Healthy Ageing Summit
Gerontech and Innovation Expo

Sensors for Home Health Monitoring
BC, Canada

June 16th, 2017

Kendall Ho, MD FRCPC
Lead, Digital Emergency Medicine
Professor, UBC Faculty of Medicine

Digital Emergency Medicine

#4 Breathometer

Which top pitch is a health technology?

Tech-savvy Seniors Want Access to Care Services

3.9 million reaching 65 years old in 2015

2-in-3 want technology to access care from home

Are we ready?

Top 5: What Do Seniors Want?

Self-care tools to manage health needs remotely

Wearables to monitor symptoms and vitals

Online communities for seeking advice from peers

Navigating health needs with help from a patient navigator

Health record tools to access outcome-related data (e.g. labs)

Accenture Survey 2014

#1015.ppl

UK Goes All In on Remote Patient Monitoring

By **Eric Wicklund** on January 25, 2016

The NHS launches seven digital health 'test beds' designed to help millions live at home while accessing real-time care support.

The UK's National Health Service is rolling out seven projects to test mHealth and telehealth technology in **remote patient monitoring**. Officials say the ground-breaking initiative will help millions of Britons live at home while having real-time access to healthcare resources.

Digital Emergency Medicine

LOOKING INTO THE FUTURE OF MHEALTH WEARABLES

By Michael Aiello   On: Digital Trends   Industry: Healthcare
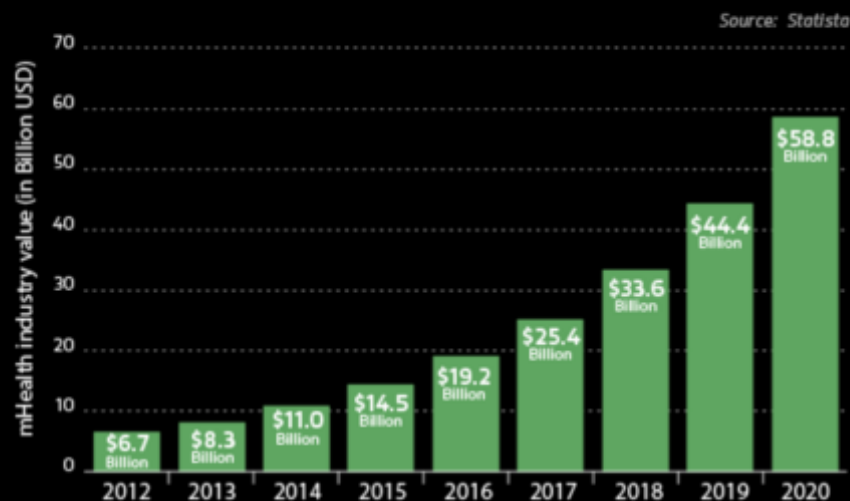
MASSIVE GROWTH EXPECTED BY 2020 IN MHEALTH

DIGITAL TRENDS

We may just be at the tipping point of explosive growth in terms of mHealth wearables. This year companies like FitBit, who expected big gains in 2016, were finishing out 2015 with solid numbers. Moving forward, the entire industry is expected to make huge strides forward.

By 2020 the mobile health industry market size is expected to quadruple from where we are today, bringing in an estimated $58.8 billion. Now is the time to jump on these trends so your company won't get left in the dust.

PROJECTED INDUSTRY MARKET SIZE OF MHEALTH

Source: Statista

mHealth industry value (in Billion USD)

Year	Value
2012	$6.7 Billion
2013	$8.3 Billion
2014	$11.0 Billion
2015	$14.5 Billion
2016	$19.2 Billion
2017	$25.4 Billion
2018	$33.6 Billion
2019	$44.4 Billion
2020	$58.8 Billion

CENTRIC DIGITAL

AGENDA: Sensors in Health

- 4 foundational principles

- Applied in healthcare: BC examples

- Collective call for action

1. Engage

Patient Engagement is the Blockbuster Drug of the Century

Forbes

+ Comment Now   + Follow Comments

Dave Chase

Kaiser study 2009: Coordinated Care <90 days of MI

- 88% reduction in dying of cardiac related cause
- 76% reduction in overall mortality

Digital Emergency Medicine

UBC   a place of mind   THE UNIVERSITY OF BRITISH COLUMBIA   FACULTY OF MEDICINE

2. Quantify Self

66% App Use
- Diet (47%)
- Meds (46%)
- Symptoms (45%)
- Activity (44%)

Makovsky/Kelton

79% wearables
- Symptoms (45%)
- Activity (44%)
- Manage (43%

Makovsky/Kelton

2016

**32%
>=1
health apps**

PwC

Instant Heart Rate – Heart Rate Monitor Free by Azumio

By Azumio Inc.

Open iTunes to buy and download ap

Descr

Just feat

Also no

Azumio
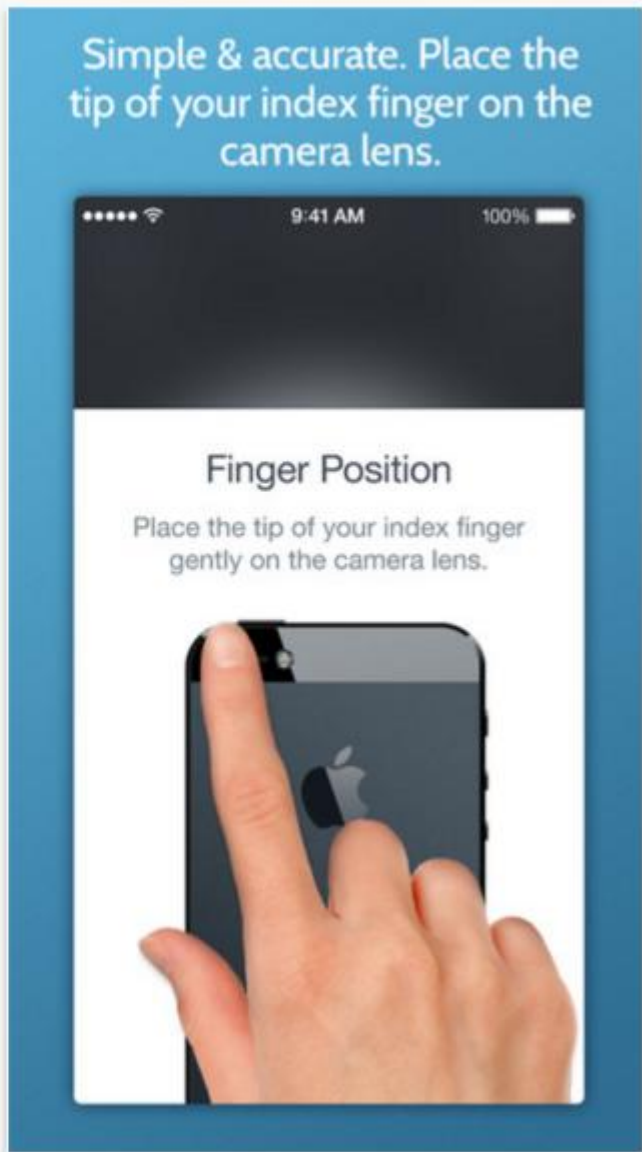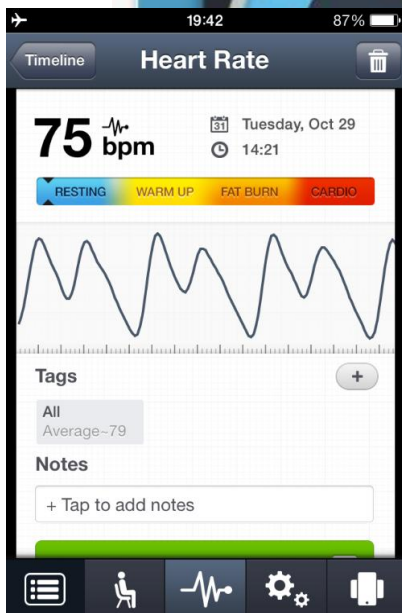
What'

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– perfor

View in iTunes

iPhone Screenshot

Measure your heart rate wherever you are.

Instant Heart Rate *i*

9:41 AM 100%

MEASURING
8s LEFT

08 bpm

Simple & accurate. Place the tip of your index finger on the camera lens.

9:41 AM 100%

Finger Position

Place the tip of your index finger gently on the camera lens.

MEASURING
4s LEFT

03 BPM

Help HR Zones Measure Timeline Settings

19:42 87%

Timeline **Heart Rate**

75 bpm

Tuesday, Oct 29
14:21

RESTING WARM UP FAT BURN CARDIO

Tags +

All
Average~79

Notes

+ Tap to add notes

Medisafe Medication Reminder and Pill Organizer

By MediSafe Inc.

Open iTunes to buy and download apps.

View in iTunes

Manage your medications

Don't let them manage you

Dan   9:41 AM   100%

Never miss a pill again

We've got your back

Cancel   9:41 AM   100%

It's time to take your meds!
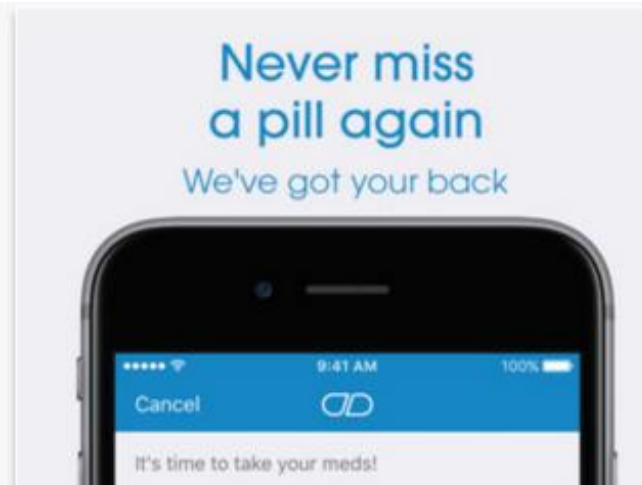
Your **Personal Nudge**

Whether you use an Android device, iPhone, or iWatch, you can relax knowing you're in control..

MEDISAFE   4:11

It's meds time
4:18PM

Tradjenta

Take All

Pill Box   Updates   Report   Med Cabinet

Sensors in Evolution

QuardioCore
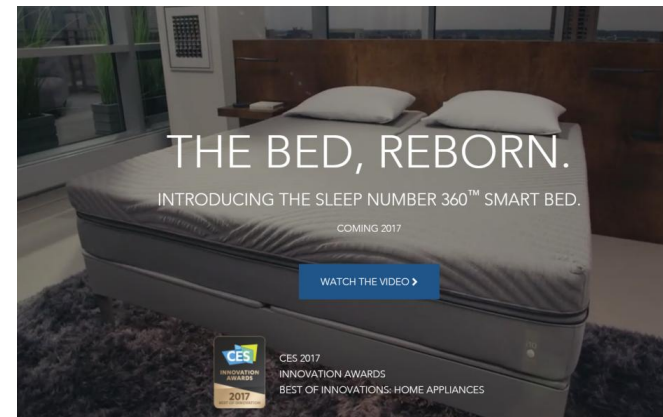
360 Smart Bed

Dispatch from QS Dublin: Results from a QS Community Survey

Posted on February 28, 2017 by Steven Jonas

- A wide range of tools being used – from fitness trackers to phone apps to pen & paper.
- Motivations for self-tracking included fitness goals, to tackling chronic diseases to self-knowledge & curiosity.
- People found that the process of self-tracking was very useful for motivating behaviour change.
- People found that once they started tracking biometrics, they didn't stop once it became a habit.
- People are not too concerned about the confidentiality of the data.
- Overall people are happy with the tools we have.

QS Quantified Self
self knowledge through numbers

Some charts from the survey:
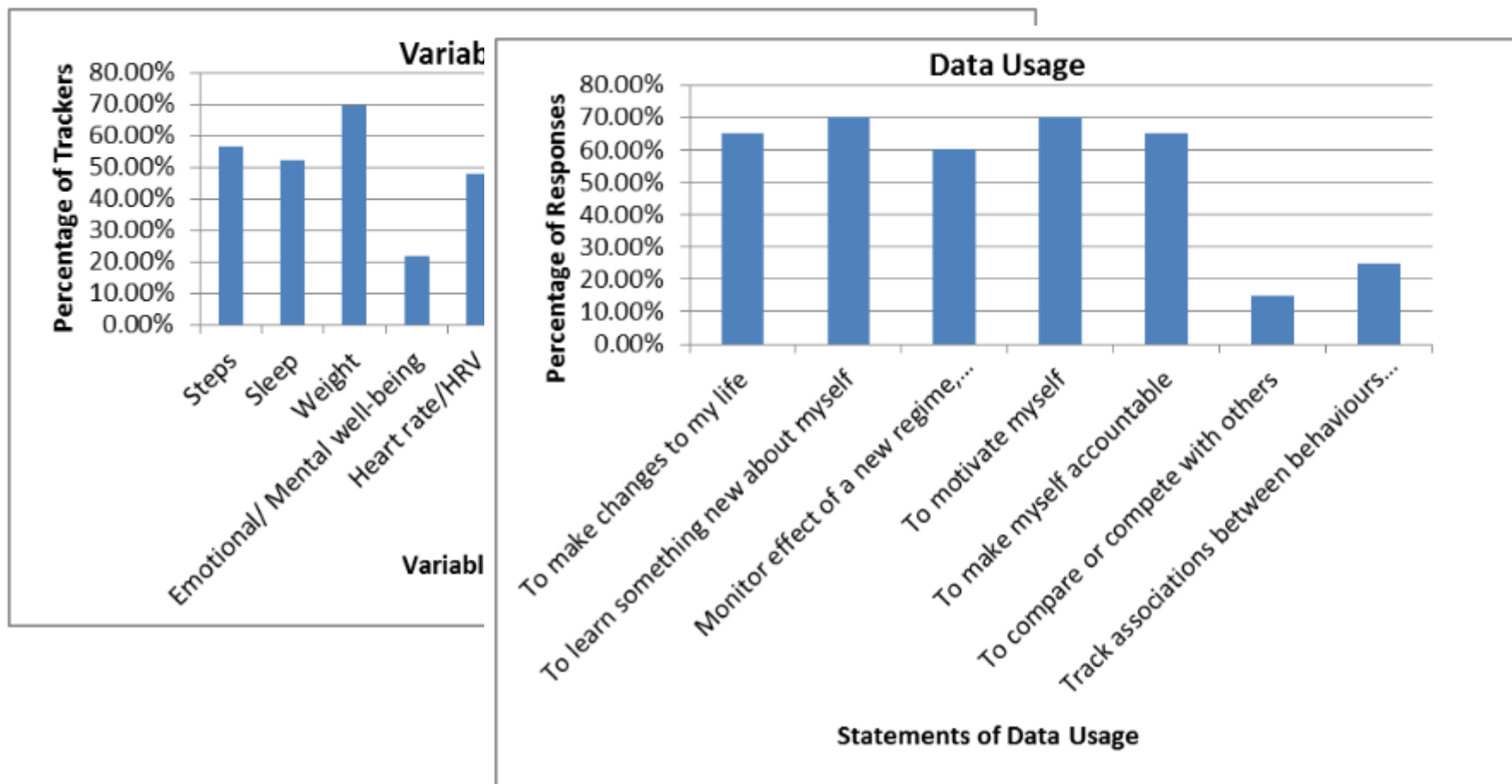
3. Social

Figure 2.4: CureTogether's Page on Chronic Fatigue Syndrome
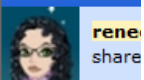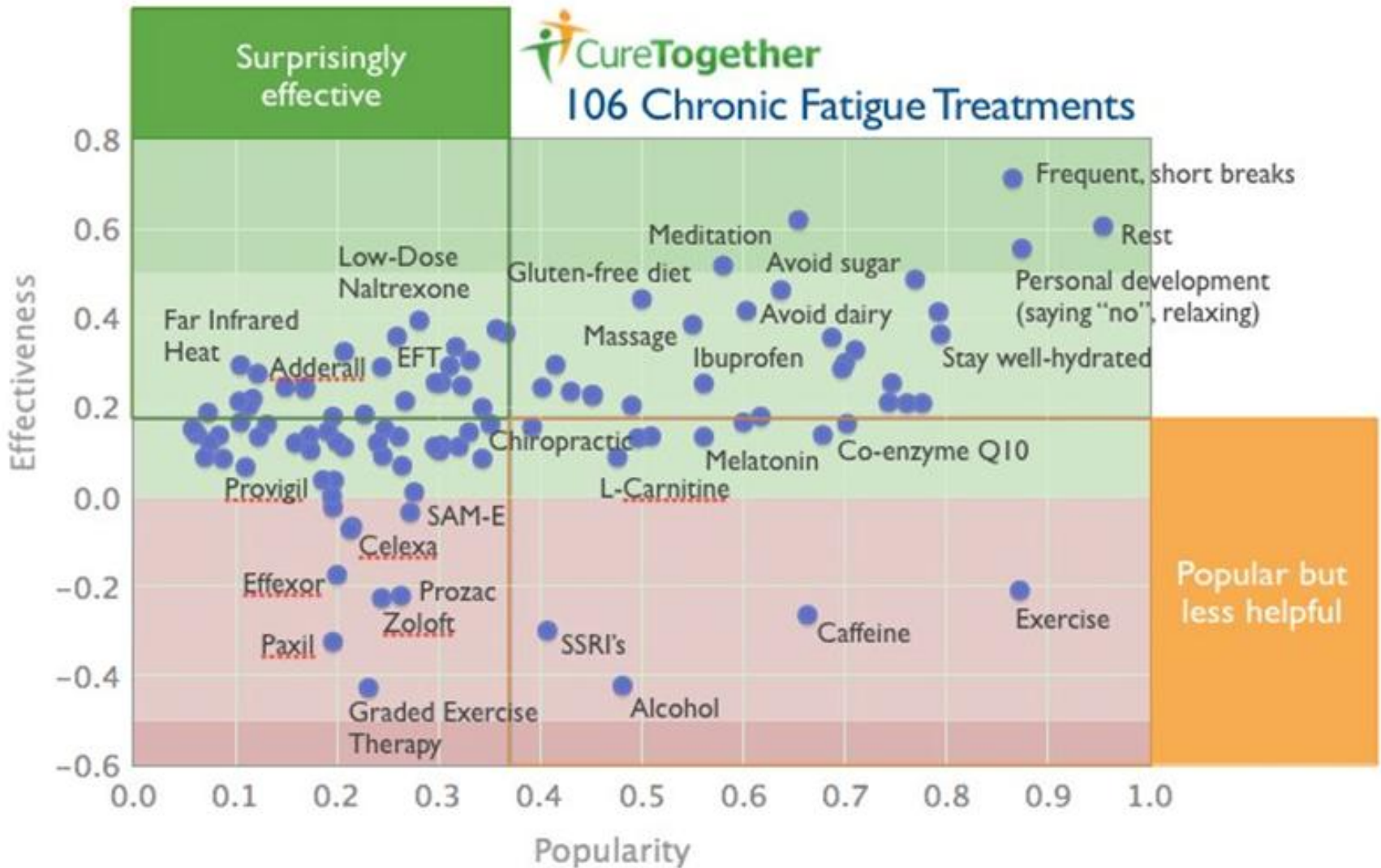
4. Behavioural Change

Quantified Self

Social Sharing

Wearables

Self Monitoring

Behaviour Modification

Self Evaluation

Bandura 1986
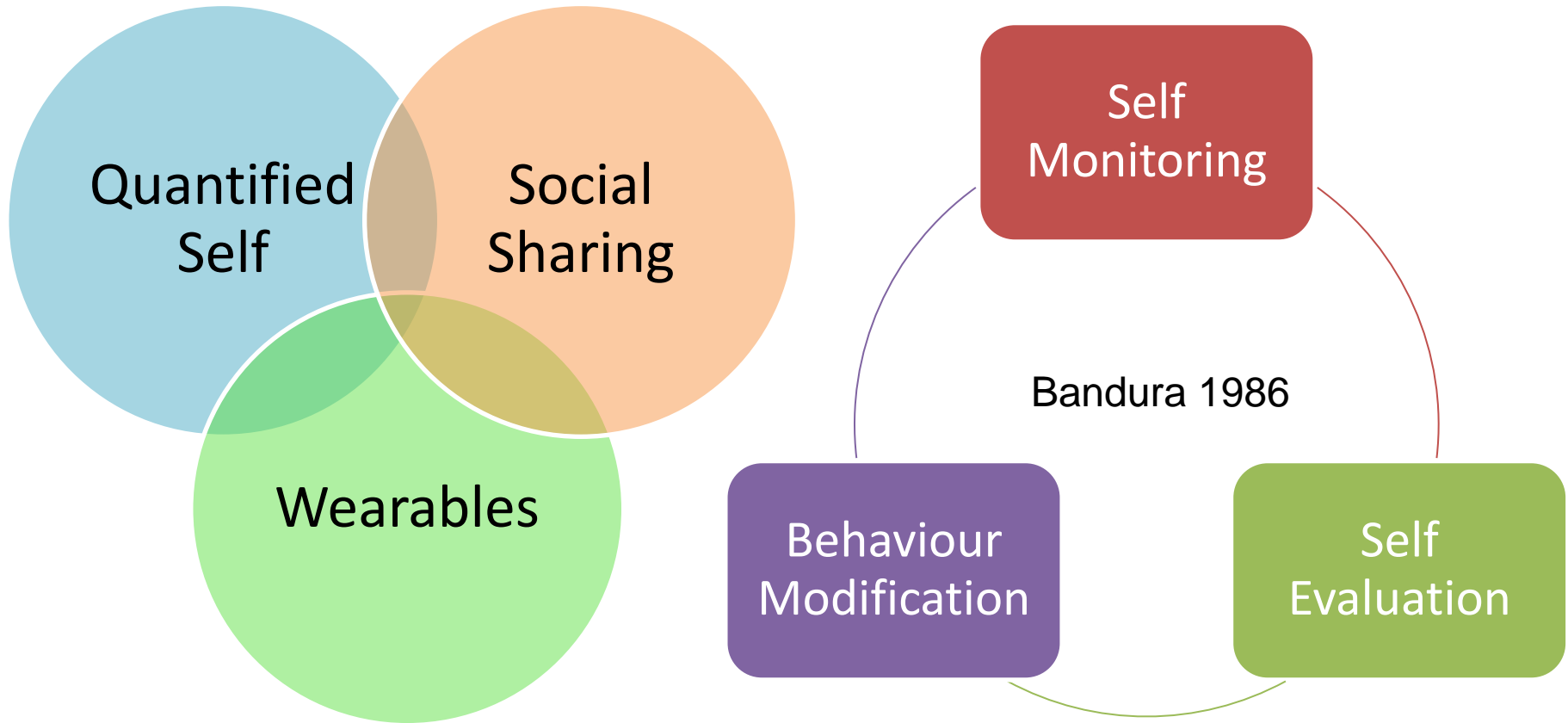
4. Behavioural Change

Bort-Roig et al 2014

- Physical activity profiles
- Goal setting
- Real-time feedback
- Social support network
- Online expert
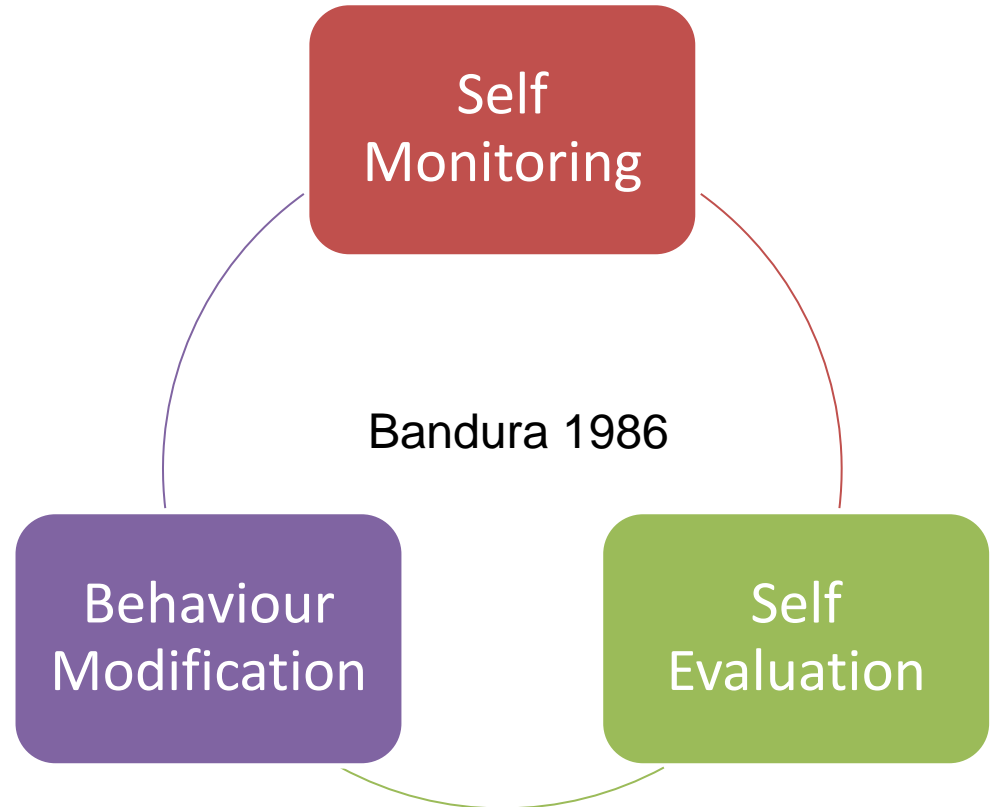
Self Monitoring

Behaviour Modification

Self Evaluation

Bandura 1986

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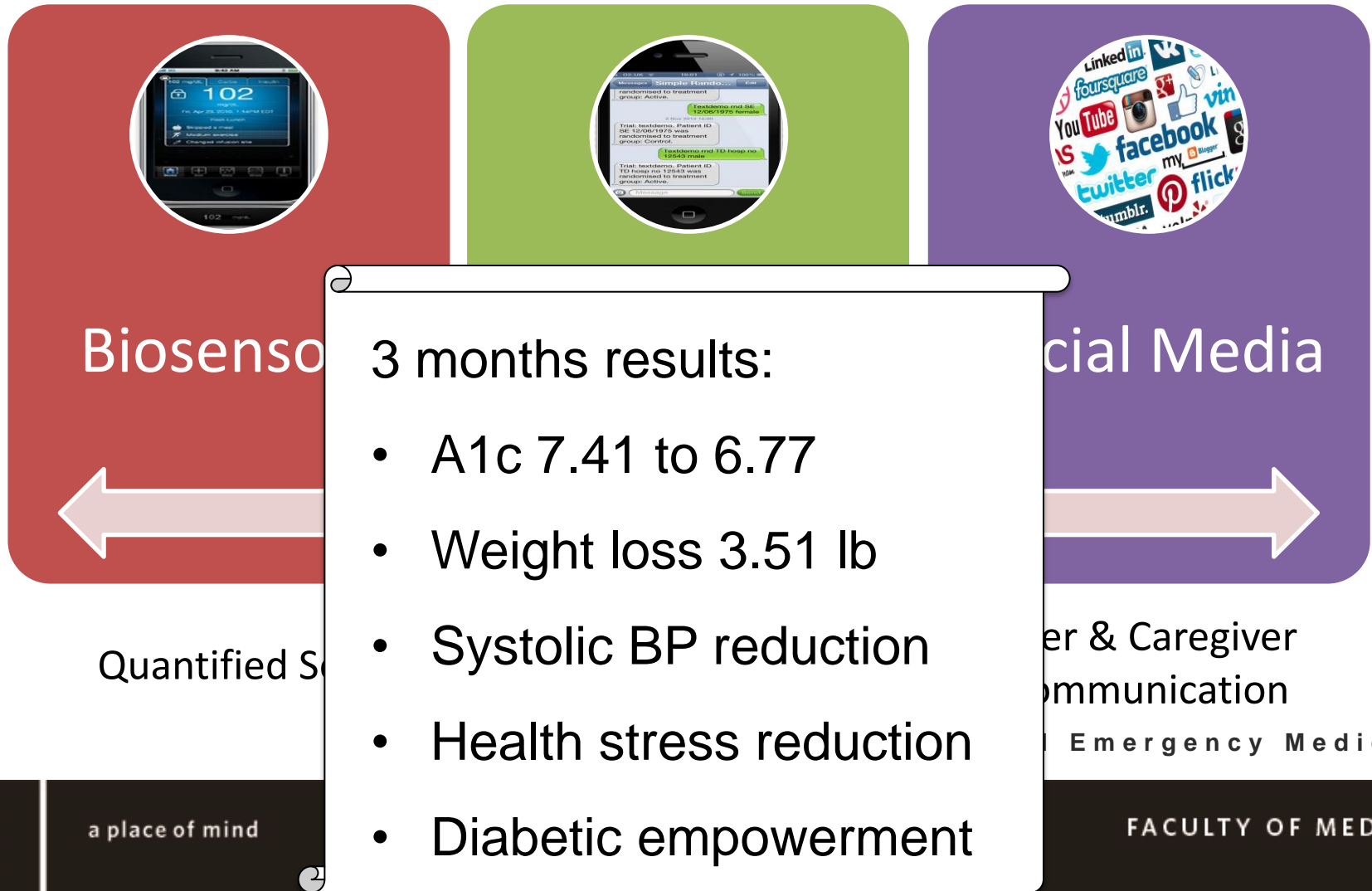
- Collective call for action

Digital Emergency Medicine

Mobile Digital Access to Wireless Network (mDAWN)

Biosensocial Media

Quantified Ser & Caregiver
ommunication

Emergency Medicine

3 months results:

- A1c 7.41 to 6.77

- Weight loss 3.51 lb

- Systolic BP reduction

- Health stress reduction

- Diabetic empowerment

mDAWN : Participant comments

"I think it was a great experience…I really like the idea of people connecting with one another...I think that's a key piece and if people can connect in that way it's very supportive and this is an illness where you can really work with depression a lot and to have those other connections I think is really important."

"[What I will take away from the program] was knowledge and the incentive just to keep going, not to let losses…pull you down, that you've got to get up and above that and even reading some of the other comments that were there, you could see the honesty and sincerity that was coming through and that has…an impact on me too."

Seniors with Chronic Diseases: Health System Priorities in B.C.

Individuals:
- Complexity/information
- Confidence
- Immunity
- Isolation (80%)

Health System:
- ED/Hospitalization
- Continuity of Care
- Health record

Case in Point: Heart Failure

Frequent hospitalizations

High admission rates (80%)

Long hospital stay (11 days)

High readmission rates (1 & 3 months)

Costly per admission (VCH $13,000 CAD)

Can prevent ED visits if well managed

BC, Canada vs Guangdong, PR China:
- 5x size (944K km2 vs 180K km2)
- 1/25 population (4.6 M vs 108.5M)

Acute-Community Interface

Hospital

Home

TRANSITION: HF patients from hospitals to home

Key Objectives: "Applied innovation"

- Clinical: Demonstrate improved outcome

- Policy: Scale up and spread in health service delivery

- Commercialization: judicious technology integration

TEC4Home Healthcare Innovation Community*

TEC4H⊕me
Telehealth for Emergency-Community Continuity of Care Connectivity via Home Tele-monitoring

"This is the best I have felt in 2 years."

"this is the longest I have stayed out of hospital"

"I may not let Telus in the door to collect the equipment" (joking)

"people who have not seen me for a while tell me 'What a difference'" and "even your voice is stronger"

Outcome Evaluation

Home monitoring HF patients **recovering from ED/hospitalization**:

- Reduction/avoidance of <u>90 day ED revisits</u> and/or hospital admissions

- Improved care coordination: <u>acu</u>_____s

- Enhanced <u>patient experience</u> in

- Improve <u>patient outcomes</u>

- Cost savings: ED/hospital <u>bed da</u>

End user experience

Cost effectiveness

Health outcome

Triple Aim
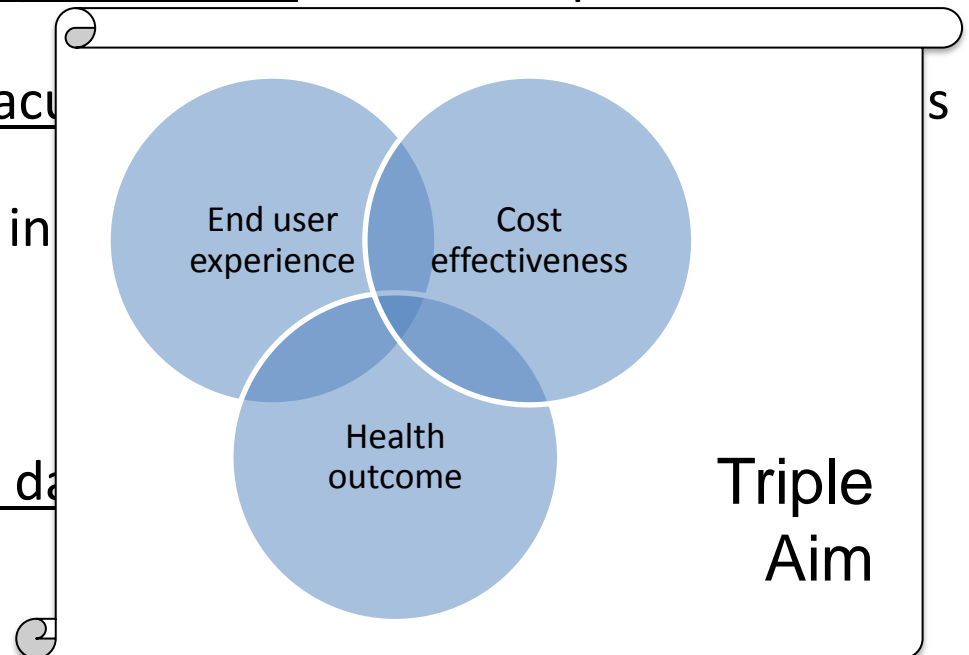
Moving Forward: Sensors in Healthcare

TEC4Home HF Provincial Collaboration 2018
- From 3 to 30 communities in BC
- January 2018 - June 2019

TEC4Home COPD implementation
- Canada Health Infoway & MOH
- June 2017-March 2018

International cooperation: Digital Patient Journey
- Europe Eureka: 2017-2021
- Asia Pacific?
- Next Generation sensors in clinical use

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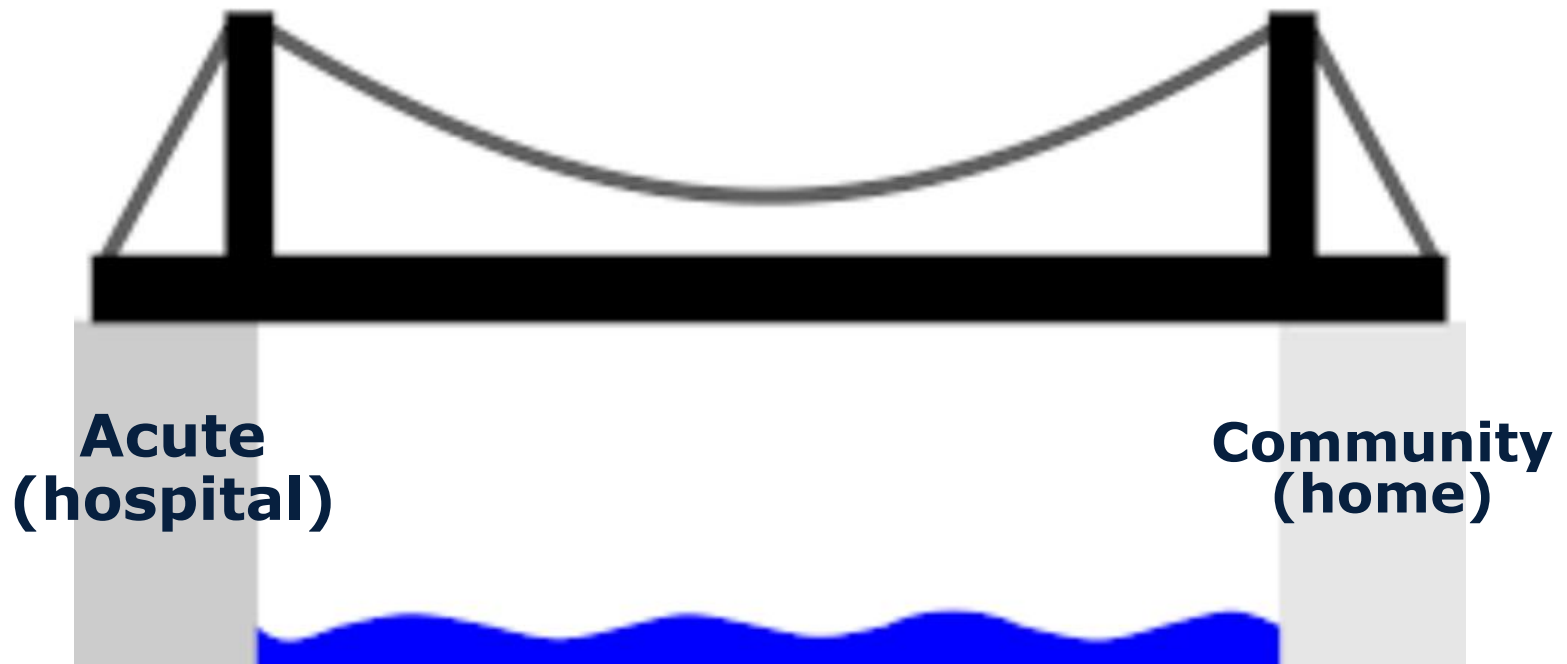
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Digital Emergency Medicine

Digital Emergency Medicine

Acute (hospital)

Community (home)
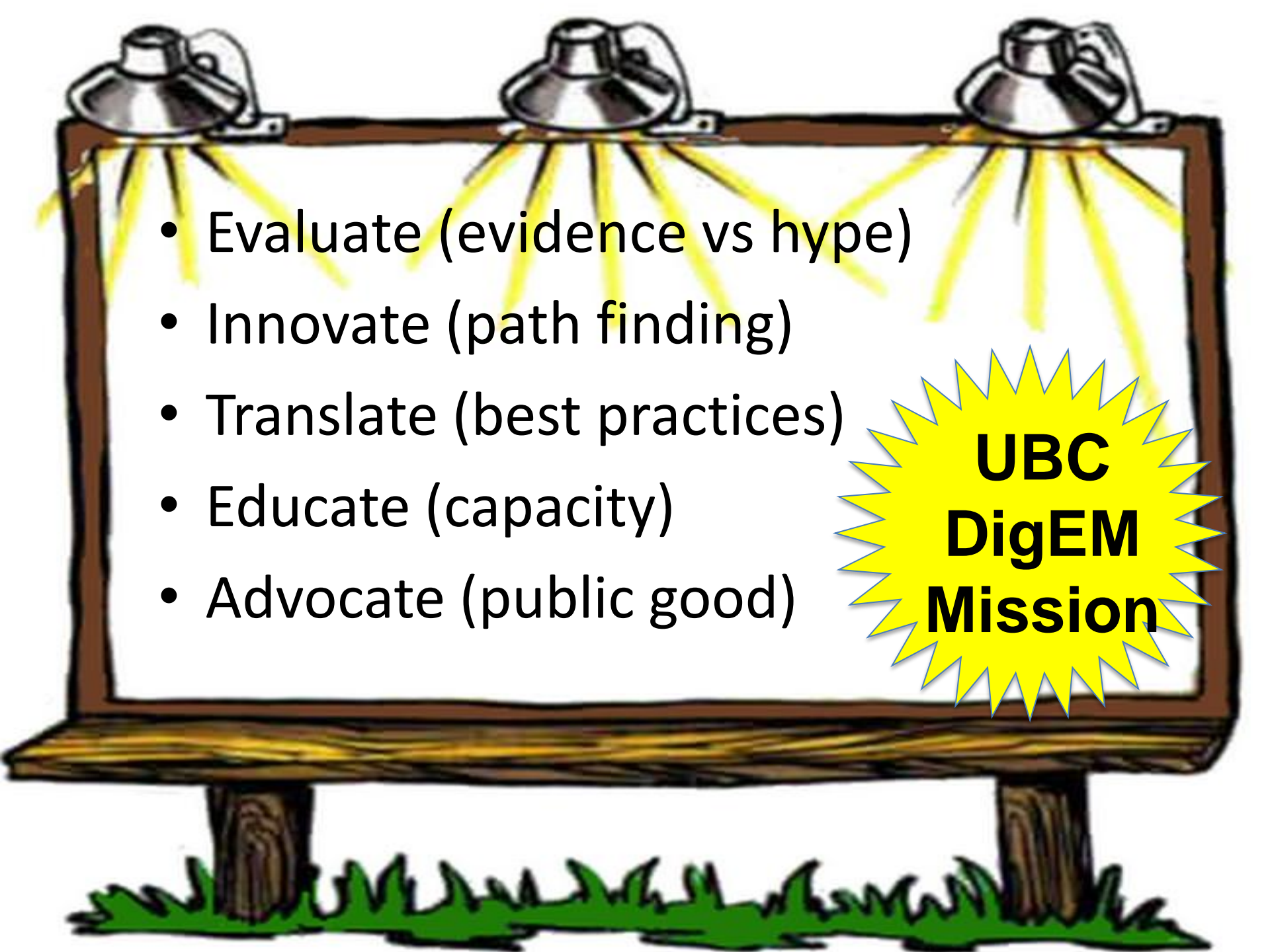
Calling for Partnership: Complementary Roles

Health Professionals: "Best technologies for my patients?"

Governments: "Most cost-effective and safe?"

Patients: "Contribute my lived experience?"

Companies: "Creating useful technologies & commercialize?"

Researchers: "What's the evidence?"

Digital Emergency Medicine

Hi touch

Hi tech

What would <u>you</u> do with and for <u>our patients</u> in digital health?

EQUALITY

EQUITY

THANK YOU VERY MUCH!

From

TEC4Home Healthcare Innovation Community

www.digem.med.ubc.ca (Projects; TEC4Home)

Let's build a community for digital health at UBC!

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www.youtube.com/   "UBC digem"

www.emergency.med.ubc.ca "Digital EM"