The Ancien Régime of Health IT

• Slow to automate core processes
• Data locked into proprietary silos
• Limited standardisation
• Absence of systematically used industry standards – no W3C
• Risk averse (good thing in health, but really slows things down)
• Very heavily regulated
• Entrenched provider interests - BMA
• Limited delivery of productivity benefits (productivity lags digitisation)
20 years to reach critical mass on EPR

2018 – October draft tech strategy based on cloud/open platforms/standards

2017 – GDE/FF/LHCRE/Placemat Diagram

*Over 75% of trusts have EPR

2014 – Personalised Health and Care 2020

2010 – NPfIT declared over (not for last time)

2003 – National Programme for IT

1999 – Information for Health

*Less than 75% of trusts had made investments in EHRs

1992 - Information Management and Technology Strategy
EPR penetration rates in acute trusts

Source: Digital Health Intelligence, CDMI data
EPR penetration rates in mental health trusts

All years are based in November except 2018 which is July

Source: Digital Health Intelligence, CDMI data
Taken 25+ years but digital Infrastructure now in place to build on
Smartphone adoption UK

Apple iPhone launches 2007

>75% Smartphone use by 2016

© Statista 2016
Brave New 2.0 World of digital health

- Builds on the infrastructure and digital services now available
- Characterised by scaling quickly and rapid adoption
- **Platform based** – builds on existing services
- Cloud and mobile focused.
- Adherence to **common standards**
- Agile / Fail Fast / get MVP out and then iterate
- Regulators scrambling to catch up
- Directly challenge or bypass current suppliers
- **Focused on consumer**
- Needs Old World
TOP SIX FUNDED VALUE PROPOSITIONS

2018

1. ON-DEMAND HEALTHCARE SERVICES
   Delivers immediate, or near real-time, healthcare services (e.g., physician house-calls, telemedicine).
   $1.41B  50 DEALS

2. DIAGNOSIS OF DISEASE
   Enables the diagnosis of a specific clinical indication.
   $1.28B  33 DEALS

3. FITNESS & WELLNESS
   Supports general health maintenance and promotion, including fitness, nutrition and sleep.
   $1.24B  49 DEALS

4. CONSUMER HEALTH INFORMATION
   Empowers consumers to better understand their own health, general healthcare concepts, and the healthcare system.
   $1.10B  43 DEALS

5. MONITORING OF DISEASE
   Enables the monitoring of a specific clinical condition (e.g., diabetes). Must be monitoring a biometric.
   $1.04B  51 DEALS

6. RESEARCH & DEVELOPMENT CATALYST
   Enables the administration and execution of R&D processes (e.g., drug discovery, clinical trial management).
   $969M  37 DEALS

Source: Rock Health Funding Database
Note: Only includes U.S. deals >$2M
AI and data now the front-line of the digital health revolution
Get well *soon* now

Free NHS GP appointments in minutes on mobile 24/7, and at our clinics across London*

Download the Babylon app

*N to register you will need to switch from your current GP practice. A registration period will apply before you are able to access the service. Available for people living or working within 40 minutes of one of our clinic locations. Download app or see website for details.

babylon
GP at hand
Babylon Health - UK

• **Proposition:** New digital model of primary care services
• AI and machine learning enable smart triaging of patients and AI-driven differential diagnosis
• Disrupting: GP services
• Fans: Matt Hancock, Sec of State for Health and Social Care
• Detractors say: Cherry picking primary care. Unsafe, unproven, don’t believe the hype
The messy, cautionary tale of how Babylon disrupted the NHS

Babylon’s London-based GP surgery is already one of the biggest in the country. But its impact on other NHS services in the area is causing concern amongst clinicians.

Matt Hancock’s endorsement of Babylon risks undermining NHS innovation

High-profile health app under scrutiny after doctors’ complaints

Babylon advice service faces warnings it can miss symptoms of serious illness
23andme – US

• **Proposition:** personal genomics and precision medicine on demand. 23 pairs of chromosomes = one you
• Disrupting: traditional models of medicine and pharma
• Services: Growing! 5 x Genetic Health Risks, 5 x Wellness, 40 x carrier Status, 25 traits including Misophania (hatred of chewing).
• Fans: Matt Hancock
• Detractors say: not medically significant at Ancestry.com stage
Google Deepmind

- **Proposition:** Digitise and mobilise data across the whole of UK healthcare as opener, in order to then be able to apply AI and machine learning
- Disrupting: concepts of UX, AI and how to develop clinical applications
- Fans: Royal Free and Imperial: chief execs swooned at Deepmind
- Detractors say: What about IG? And this may be a bit more complicated. Why Just been taken over by Google.
Sensyne - UK

- **Proposition:** AI data brokerage between NHS and Pharma
- **Disrupting:** clinical trials and medical research data
- **Raised:** £60m in 2018
- **Close links to Oxford University and Trust**
- **Cloud and AI focus**
- **Fans:** Founded by Lord Drayson chair of UK Health Cloud
- **Detractors say:** worried about proprietary deals on data and AI
Tech giants acquisitions in health

• Amazon purchase of online pharmacy PillPack $1 billion
• Veritas Capital acquisition of Cotiviti Holdings (healthcare analytics and payments) for $4.9 billion
• Roche Holding Flatiron Health, (electronic health record software specialist with a focus on oncology) $2.1 billion
Nov 2018 Vitality Study of 400K people recorded sustained 34% increase in activity through incentive programmes including Apple Watch.
Apple Watch 4 can take ECGs, detect Heart Rhythm & Atrial Fibrillation
2. Digital Maturity of Health Systems and Data

- Level 8 - Personalized Medicine & Prescriptive Analytics
- Level 7 - Clinical Risk Intervention & Predictive Analytics
- Level 6 - Population Health Management and Suggestive Analytics
- Level 5 - Waste & Care Variability Reduction
- Level 4 - Automated External Reporting
- Level 3 - Automated Internal Reporting
- Level 2 - Standardized Vocabulary & Patient Registries
- Level 1 - Enterprise Data Warehouse
- Level 0 - Fragmented Point Solutions
UNITING THE UK’S HEALTH DATA TO MAKE DISCOVERIES THAT IMPROVE PEOPLE’S LIVES

TRUSTWORTHY USE OF DATA

1. UK HEALTH DATA RESEARCH ALLIANCE
   - Uniting the UK’s health data
   - NHS DATA: Current members include:
     - NHS England
     - NHS Scotland
     - NHS Digital
     - NCSC
     - Genomics England
   - CONSORT, TRIALS AND REGISTRY DATA: Current members include:
     - CPRD
     - Genomics England
     - MRC EHR
   - Convened by HDRUK

2. DIGITAL INNOVATION HUBS
   - Curating disease focused datasets and providing clinical trial and realworld evidence services

3. HEALTH DATA RESEARCH INNOVATION GATEWAY
   - Finding and accessing nationally aggregated, usable data
   - DISCOVER
     - DE-IDENTIFY
     - LINK
     - ACCESS
     - ANALYSE
     - PHENOTYPE LIBRARY
   - LINK TO TRUSTED RESEARCH ENVIRONMENTS (SAFE HAVENS)
   - Operated by HDRUK

PATIENTS

PATIENT AND PUBLIC BENEFIT

USERS:
- Researchers
- Industry
- NHS
- Charities
- Government
Digital Health and Higher Education

Clear potential in linking data sets to researchers but national policy initiatives have badly damaged public trust

- **Care.data debacle 2014-16** – suggested that government was ready to sell NHS data to highest bidder and ride roughshod over patient consent
- **Sale of HES data by NHS Digital** (HSCIC) to firms including insurers
- **Providing individual patient data to Home Office for immigration enforcement**
- Deliberate lack of clarity on confidentiality and IG – we need to make and win case nationally
The long shadow of Care.data

- Since the Care.data debacle politicians and senior civil servants have avoided anything that looks like a national NHS database - while quietly instead building federated data lakes and infrastructure
- Lack of clarity on priority of direct care / planning and population health / R&D and clinical trials
- LHCRE and Digital Innovation Hubs created into this environment – their development has so far been extremely opaque outside immediate bubble
- Local initiatives to win public trust underway, not yet happening nationally
- Trust vacuum from Care.data not gone away
- New factor is big tech titans– Google, Amazon, Facebook
- Makes for a potentially toxic mix
Concluding thoughts...

- **Health is now digital** and data is the basis for the future improvement of health and wellbeing and health research – but old rules no longer apply
- **Need a personal health data bill of rights** – that puts individual truly in control
- This remains a brave new world offering huge potential benefits – **Who will regulate? Can we really leave to academics and researchers?**
- Currently a highly fragmented landscape with confusing array of actors and initiatives – in which things are evolving extremely quickly
- Need stronger connections between NHS and research bodies at all levels
- Topol Review highlighted that data science skills at all levels will be key to exploiting benefits of data rich digital health – **need to democratise data science**
- Research data sets will be hacked, de-anonymization will occur and individuals suffer as a result