

Data : The new infrastructure for healthcare

Rachel Dunscombe – CEO openEHR

open
EHR

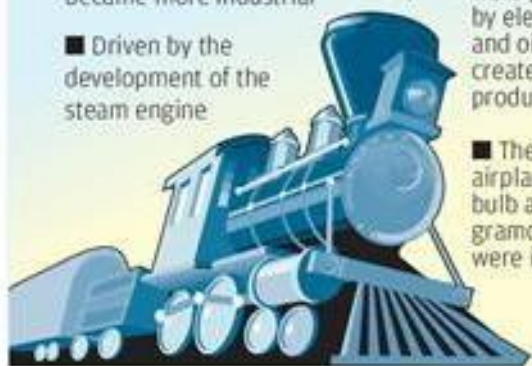
Vitagroup AG Symposium

Industrial revolutions over time

1

Industrial Revolution (late 1700s)

- Rural, agricultural societies became more industrial
- Driven by the development of the steam engine



2

Industrial Revolution (late 1800s)

- New industries were powered by electricity and oil to create mass production
- The telephone, airplane, light bulb and gramophone were invented



3

Industrial Revolution (1980s)

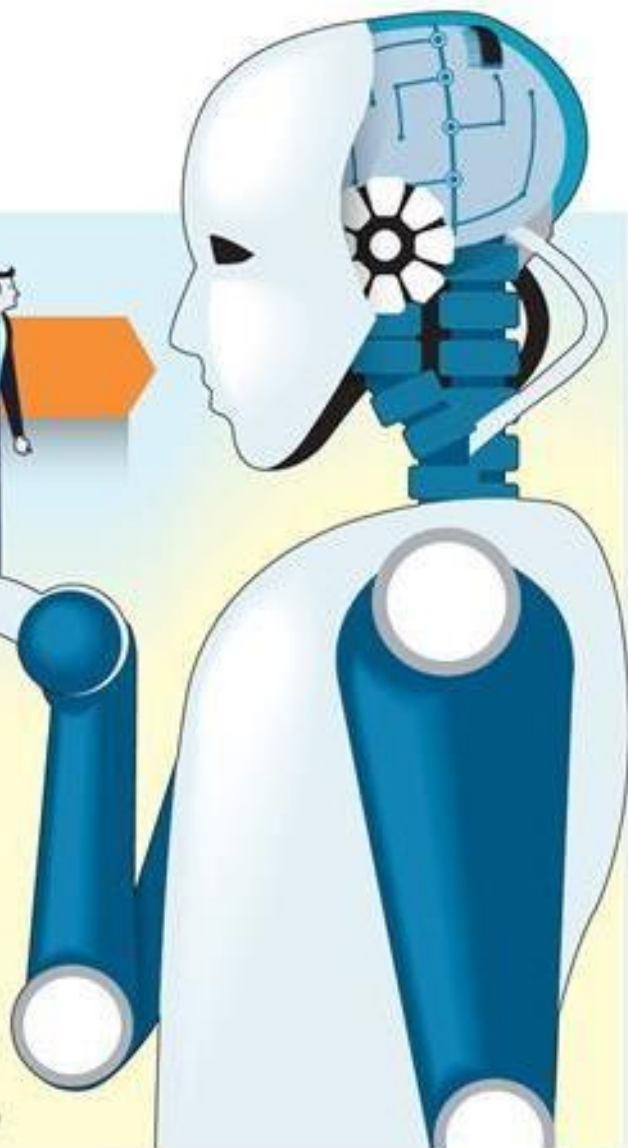
- Known as the digital revolution
- Analog, mechanical devices became digital
- Emergence of personal computers and the Internet



4

Industrial Revolution (present day)

- The blurring of lines between technology and our lives
- Technology becomes embedded in societies and the human body
- Examples of innovations are 3D printing, robotics, artificial intelligence and nanotechnology



1. First Industrial Revolution (Mechanization & Steam Power)

“We are not just changing a few machines, but the whole way we live and work.” — Richard Arkwright (on textile mechanization)

2. Second Industrial Revolution (Electricity & Mass Production)

“There is one thing stronger than all the armies in the world, and that is an idea whose time has come.” — Victor Hugo

3. Third Industrial Revolution (Digital & Automation)

“Automation applied to an inefficient operation will magnify the inefficiency.” — Bill Gates

4. Fourth Industrial Revolution (AI, Robotics, & Data)

“The Fourth Industrial Revolution doesn’t change what we are doing, but it changes us.” — Klaus Schwab, Founder of the World Economic Forum

“AI is not going to replace managers, but managers who use AI will replace those who don’t.” — Erik Brynjolfsson, Stanford Institute for Human Centred AI

Google remakes Super Bowl ad after AI cheese gaffe



GETTY IMAGES

| Gouda is popular - but not that popular

Graham Fraser & Tom Singleton

Technology reporters

6 February 2025

Google has re-edited an advert for its leading artificial intelligence (AI) tool, Gemini, after it overestimated the global appetite for Gouda.

The commercial - which was supposed to showcase Gemini's abilities - was created to be broadcast during the Super Bowl.

It showed the tool helping a cheesemonger in Wisconsin write a product description by informing him Gouda accounts for "50 to 60 percent of global cheese consumption".

B B C
NEWS



Hey Siri

Artificial Intelligence Action Summit – Paris 11th Feb 2025



AI ACTION SUMMIT

The Charter identifies the main barrier to scaling AI models as the lack of high-quality data with proper governance structures, rather than computational power alone. It calls for new methods to access quality data while complying with privacy and data protection rights, fostering trust in the AI ecosystem.

<https://www.elysee.fr/en/emmanuel-macron/2025/02/11/the-paris-charter-on-artificial-intelligence-in-the-public-interest>



Health LLMs

Model	Developer	Released	Parameters	Multimodal
Med-PaLM 2	Google	2023	340B	✓
Radiology-Llama2	Meta	2023	70B	✓
MedAlpaca	Technical University of Munich	2023	13B	✓
Clinical Camel		2023	13B	✗
GatorTron	NVIDIA	2021	8.9B	✗
BioMedLM	Stanford University	2022	2.7B	✓
PubMedGPT	Stanford CRFM	2023	2.7B	✗
BioGPT	Microsoft Research	2022	347M	✓
BioLinkBERT		2022	340M	✗
Health Acoustic Representations (HeAR)	Google	2024	313M	✗
MedBERT	Stanford University	2021	17M	✓



Why does data matter in Healthcare

- Data is the new Infrastructure for health systems (AI Policy forum 2024)
- This data Infrastructure allows care to be delivered in or near the home where appropriate and healthcare planning shows this can reduce hospital size as evidenced in South Australia.
- Self care and patient enablement will not occur without unified access to their longitudinal patient record.
- AI “is what it eats” – even the best models perform poorly on poor data.
- The UK now allows data and strategic assets associated to be capitalized using rules for intangible assets making this capital infrastructure.



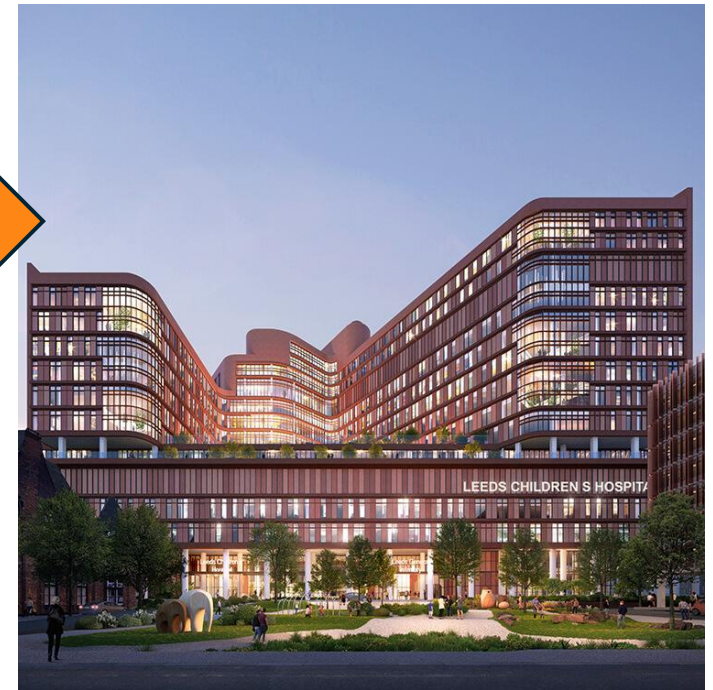
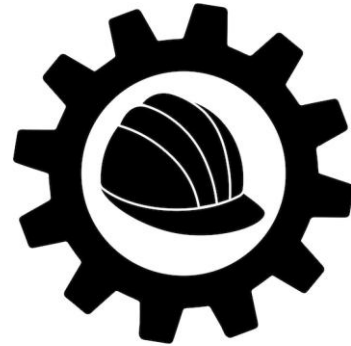
Data as a Capital Asset

A capital asset is a long-term investment in a business that is expected to be useful for more than a year. Capital assets can be tangible, like a computer, or intangible, like a healthcare data and the assets that add value to it e.g. population health systems.

The data has value for the life of the patient and beyond.



Engineering Suitable Infra/Infostructure



Some proof points - why data matters for AI

- **AI Requires Structured, Interoperable Data for Accuracy**

Source: A viewpoint published in the *Journal of Medical Internet Research* discusses the importance of applying standards like openEHR and HL7 FHIR to achieve interoperable and reusable health data, aligning with FAIR principles. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10784985/>

- **AI-Ready Healthcare Data Needs Standardization**

Source: A study titled “Scalable and accurate deep learning for electronic health records” demonstrates that deep learning models using the standards-based formats can accurately predict multiple medical events, emphasizing the need for standardized data formats. <https://arxiv.org/abs/1801.07860>

- **Enhancing Health Data Interoperability with Large Language Models**

Source: A study titled “Enhancing Health Data Interoperability with Large Language Models: A FHIR Study” investigates the ability of large language models to convert clinical texts into FHIR resources, achieving over 90% accuracy compared to human annotations.



The increasing value of good data

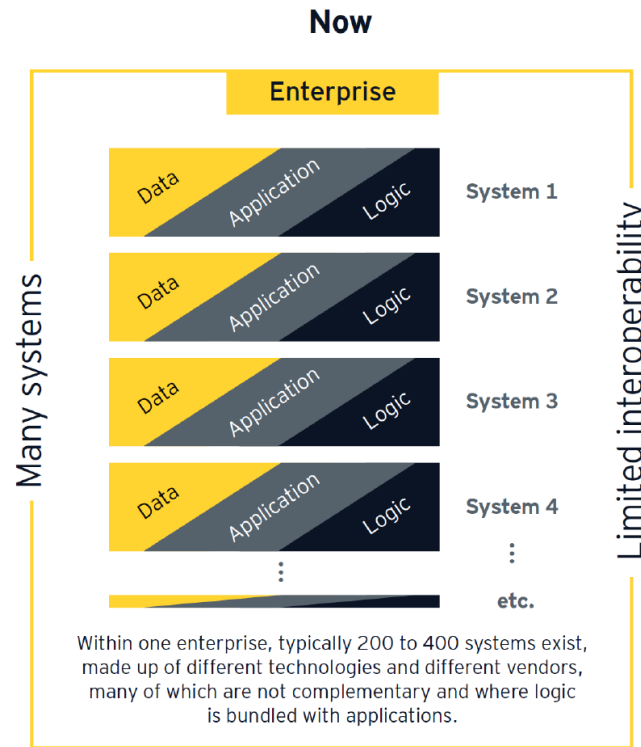
“The UK’s National Health Service is a unique repository of patient data. That data could generate several billion pounds in revenues based on analysis of commercial value of comparable datasets. Moreover, these NHS datasets can enable the rise of Big Data, AI and Personalized Medicine, potentially realizing up to £9.6bn per annum in benefits to patients and the UK economy.”

https://www.ey.com/en_uk/insights/life-sciences/how-we-can-place-a-value-on-health-care-data

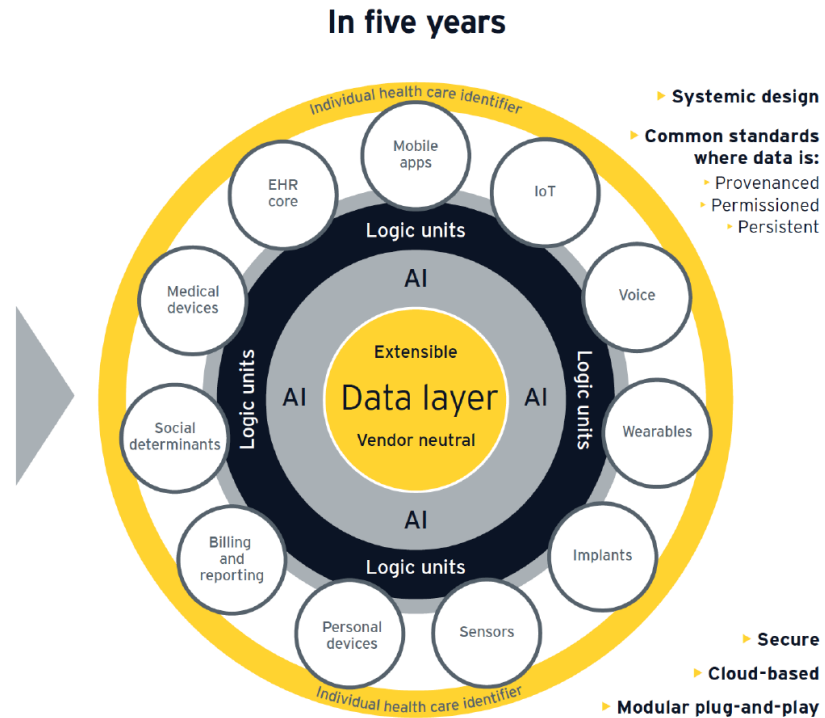


**Imperial College
London**

Engineering the "Infostructure"



Present: Many systems all with intimately bound data logic and applications

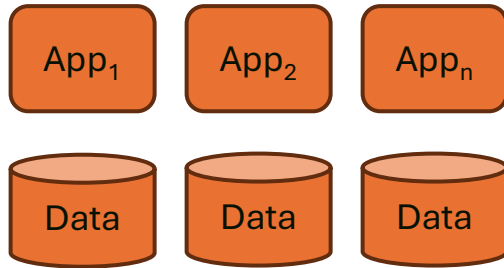


Future: A cohesive technology stack, giving a unified experience for clinicians, professionals and patients; unique data at the center accessed by applications in real time through micro-services

The Infostructure for the future health record

First generation

“best of breed”
(Standalone)

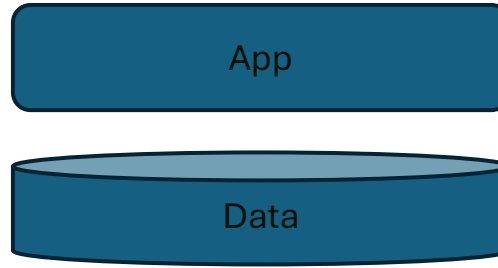


- Robustness
- Value for money
- Flexibility
- Vendor neutrality
- Innovation
- Data semantics
- Interoperability
- Renovation
- Decision support
- Reporting



Second generation

“best of suite”
(Mega suite or monolith)

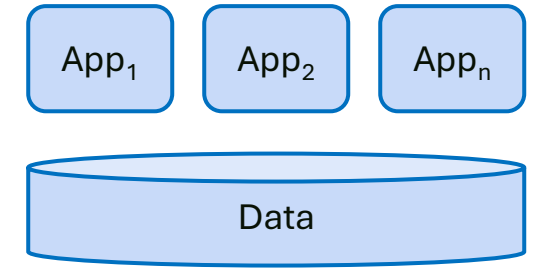


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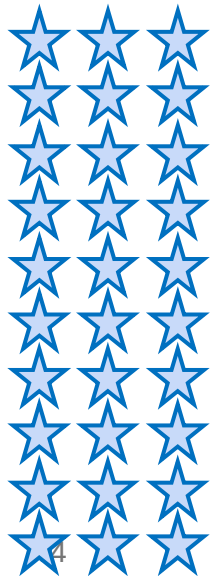


Third generation

“open platform”
(Open ecosystem)



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- Value for money
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Infostructure enabling progress

- Transitioning health systems to new models of care and technology enabled care relies on data
- Enabling the power of AI and large language models for citizen and healthcare needs longitudinal data at scale
- Enabling the benefits of the 4th industrial revolution for quality, efficiency and safety requires well engineered data as a strategic foundation

Healthcare data is **the** enabler for the next generation health system to leverage the 4th industrial revolution.



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The logo for openEHR, featuring the word "open" in orange lowercase letters and "EHR" in blue uppercase letters below it.

open
EHR

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