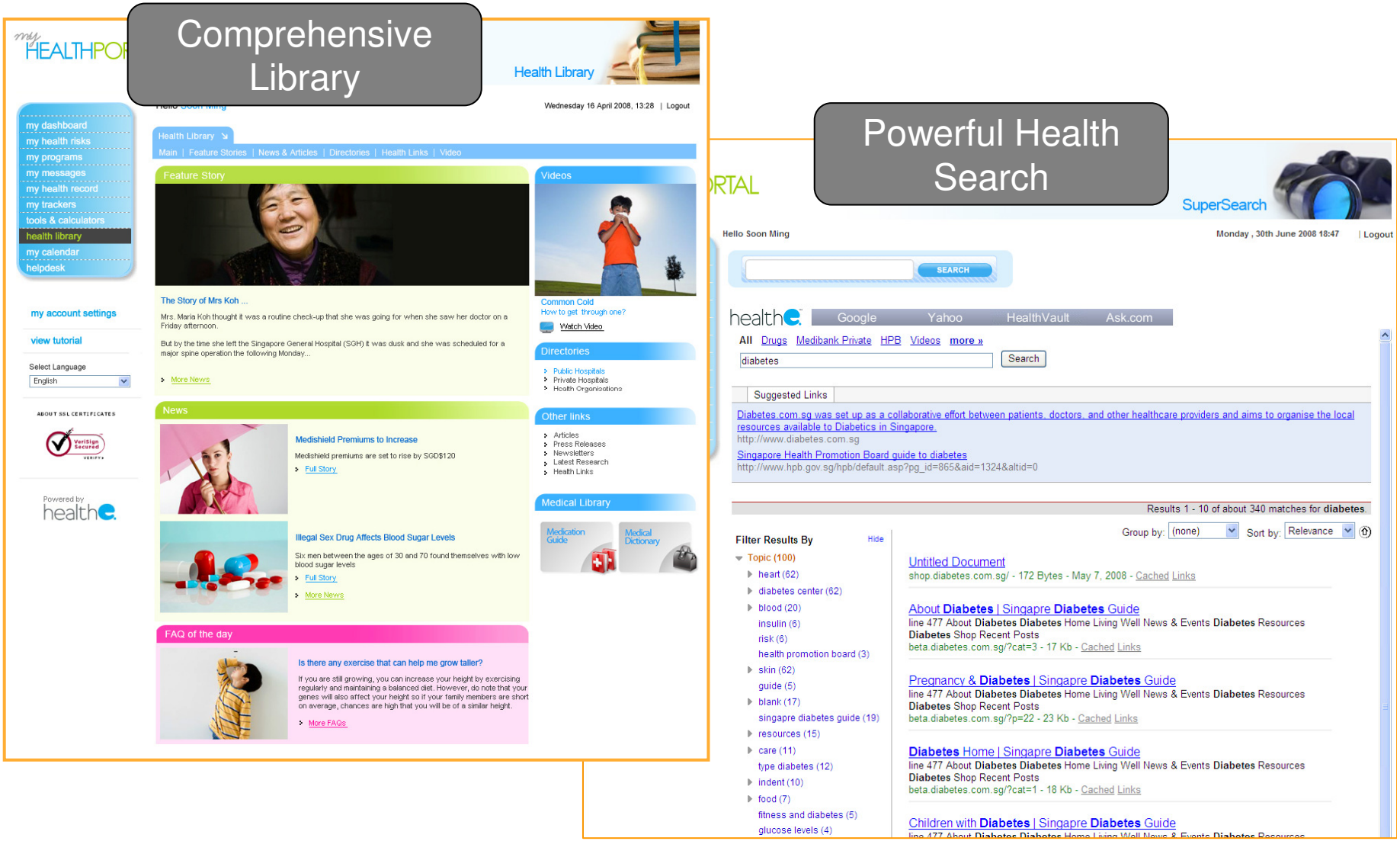
Consumer Health Platform

Quality Educational Content



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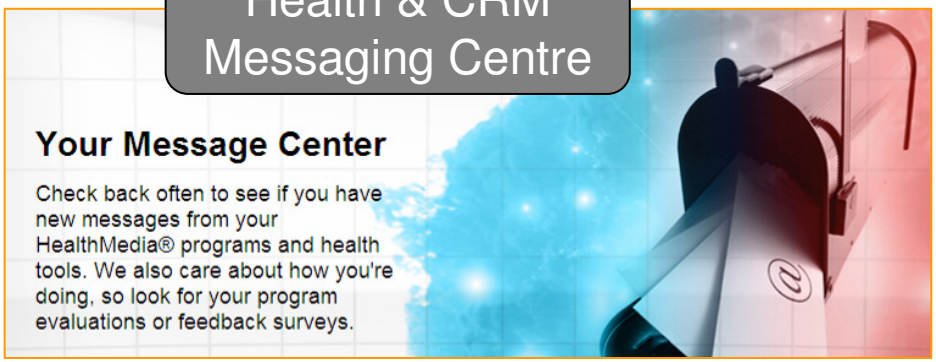
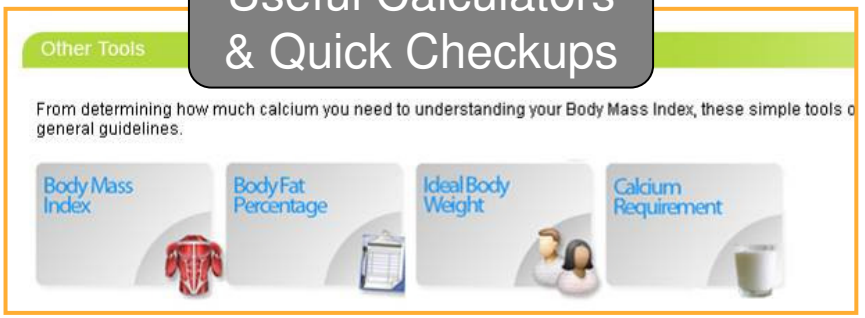
Consumer Health Platform

Other Features

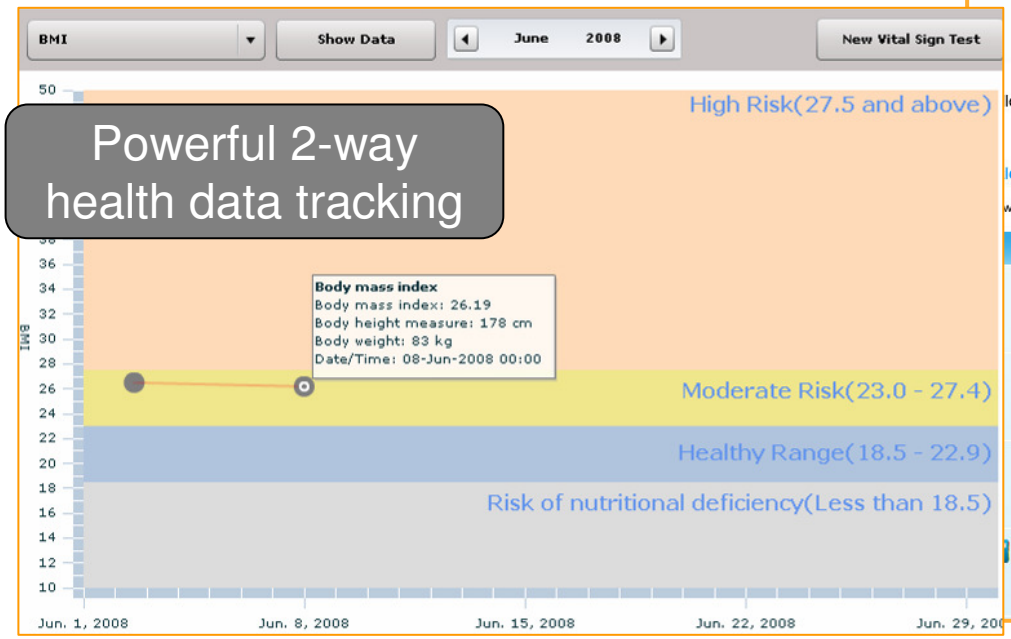
Health & CRM Messaging Centre



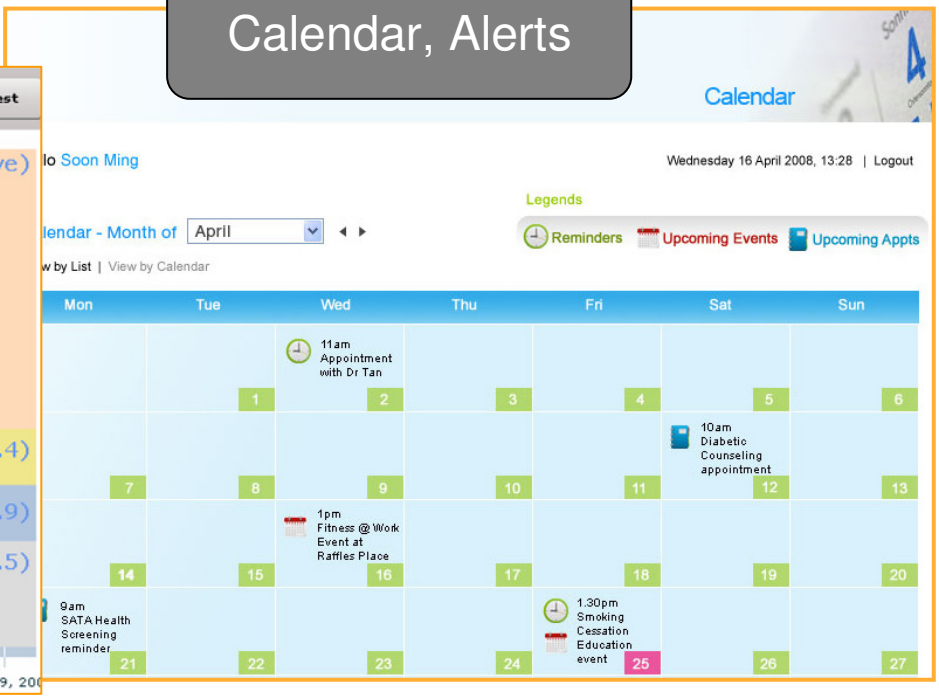
Useful Calculators & Quick Checkups



Powerful 2-way health data tracking



Calendar, Alerts



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