Standardised Data and Patient safety:

From 1979 to 2019 to 2039?

Professor Sir Terence Stephenson

Nuffield Professor, Institute of Child Health, University College London

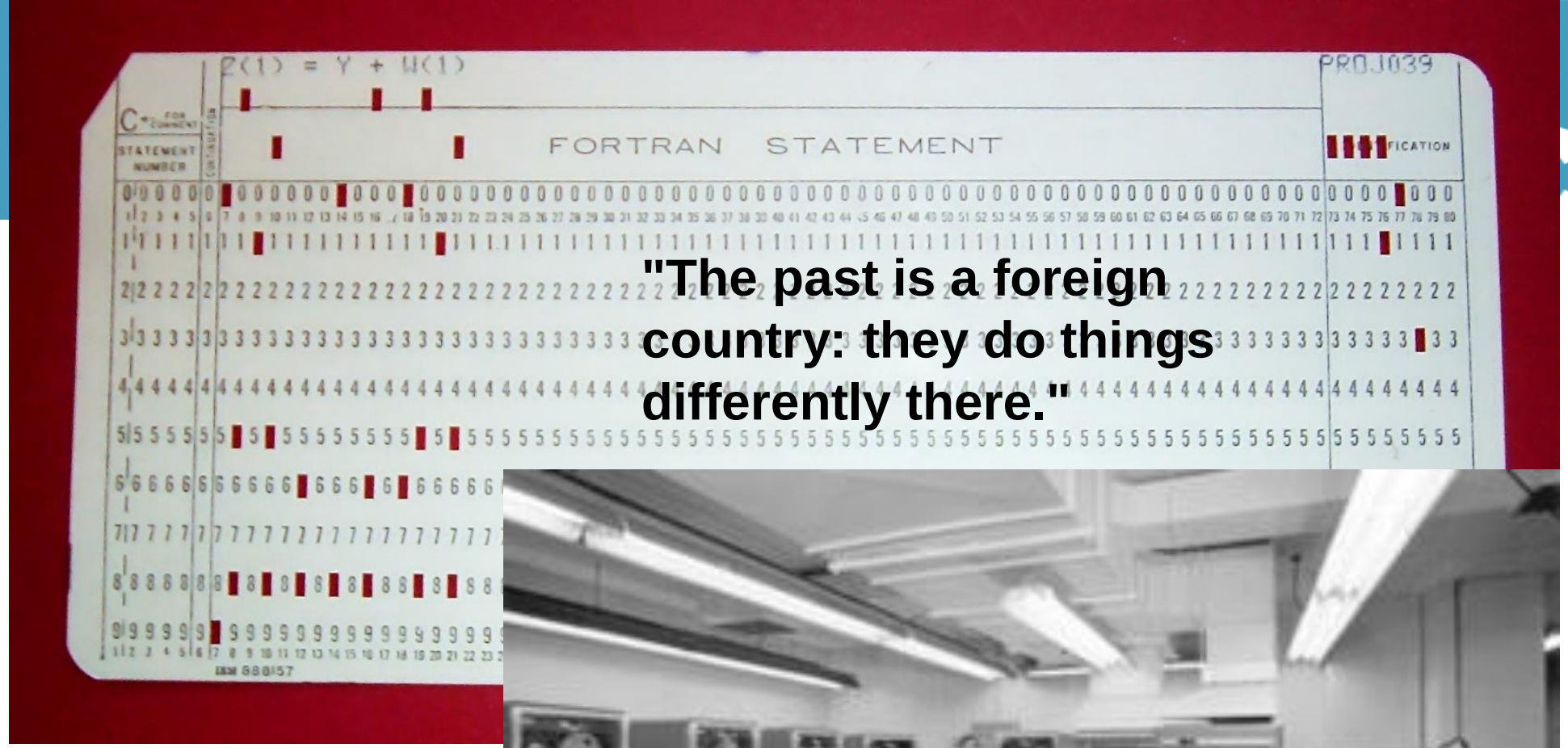
Hon Cons UCLH & Great Ormond Street Hospital, London

Former Chair of GMC 2015-18
Past-President Royal College of Paediatrics & Child Health 2009-12

Standardised Data and Patient safety

- I joined the GS1 Advisory board in 2015 – my advice was to engage clinicians and see an evidence base
- My third time here – huge advances already. See the ‘TechTalks’ tomorrow
- Previously I have spoken about how the NHS should be thinking like a high risk industry
- Today I want to talk about standardised data

Where were we with data in 1979?



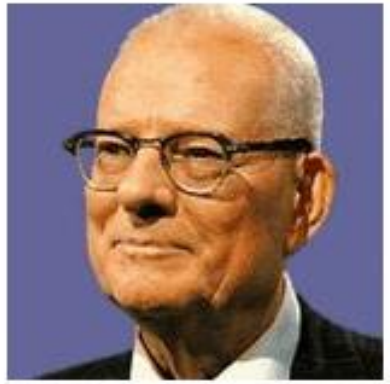
"The past is a foreign country: they do things differently there."

SCIENTIA
SCIENTIA IMPERII DECUS ET TUTAMEN

Where are we with data in 2019?

Data – we are surrounded by it and the UK NHS is awash with it

- Cancer registries
- Immunisation records
- Emails
- 100,000 genome project
- 3D MRI = 150 Mb
- Electronic health records



"In God we trust; all others bring data."

– W. Edwards Deming

Will ‘Big Data’ answer all our health questions?

- By 2020, the average UK hospital will generate 1000 terabytes/year
- 50 petabytes of healthcare data stored currently
- 90% of the world’s data generated in the last 2 years
- Exponential increase since internet 1989 and subsequent email, text, apps and other cyber data

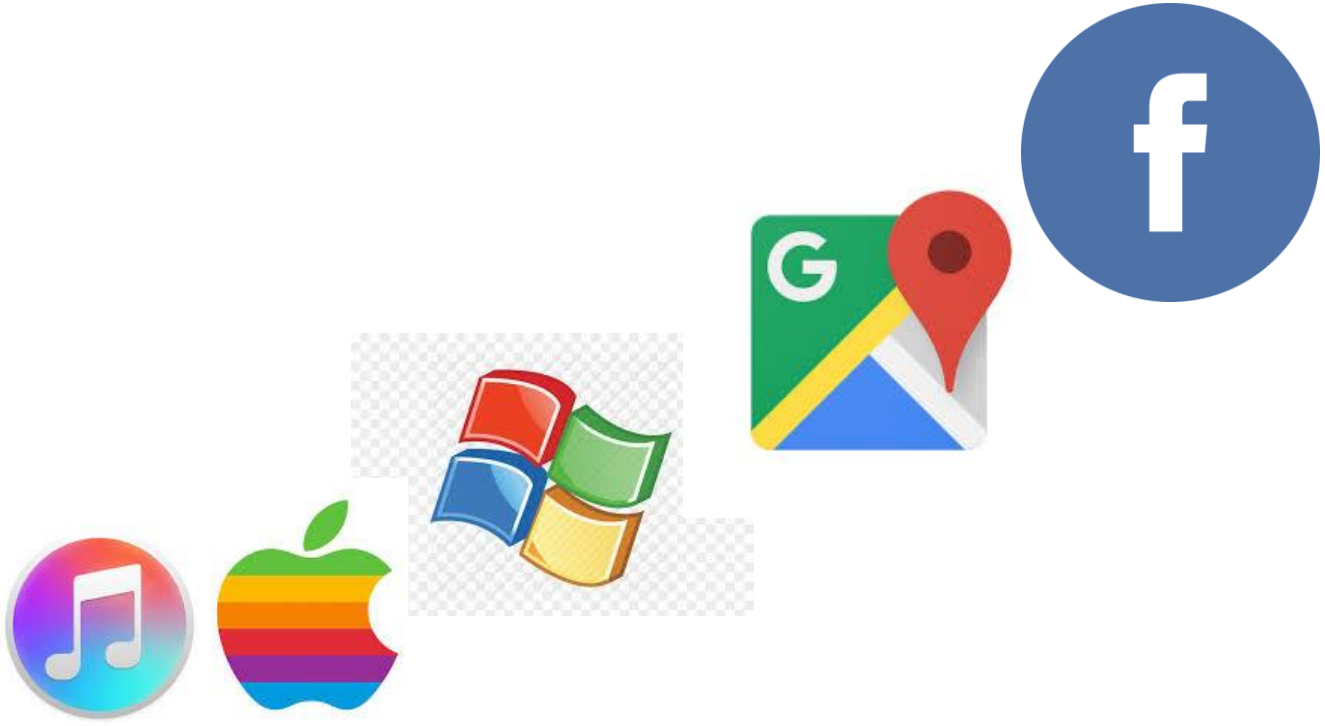
What will Big Data be used for?

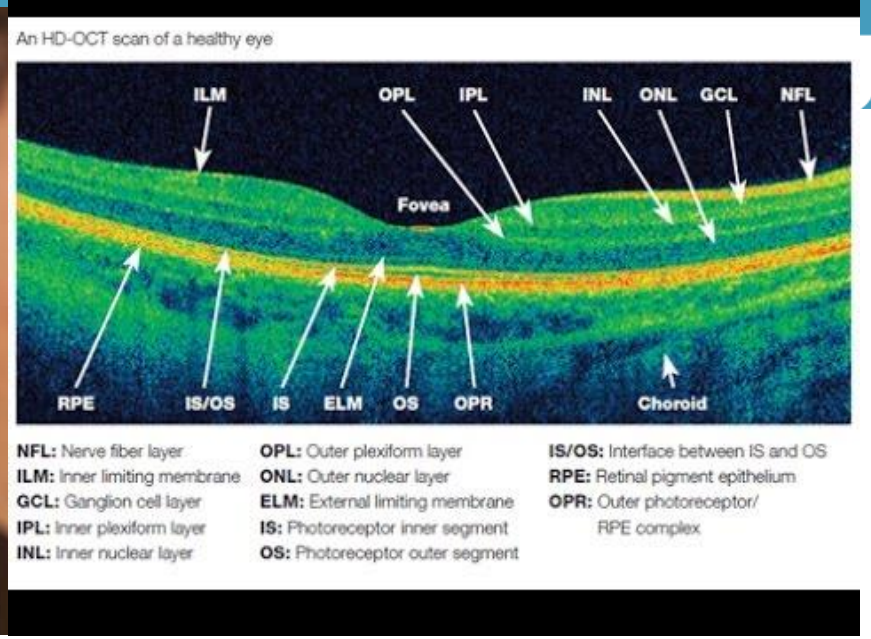
- Support research
- Support self care
- Support providers

BUT to do this we need to transform unstructured data into useful information

World's 5 biggest companies all use Big Data

- Amazon
- Apple
- Microsoft
- Facebook





Machines faster than humans at diagnosing brain injuries

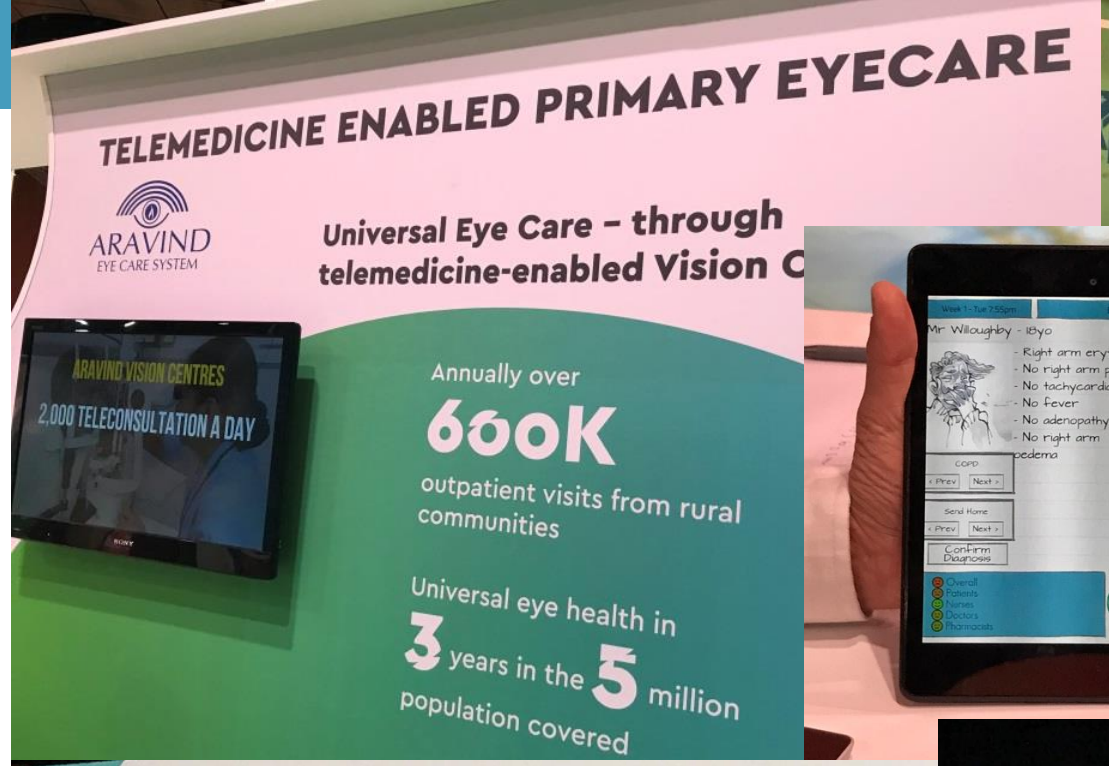
Tom Whipple Science Editor

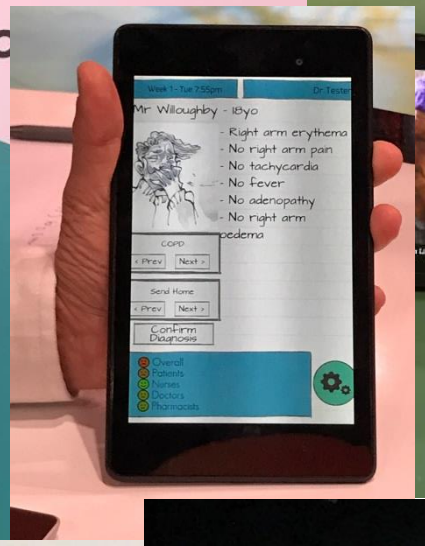
Computers have outperformed doctors in diagnosing neurological illnesses and retinal disease — a finding that scientists said could speed up treatments.

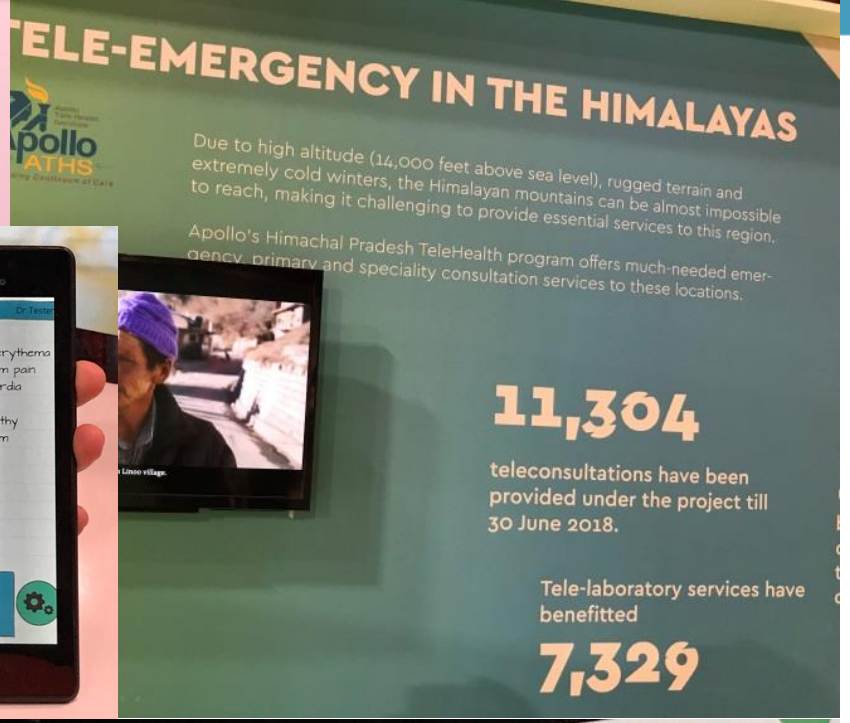
In two separate studies, artificial intelligence programs were trained to spot the signs of illness in CT scans. They did it as well as humans and were 100 times faster.

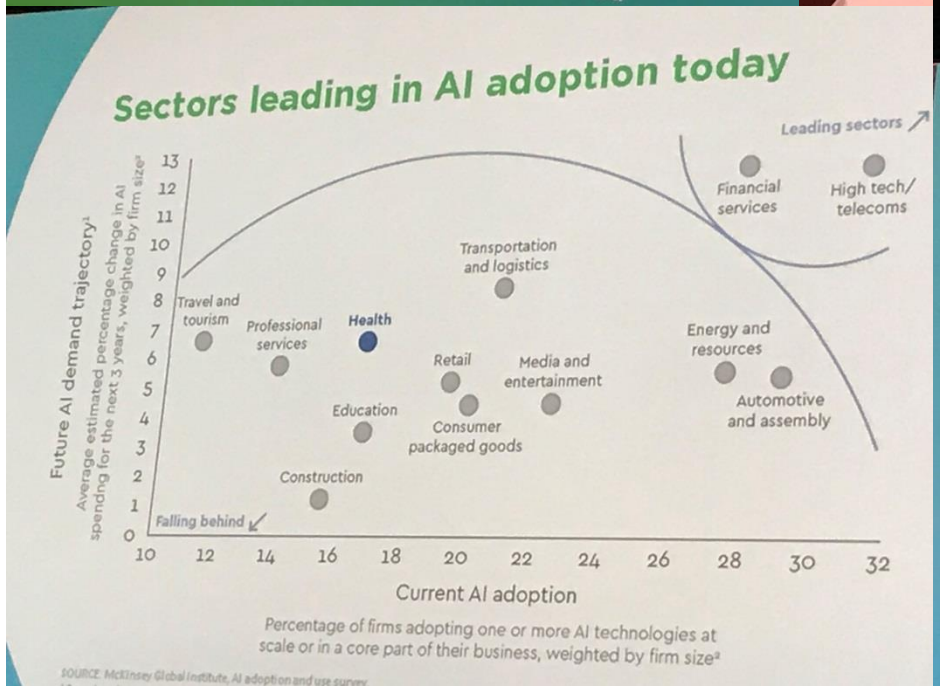
Scientists said this meant dangerous conditions could be spotted far more quickly. Eric Oermann, from Icahn School of Medicine at Mount Sinai, said: "With a total processing and interpretation time of 1.2 seconds, such a triage system can alert physicians to a critical finding that may otherwise re-

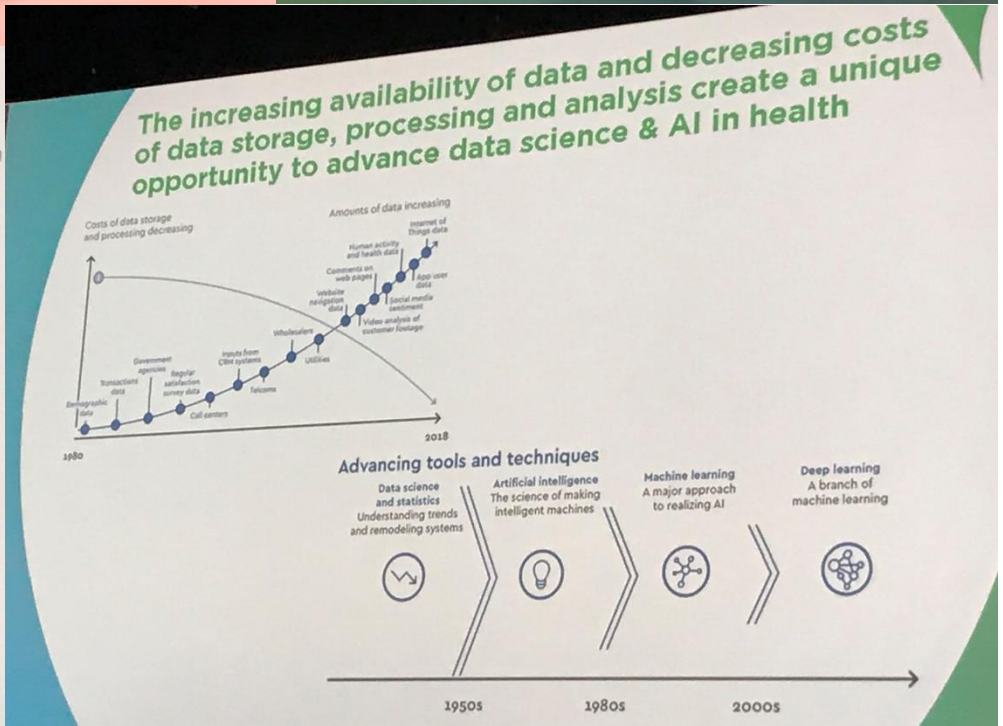
humans in a simulat
ment. The research
tention was not to r
flag up worrying sca
they did not sit in
ially critical minute
"The expression
fies that rapid respo
treatment of acute
es, so any tools th
diagnosis may lead
outcomes," Joshua
Mount Sinai Healt
In a separate stud
nal, a British team f
Hospital, London, a
pany DeepMind,
niques to classify r
agnose early signs


TELEMEDICINE ENABLED PRIMARY EYECARE
ARAVIND
EYE CARE SYSTEM
Universal Eye Care – through telemedicine-enabled Vision C
ARAVIND VISION CENTRES
2,000 TELECONSULTATION A DAY
Annually over
600K
outpatient visits from rural communities
Universal eye health in
3 years in the 5 million
population covered


Mr Willoughby - 13yo
- Right arm erythema
- No right arm pain
- No tachycardia
- No fever
- No adenopathy
- No right arm oedema
COPD
Send Home
Confirm Diagnosis


TELE-EMERGENCY IN THE HIMALAYAS
Apollo
PATHS
Due to high altitude (14,000 feet above sea level), rugged terrain and extremely cold winters, the Himalayan mountains can be almost impossible to reach, making it challenging to provide essential services to this region.
Apollo's Himachal Pradesh TeleHealth program offers much-needed emergency, primary and speciality consultation services to these locations.
11,304
teleconsultations have been provided under the project till 30 June 2018.
Tele-laboratory services have benefitted
7,329


Sectors leading in AI adoption today
Leading sectors
Financial services
High tech/ telecoms
Transportation and logistics
Travel and tourism
Professional services
Health
Retail
Media and entertainment
Energy and resources
Education
Consumer packaged goods
Automotive and assembly
Construction
Falling behind
Future AI demand trajectory¹
Average estimated percentage change in AI spending for the next 3 years, weighted by firm size²
Current AI adoption
Percentage of firms adopting one or more AI technologies at scale or in a core part of their business, weighted by firm size²
SOURCE: McKinsey Global Institute, AI adoption and use survey


The increasing availability of data and decreasing costs of data storage, processing and analysis create a unique opportunity to advance data science & AI in health
Costs of data storage and processing decreasing
Amounts of data increasing
1980
2018
Advancing tools and techniques
Data science and statistics
Understanding trends and remodeling systems
Artificial intelligence
The science of making intelligent machines
Machine learning
A major approach to realizing AI
Deep learning
A branch of machine learning
1950s
1980s
2000s

Where will we be with data in 2039?

There will be huge change – as there has been since 1979

Population

- Age
- Births
- Social isolation
- Loss of the nuclear family
- obesity

Technology

- Genomics
- Nanotechnology
- Artificial intelligence
- Robotics
- Online medicine
- Data

Disease patterns

- Long-term conditions
- Complexity
- Multi-morbidity
- Emerging disease
- Climate change

BMJ 2013;346:f4028 doi: 10.1136/bmj.f4028 (Published 24 June 2013)

BMJ

VIEWS & REVIEWS

PERSONAL VIEW

To boldly go from "computer says no" to an iNHS

It's IT, Jim, but not as we know it, says **Terence Stephenson**, with some suggestions for improvements

Terence Stephenson *professor and chair, Academy of Medical Royal Colleges, London EC1V 0DB, UK*

Captain's log. Stardate May 2013

0830-0930: Consultant led handover as per Francis.[1] The cases are projected by the trainee, Dr McCoy, on to the

1030: The nurse gives the antibiotics intravenously as prescribed but, through an easily avoidable decimal point error, the dose is only a tenth of the therapeutic dose and so is inadequate against the patient's septicaemia. Unfortunately,

Computerised prescribing with computerised decision support can decrease serious medication errors by 55% - 64%

EPIC at UCLH

Interoperability and standardised data

PERSONAL VIEW

To boldly go from "computer says no" to an iNHS

It's IT, Jim, but not as we know it, reports **Terence Stephenson**

Captain's log. Stardate May 2013
0830-0930: Consultant led handover as per Francis.[1] The cases are projected by the trainee, Dr McCoy, on to the screen of the NHS Enterprise. Mr Chekov says, "Let's just take a quick look at the chest x ray." Bones has to come out of the current program, decline several on-screen queries, open a new program, and re-enter his username and password—only to be told that the x ray software won't open unless he begins again and closes the word processing program. Three minutes have elapsed, and we have 60 minutes to discuss 20 cases. We give up, noting the excellent radiologist's report but missing a valuable teaching opportunity. Thank goodness we didn't have to access anything as complicated as the tricorder or switch the phasers to stun.
0930: Consultant led ward round[2] starts on ward A. The first patient has sickle cell disease and a fever and has been seen by another NHS hospital more than a year ago.
0945: The general practitioner and St

Thank goodness we didn't have to access anything as complicated as the tricorder or switch the phasers to stun

Safety—General practice
e-prescribing and e-rec
Why are systems whi
calculation, drug int
prescribing not rou
errors are a comm
claims; as many
negligence clai
prescribing er
"*Outside-in*"
10 minute c
through m
passwords
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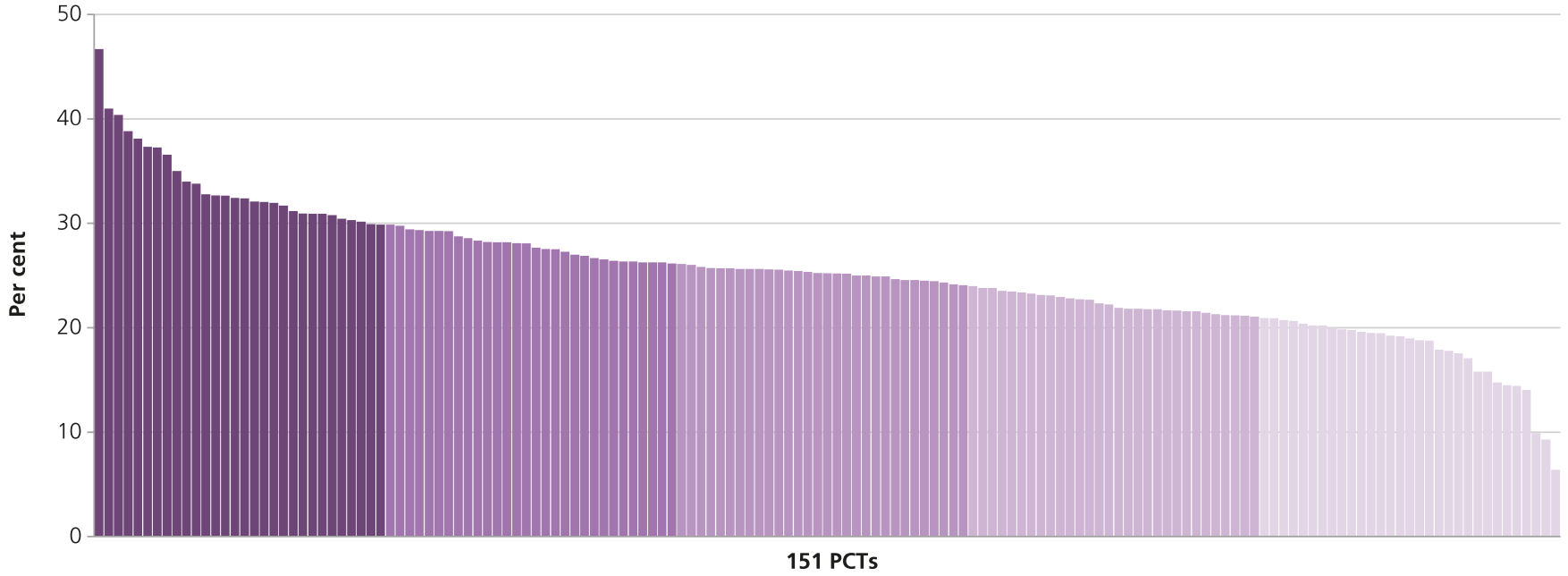
Expert Clinical Advice – MHRA Medical Devices

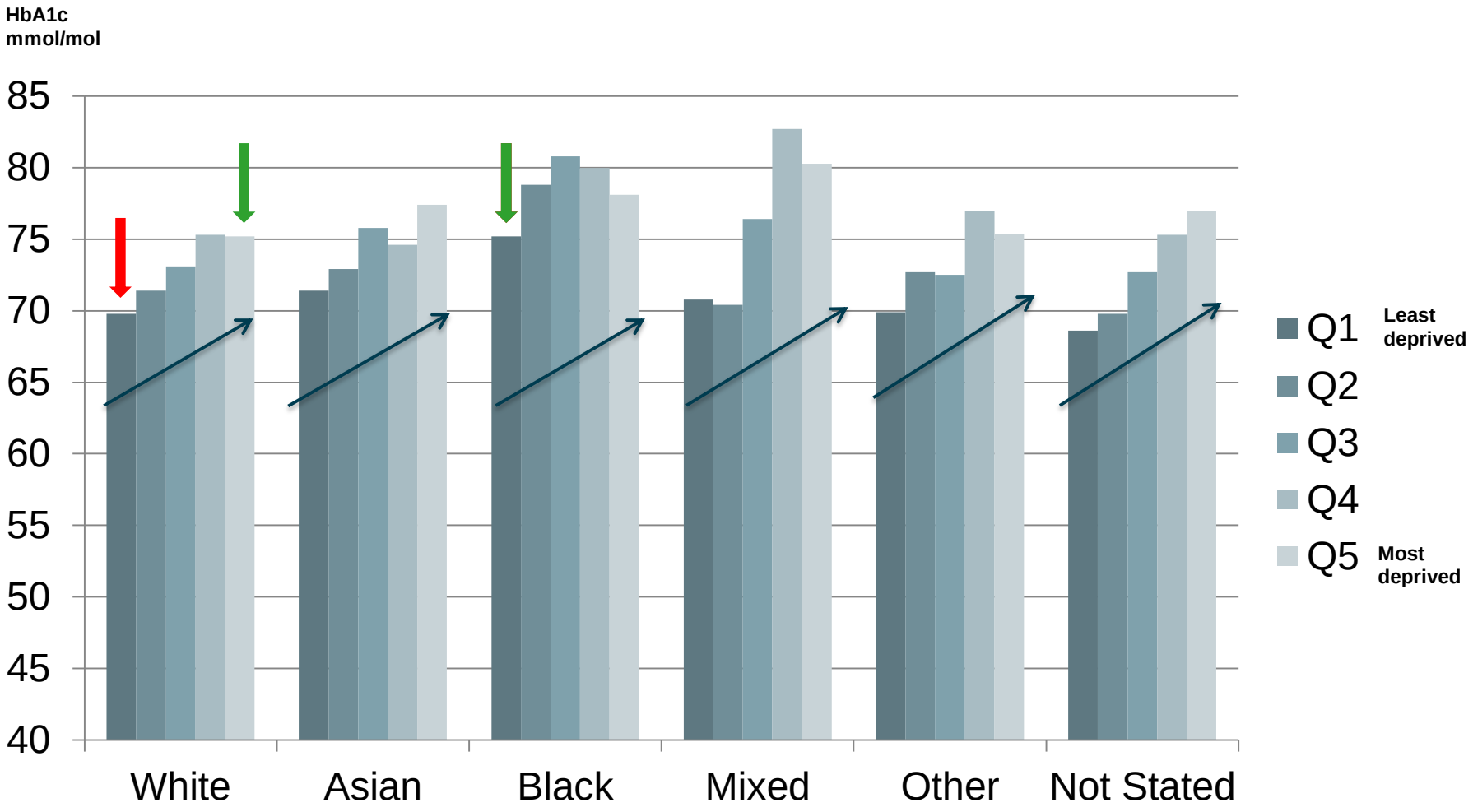
Report of the independent review on MHRA access to clinical advice and engagement with the clinical community in relation to medical devices.

Professor Terence Stephenson

% of children with diabetes admitted with ketoacdosis over last 5 yrs – 7 fold variation across England



Inequalities in glycaemic control in CYP with T1D – mean HbA1c by deprivation quintile across major ethnic groups



Cross-sectional analysis of 2012-13 NPDA data

The Times 16 Feb 2019

Robots to hasten the demise of grumpy doctors

Eric Topol, who this week published a report for the Department of Health on adapting NHS staff to the rise of digital technology, argues that automation of diagnosis will mean that routine care will no longer need a doctor at all as nurses or even receptionists equipped with computers can do just as well.

“We are heading for a global workforce crisis in healthcare. It’s estimated that the world will need an extra 18m health workers by 2030 as the population grows and ages. In the short term the UK is in danger of making a bad situation worse.”

Standardised data can make workflow more efficient (ie drudgery):

- Appointments
- MDT
- Triage eg of scans
- Standard measurements
- Semi-automated reporting
- QA
- Informatics

Better use of standardized data can mitigate the workforce deficit but human doctors and nurses will not be redundant any time soon!

Thank you