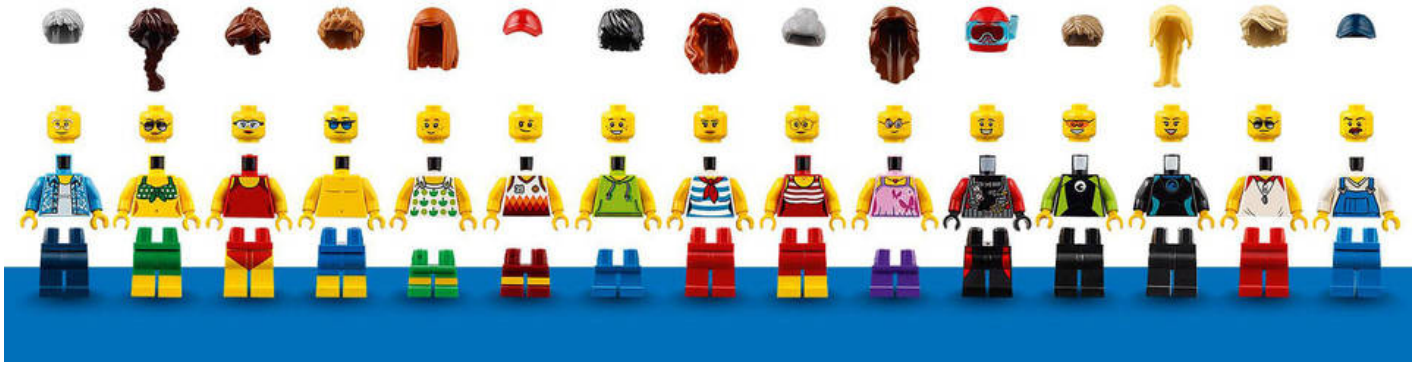
Producing a 21st century Doctor

Trudie Roberts

AMEE and University of Leeds, UK



The Educational Challenge

Today, we need to prepare students for jobs that have not yet been created, to use technologies that have not yet been invented, and to solve problems that we do not yet know will arise.

Andreas Schleicher OECD

Outline

- The past
- The present
  - Impact of changes in medicine and Healthcare delivery
  - The effects of the 4th Industrial revolution
- The doctor of the future

The past – ‘a golden age’

- Patients were passive and grateful
- Regulation of doctors was controlled by doctors themselves
- Public accountability was negligible
- Social prestige was high

The past ……

- Training was long and doctors learnt from seeing many patients
- Doctors learnt from the evolution of a patient's condition
- Patients had limited understanding and were compliant
- Most learning was in formal face to face teaching
- Changes in medical knowledge took time to be adopted
- Treatment was largely based on traditional practice

The PHOG approach to teaching

- ***P***rejudice
- ***H***unches
- ***O***pinion
- ***G****uesses*

From the past to the present

In the past medicine was simple, safe and largely ineffective.

Now it is complex, effective and highly dangerous

Cyril Chantler 2003

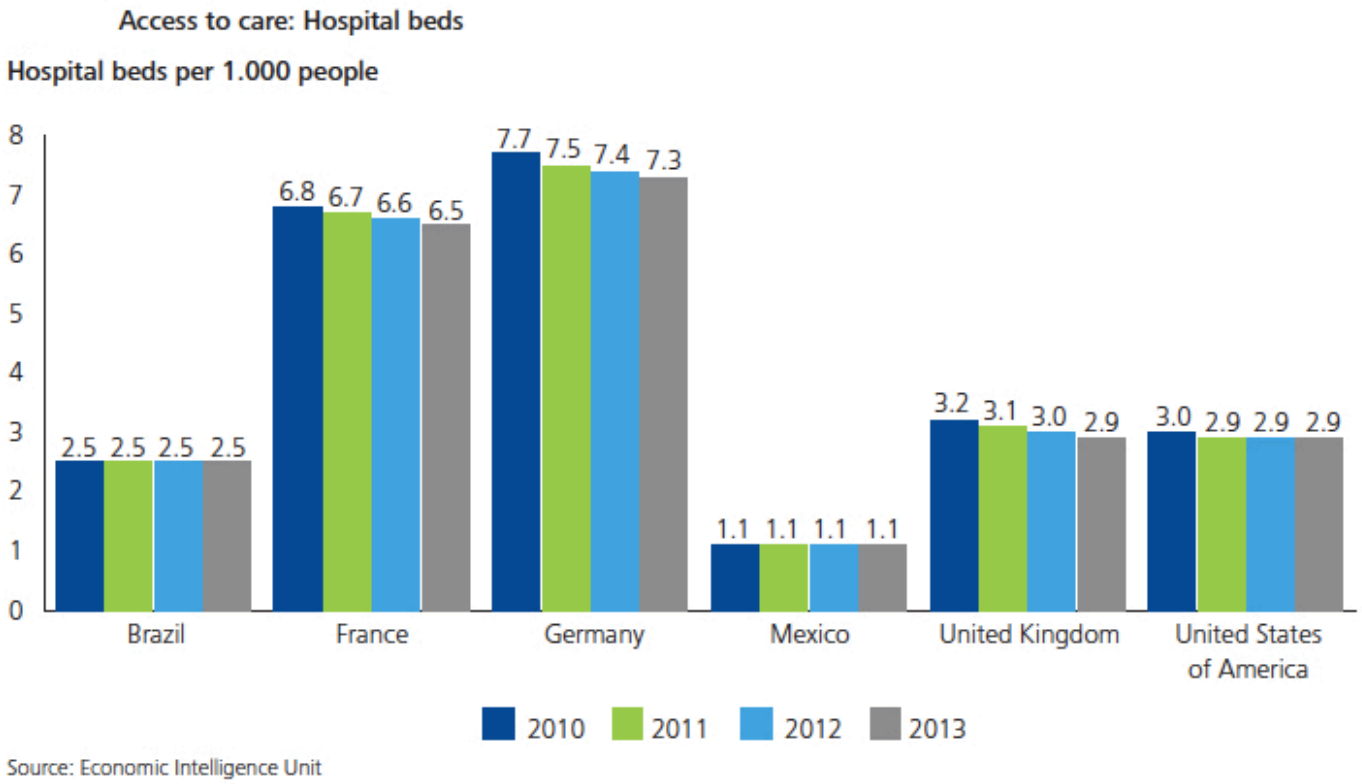
How doctors learn

- Doctors learn from interactions with patients

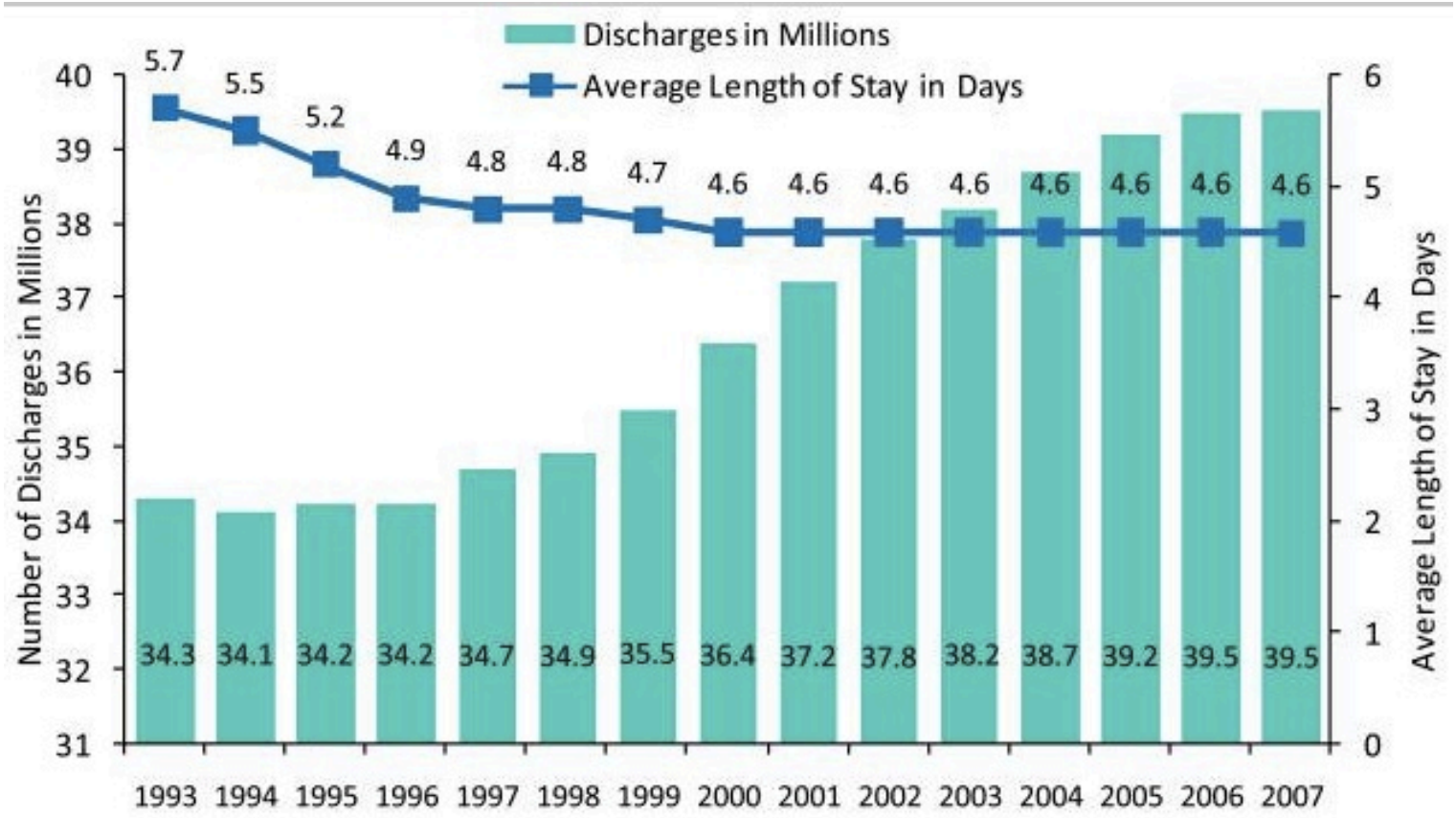
The changing focus of patient treatment

- From hospital to community

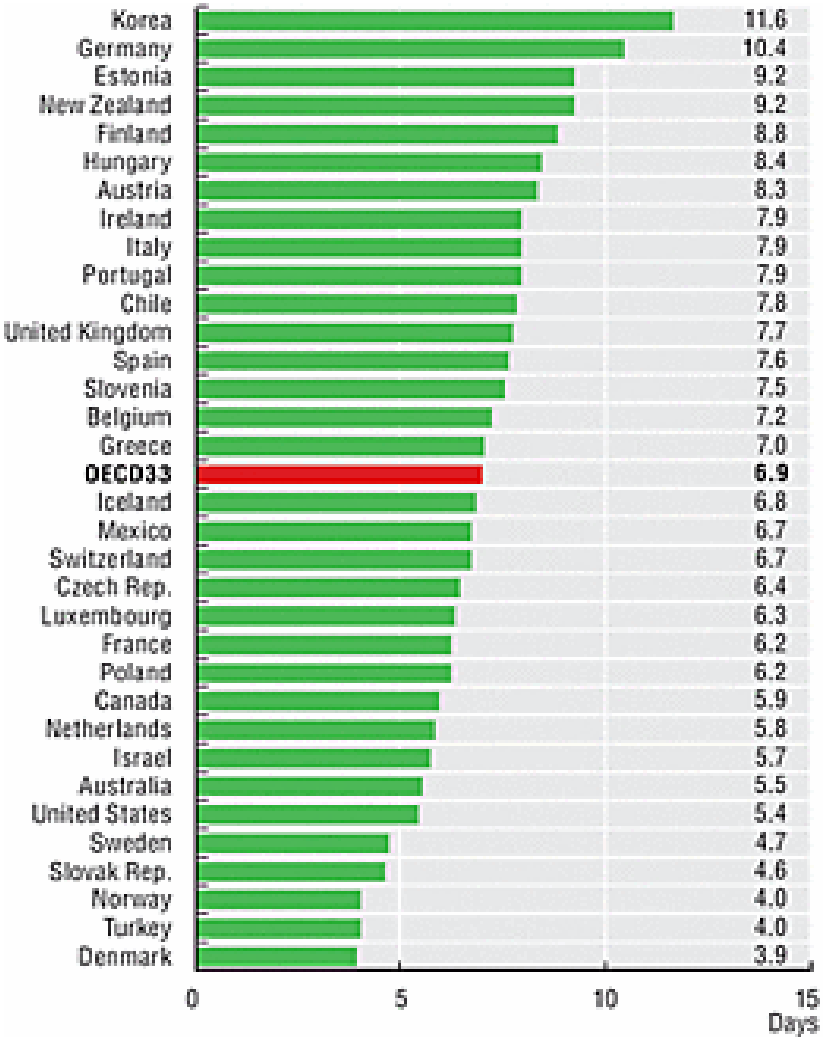
Hospital beds per 1,000 people



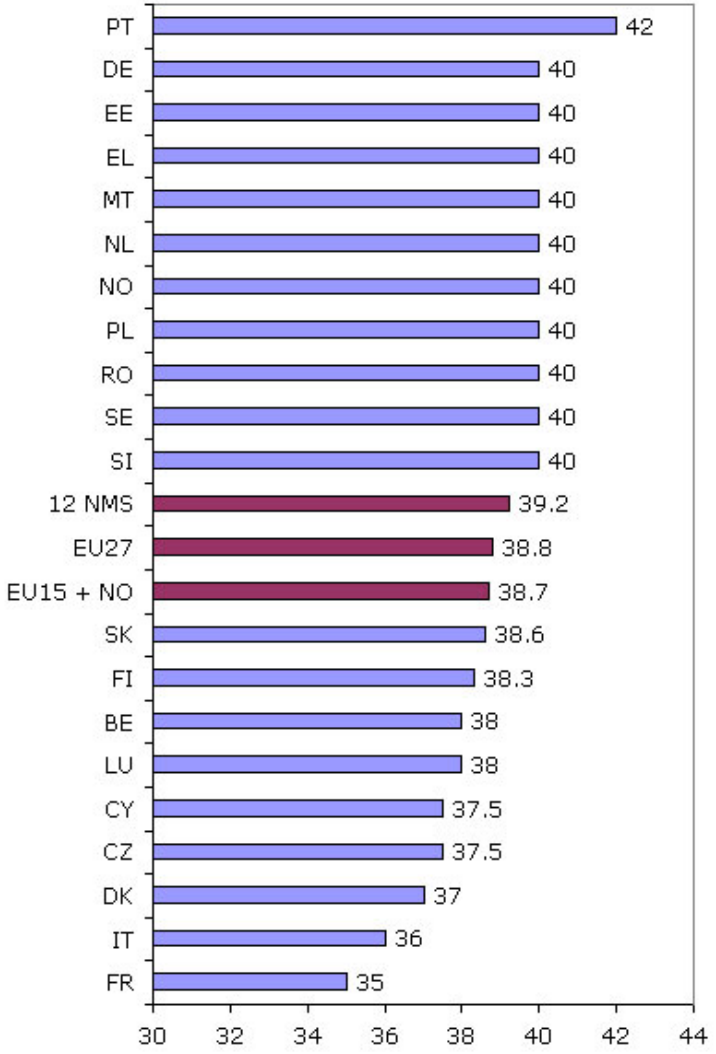
EU Average in-patient length of stay



AMI length of stay



Changes in doctors working hours



The challenge then is….

Maximise learning opportunities to cope with the demands of modern medical practice

Technology supported ‘patient Journey’ learning

Student sees patient

Formulates diagnosis

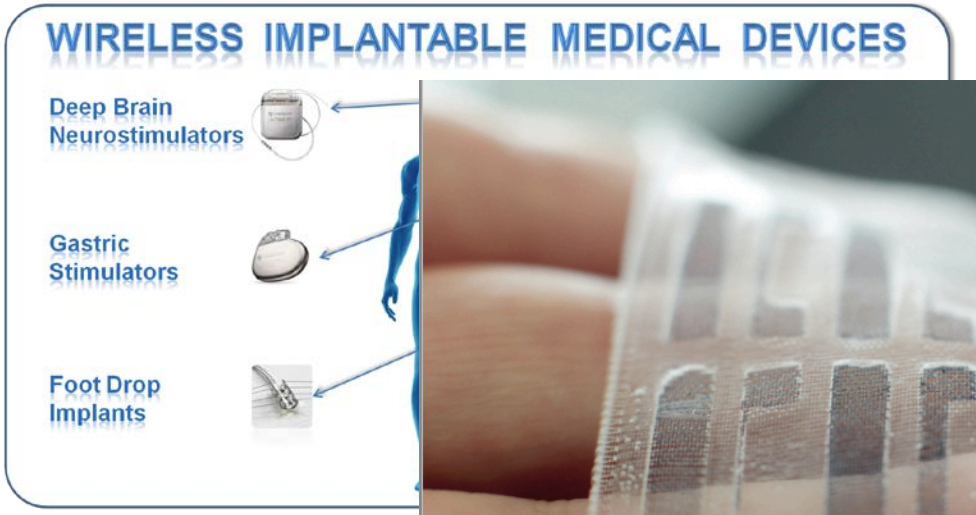
Student has remote access to patient progress

Confirms or refines original diagnosis

The 4th Industrial Revolution – effects on healthcare

- Alzheimer's: 5 million Americans. Wireless sensors can track the vital signs of patients as well as their location, activity, and balance.
- Asthma: 20 million Americans. Wireless can track the respiratory rate and peak flow so patients can use inhalers before an attack occurs.
- Breast Cancer: 3 million Americans. Women can use a wireless ultrasound device at home and send the scan to the doctor–won't have to go in for a mammogram.
- Chronic Obstructive Pulmonary Disorder (COPD): 10 million Americans. Wireless can monitor FEV1, air quality and oximetry.
- Depression: 19 million Americans. Wireless can monitor medication compliance, activity and communication.
- Diabetes: 21 million Americans. Wireless can monitor blood glucose and hemoglobin.
- Heart Failure: 5 million Americans. Wireless can monitor cardiac pressures, fluids, weight and blood pressure.
- Hypertension: 74 million Americans. Wireless can continuously monitor blood pressure and track medication compliance.
- Obesity: 80 million Americans. Wireless scales can track weight and wireless sensors can track calories in/out and activity levels.

What will healthcare look like?



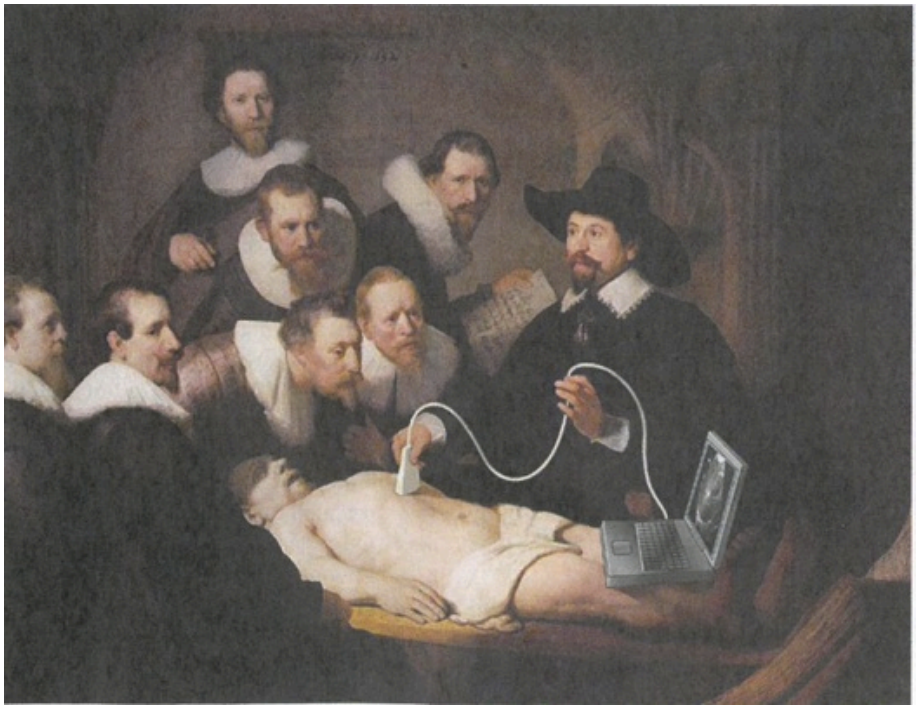
THE BODY ELECTRIC

RESEARCHERS WANT TO WIRE THE HUMAN BODY WITH SENSORS THAT COULD HARVEST REAMS OF DATA — AND TRANSFORM HEALTH CARE.

BY ELIZABETH GIBNEY

What are the 21st century knowledge, and skills required to be a doctor?

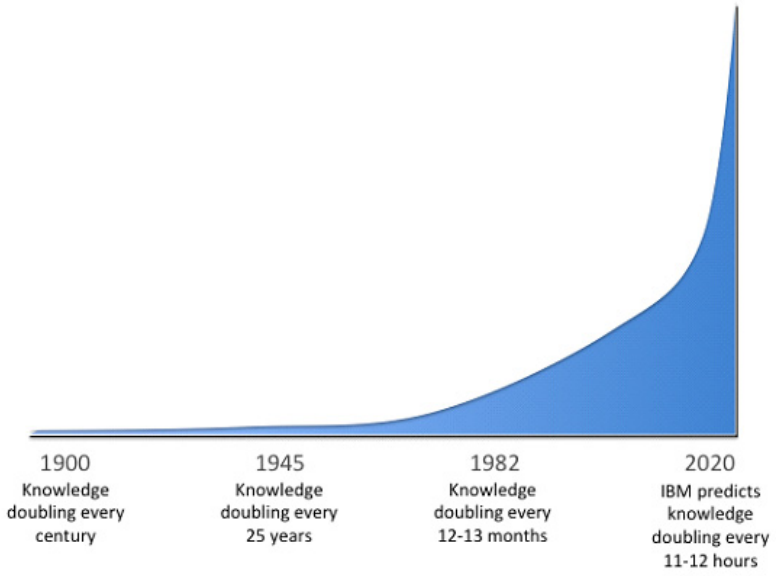
- What can be devolved?
- What needs to be retained?
- What needs to be enhanced?
- What new things are needed?



What can be devolved?

Knowledge

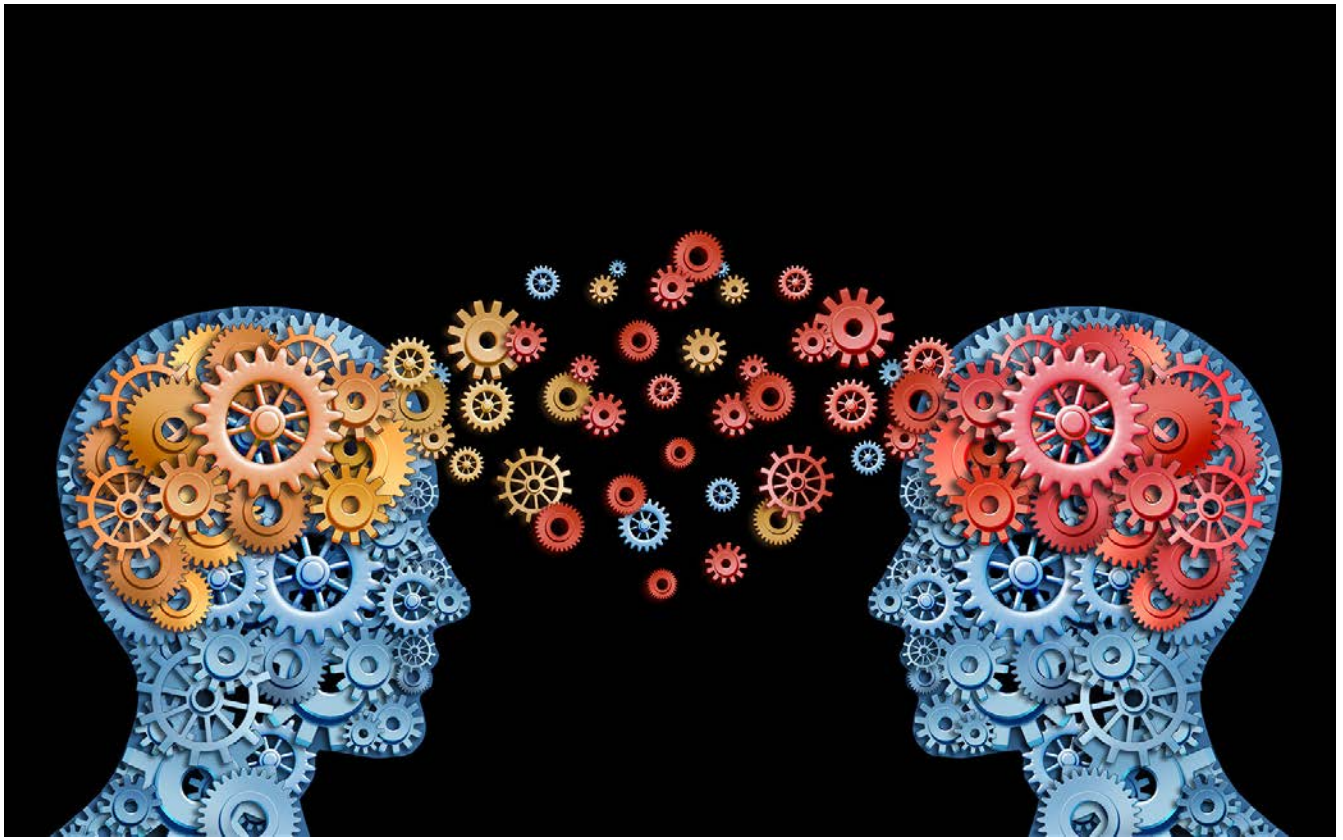
Buckminster Fuller's Knowledge Doubling Curve, with post-1982 addition by IBM



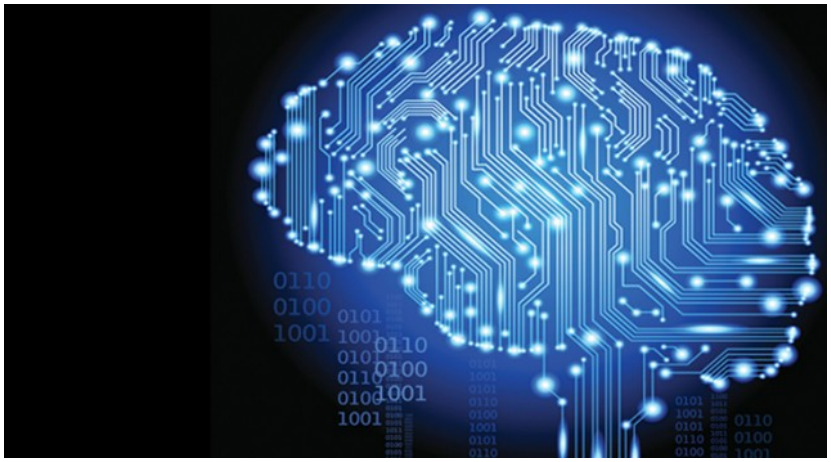
Alvin Toffler (1970)

- "the illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."

What knowledge will be required?



Where should knowledge reside?



The machine as part of the team

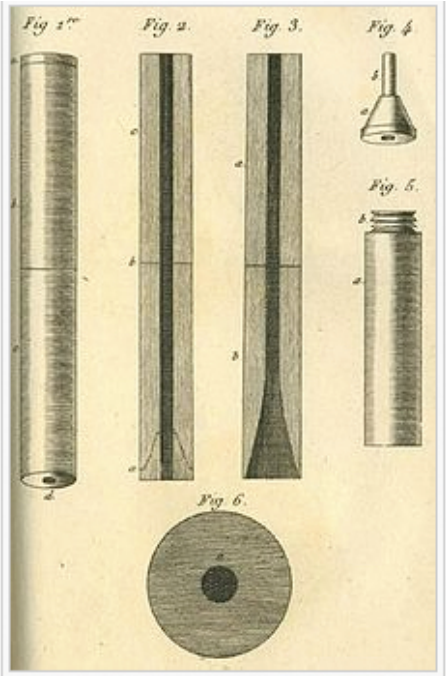
The concept of the extended mind

IBM Watson

Google DeepMind

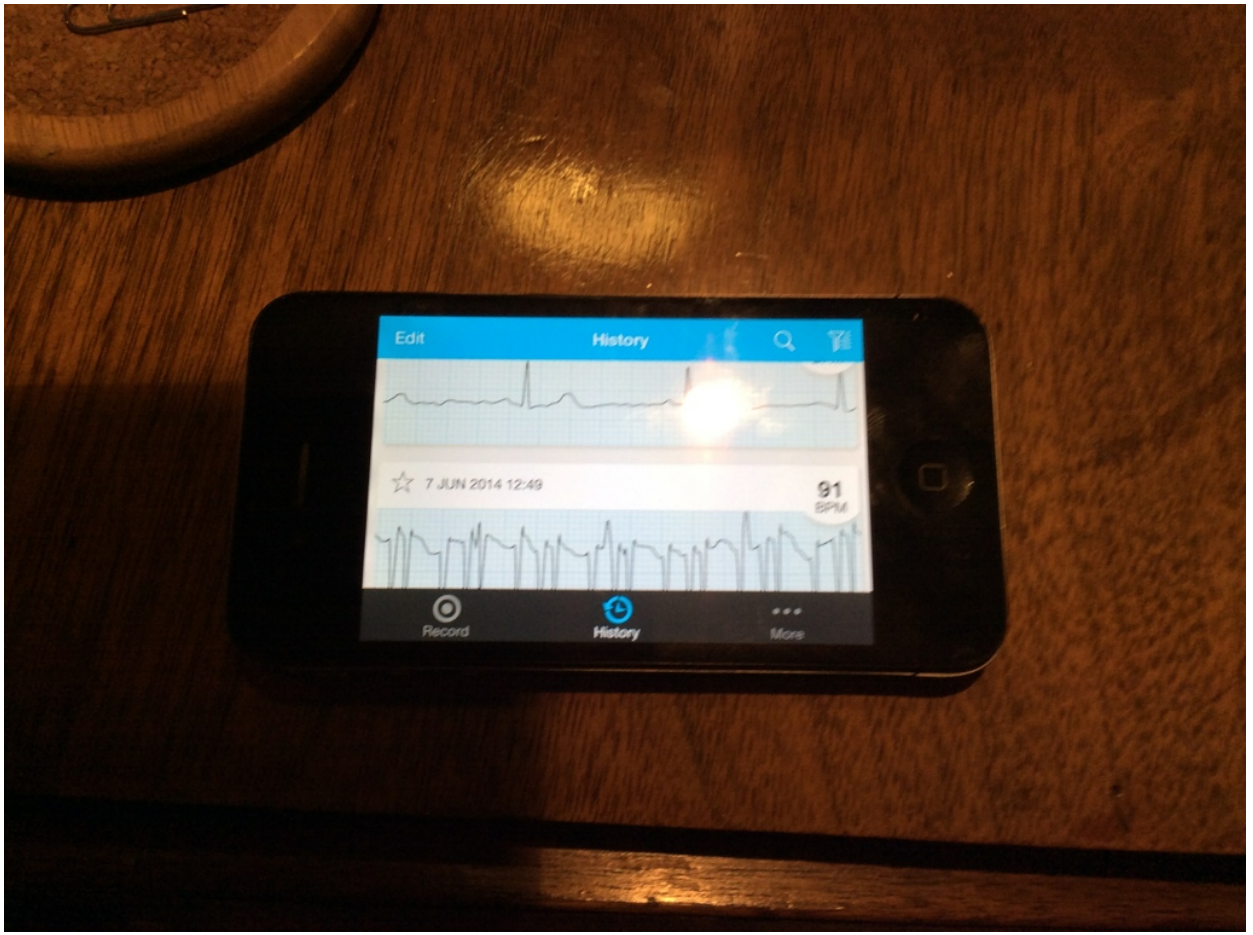
Clinical Skills

Cardiology

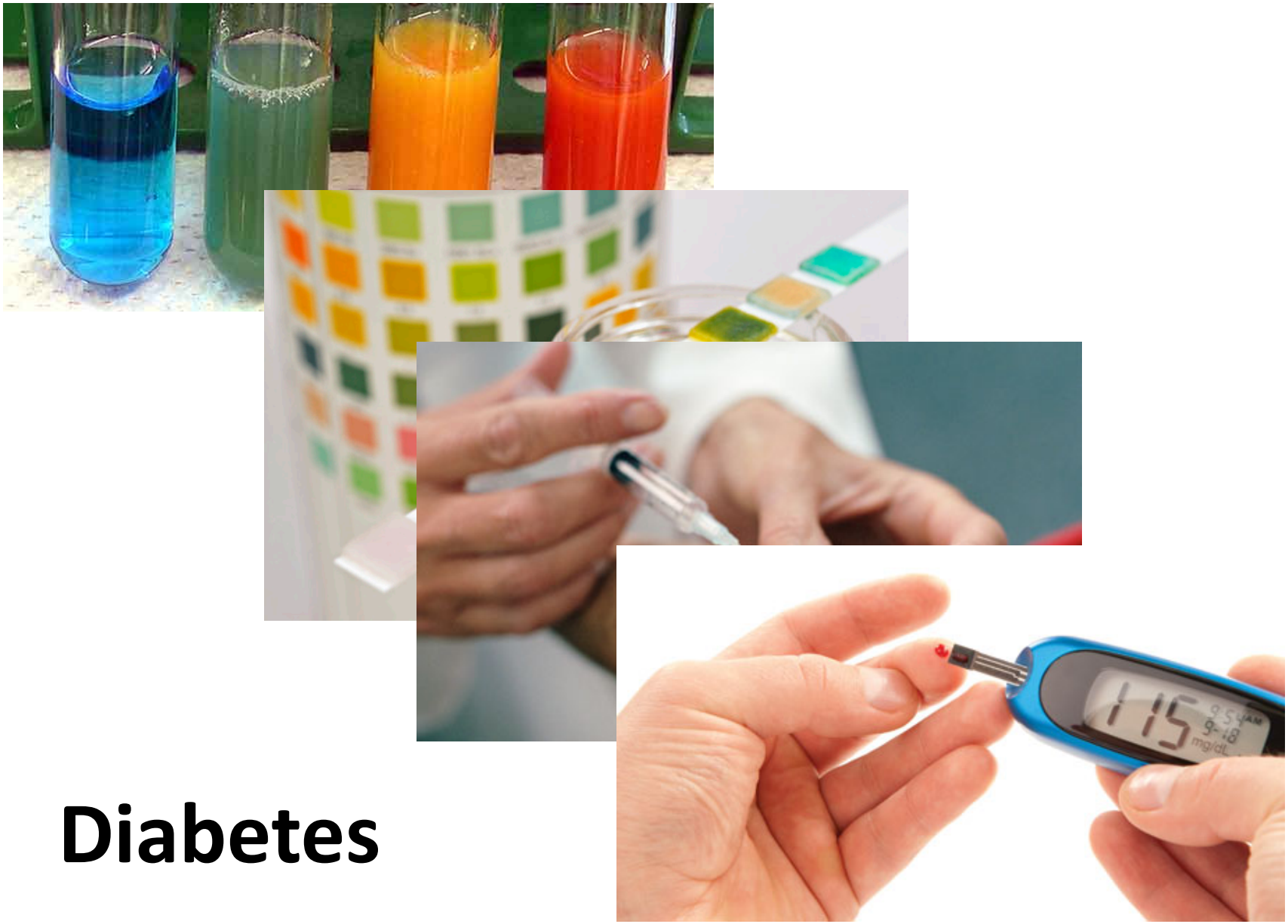


Auscultation

Recording an ECG



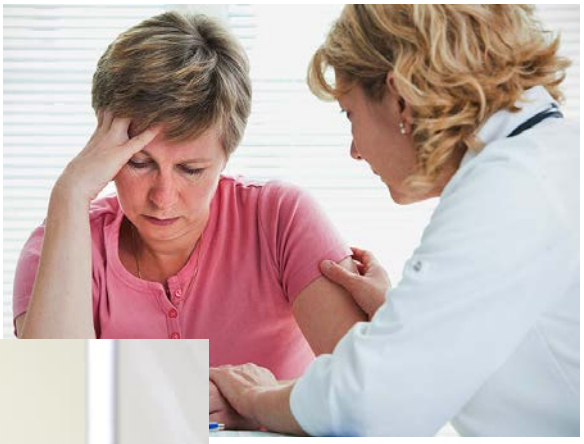
Abdominal examination



Diabetes


113
85
56
28
0
mg/dL Thu
Fri
Sat
Sun
Mon
Tue
Goal
Measured
Average
By Date
Week
Month
Year
OPTIONS
INSULIN ON BOARD (IOB)
Units
1.1 u
Time Remaining
1:09 hrs

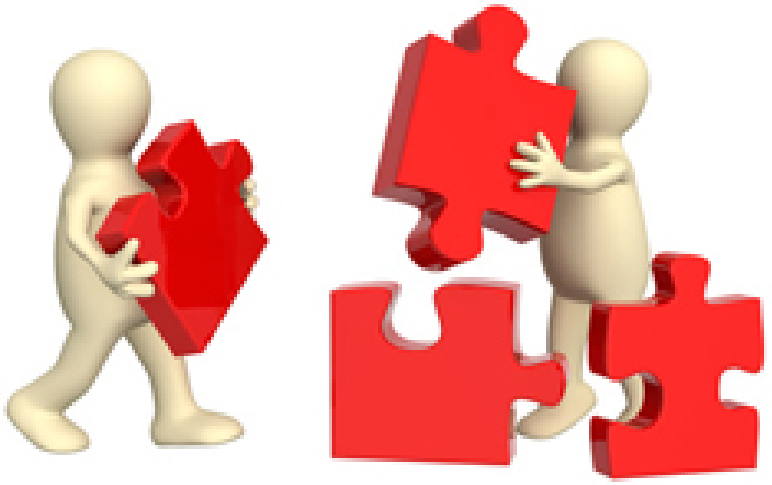
What needs to be retained?



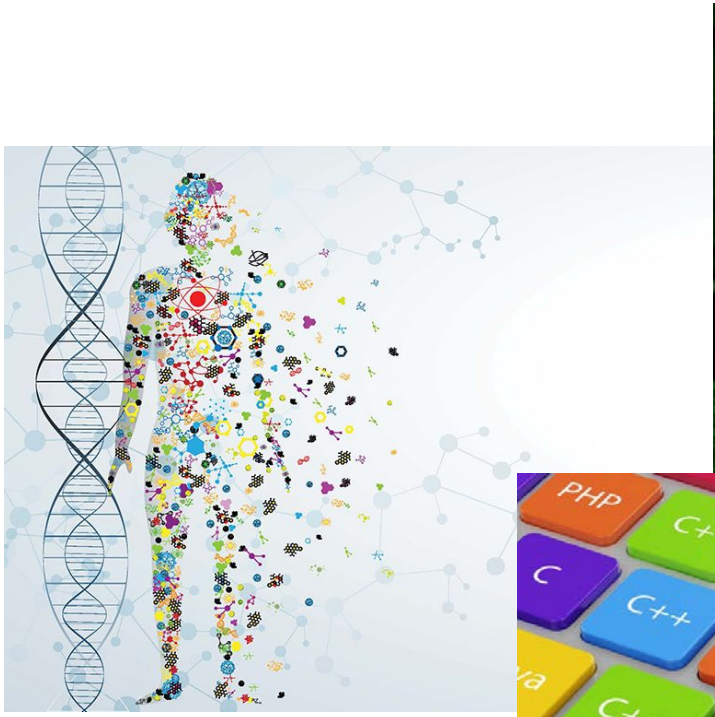
What needs to be enhanced?

Innovation and enterprise

Interprofessional Team working



What new knowledge and skills are needed?



Framework for future medical education

- Pipeline
- Existing workforce
- New professional groups

Pipeline

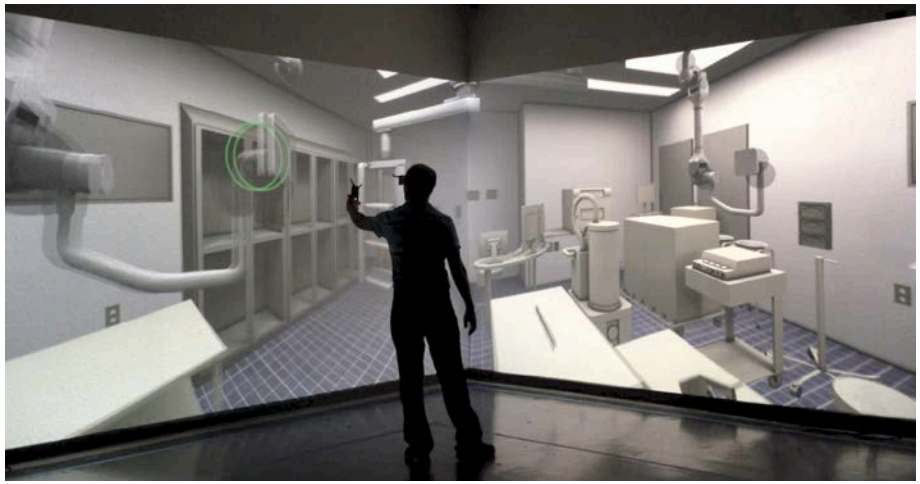
- Junior schools
- High schools
- Tertiary education

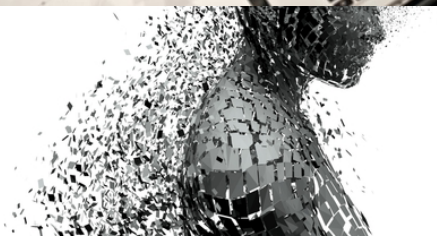
Achieving digital literacy

Existing Workforce - cpd

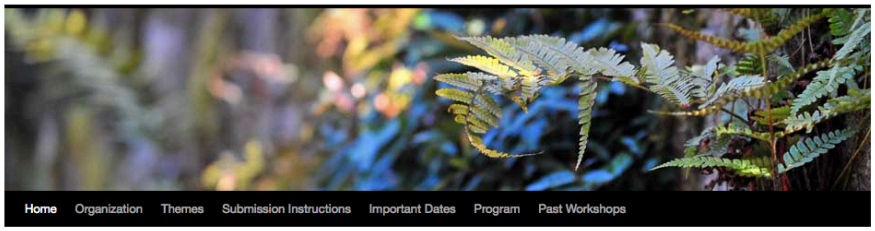
- Specialists
- General Workforce
- Returners to the workforce
- Regulators

Using technology support learning





IMS2018: Third International Workshop on Intelligent Mentoring Systems



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Held in conjunction with the 19th International Conference on Artificial Intelligence in Education, AIED2018
London, UK, 27- 30 June 2018

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Do we need to increase the skills of existing staff?

Doctor

+

Engineer

+

Artist

=

Rehabilitation physician

Physician

+

Data scientist

+

Behavioural psychologist

=

Public Health Doctor

Or do we need new professional groups?

Key skills gaps include:

- Digital Leadership
- Medical data scientists
- Ethicists
- Data security experts
- Researchers to deploy and to evaluate the effectiveness of digital technologies at scale
- Trans-disciplinary skills embedded within the health service – computer science and software engineering etc

So what is the vision for person centred healthcare for the future in a technology-enabled 21st Century?

2050

Holistic determinants of health - from individuals to environment

Behaviour

Personal ⟷ **Environment**

From symptomatic, episodic medicine to holistic always-on person centred care

Thank you for your attention

Questions?