# DESIGNING FOR HEALTH IMPACT IN A DIGITAL WORLD

## TAMSIN GREULICH-SMITH
## CHIEF, SMART HEALTH LEADERSHIP CENTRE

**22 August 2019**

OVER
**5,500** GRADUATE ALUMNI

OFFERING OVER
**120** ENTERPRISE IT, INNOVATION & LEADERSHIP PROGRAMMES

TRAINING OVER
**120,000** DIGITAL LEADERS & PROFESSIONALS

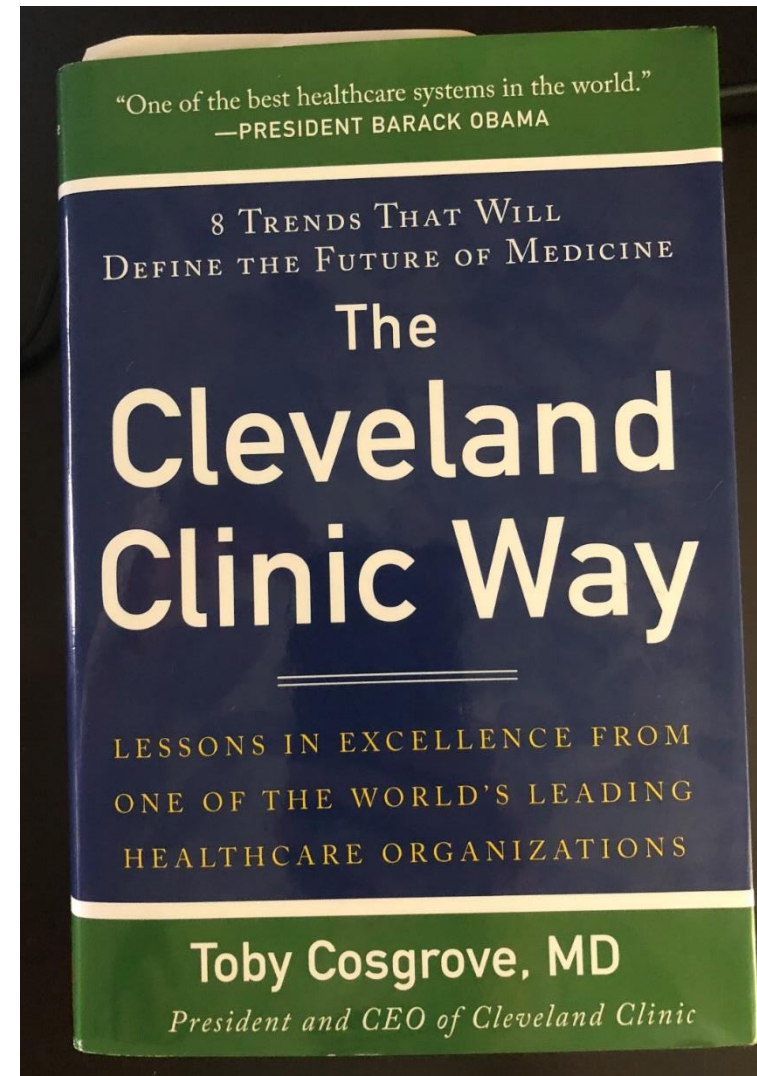# NUS-ISS Smart Health Leadership Centre

**DISCOVER**

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Toolkits
Blogs & News

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Executive Courses &
Master of Technology

Customised Training Programmes

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Seminars & Events

**SMART HEALTH LEADERSHIP CENTRE**

**COLLABORATE**

Community of Practice

Consultancy

Collaborative Projects & Partners

Student Placements

## Vision

To transform the future experience of health through data, technology and design
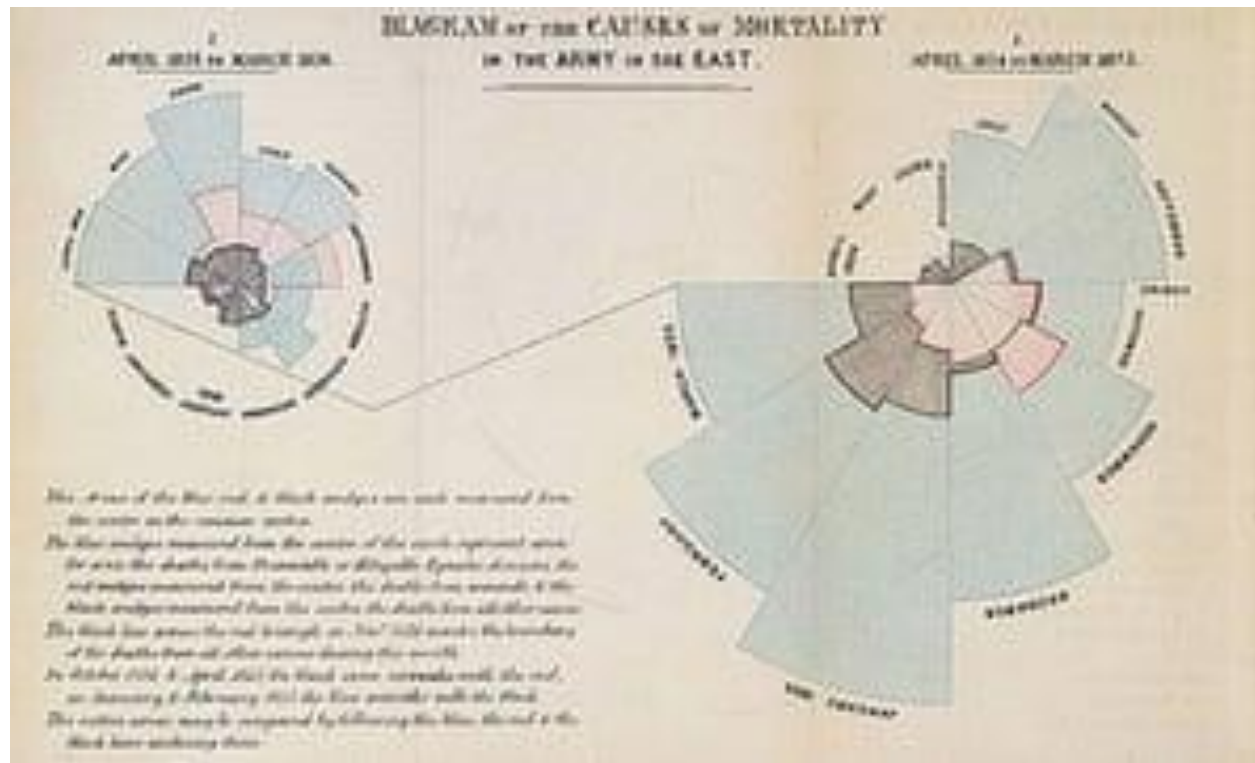
*"a century ago...most doctors...couldn't offer sick patients many treatments that actually worked.*

*What they could offer was reassurance, comfort, communication and empathy"*



"One of the best healthcare systems in the world."
—PRESIDENT BARACK OBAMA

8 TRENDS THAT WILL
DEFINE THE FUTURE OF MEDICINE

The
Cleveland
Clinic Way

LESSONS IN EXCELLENCE FROM
ONE OF THE WORLD'S LEADING
HEALTHCARE ORGANIZATIONS

Toby Cosgrove, MD
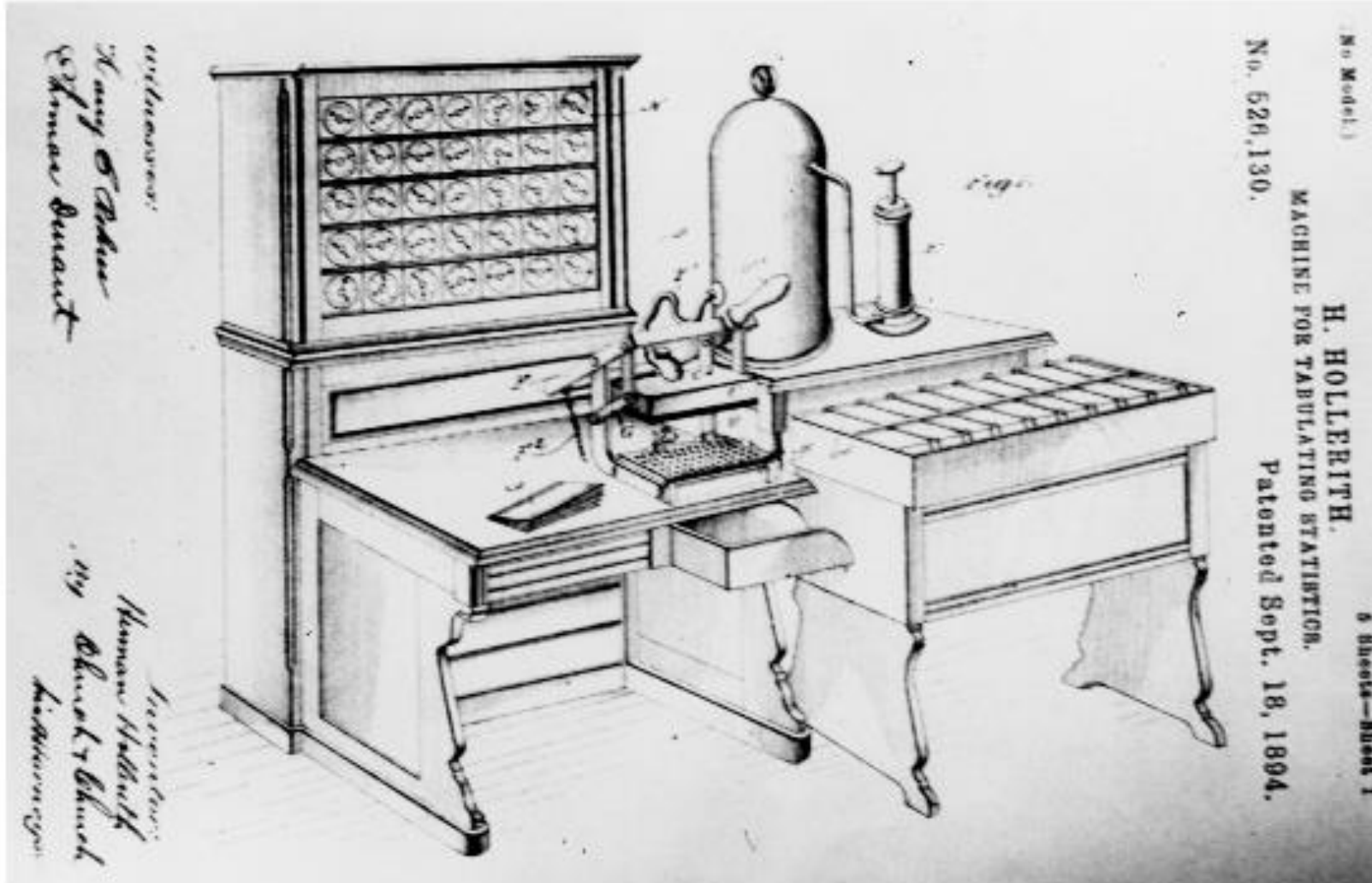President and CEO of Cleveland Clinic

We focused more on patient experience when we had fewer solutions to improve health outcomes
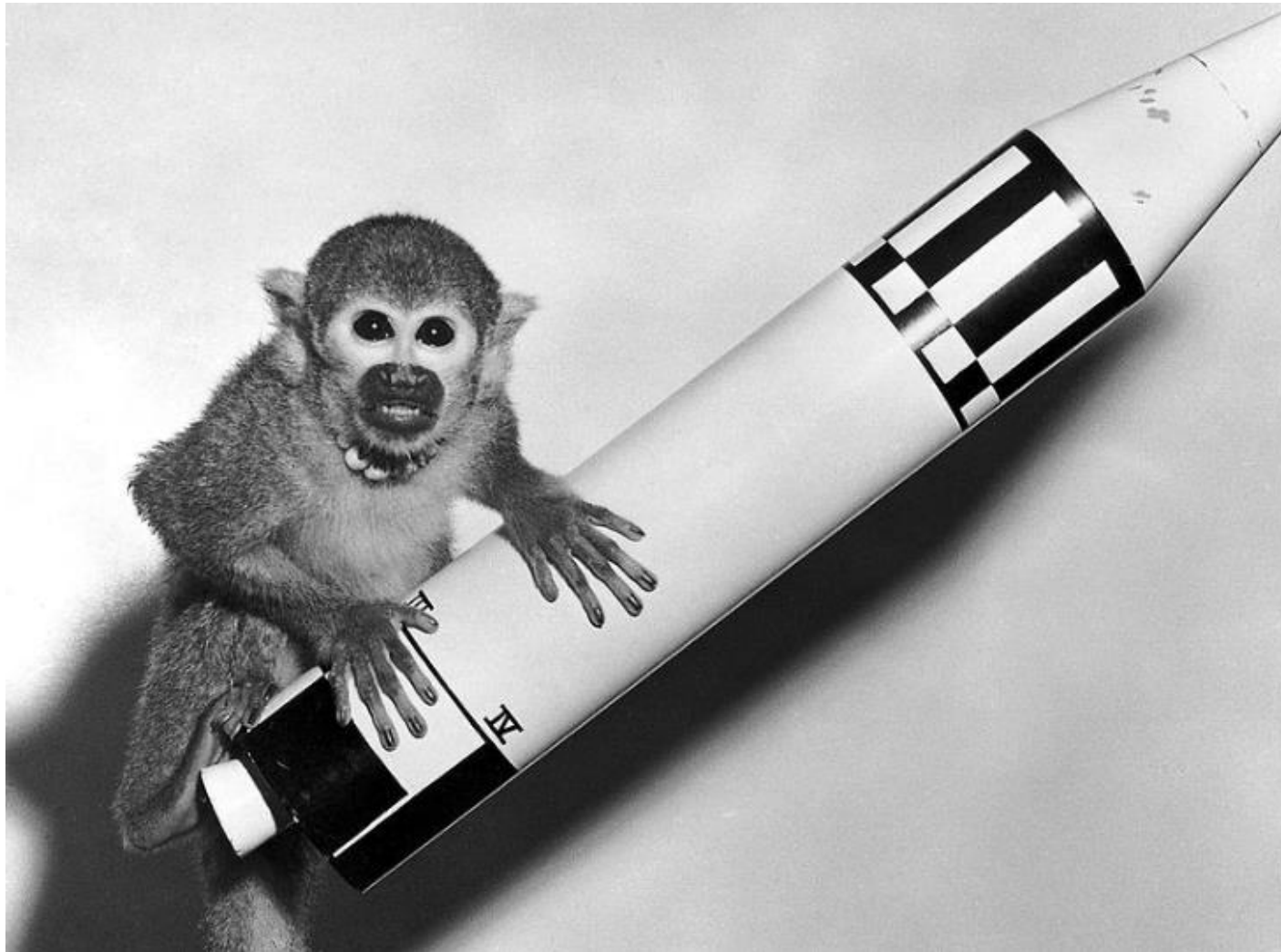
The role of data and technology in medicine has become increasingly integral to healthcare

In **1858** Florence Nightgale's data visualisations established the facts behind Crimean War army death rates

In 1896 Baltimore's Department of Health uses Herman Hollerith's tabulating system for recording vital statistics

NASA was exploring remote healthcare for astronauts from the 1940s & telesurgery from the 1970s
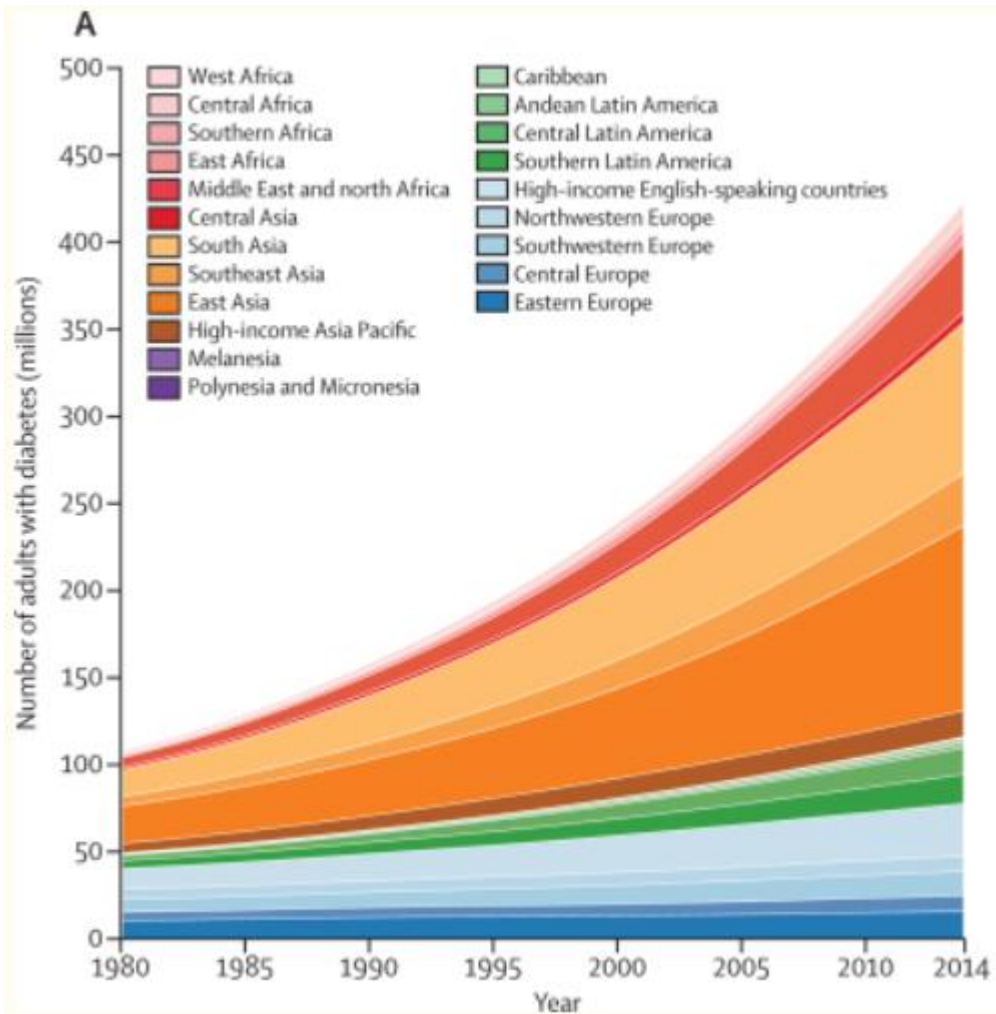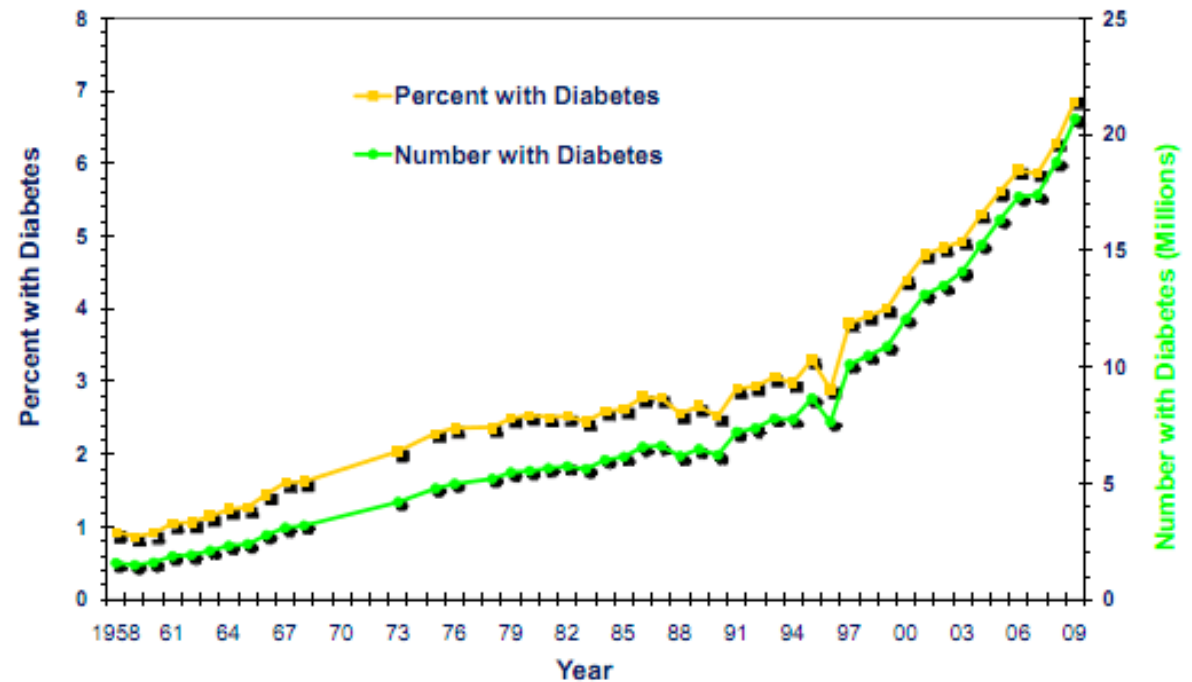
SIEMENS-ELEMA
1958

First artificial pacemaker is installed

# 1985: PUMA 560 - 1st surgical robot



Credit: Roger Ressmeyer/CORBIS

The growth of technology and data-enabled solutions in healthcare didn't keep pace with evolving needs

Number and Percentage of U.S. Population with Diagnosed Diabetes, 1958-2009

Graph source: Long-term Trends in Diabetes, CDC, October 2010

# Today's healthcare system

| | 2009 % | 2017 % |
|---|---|---|
| Three or more chronic health conditions: | 20 | 37 |
| High blood pressure | 74 | 72 |
| Diabetes | 22 | 25 |
| Cataract | 19 | 31 |
| Joint pain, arthritis, rheumatism or nerve pain | 31 | 29 |
| Obesity | 8 | 9 |
| Difficulty with three or more activities of daily living | 3.5 | 5 |

## Increasing complexity of care – multiple chronic conditions

**The proportion of older adults with three or more chronic diseases nearly doubled from 2009 to 2017, a local study has found.**

**More Singaporeans aged 60 and above are also having difficulty carrying out activities of daily living.**

Ref: Transitions in Health, Employment, Social Engagement and Intergenerational Transfers in Singapore Study, Duke-NUS Medical School's Centre for Ageing Research and Education, and the Ministry of Health. From The Straits Times, 8th May, 2019

# Today's healthcare system

## LIFE EXPECTANCY AT BIRTH

(Years)

**Total**
- 2018: 83.2
- 2008: 80.9

**Males**
- 2018: 81.0
- 2008: 78.4

**Females**
- 2018: 85.4
- 2008: 83.3
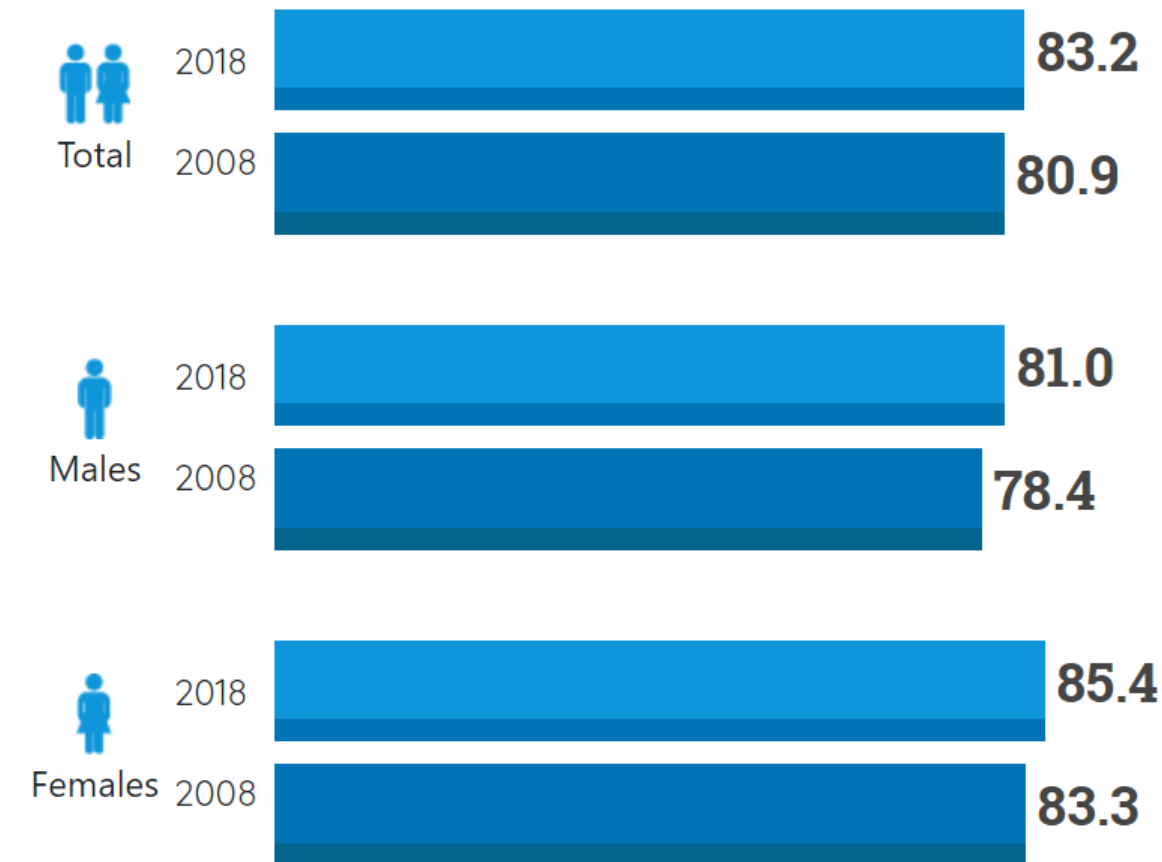
Aging population:

By 2030, a quarter of Singaporeans will be over 65 years of age

Consumption of healthcare increases with age

# Today's healthcare system

Manpower shortage – insufficient nurses and doctors

## Tackling future healthcare needs

### SINGAPORE'S HEALTHCARE WORKFORCE AND FACILITIES IN 2015

| | | | | Primary care | Acute care | Community care | | 2015 HEALTHCARE BUDGET |
|---|---|---|---|---|---|---|---|---|
| 39,000 Nurses | 12,000 Doctors | 10,000 Ancillary staff | 9,000 Support care staff | 18 Polyclinics | 8 Speciality centres | 72 Nursing homes | 57 Day care centres | $8.9 billion |
| 9,000 Administrative staff | 7,000 Allied health professionals | 3,000 Pharmacists | 2,000 Dentists | 2,973 GP and dental clinics | 18 Public and private hospitals | 7 Community hospitals | 53 Home care providers | |

### PROJECTED GROWTH IN HEALTHCARE JOBS AND FACILITIES FROM 2015 TO 2020

| 30,000 Additional healthcare workers | Primary care | Acute care | Community care | |
|---|---|---|---|---|
| | 6 New polyclinics | 2,100 Additional beds in public hospitals | 9,100 Additional beds in community hospitals and nursing homes | 7,600 Additional places in day care, home care and palliative care |
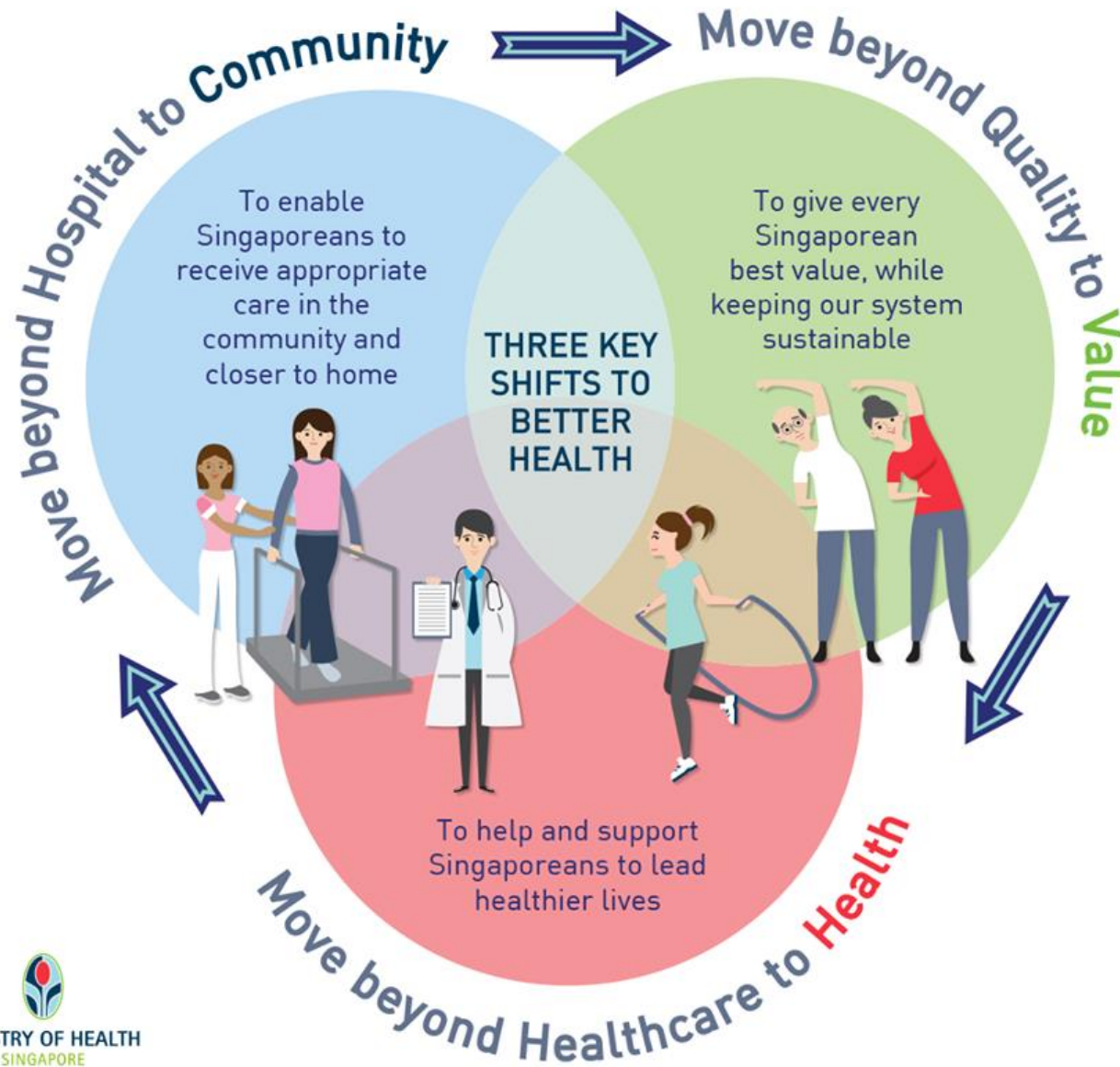
Trying to meet demands with new approaches – where does technology and patient experience fit in?

# Citizen expectations have changed
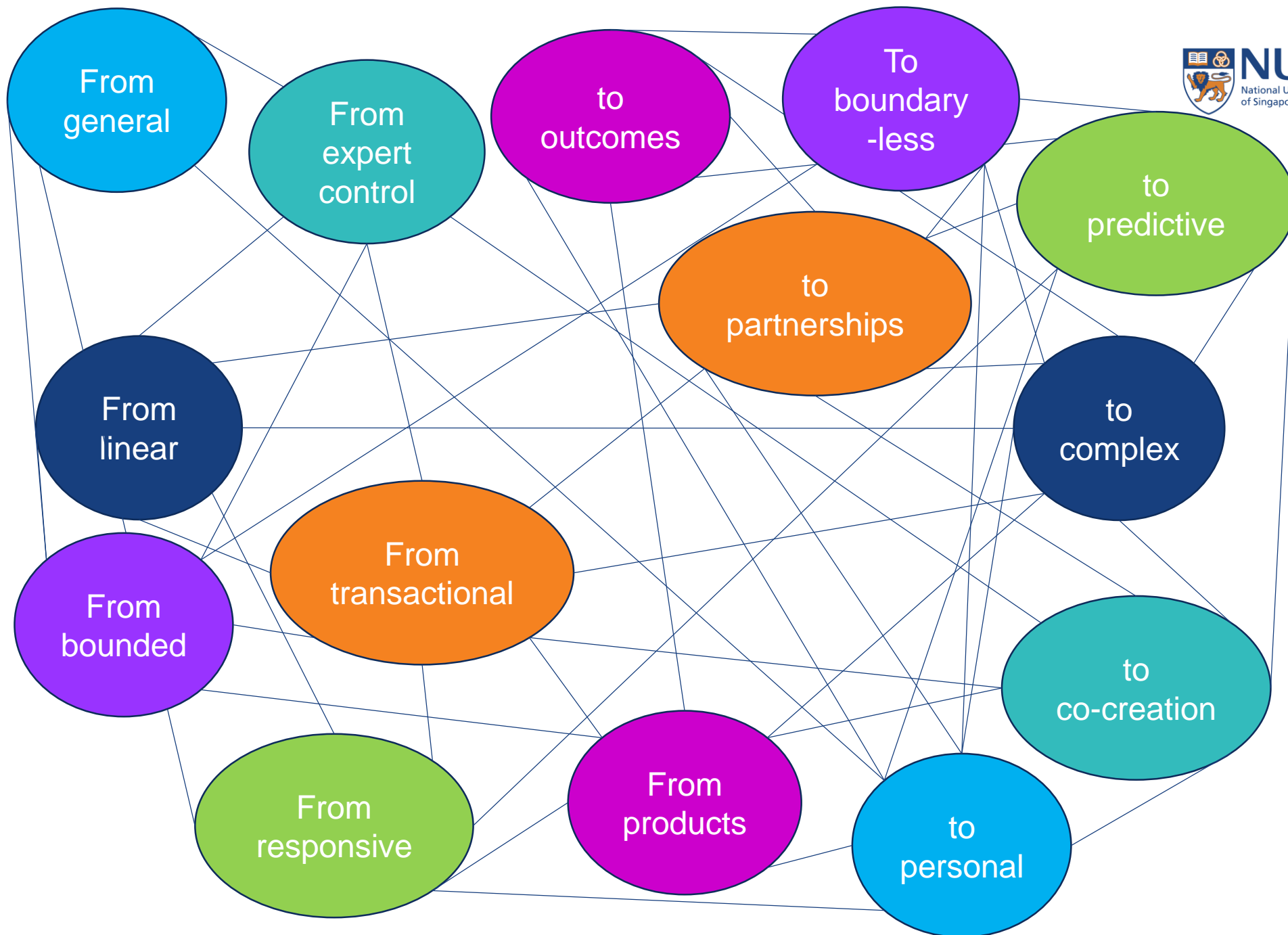
# Digital citizen expectations

I want **instant access**

I want **simplicity**

I want **transparency**

I want to **understand**

I want **choice**

I want to **make decisions**

I want **trust**

I want to be **empowered**

I want to **feel valued**

# Patient expectations?

The highest standards of clinical excellence?

Strong track records in patient safety?

Continuous improvement?

# Patient expectations?

They want to be able to **take these things for granted**:

- Clinical excellence
- Patient safety
- Continuous improvement

These are **behind the scenes** challenges for healthcare providers to address.

" I'VE LEARNED THAT PEOPLE WILL FORGET
WHAT YOU SAID, PEOPLE WILL FORGET WHAT
YOU DID, BUT PEOPLE WILL NEVER FORGET
HOW YOU MADE THEM FEEL. "

-Maya Angelou

# Living the Patient Experience

Here's the thing about healthcare – when we need it, we are vulnerable

We want human care

Empathy makes all the difference

And we remember experiences as a whole rather than singular interactions
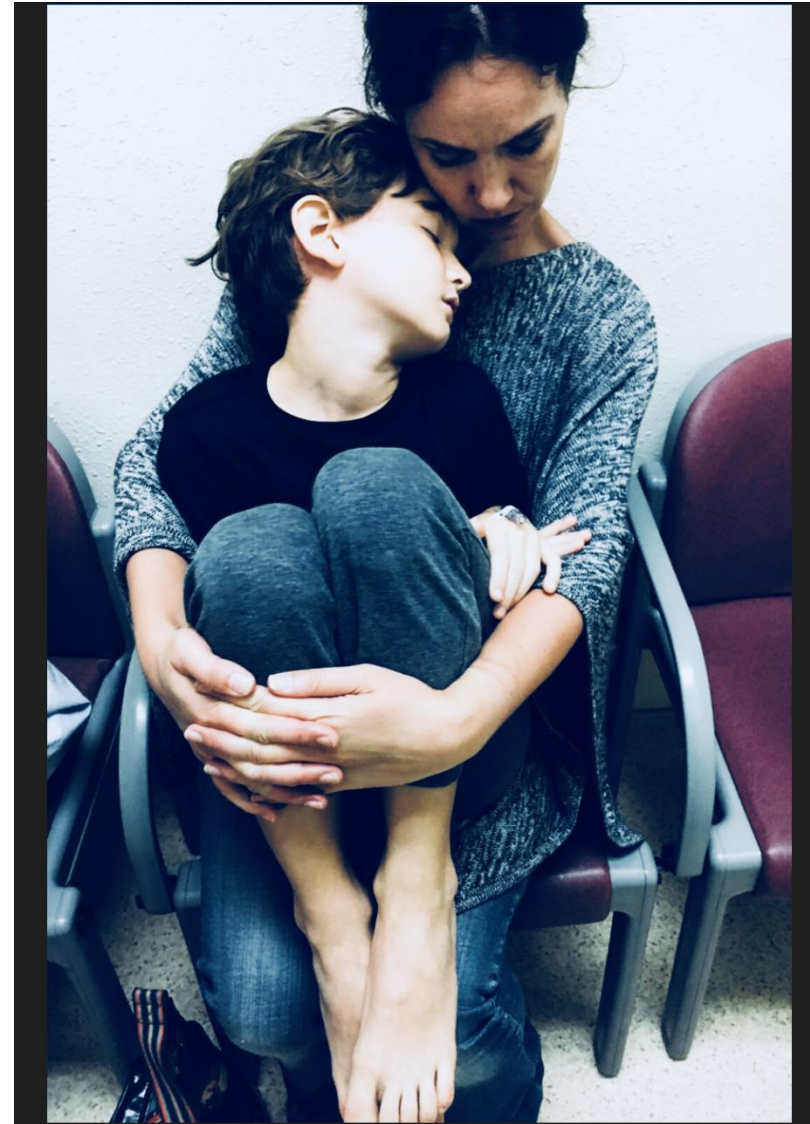
# "Kevin Speaks"

*our purpose comes from those we serve*

Kevin says care is best when:

*"They tell you what is going on right away"*

*"You get the same answer from everyone"*

*"They don't make you scared."*

Donald M. Berwick

**Escape Fire**

*Designs for the Future of Health Care*

Collected Speeches, 1992–2002
The Institute for Healthcare Improvement's
National Forum on Quality Improvement in Health Care
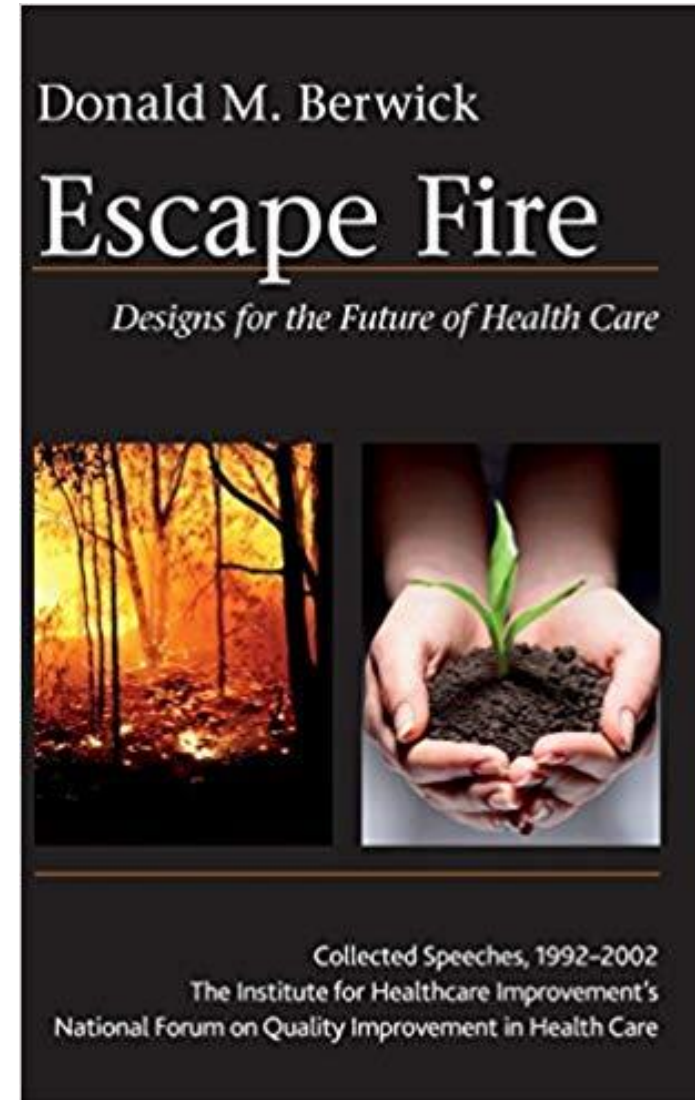
# The medical residents said..

"that's unrealistic"

"we're so busy!"

*"doesn't he know he'll have to wait?"*

# What else do patients want?

Patients are concerned about the **emotional aspects of** experience, not just the clinical:

- Be there for me
- Make it easy for me
- Listen to me
- Respect me
- Understand me
- Remember me
- Explain to me
- Reassure me
- Care for me
- Heal me

# Digital consumer expectations Versus PX expectations

I want **instant access** "be there for *me - wherever, whenever*"

I want **simplicity** "*make it easy for me*"

I want **transparency** "be honest with me"

I want to **understand** "*explain to me*"

I want **choice** "trust *me*"

I want to **make decisions** "*listen to me*"

I want **trust** "*understand me*"

I want to be **empowered** "*remember me*"

I want to **feel valued** "*respect me*"

**+** "*reassure me*"

**++** "*care for me*"

**+++** "*heal me*"

"Over and over and over again, the drivers of exceptional experiences are **the moments with the doctors and the nurses**. There's still something sacred about that moment.

"So how we're training, how we're teeing up, how we're using technology to extend and support that relationship is how we should be placing our bets."



Cleveland Clinic Chief Experience Officer Adrienne Boissy

# But is patient experience simply about meeting the emotional expectations of patients?

Move beyond Hospital to Community

Move beyond Quality to Value

Move beyond Healthcare to Health

THREE KEY SHIFTS TO BETTER HEALTH

To enable Singaporeans to receive appropriate care in the community and closer to home

To give every Singaporean best value, while keeping our system sustainable

To help and support Singaporeans to lead healthier lives
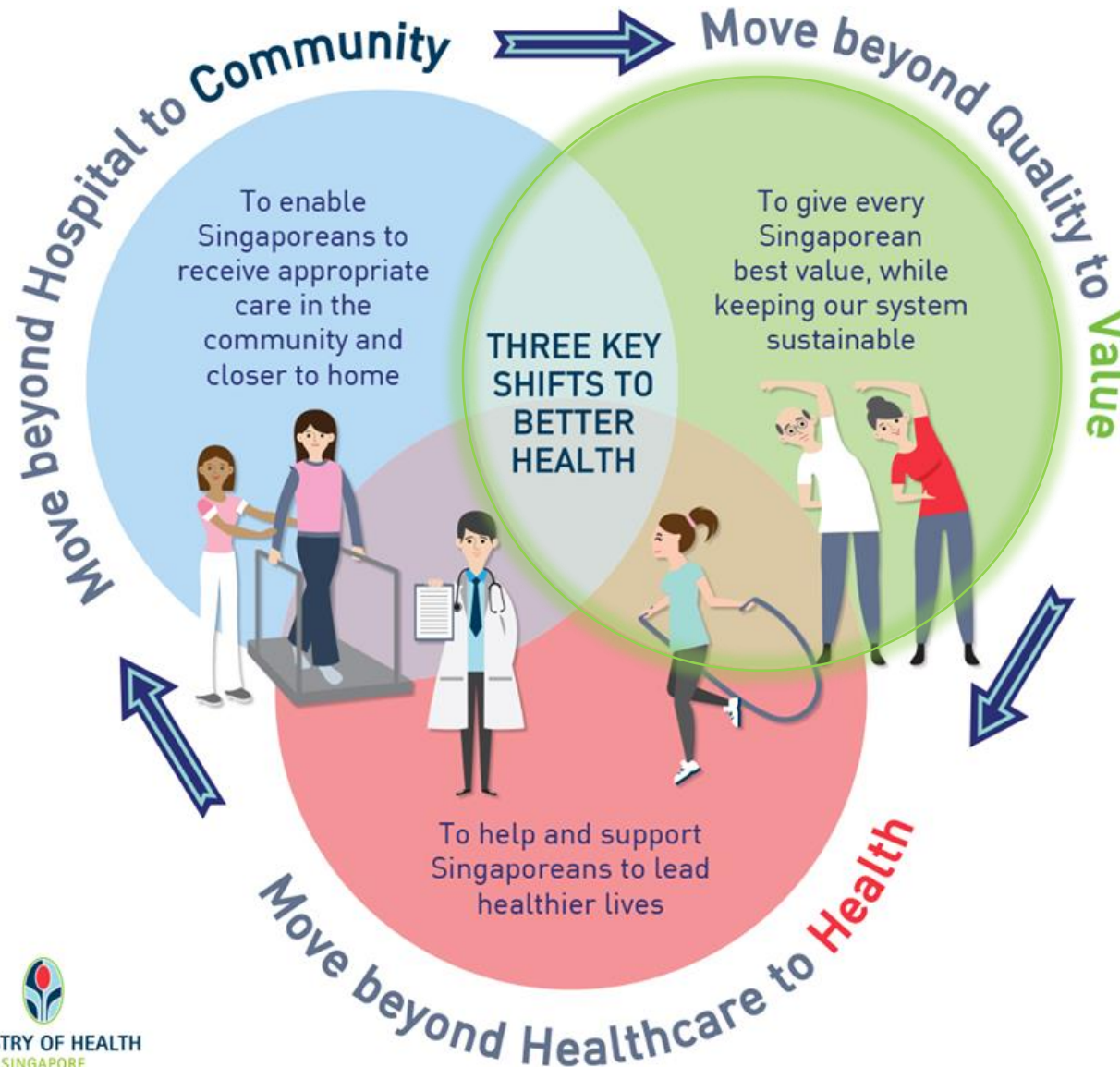
Can PX and technology come together to help us solve our healthcare challenges?

MOXI: Do nurses need to be human?

# Freeing up nursing time to care

- Moxi has reduced the cognitive load of nurses – the robot has learned what is needed and does it without being told

- This required 150 hours of ethnographic research to inform design requirements

- Plus further testing and iteration once piloted

- Resulting in 30% of non-clinical nursing tasks being freed up, for nurses to spend more time with patients

# PX impacts

- Key to success was the design of non-threatening behaviour in Moxi
  - It moves in human ways, even though it need not
  - Its scale has been reduced to be less intimidating
- Patients became fascinated so designers integrated superfluous activities into Moxi's behaviour, and between tasks it performs social activities which have been found to have positive impacts in patients

# Even the sceptics fell in ❤

I want to **feel valued:**

*"respect me"*
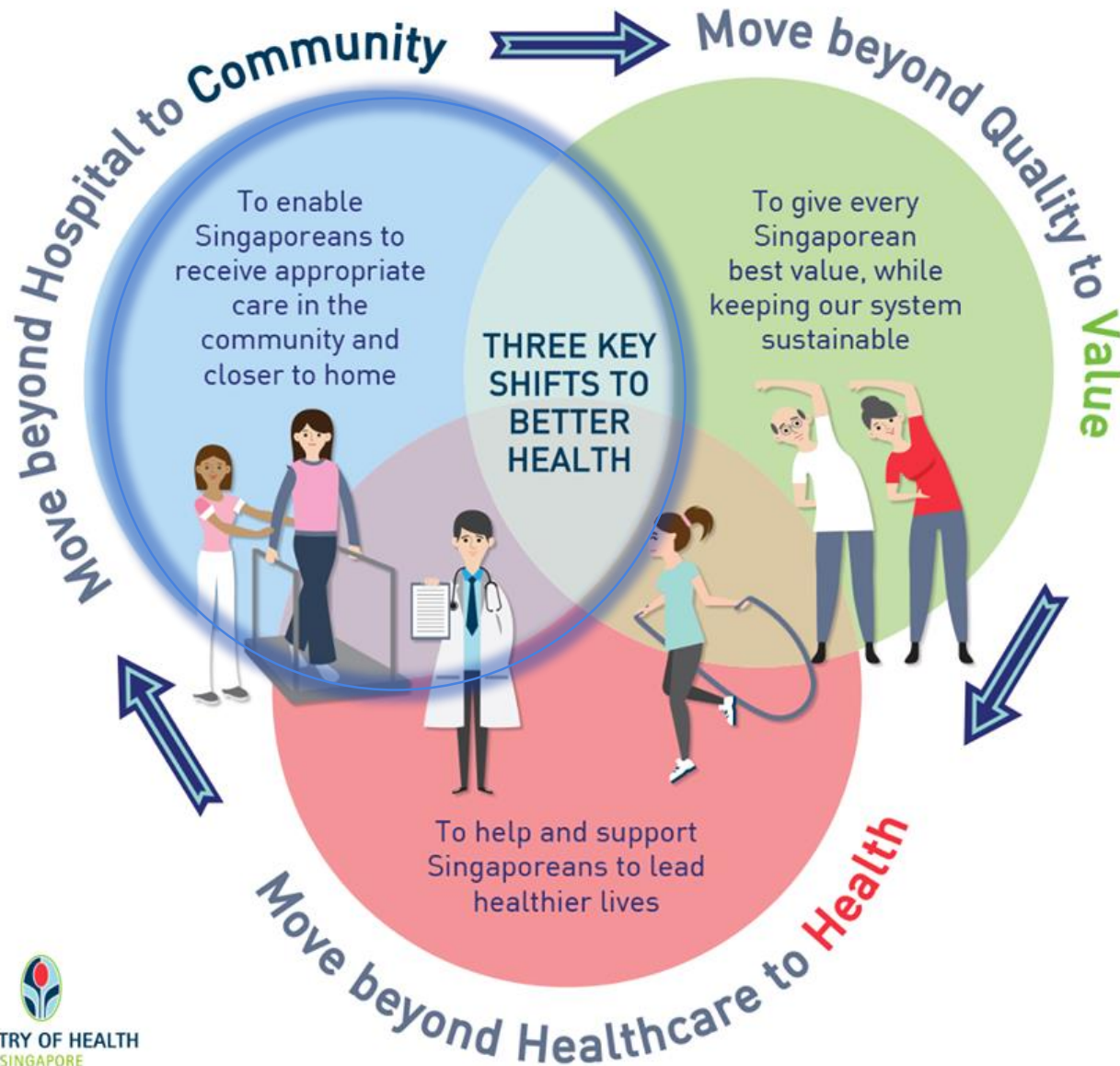
The role of PX and technology in moving beyond hospital to community

# From hospital to community



do hospitals have to be places patients go to?

# internet hospitals



Credit: Ping An Good Doctor

I want **instant access** "be there for *me - wherever, whenever*"

# mobile hospitals



I want **instant access** "be there for me - *wherever, whenever*"

I want **simplicity** "*make it easy for me*"

I want to **understand** "*explain to me*"

# self-monitoring



I want to be **empowered** "*remember me*"

I want to **feel valued** "*respect me*"

# doctor in the house



I want **instant access**
"be there for *me* - *wherever*, *whenever*"

I want **trust**
"*understand me*"

I want **choice** "trust *me*"

I want to **make decisions** "*listen to me*"

# home rehabilitation

# NUS-ISS Serious gaming for stroke rehab



I want **simplicity** *"make it easy for me"*

I want to be **empowered** *"remember me"*

https://www.youtube.com/watch?v=ogI6IRPEXFU
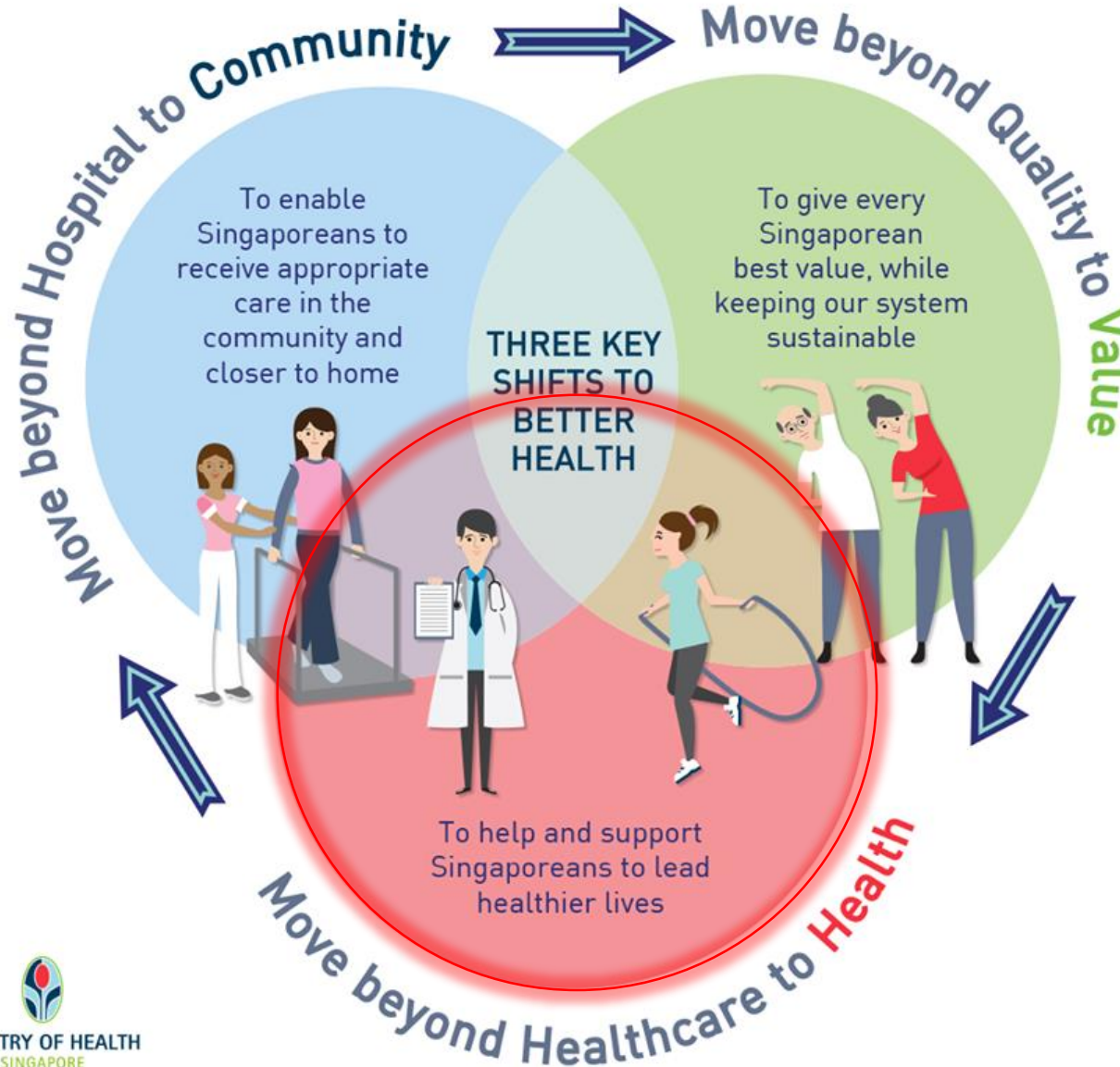
The role of PX and technology in moving beyond healthcare to health

do we need healthcare, to be healthy?

# personal risk insights

**NEW**

## MyHeritage DNA Health+Ancestry Test

Discover how your genes may affect your health with comprehensive reports

- Only major test with polygenic risk reports for heart disease and breast cancer
- Only major DNA company that pledges to never share your data with insurance companies. MyHeritage has never sold user data.
- Only consumer health test available in 40+ languages
- Physician and genetic counseling oversight included in the price of the test for all U.S. customers
- More breast cancer variants tested than the competing brand

**MyHeritage**   www.myheritage.com/health
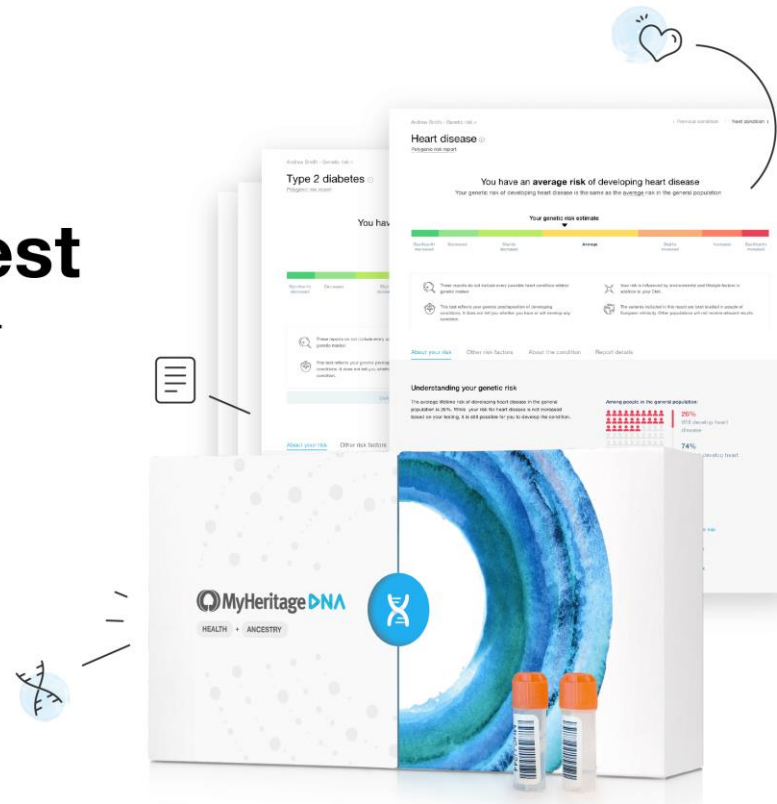
I want **transparency** "be honest with me"

I want **trust** "*understand me*"

# Personal nutrition
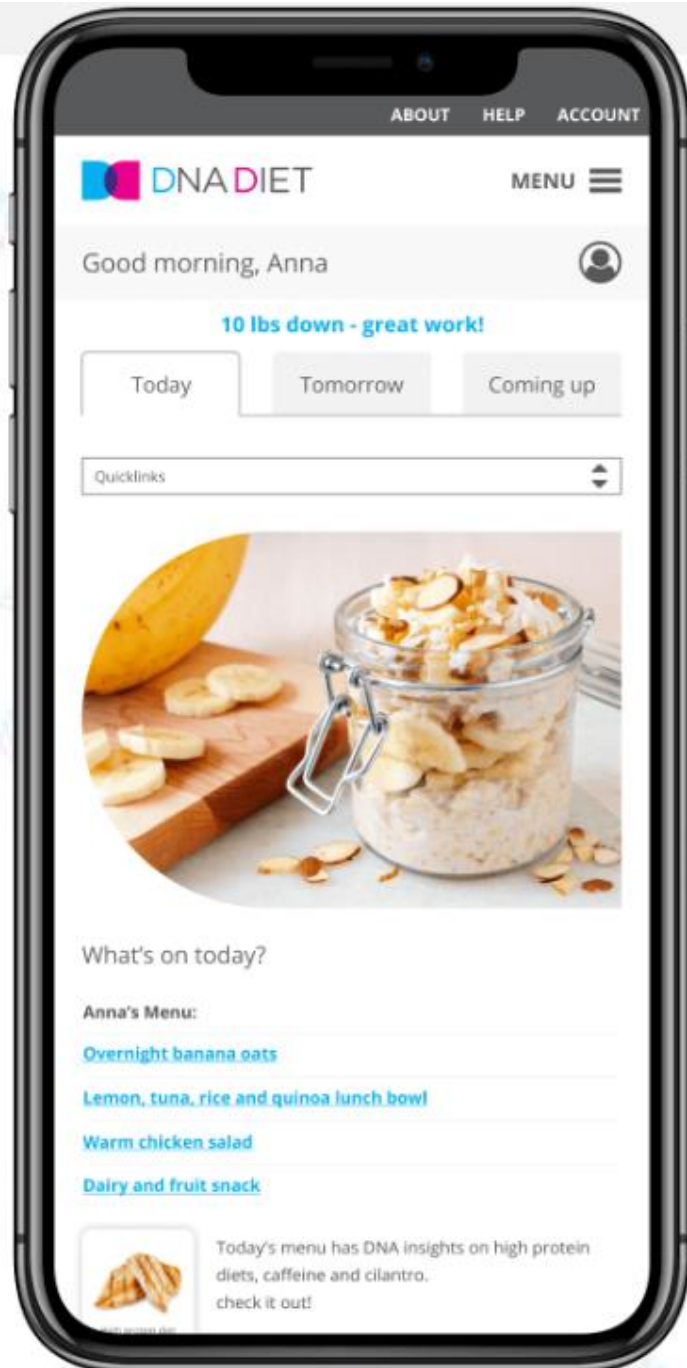


I want **instant access** "be there for *me - wherever, whenever*"

I want **simplicity** "*make it easy for me*"

I want to **understand** "*explain to me*"

I want **choice** "trust *me*"

I want to **make decisions** "*listen to me*"

I want **trust** "*understand me*"

I want to be **empowered** "*remember me*"

# personal fitness

Astroskin Headband
For Men / For Women

Astroskin Shirt
For Men / For Women

**Blood Pressure**

**3-Axis Accelerometer**

**Skin Temperature**

**Blood Oxygen Levels** O₂

**3-Lead ECG**
HRV, QRS, RR Intervals

**Breathing Rate & Volume** (RIP)

? Support

**HEXOSKIN**
HEALTH SENSORS & AI

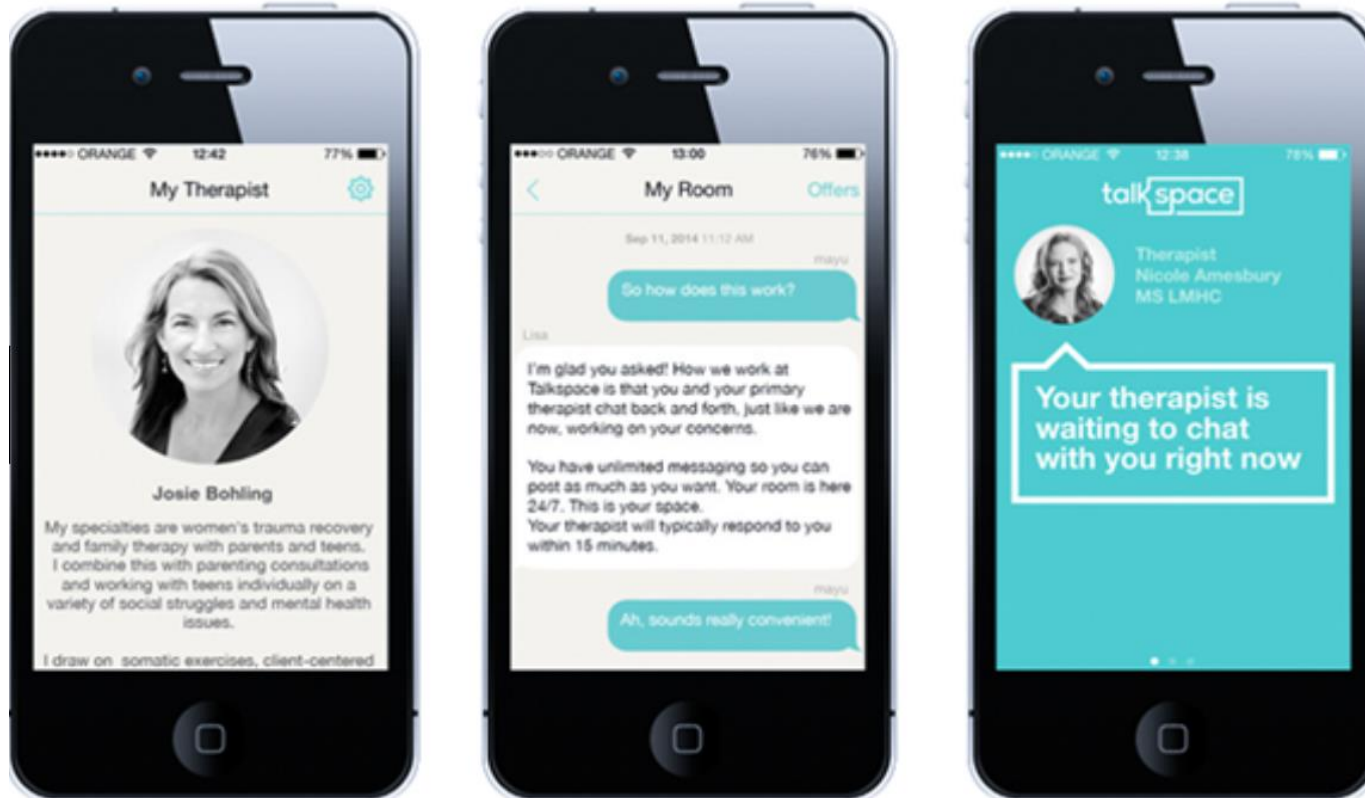I want **simplicity**
*"make it easy for me"*

I want **transparency**
*"be honest with me"*

I I want **choice** *"trust me"*

I want to **make decisions** *"listen to me"*

I want to be **empowered**
*"remember me"*

# digital mental wellness

I want **instant access** "be there for *me - wherever, whenever*"

I want **simplicity** "*make it easy for me*"

I want **transparency** "be honest with me"

I want to **understand** "*explain to me*"

I want **choice** "trust *me*"

I want to **make decisions** "*listen to me*"

I want **trust** "*understand me*"

I want to be **empowered** "*remember me*"

I want to **feel valued** "*respect me*"

# injury prevention

INFLATION TIME
0,08 sec →

DAILY USE

AFTER A FALL

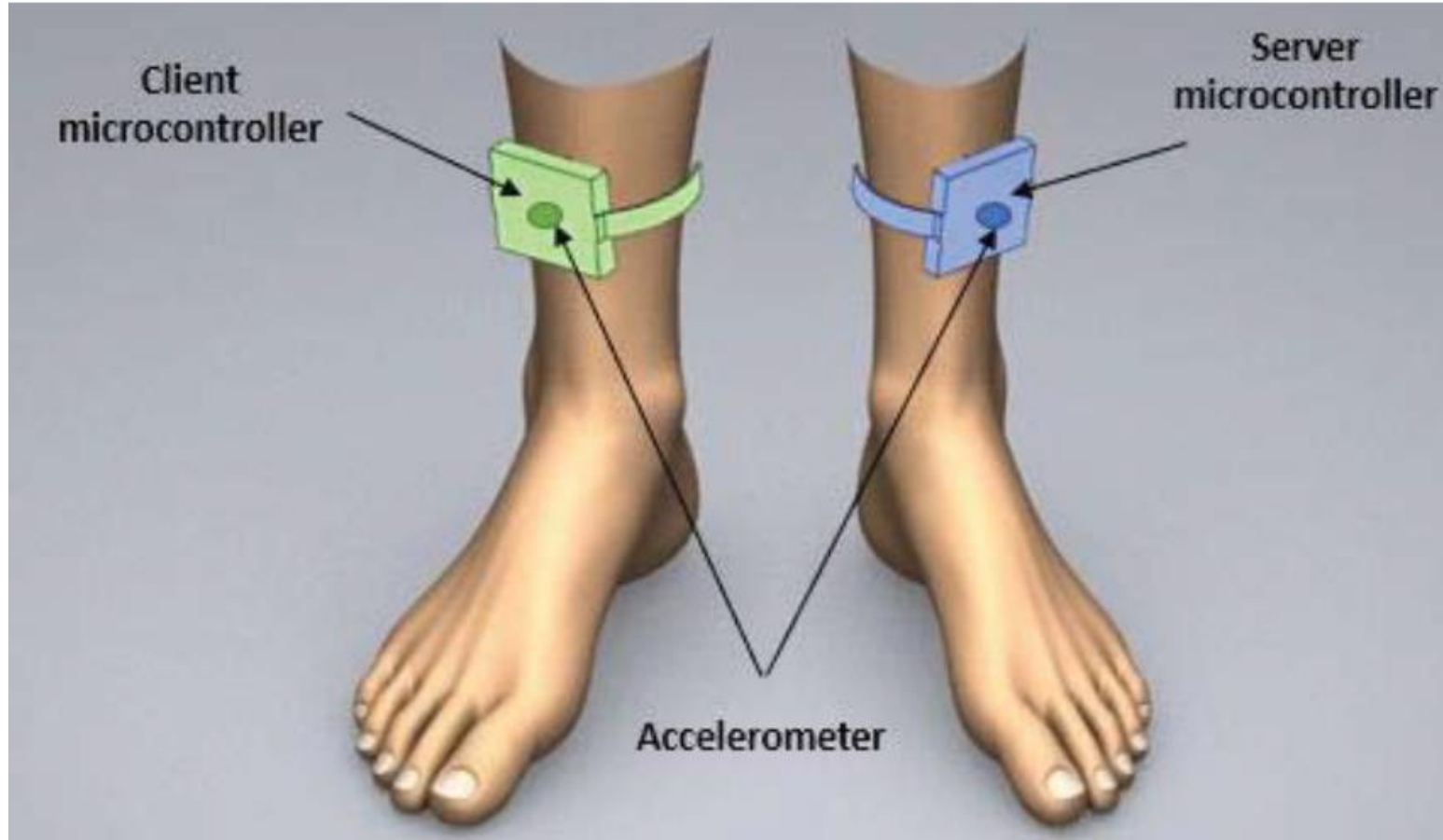Hip'Safe : the first wearable airbag hip protector by Helite

I want **instant access** "be there for *me* - *wherever, whenever*"

I want **simplicity** "*make it easy for me*"

I want **trust** "*understand me*"

# NUS-ISS i-gait system



Integrates user gait data, with pre-trained gait data, machine learning and haptic stimuli

I want **choice** "trust *me*"

I want to **make decisions** "*listen to me*"

I want **trust** "*understand me*"

I want to be **empowered** "*remember me*"

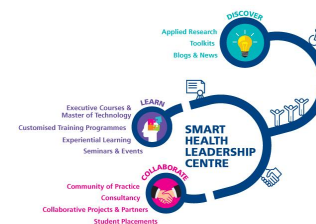https://www.youtube.com/watch?v=ZbrFH2m0tgA&t=216s

From Channel News Asia 2018

# intcarer integrated care pilot

A data-driven project designed to deliver integrated care for seniors and increase patient empowerment with the objective of **improving health outcomes**.

I want **instant access** "be there for *me* - *wherever, whenever*"

I want **simplicity** "*make it easy for me*"

I want **choice** "trust *me*"

I want to be **empowered** "*remember me*"

# Why does digitally-enabled PX matter?

- An empathic patient experience can help **healing**: anxiety & fear delay healing

- Effective, empathy based engagement builds strong trust-based relationships: if we want **patients as partners** in their own health (supporting preventative health strategies), we need to positively engage and motivate them

- The **bottom dollar**: poor patient experience will drive your customers elsewhere

- The role of data and digital allows us to maintain patient engagement and monitoring beyond our individual capacities – it augments and **scales** the healthcare professional's service

- Data-informed PX allows us to personalize our patient strategies with powerful **insights**

# The role of digitally-enabled PX in risk management
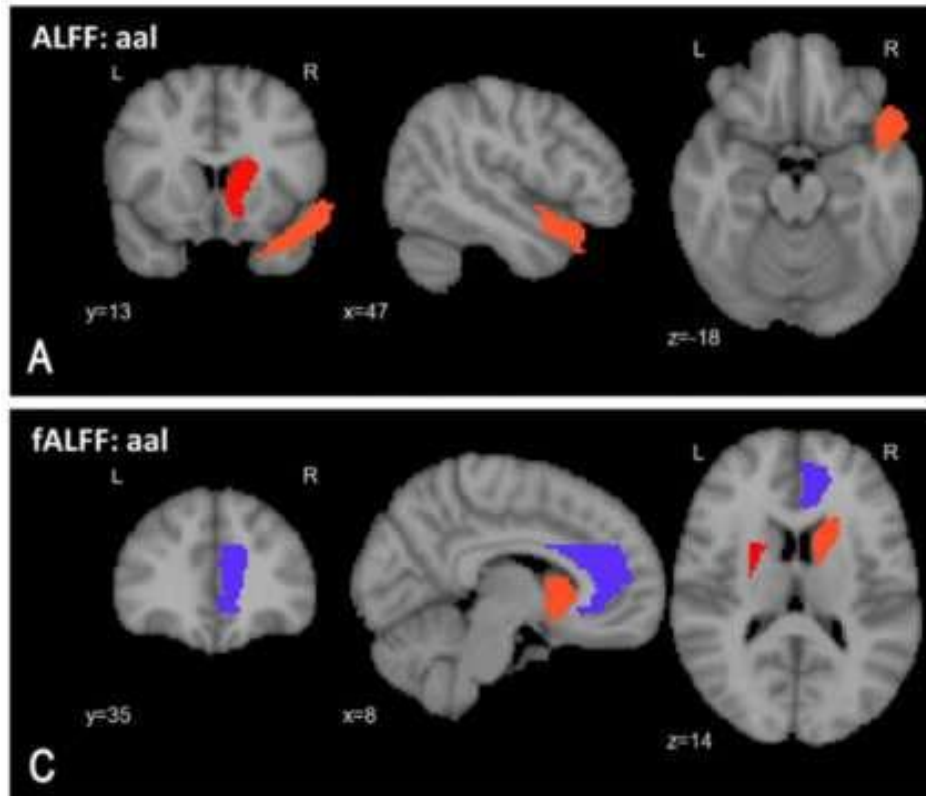


Accuracy of diagnosis:
- PX: I want **trust**
- RM: reduced likelihood of treating the wrong condition, and potentially worsening the condition

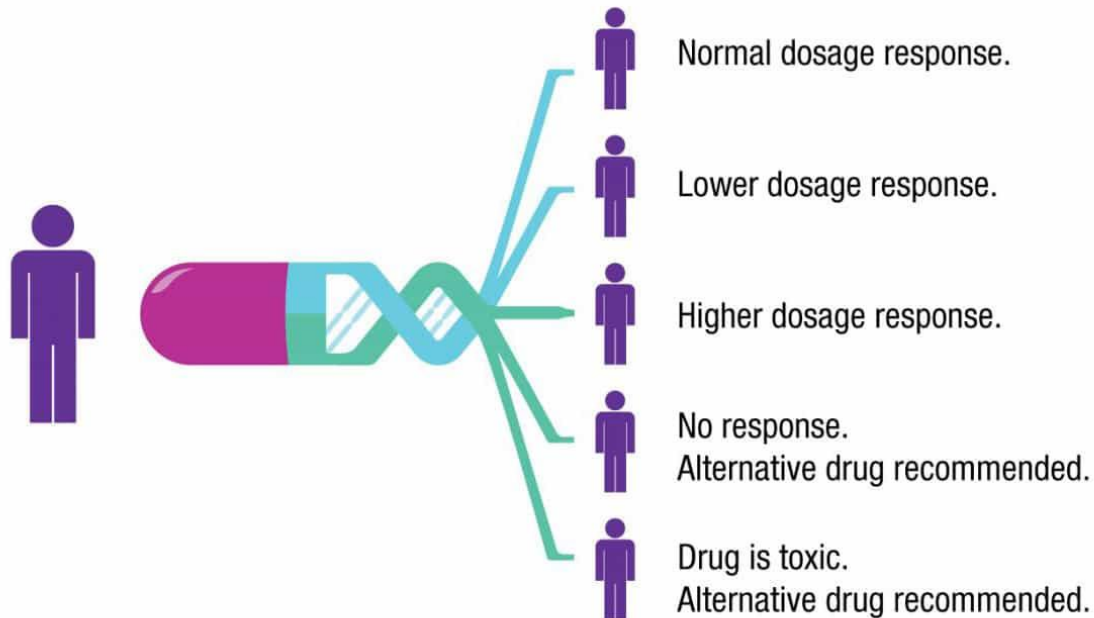# The role of digitally-enabled PX in risk management



Earlier detection of disease:

- PX: I want **instant access**
- RM: reduce time spent before correct treatment commences; reducing likelihood of condition deteriorating or reaching irreversible state

# The role of digitally-enabled PX in risk management



Accurate prescribing through genetics.

Normal dosage response.

Lower dosage response.

Higher dosage response.

No response.
Alternative drug recommended.

Drug is toxic.
Alternative drug recommended.

Personalised medication dosing e.g DNA profiling
- PX: I want **simplicity**
- RM: reduce likelihood of adverse side effects; reduce likelihood of delays in response to treatment, and hence possibility of condition deteriorating

# Opportunities

- Digital technology and Artificial Intelligence allow us to gain insights around PX in powerful new ways, and to support **strategies for improved health outcomes**

- Number of data collection points during a **patient journey** are considerable

- Push & Pull opportunities to better understand patients and **nudge** behaviours for improved health outcomes & healthcare experiences

# Challenges

- AI and digital technology do not meet the full range of patient expectations – we still need a **human touch**

- **Data privacy & security** controls limit how you can collect and use patient data and feedback

- **Ethics** considerations may prevent full AI potential being realized

- You should not place all your **trust** in digital or AI solutions – augment rather than replace the clinician

- Those key to ensuring positive PX may not have the **skills** to make sense of data  - those who understand the data may not appreciate the context

# Digitally-enabled PX should be based upon…

**E**thnographic research for a strong value proposition

**M**aking solutions easy, intuitive & non-threatening

**P**ersonalisation, for resonance and impact

**A**cceptance of REAL user behaviours

**T**hinking about the risks of digital solutions

**H**aving options - design for the breadth of user needs

**Y**ou are not your user mindset! Co-design solutions

# Thank You

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