

Technology in the NHS

Realities & Opportunities

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THREE DIGITAL ESSENTIALS



INTEGRATION



USABILITY



AUTOMATION



INTEGRATION

19 software programs

4 used on a ward round

1 hour copying prescriptions

1 hour copying disease codings

30 minutes handing over to
community teams

Information lost with every
patient transfer





USER EXPERIENCE DESIGN



Design Hierarchy of Needs

CAUSES PRESCRIBING ERRORS

MAKES WORK SLOW & INEFFICIENT

LIMITS INFORMATION ACCESS

INCREASES COGNITIVE LOAD

Searl, M. M., Borgi, L., & Chemali, Z. (2010). It is time to talk about people: a human-centered healthcare system. *Health Res Policy Syst*, 8(35).



AUTOMATION

Automation of basic administration through INTEGRATION

Simple automated REMINDERS for patients *and* CLINICIANS

Clinical guidelines TRIGGERED automatically

SOLVE JUST ONE SMALL PROBLEM...

Integrate **2** software programmes

Save each junior doctor **1** hour per day

Over **55,000** doctors in training nationwide...

... would save **275,000** hours per week

An average hourly wage for a junior doctor is **£15**

Making potential savings of **£4 million**

Over **£200 million** per year.

IN GETTING THE BASICS RIGHT...

Technology has the potential to deliver against all aspects of the
TRIPLE AIM

- ① Better patient experience
- ② Improved outcomes
- ③ Reduced cost

*We still need significant improvements **today** to prepare for innovative change **tomorrow***

PREPARATION FOR THE FUTURE



U B E R

TAXIS



PHOTOGRAPHY



Spotify

MUSIC

2014

7600

DIGITAL HEALTH START UPS

\$4-6bn

DIGITAL HEALTH FUNDING

"Over the next 10 years healthcare will become a software business."

Lucien Engelen, Director of Innovation
Radboud University Nijmegen Medical Centre

THE FUTURE OF HEALTHCARE



**DISTRIBUTED
MEDICINE**



**AUTOMATED
MEDICINE**

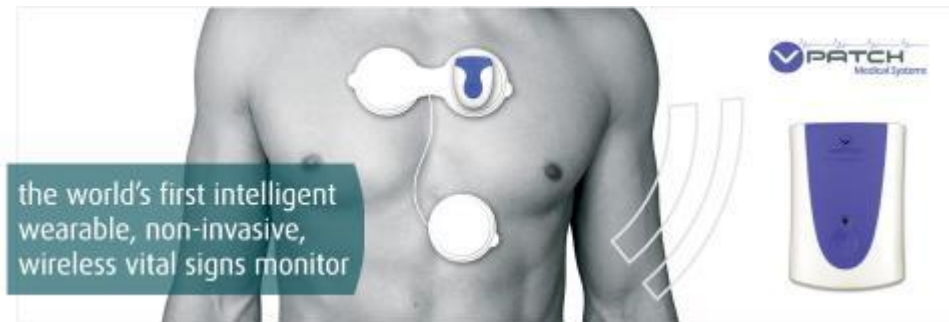


**PRECISION
MEDICINE**



DISTRIBUTED MEDICINE

WIRELESS SENSORS enabling care in the community



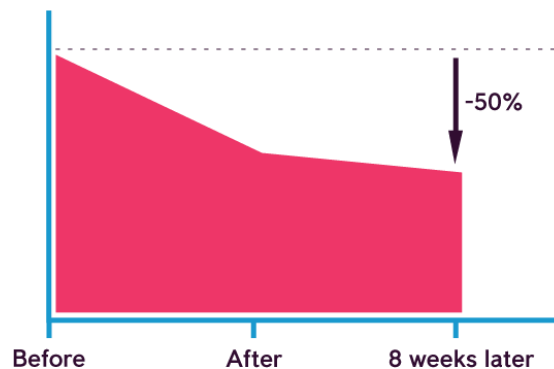
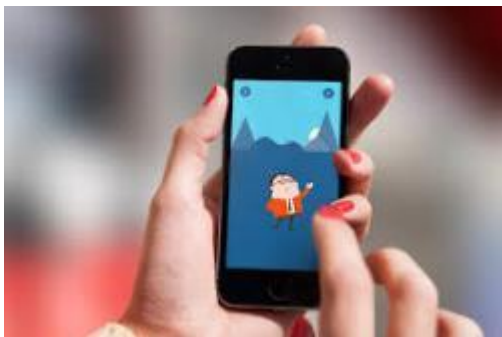
IN HOME DIAGNOSTICS facilitating self-management



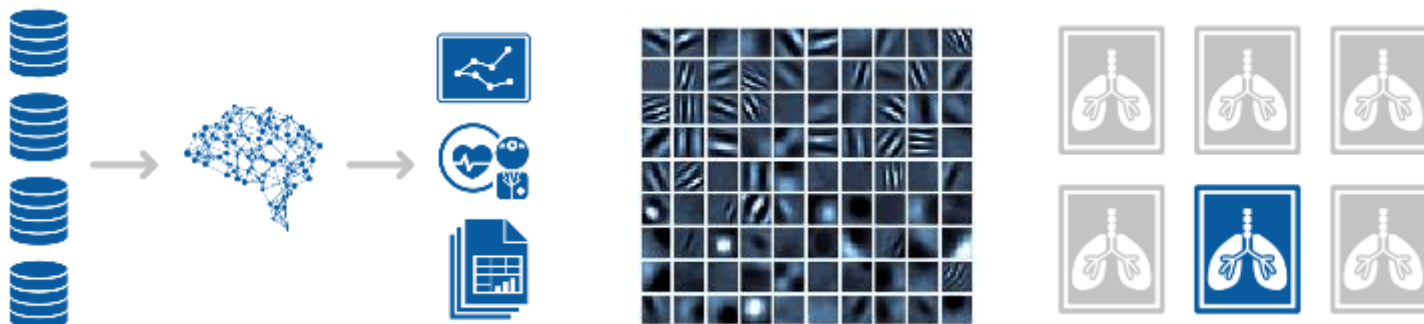


AUTOMATED MEDICINE

Psychiatry, psychology and **DIGITAL MEDICINE**



MACHINE LEARNING in radiology and pathology

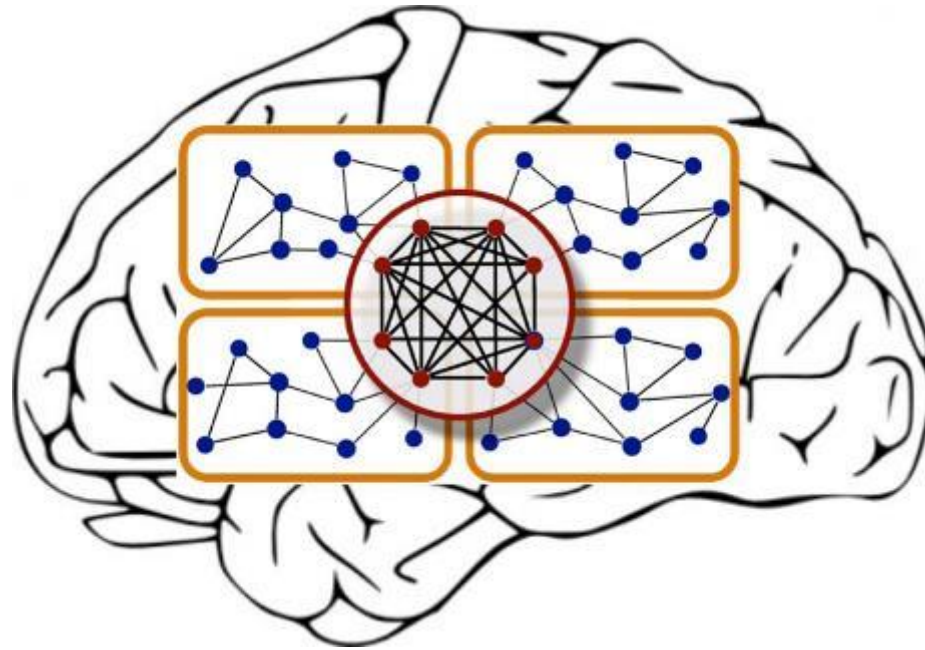




AUTOMATED MEDICINE

"Historically the doctor has been the machine learning algorithm"

Jeremy Howard, Data Scientist





PRECISION MEDICINE

“An emerging approach for disease prevention and treatment that takes into account individual variations in **genes, environment, and lifestyle.**”

Precision Medicine Initiative, NIH

RE-DEFINING DISEASE using machine learning

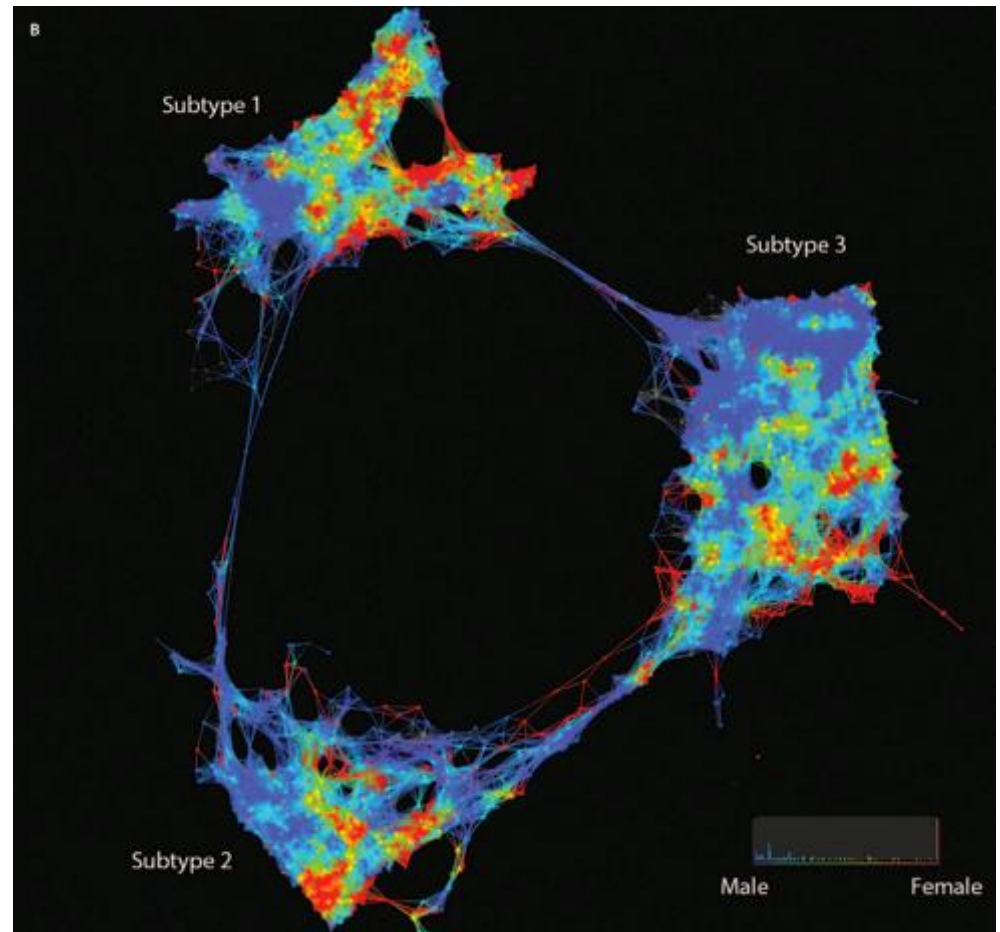
Smartphone BEHAVIOURAL ANALYTICS for disease intervention



PRECISION MEDICINE

RE-DEFINING DISEASE using machine learning

Li, Li, et al. "Identification of type 2 diabetes subgroups through topological analysis of patient similarity." *Science translational medicine* 7.311 (2015): 311ra174-311ra174.

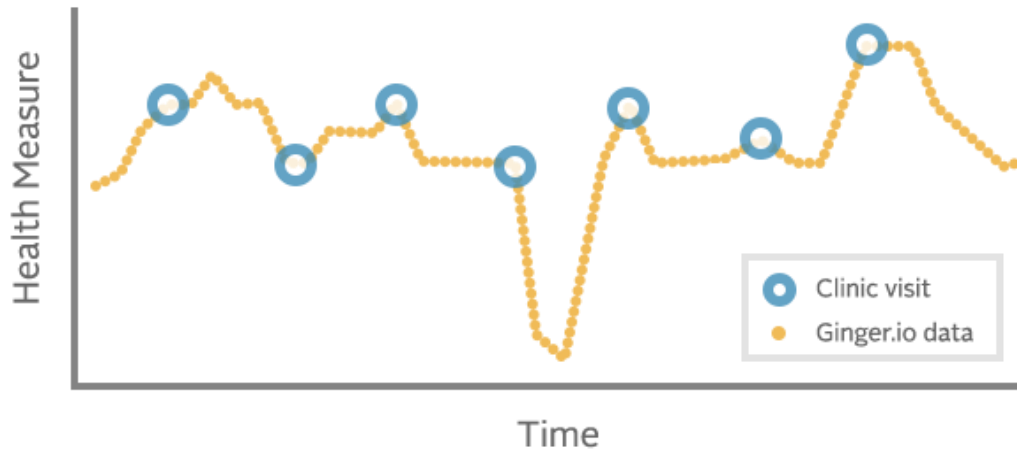




PRECISION MEDICINE

Smartphone **BEHAVIOURAL ANALYTICS** for disease intervention

FROM EPISODIC DATA TO CONTINUOUS INSIGHT



MOVING FORWARD...

FUNDING

LEADERSHIP

CULTURE

FRAMEWORK

THANK YOU

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