

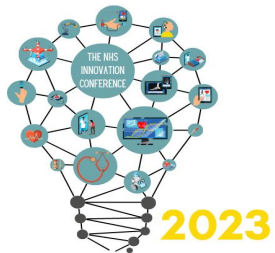
A background image showing several hands of different skin tones cupping dark soil and small green seedlings, symbolizing environmental care and growth.

# Our Commitment to the Planet

**For Each Delegate Attending Our In-Person Event Today, we will be planting 1 tree with our Key Sustainability Partner**



**PLAY IT GREEN**



# Event Day Overview



**Morning Networking: 10:40am – 11:40am**

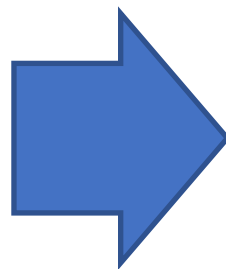
**Lunch & Networking: 13:15pm – 14:05pm**

**Drinks Reception: 16:00pm – 15:00pm**

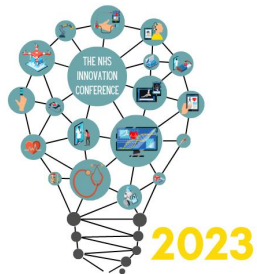
Slido is being used to:

- Collect Feedback
- Run polls
- Gather questions

the next slide will have  
joining instructions.



The event is CDP  
accredited and your  
points will be sent  
within around 6 weeks  
of the event date.



# The NHS Innovation Conference



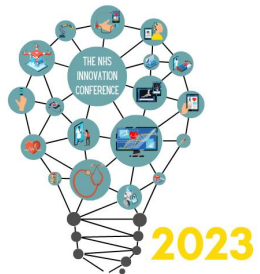
## Event Chair – Opening Address



**Dr Dimitris  
Kalogeropoulos**

Senior Independent Advisor,  
Global Health Innovation Expert  
WHO, World Bank, European  
Commission, UNICEF,  
Healthcare Industry





# The NHS Innovation Conference



## SPEAKING NOW



Patrick Mitchell

Director of Innovation, Digital and Transformation  
Health Education England

I will be discussing...

“Preparing our  
Workforce for the future  
Digital Hospital”

# Convenzis – The digital hospitals conference

## February 2023

An overview of digital deployment across the NHS and the impact on staff recruitment, retention and training – how to build digital capacity across your workforce



**Patrick Mitchell**

**Director of Innovation, Digital and Transformation**



## Reflections on the Topol Review

Proposed **three principles** to support the deployment of digital healthcare technologies throughout the NHS:

- **Patients included as partners** and informed about health technologies
- **Evidence:** the healthcare workforce needs expertise and guidance to evaluate new technologies, on the basis of real-world evidence of clinical efficacy and cost-effectiveness
- **The gift of time:** wherever possible the adoption of new technologies should enable staff to gain more time to care

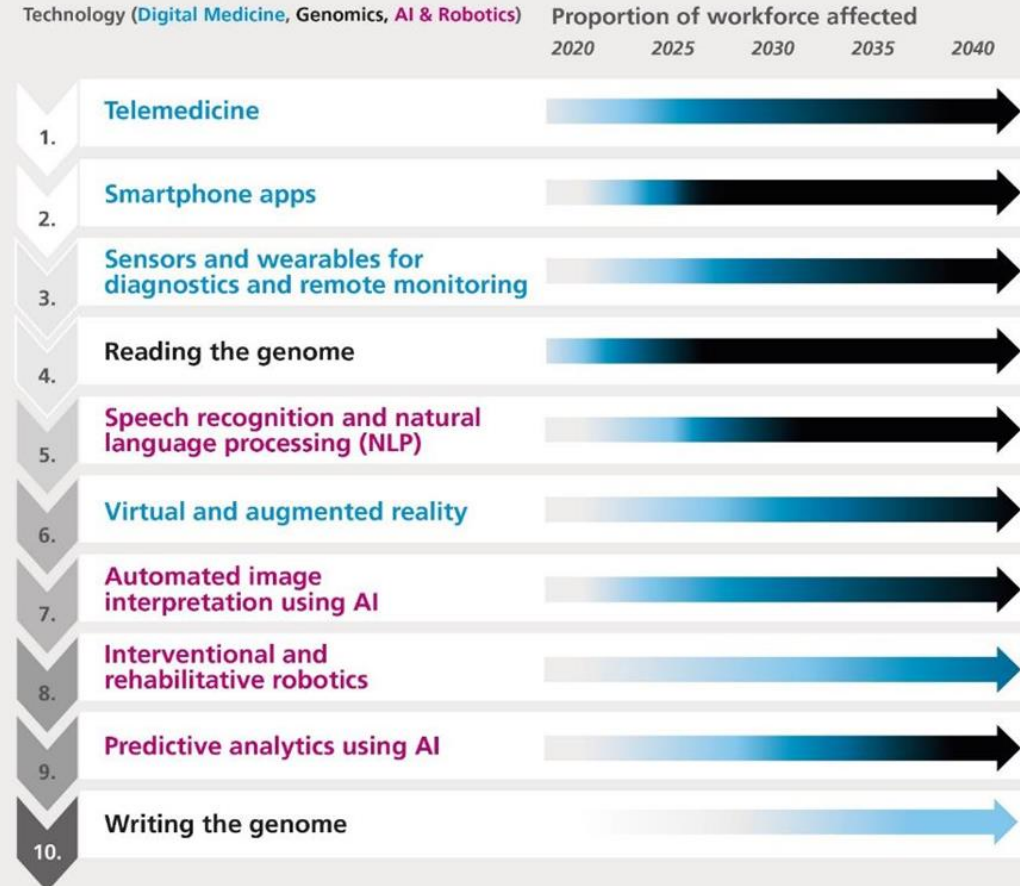
**Four themes:** Genomics, AI & Robotics, Digital Medicine and Organisational Development

# The Topol Review - 2019

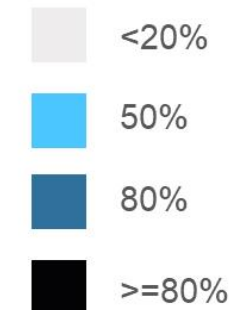
1. How are technological developments likely to change the roles and functions of clinical staff in all professions over the next two decades?
2. What are the implications of these changes for the skills required?
3. What does this mean for the selection, curricula, education, training and development of current and future NHS staff?



# Top Technologies



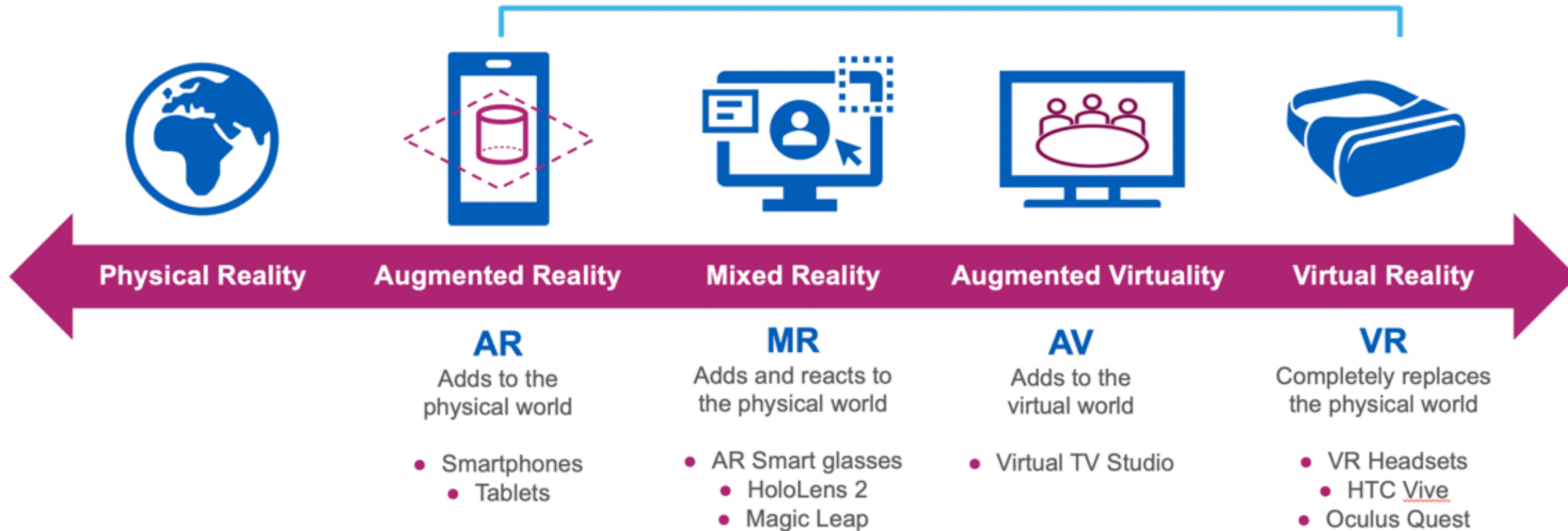
Arrow heat map represents the perceived magnitude of impact on current models of care and, by inference, on the proportion of workforce affected.



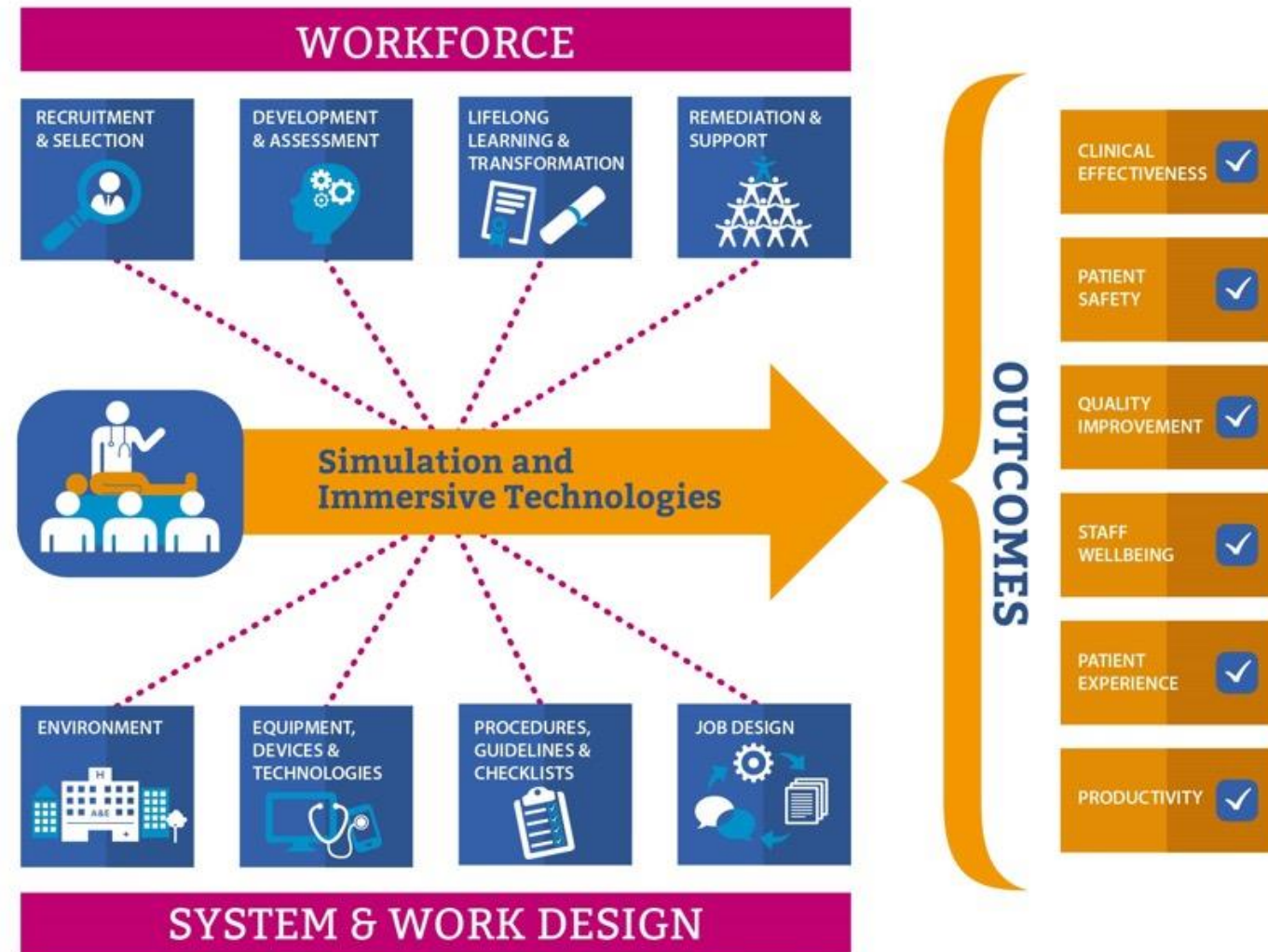


The **Metaverse** is a collection of technologies, tools and networks that enable communication and collaboration in the virtual world using virtual and augmented reality.

## XR = Extended Reality



# Why are we Implementing XR?





# Future Health Learner Needs

- Flexibility in their working
- Flexibility in their learning
- Ownership and portability of their learning.
- Metaskills
- lifelong





# Common Learning Challenges

- Lack of time for learning
- Lack of access to technology
- Low levels of digital literacy
- Doing more with less. Shrinking health workforce.
- Pace at which health is changing



# What are we trying to achieve?

## Challenges and Barriers



Technology available and working with policies for use



Changing shape and capabilities of digital workforce



Rate of technological change very fast, workforce very large in number and often quite disparate



No clear career pathway or professional 'home' for most digital roles



Importance of senior leadership understanding digital



Uncertainty re sustainability of workforce initiatives



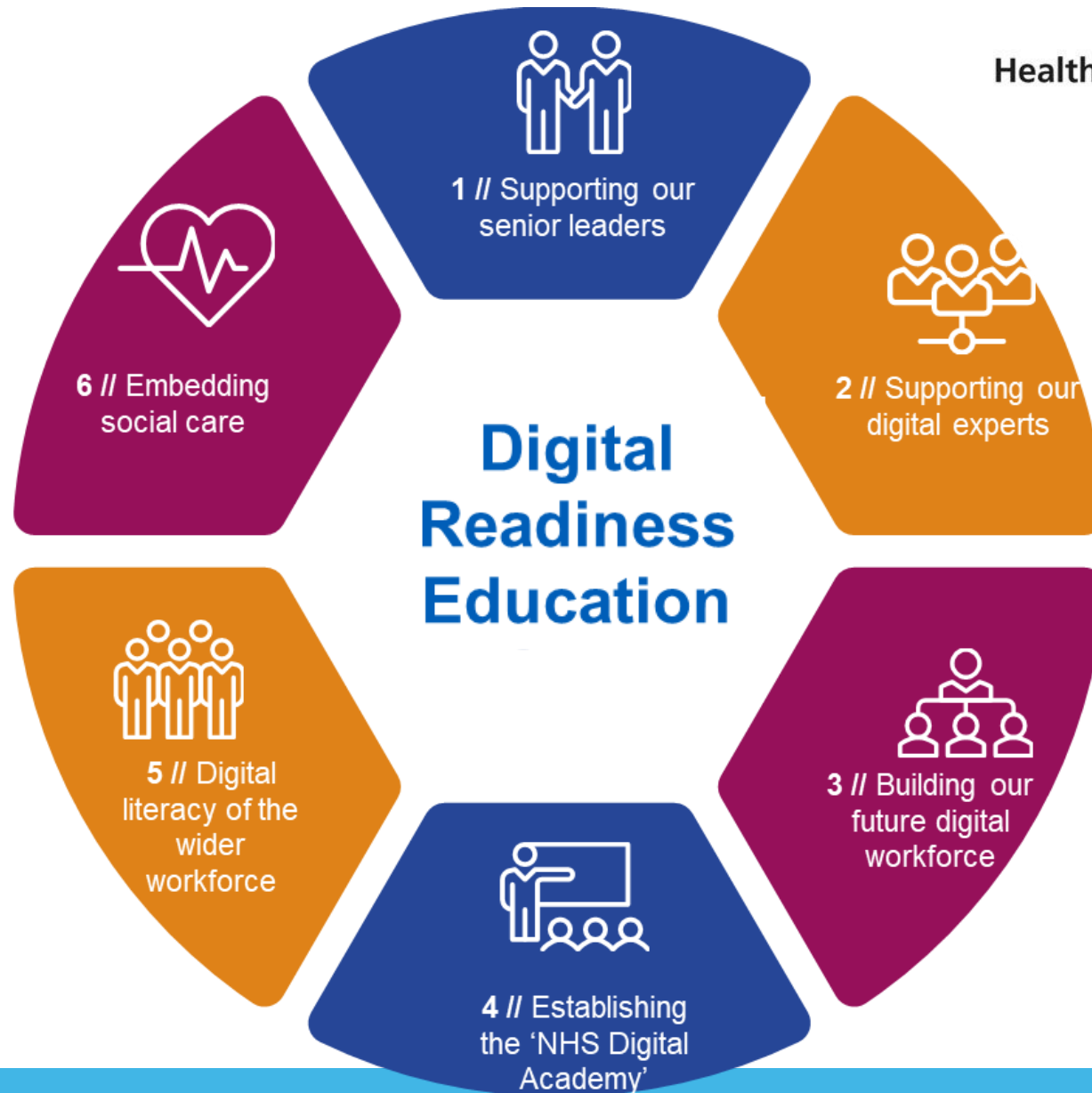
No single, contextualised place for digital learning

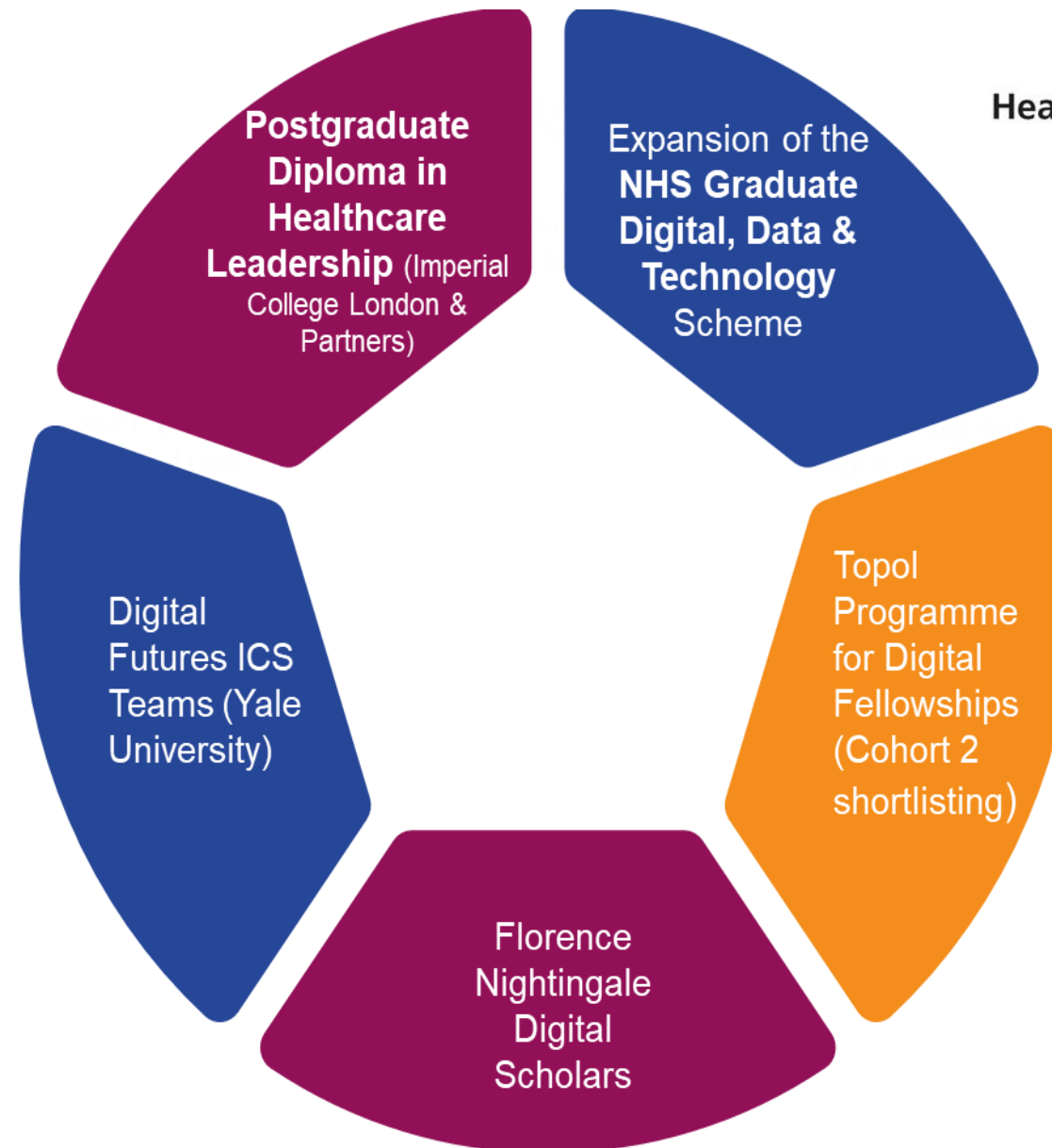


Big shifts in post-COVID-19 ways of working

What are we doing?

## NHS Digital Academy



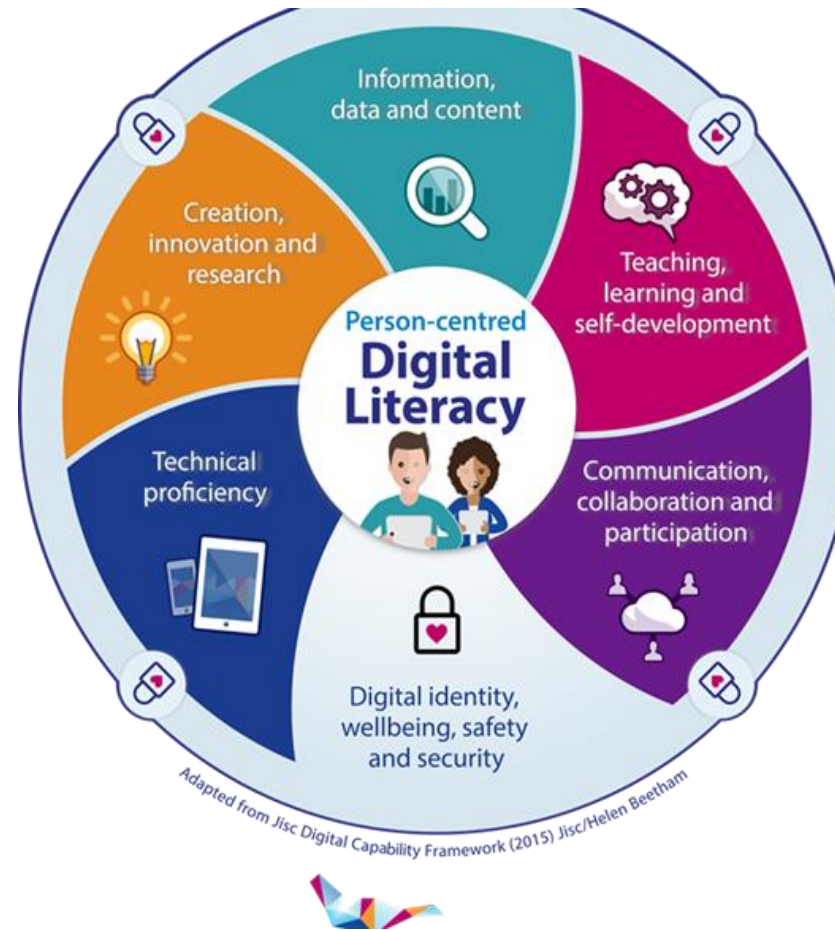


What are we doing?

Digital – Supporting Learning Programmes

# Defining Digital Literacy and Assessment of Needs

“Digital literacies are those capabilities that fit someone for living, working, learning, participating and thriving in a digital society.”



# Approach to Digital Literacy





# How the Pandemic Changed Education

- Return to the frontline and return to training
- To continue to educate the future health and care workforce
- Limited clinical experience opportunities
- Lack of diversity of clinical cases
- Ongoing need to increase the workforce supply

# Technology Enhanced Learning

- Learning Platforms
- Faculty and infrastructure development
- Increase clinical placement capacity (through use of simulation and immersive technologies)
- Increased use of artificial intelligence for supporting learners.
- Digital technologies supporting partnerships





## elearning for healthcare

- knowledge sessions, scenarios, assessments, awareness raising, simulations and reference materials.
- high quality, peer reviewed content is aimed at all roles and professions in the NHS, social care and beyond.

- Providing elearning programmes to educate and train the health and care workforce
- 500 elearning programmes
- 2.4m registered users
- 4.8 million session launches in January 2021 – our biggest month ever
- 26 million session launches in 2021
- Available free of charge to all colleagues working in health and care

<https://www.e-lfh.org.uk/>



**Digital Learning  
Solutions**

**DLS supports over 300 health and care organisations, and over 450,000 users, to create, deliver, manage and track digital learning.**

Its **IT Skills Pathway** service has been launched more than 3.2 million times and has 478,690 learner registrations to date.

It offers:

- generic IT skills learning
- pre and post learning assessments
- tracking, customisation and reporting

DLS has generated more than 1 million learning hours on IT Skills for NHS and Social Care staff.



**Health Education England**



Digital Learning Solutions

Welcome

Find your centre

Log in

Register

# Welcome

Digital Learning Solutions

Log in

Register

— **Welcome**

— [Products](#)

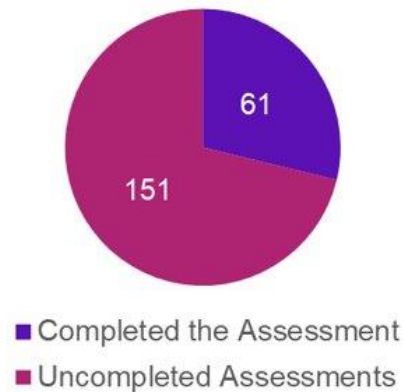
— [Learning content](#)

# TEL Infrastructure Development

## TEL Readiness Assessment

- TEL Readiness assessment allows organisations to benchmark themselves against 8 TEL domains to judge their overall TEL Maturity.
- The assessment identifies strengths and development needs.
- Provides the evidence for targeted support as well as showcasing and spreading best practice.

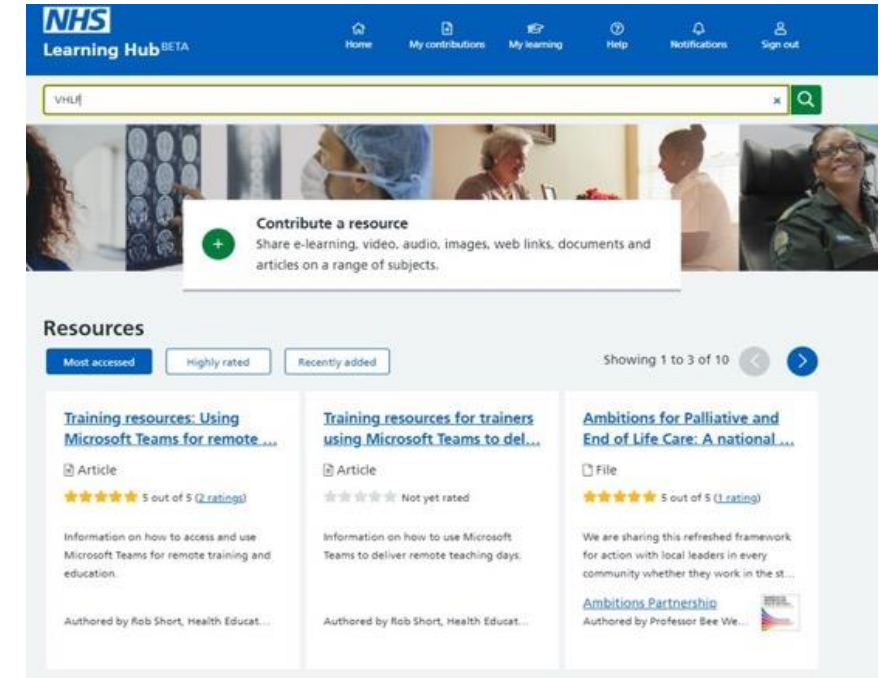
TEL Readiness Assessment Progress



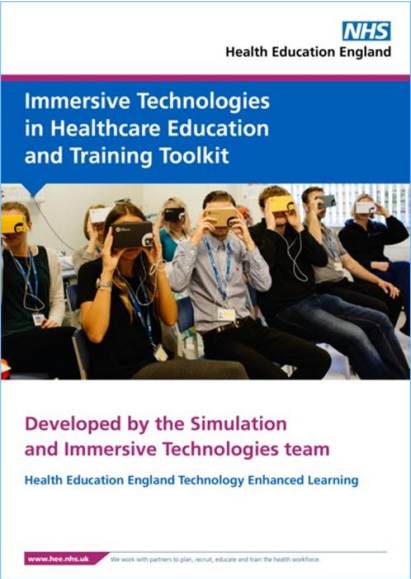
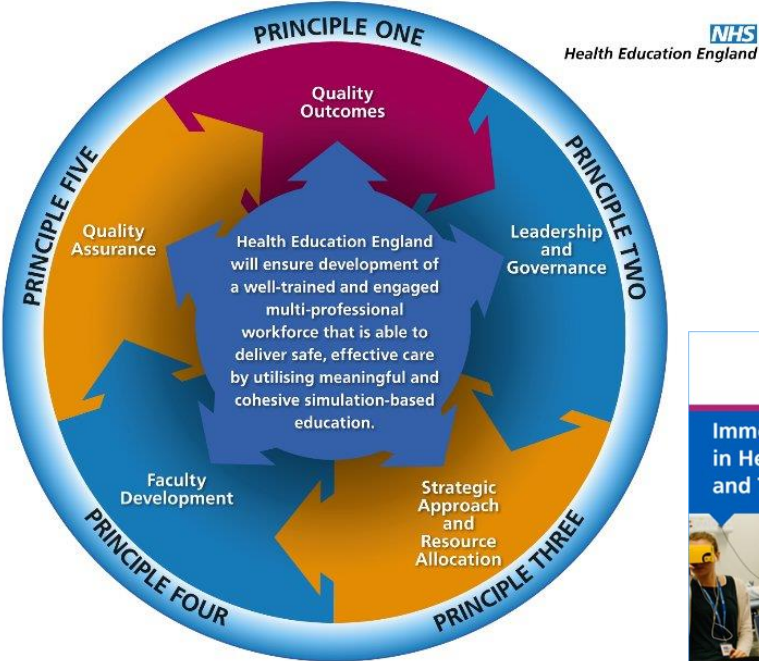


# Virtual and Hybrid Learning

- Increase the **impact**, **confidence** and **capabilities** in designing, developing and delivering virtual and hybrid learning.
- Support every educator and those involved in the education community regardless of ability and experience.
- Enabling the community to be self-serving and self - determined, so educators choose the learning which best meets their needs and the needs of their learners.
- The faculty provides resources (videos, templates, checklists, how to guides) and offers a selection of best practice principles around the design, development, delivery and engagement of virtual and hybrid learning.

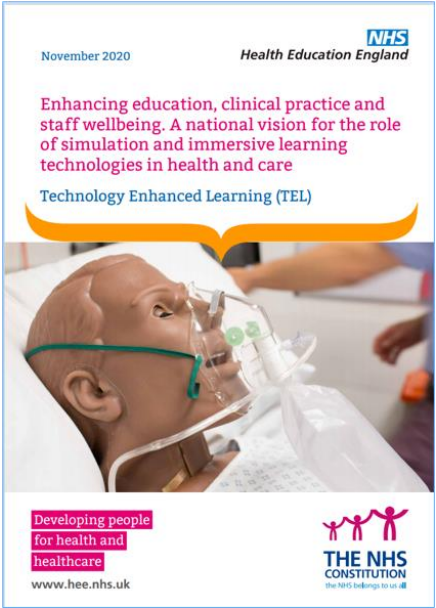


# Guidance and Support



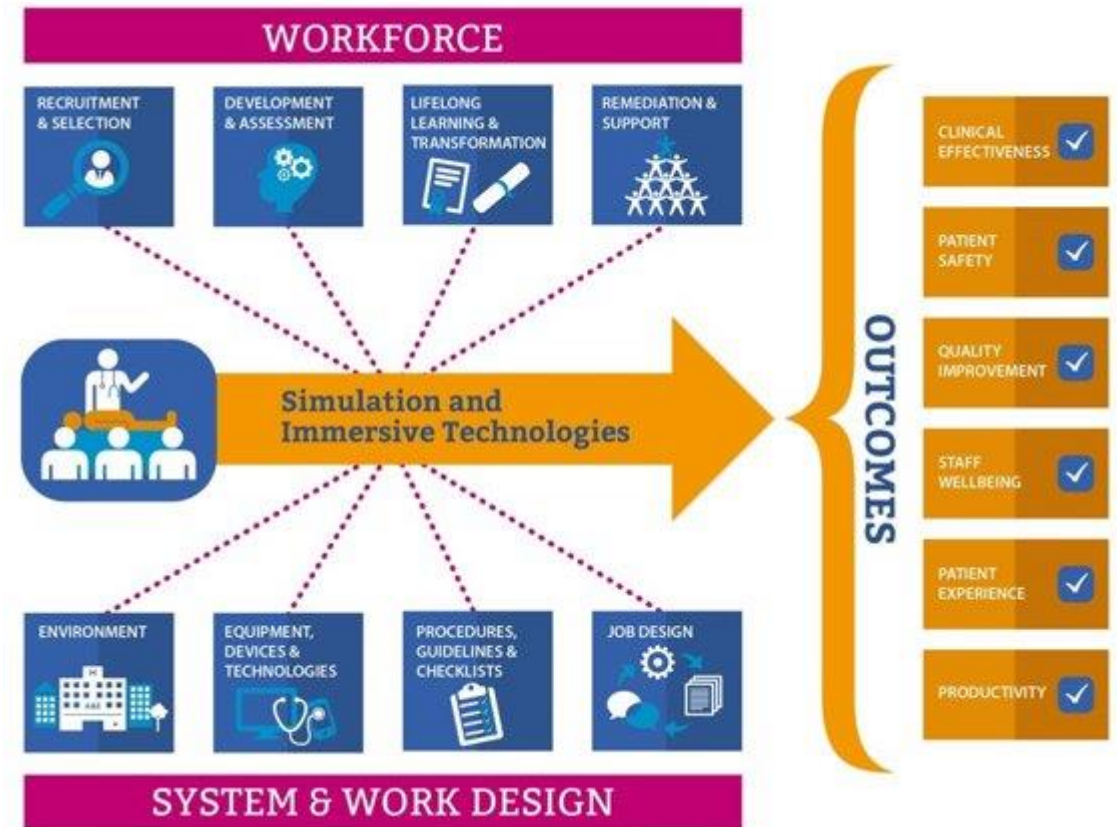
## Simulation-based Education in Healthcare

## Standards Framework



# Increase Clinical Placement Capacity

- **Postgraduate medical and dental specialty training:** to mitigate the impact on medical training from COVID
- **Enhancing placement-based learning and the Blended Learning programme:** expand placement capacity to support workforce requirements and better prepare students to develop the professional capabilities required for their future careers
- **Supporting the implementation of the national patient safety syllabus and strategy:** specific simulation tools and techniques to strengthen critical decision making, multiprofessional team working, clinical leadership capabilities, and support an organisational learning culture in health and care systems



# Blended Learning

The aim of the programme is to commission a creative, innovative, accessible and flexible degrees that uses innovative means in digital and other technologies.



HEE mandate to increase nursing workforce



A more flexible and accessible learning opportunity



Promotion of alternative routes e.g. blended learning



Environmentally friendly and allows increased rate of students



Includes leading edge immersive technologies – risk of overusing wrong tech



Collaboration with 7 universities signed up, delivery from January 2021

<https://www.hee.nhs.uk/news-blogs-events/news/new-blended-learning-nursing-degree-offers-flexibility-choice>

# Learning on-line – Potential Benefits

- Instruction in a **safe, flexible** manner to students with varying time and location constraints.
- Instruction in a manner **familiar** to the current web-oriented generation of students.
- Facilitate the **networking between educators**
- **Reuse of common material** among different courses.
- Ability to deliver various courses to **a large number of students**.
- Economise on **the time of teaching staff**, and the cost of instruction.



# Digital, AI and Robotics Technologies in Education

Educational resources should be developed to educate and train all healthcare professionals in: health data provenance, curation, integration and governance; the ethics of AI and autonomous systems/tools; critical appraisal and interpretation of AI and robotics technologies

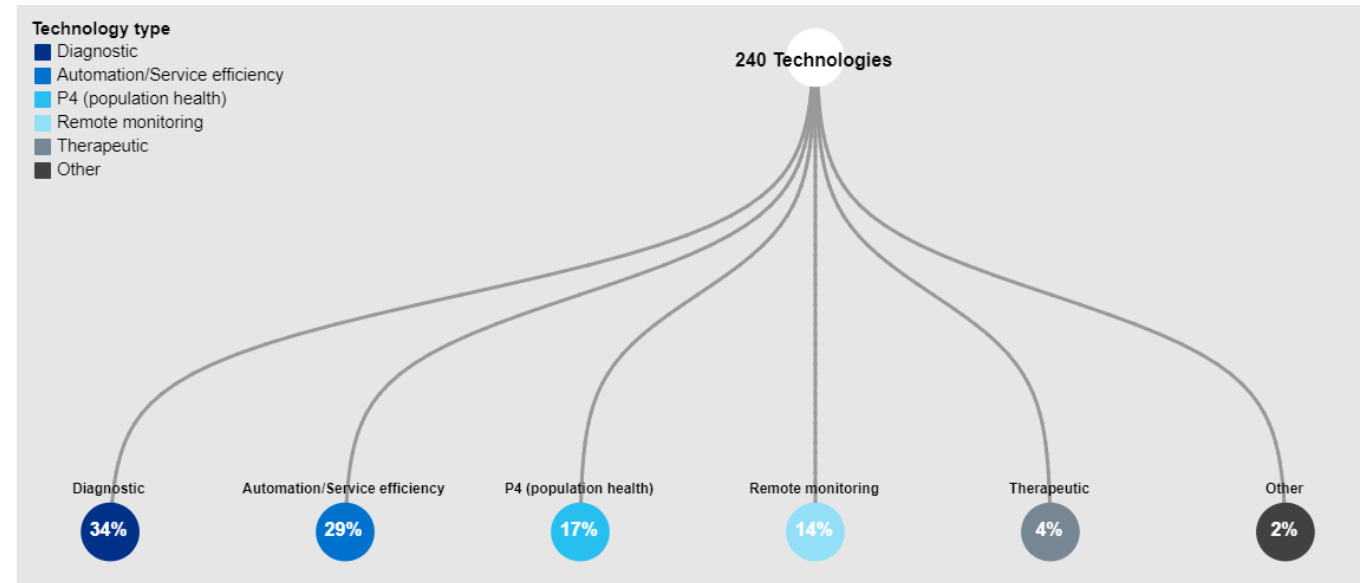




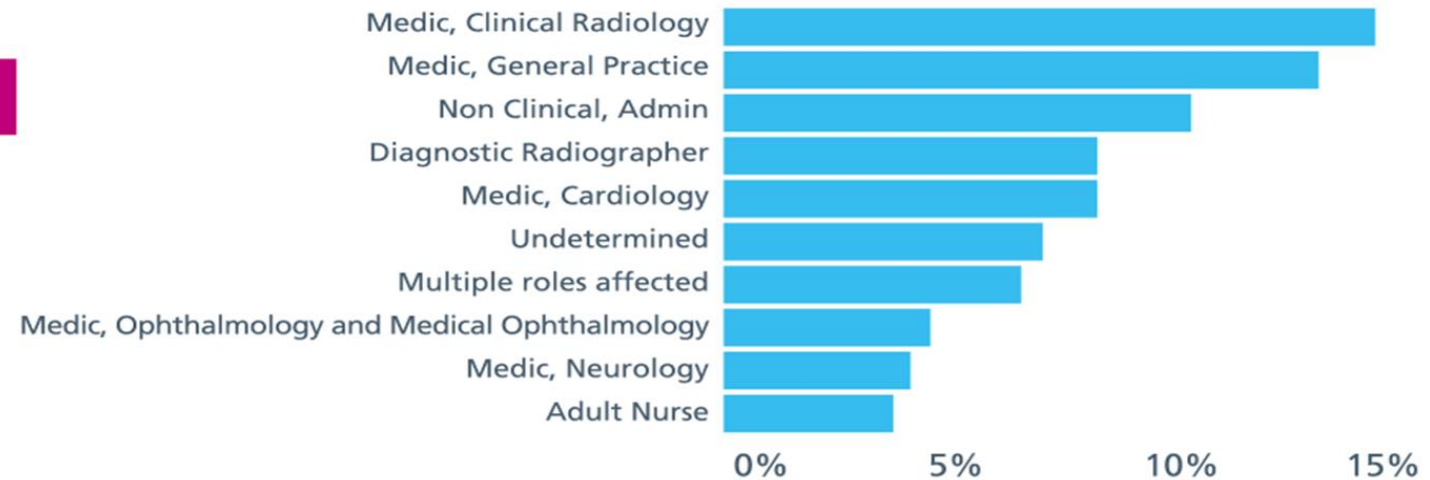
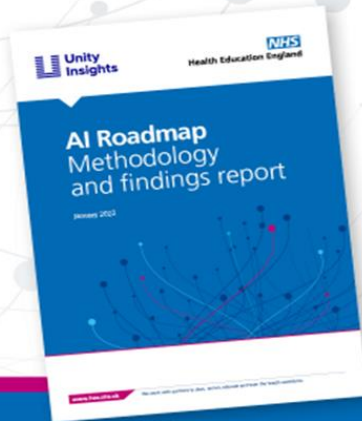
# AI Roadmap

**Aim: Develop a roadmap of AI-driven technologies nearing or ready for market to understand the likely impact on the workforce:**

- Roles affected
- Clinical pathways
- Point of care
- Time to deployment
- Clinical radiology, Cardiology and GP are top clinical areas impacted
- Medics in clinical radiology and GP are top workforce groups impacted
- Most prevalent in secondary care



**Workforce groups  
most affected  
by the use of AI  
technologies**



# Understanding healthcare workers' confidence in AI

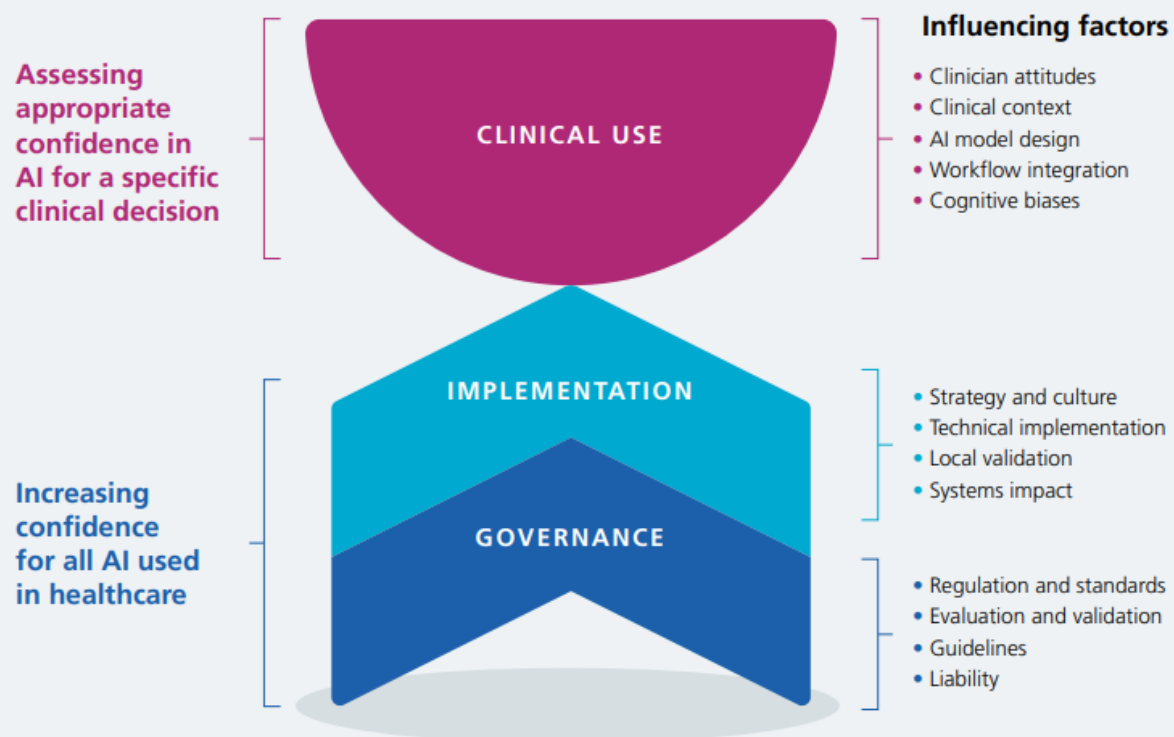
Report 1 of 2

May 2022

NHS AI Lab & Health Education England



**Figure A:** Framework for understanding confidence in AI among the healthcare workforce



# Conclusion

1. To recruit, train and retain staff we need to bring as much flexibility into the system as possible in terms of ways of working and employment practice – the digital agenda is central to supports this.
2. Digital skills training will keep staff current, provide opportunity to innovative and maintain interest therefore build retention.
3. Provide a range of XR opportunities and through blended learning programmes opens up great productivity in education delivery and enabling staff to upskill and work differently
4. There some very specialist digital opportunities especially in AI that have complex data, ethical and education needs that require careful attention.

# Thank you

Patrick.Mitchell@hee.nhs.uk



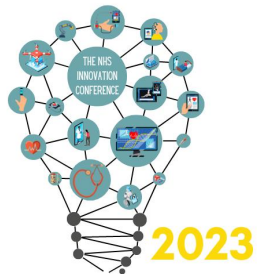
# Slido

**Please scan the QR Code on the screen. This will take you through to Slido, where you can interact with us.**



Tuesday 28th February 2023 - 8:00am – 16:00pm – Hatfield's Conference Centre  
Conference hosted by Convenzis Group Limited





# The NHS Innovation Conference



## SPEAKING NOW



**Douglas Hamandishe**

Chief Digital  
Officer/Broadcaster &  
Presenter - Context Health &  
Centric Health Media



**Phillipa-Rose  
Hodgson**

Head of National Digital  
Product - NHS England's  
Transformation Directorate



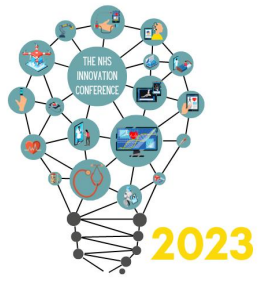
**Lauren Harkins**

Assistant Director of  
Programmes  
NHS England's  
Transformation Directorate



**Rhod Joyce**

Deputy Director of  
Innovation  
NHS England



# The NHS Innovation Conference



## UP NEXT...



Human  
Conversations,  
Automated



# The NHS Innovation Conference



## SPEAKING NOW



Dr Gege Gatt

CEO  
EBO

I will be discussing...

“How can AI help  
achieve a patient-  
centered NHS by 2030?”



# How can AI help achieve a patient-centred NHS by 2030?

**Dr. Gege Gatt, CEO EBO**

28<sup>th</sup> February 2023

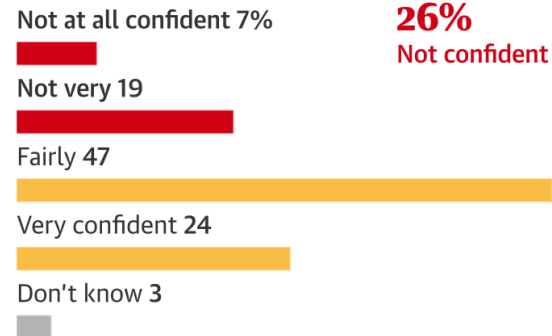
The NHS Innovation Conference, London

# A Challenge: Making the NHS Accessible & Effective

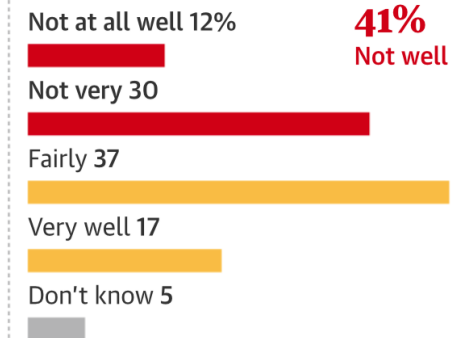


## One in four people in Britain are not confident in the NHS's ability to provide the care they need

How confident are you in the NHS's ability to give you the care you need?



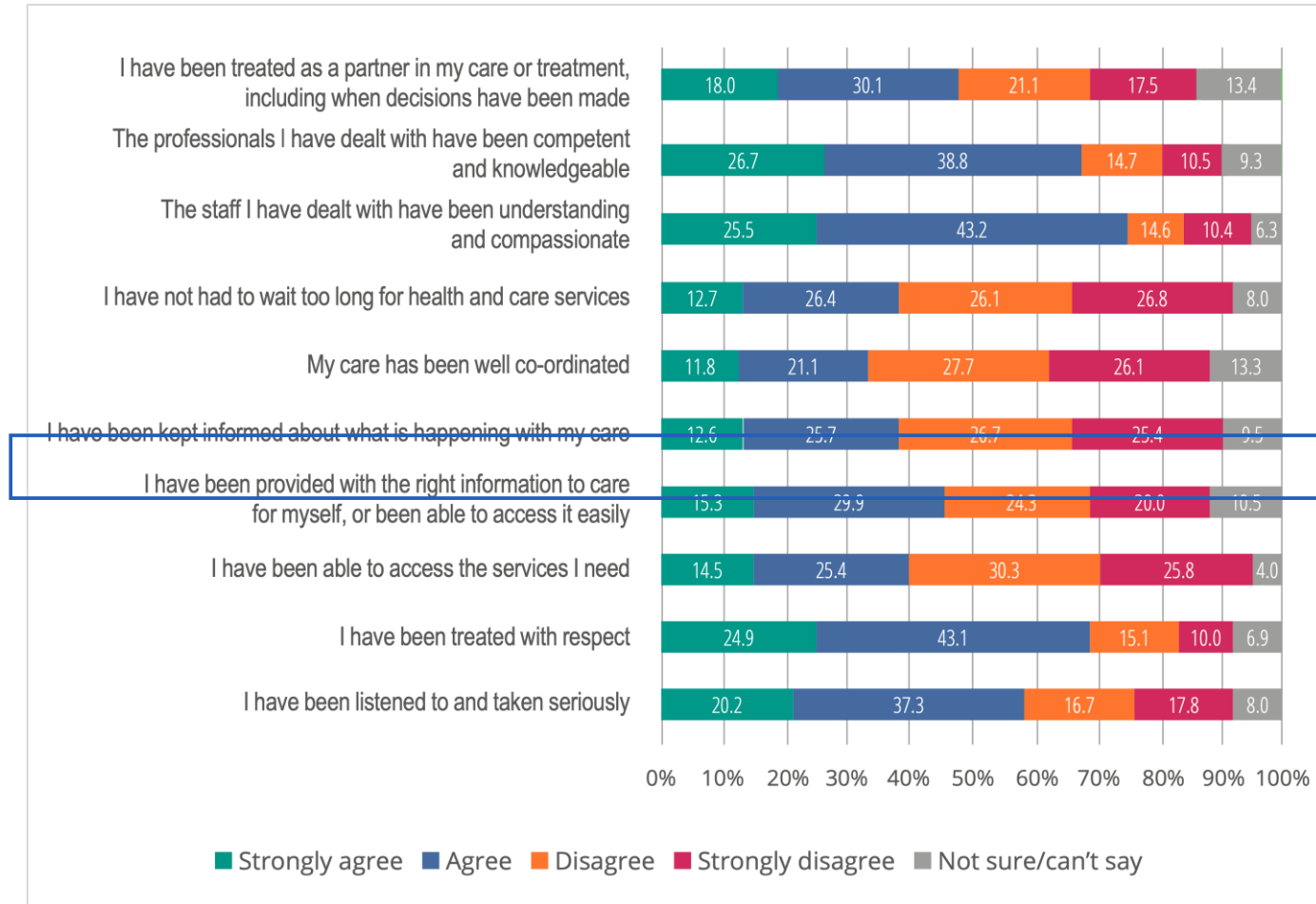
How well do you think the NHS is coping with other services at the moment?



Ipsos MORI

The Guardian, December 2021

# Inclusive Access & Engagement



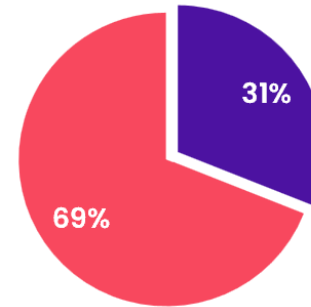


# The Problems we Solve

1

## Inclusive Access

Those most in need of health services are often excluded due to a digital literacy barrier

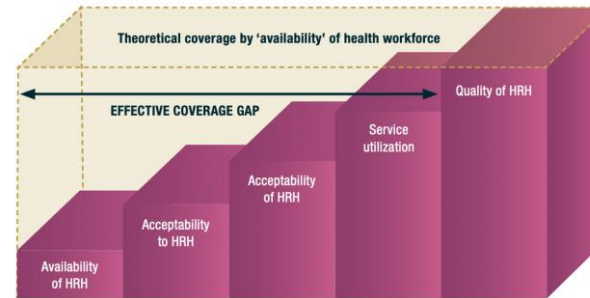


While healthcare providers have raced to digitise their processes, **only 69% of those aged 55+ have basic digital skills** necessary for the interaction with such systems<sup>1</sup>.

2

## Meeting Demand

Hospitals don't have the capacity to meet rising workload requirements



Human resources for health (HRH): availability, accessibility, acceptability, quality and effective coverage.

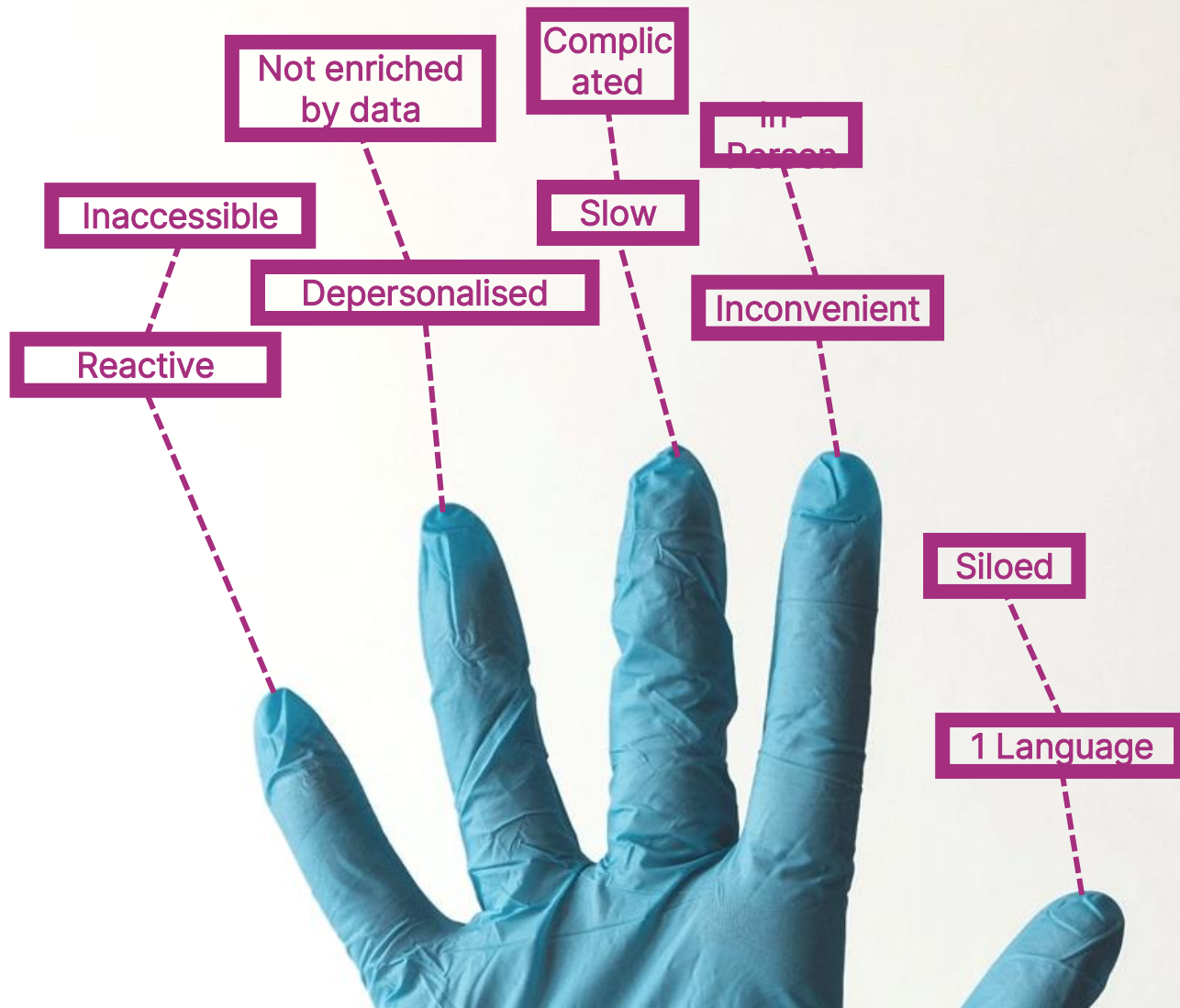
A WHO report<sup>2</sup> projects a **shortfall of 9.9m healthcare professionals**.

# Operational AI

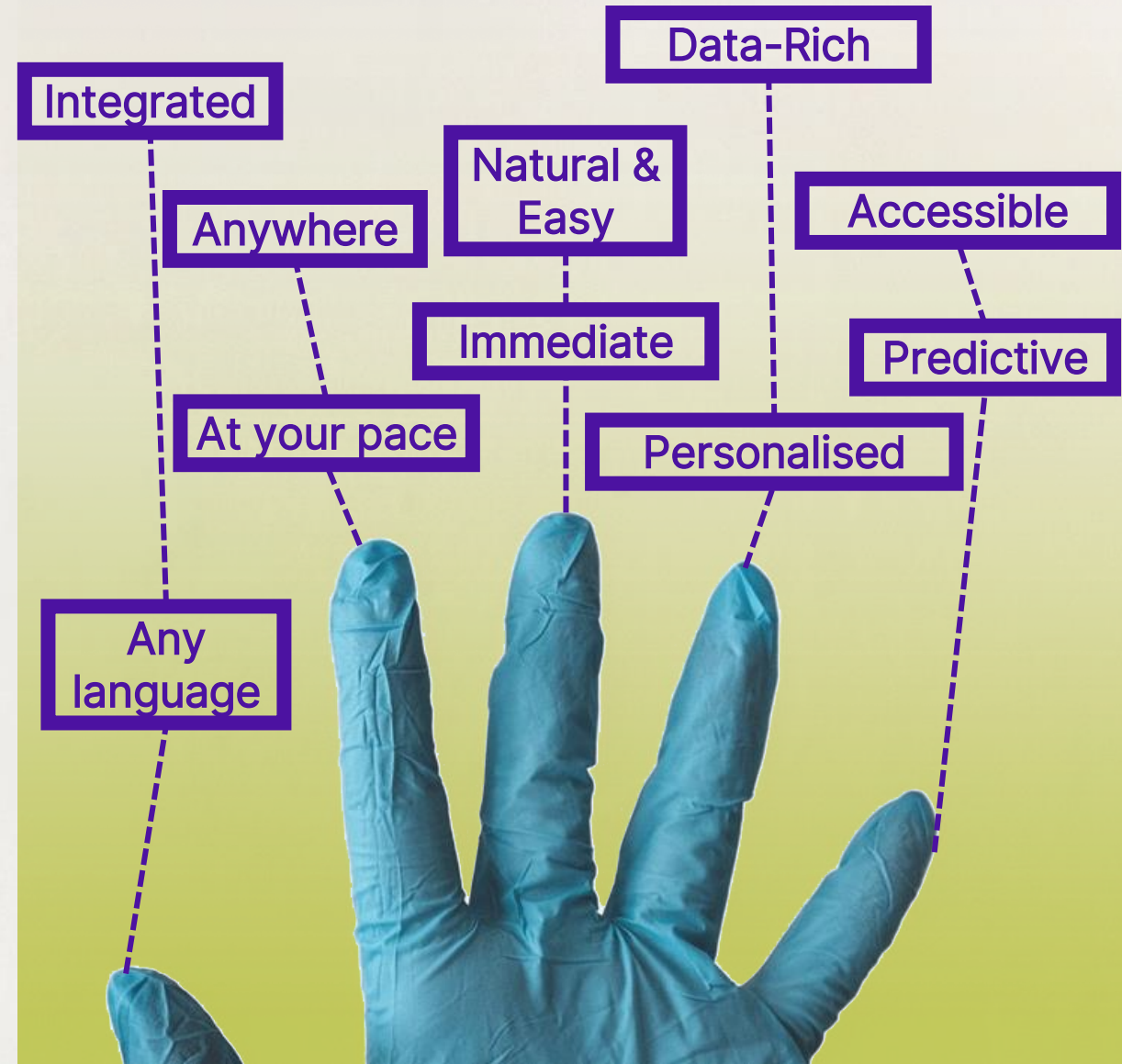
## Embracing AI transforms healthcare



# 2023



# 2030





**The Digitally  
Included  
Patient  
at the centre  
of our NHS  
2030 Vision**

# Engagement is **not**

Portal

Simple

Automatic

Technology

# Engagement **is**

Conversations

Collaborative

Adoption

Communication





# **EBO removes the necessity for patients to have a high level of digital literacy.**

We offer a dependable, user-friendly and trustworthy solution that enables interaction of patients with trusts through pre-defined patient pathways.



# Operational AI in action

## Patient Pathway Automation

1. Automating **Appointment Booking**
2. Auto-assignment **of freed-up slots**
3. Automated **Waiting List** Validation
4. Large-Scale Conversational **PIFU**
5. **Forms/Assessments** through Conversations
6. **E-Referral** Pathway automation
7. **Signposting** to self-management resources

Imogen activates her GP referral on the NHS App. John has been working with the EBO team and is excited by the prospect of being wholly integrated to the NHS App.



Robbie notifies Imogen on her mobile to self-schedule her appointment. She asks several questions about parking before she books her appointment. Imogen remarks to her friends how "human" Robbie was.



Another of John's ideas was to use Robbie to share Imogen's care record with her. Because of this, Imogen can ask Robbie to view her CT scan results as she prepares for an early night.



Robbie guides Imogen through the completion of a pre-assessment form through a natural conversation. The solution has already saved 40% of the time previously spent completing forms.



# The Digitally Included Patient



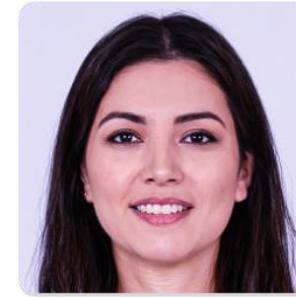
HARRY

Grandfather.  
58, Lost his job.



MARK

Psychologist @NHS.  
Trust's IAPT is AI-  
enabled through EBO.



SALLY

A specialised  
IAPT Virtual Assistant

01

Harry receives a message from Sally, the Virtual Assistant, to activate his GP referral on the NHS app. He books a time to suit him and Sally confirms this with him.



Your appointment is confirmed

Thank you!



03

Mark is notified of the assessments which flag worrying symptoms. Sally contacts Harry and confirms a new prioritised appointment by text and email.



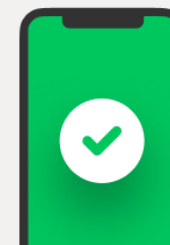
05

Harry attends the IAPT service for 6 weekly sessions with Mark. Before each session Sally guides him in completing the anxiety and depression score to monitor the impact of his therapy.



07

He is discharged by the service and Sally signposts him to information to help him remain well. Sally continues to check how Harry is doing over the next three months.



02

Sally guides Harry to complete three digital pre-assessment questionnaires in a "natural conversation", rather than Harry having to complete paper or digital forms on his own. He gets to instantly ask Sally any questions he has along the way.



Have you had little interest or pleasure in doing things in the last 2 weeks?

More than half the days

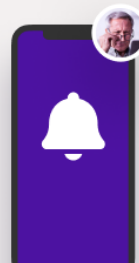


Have you been feeling down, depressed or hopeless?

Several days

04

Harry receives a reminder from Sally 48 hours before his appointment and confirms he will attend. He asks Sally about bus travel and is immediately provided with help.



06

After several weeks, Harry is feeling better. He has gained coping skills to manage his mood.



# Patient Pathways we're transforming



- Requests for **rescheduling & cancellations**
- Automated **cancellations & notifications**
- **E-Referral** and **PROMs**



- **eConsent** for children's school **immunisations**
- **PROMs & PREMs**
- Patient **demographic** information updates
- Trust-wide automated **appointment management**
- **PIFU**



Lincolnshire Partnership  
NHS Foundation Trust

- Memory assessment & management service **Pre-Assessment Form**
- **Referral** completion



- Automated **appointment management**
- Steroid injection **e-consent** for MSK
- **PIFU**



- **eConsent** for school-age **vaccinations**
- Automated **appointment management**



- Automated **Waiting List Validation**



**Do patients  
welcome  
automation?**



# AI-enabled Appointment Management

**99.2%**

Of statements understood by  
the Virtual Assistant

**9,258**

Conversations in the last year

**NHS**

**Somerset**

NHS Foundation Trust

**20%**

Adoption Rate

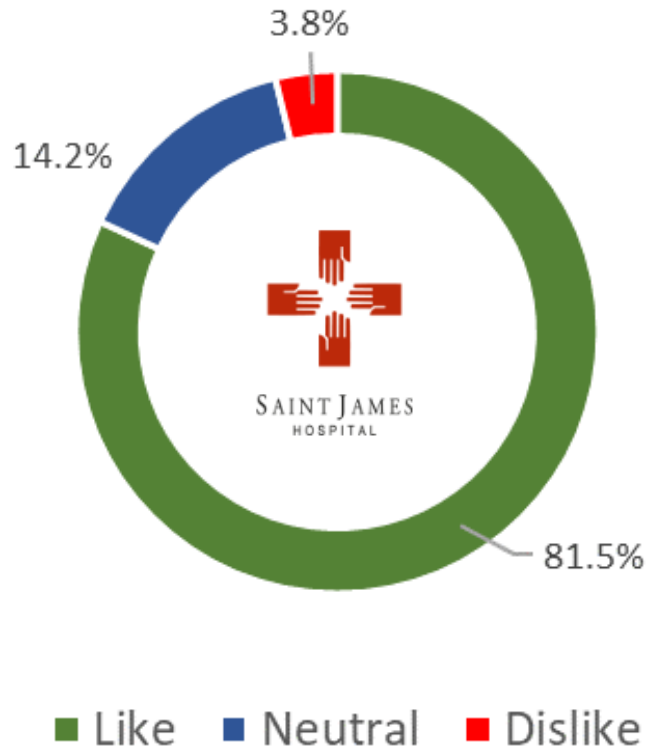
**89%**

Of patients satisfied with the  
experience



# Automation leads to Transformation

## Patient Feedback



- ✓ **Within 6 months: 35%** of all Customer Centre 'calls' managed by Virtual Assistant
- ✓ **Over 12% of bookings** fully automated
- ✓ **10,000+** conversations per month
- ✓ Reduced **28% of all recorded admin time**
- ✓ Helps **manage fluctuations in demand**; adoption increases when call volumes and waits increase
- ✓ **Human handover** activity

"Fast, convenient and amazing service"

"Very efficient"

"All quick and perfect"

"Fabulous. Much appreciated"

**How are we  
going to  
fund it?**





# EBO's Health Fund

## 'Skunkworks' unlocks £10m in Innovation



- ✓ Co-production of **patient pathway automation** and true patient-first communications
- ✓ 20 new projects supported with up to 70% project costs covered
- ✓ NHS Trusts & ICSs invited to apply

# Thank you



**Dr. Gege Gatt**  
**CEO**



@gegegatt



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ebo.ai

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## Cyprus Office

Cedars Oasis Tower, 6th floor,  
Office 602, Corner Arch.  
Makarios III Avenue & Platonos  
Str. 3090, Limassol

+357 25000350



Human Conversation  
Automated



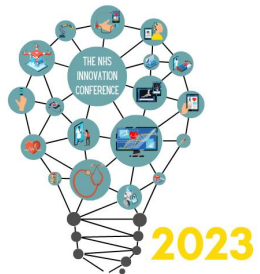
# slido



**To engage directly with EBO and continue the conversation, Click from the options below**

① Start presenting to display the poll results on this slide.





# The NHS Innovation Conference



## Q&A PANEL



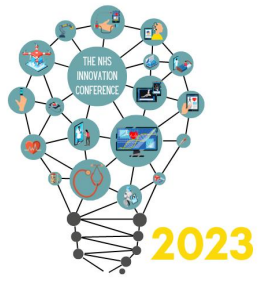
**Dr Gege Gatt**

CEO  
EBO



**Patrick Mitchell**

Director of Innovation, Digital and Transformation  
Health Education England



# The NHS Innovation Conference



# MORNING BREAK



# The NHS Innovation Conference

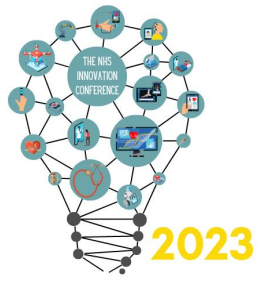


## Event Chair – Chair Morning Address



**Dr Dimitris  
Kalogeropoulos**

Senior Independent Advisor,  
Global Health Innovation Expert  
WHO, World Bank, European  
Commission, UNICEF,  
Healthcare Industry

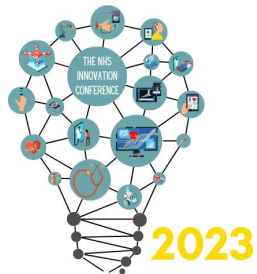


# The NHS Innovation Conference



## UP NEXT...

riverbed



# The NHS Innovation Conference



## SPEAKING NOW



Peter Furneau

Solutions Engineer  
Riverbed

I will be discussing...

“Improving Clinical Experience &  
Reducing IT Spend for NHS”





# Improving Clinician Experience & Reducing IT Spend for NHS

---

Pete Furneau, Solutions Engineer  
Riverbed

riverbed



# Concerns across IT in Healthcare

Where should we spend our IT budget to get the best return?

Do staff have MS Teams issues this morning?

Who takes ownership of an IT incident?

Can we automate routine fixes?

Why is it taking so long for clinicians to search for patient records?



# What if Healthcare Could...

The diagram consists of three overlapping circles. The left circle is purple and contains the text 'Improve Clinician Experience'. The right circle is blue and contains the text 'Save IT Costs'. The central circle, which overlaps both the left and right circles, is pink and contains the text 'Efficient Patient Pathway'.

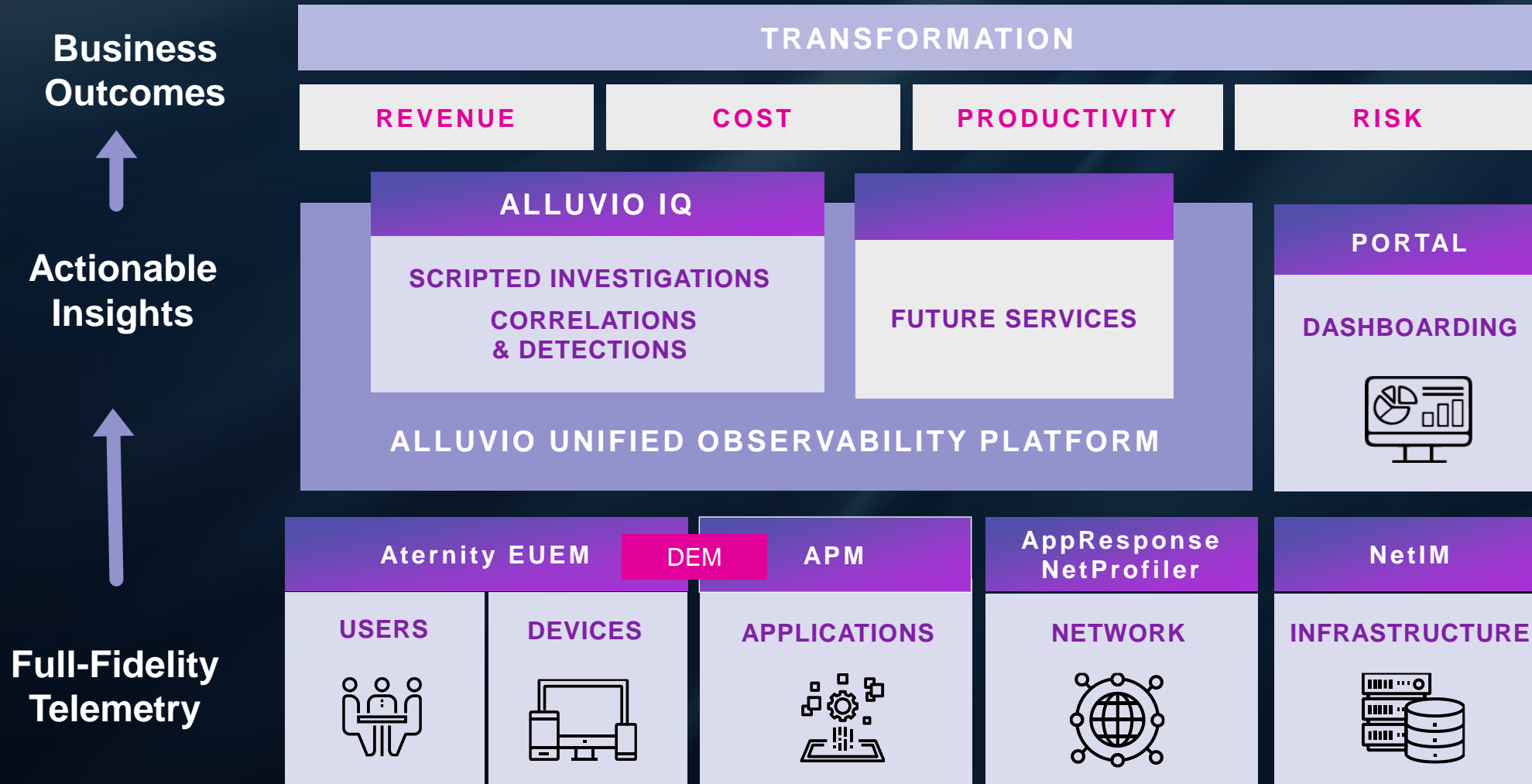
**Improve  
Clinician  
Experience**

**Efficient Patient  
Pathway**

**Save IT  
Costs**

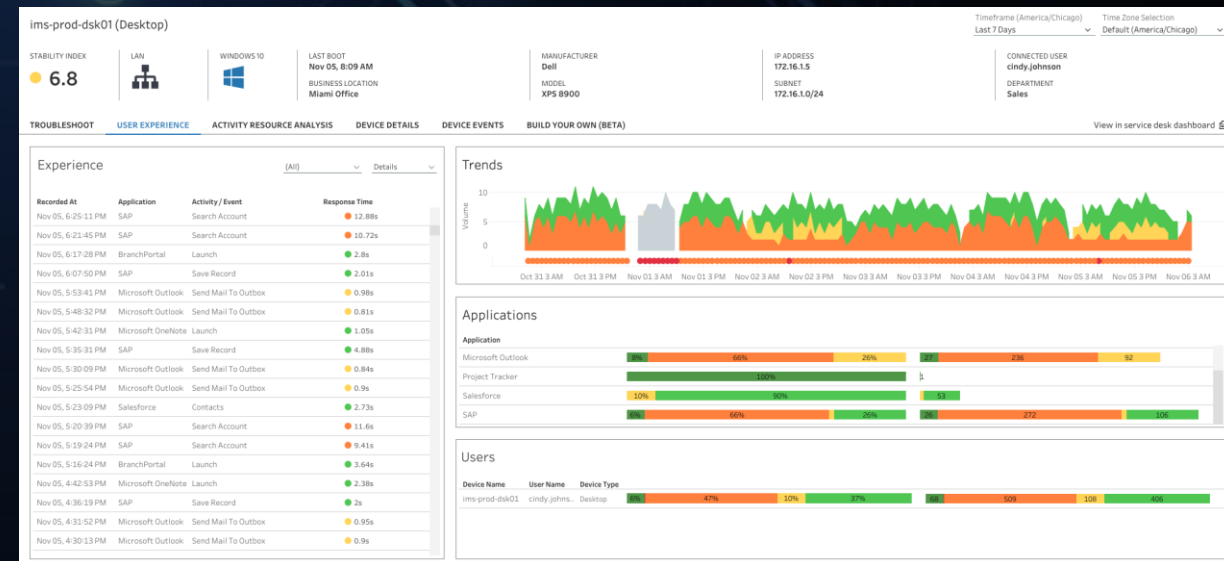
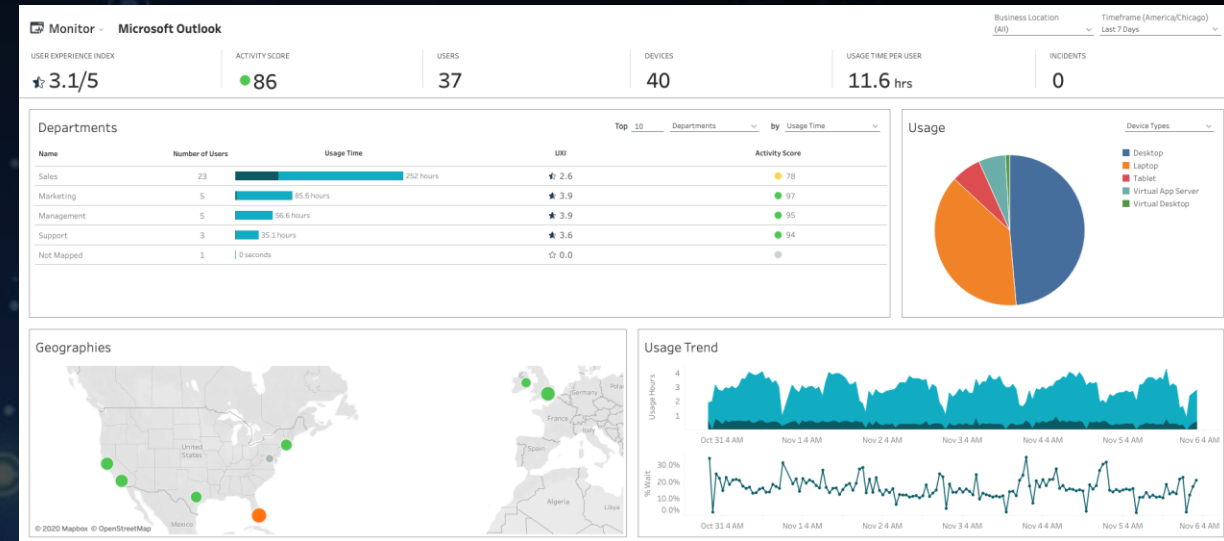
# Alluvio Unified Performance Management

Unified visibility across packet, flow and device metrics



# What is Alluvio Aternity and the value it brings?

- Alluvio Aternity gives visibility of the performance and stability of **applications** and **devices** from the user's perspective
- Alluvio Aternity gives visibility of your business-critical **applications** regardless of their location or delivery method (local, on-premise, SaaS, Virtual, Mobile etc.)
- Alluvio Aternity establishes a health and performance **baseline** for the **tasks** that your colleagues do inside the applications, that they rely on to be productive
- The baseline allows **proactive alerting** and **remediation** if performance or health degrades. It allows **improved MTTR** by understanding where to troubleshoot (client, network, backend services)
- It helps **de-risk new initiatives** by ensuring health and performance don't exceed the baseline when changes occur within your environment
- Manages experience over time to understand and **prioritise initiatives** that will help improve efficiency and productivity of each end-user





# Customer Case Study

Riverbed & Herefordshire, and Worcestershire Health & Care NHS Trust



## Use Cases

- Solve clinician complaints
- EPR vendor accountability
- Smart hardware refresh



## Solution

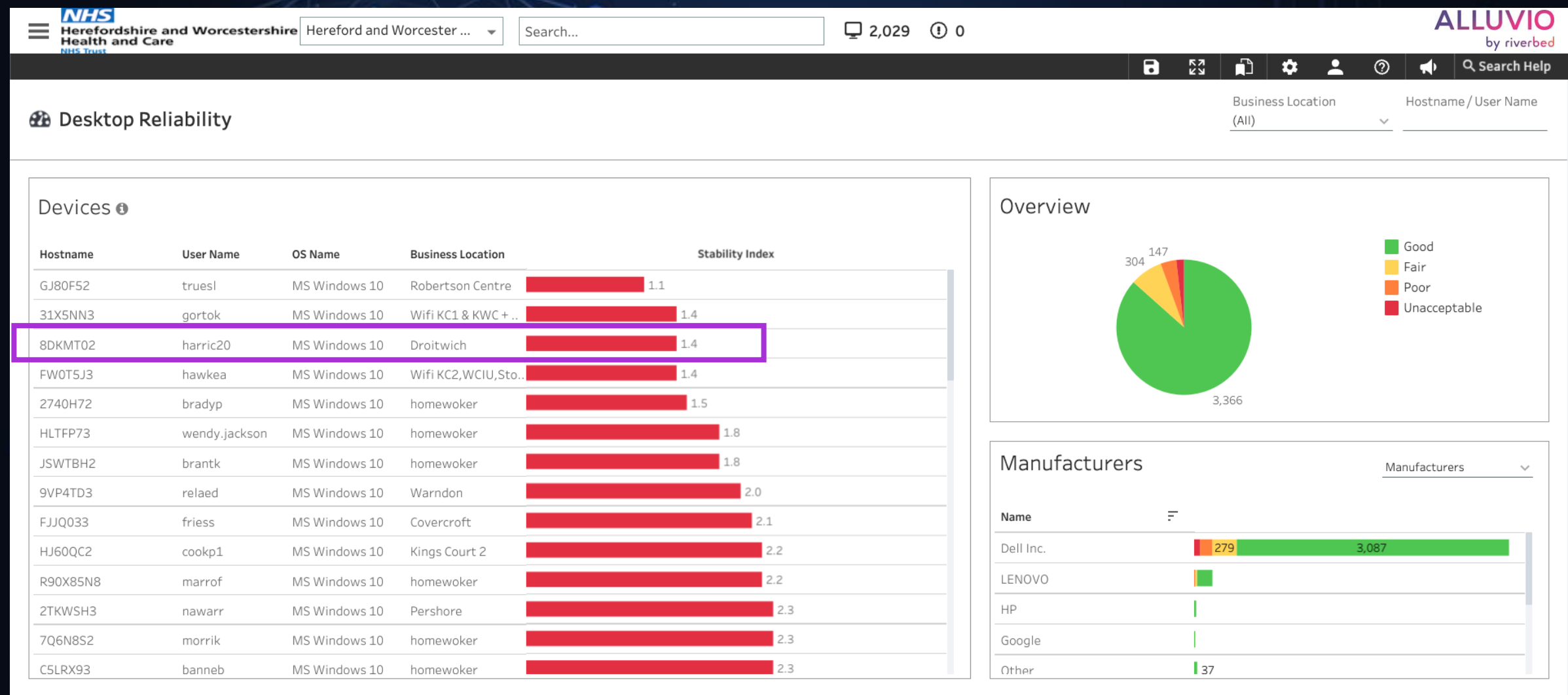
- Alluvio Aternity Digital Experience Management



## Benefits

- Improve clinician experience & efficient patient pathways
- Save IT costs
- Reducing mean time to resolution and isolating the right problem domain

# Solve Clinician Complaints



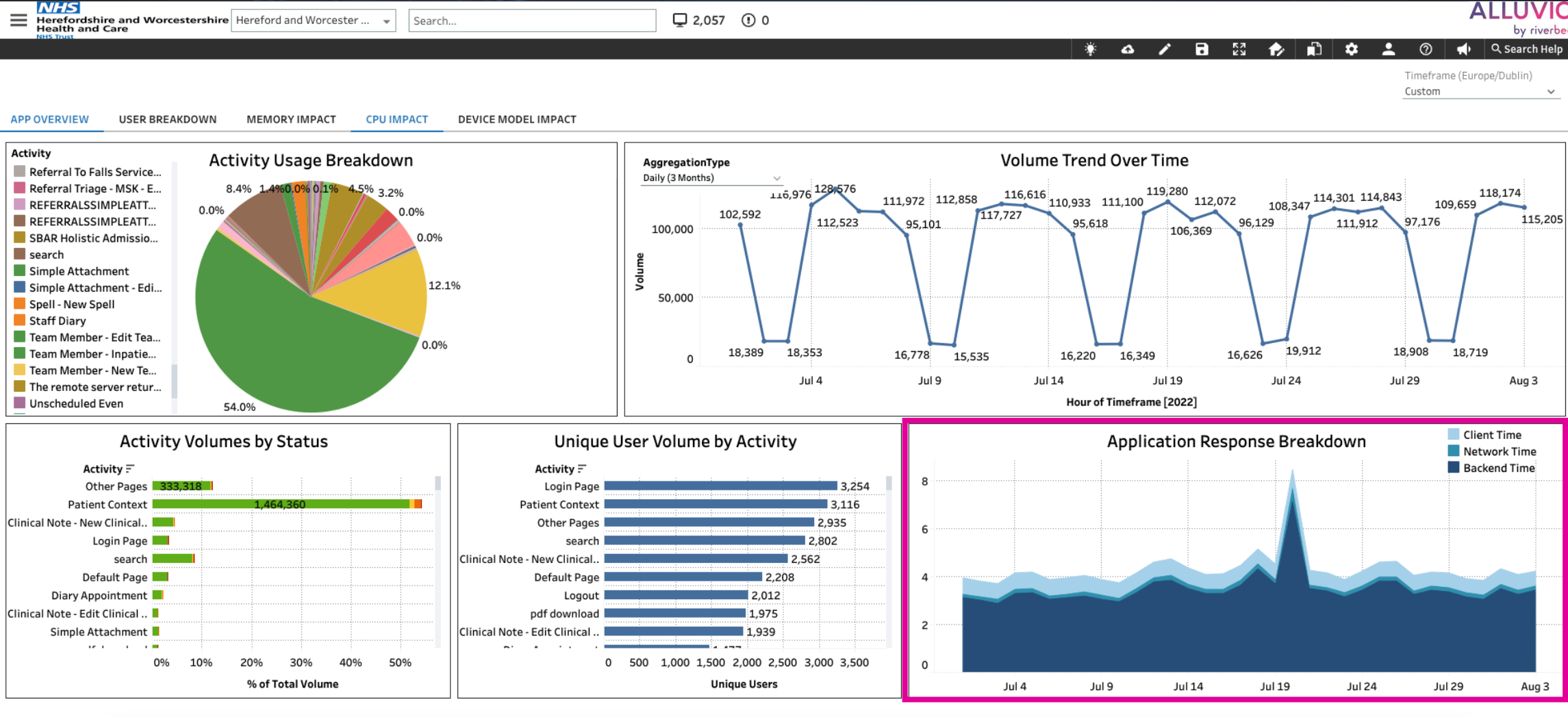


## 74

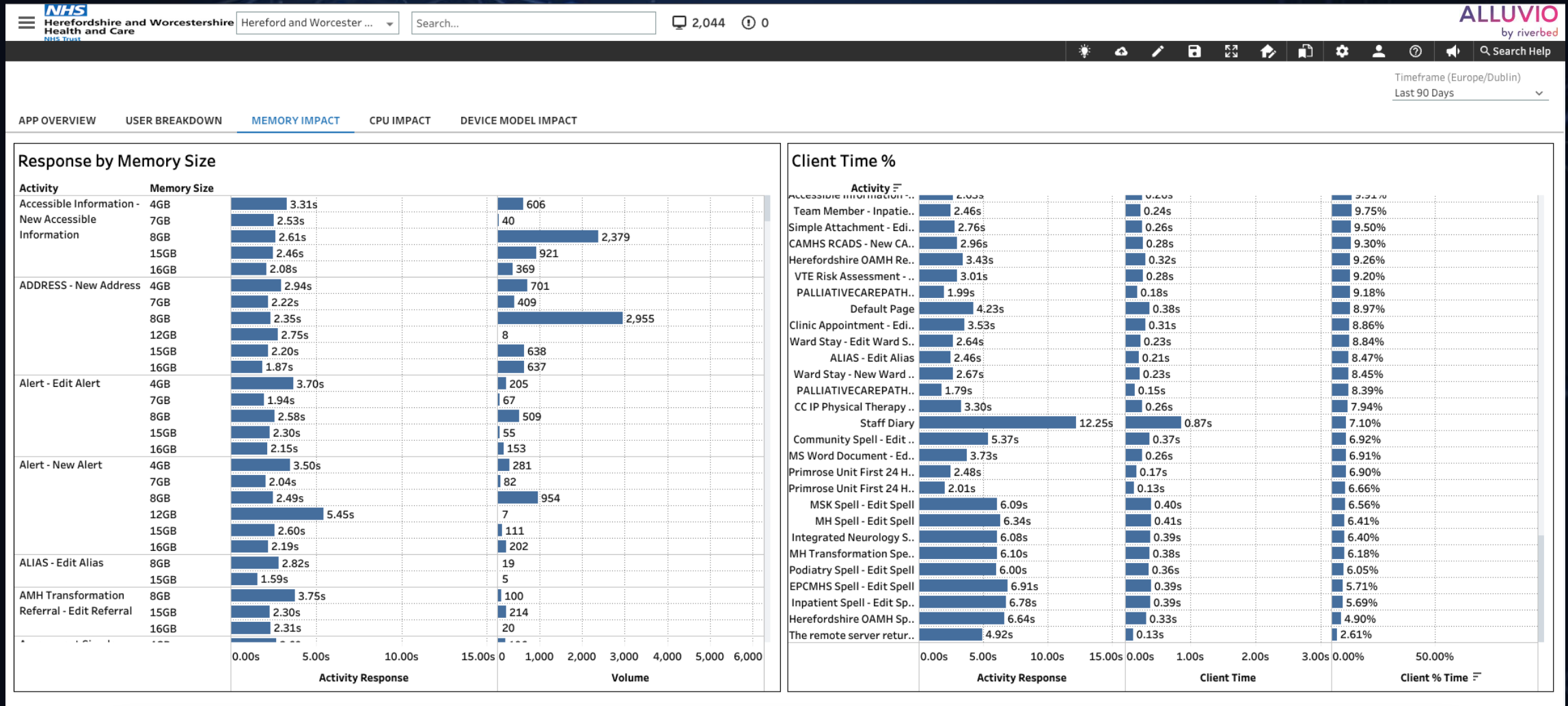
## 75

© 2022 Riverbed Inc. All rights reserved.

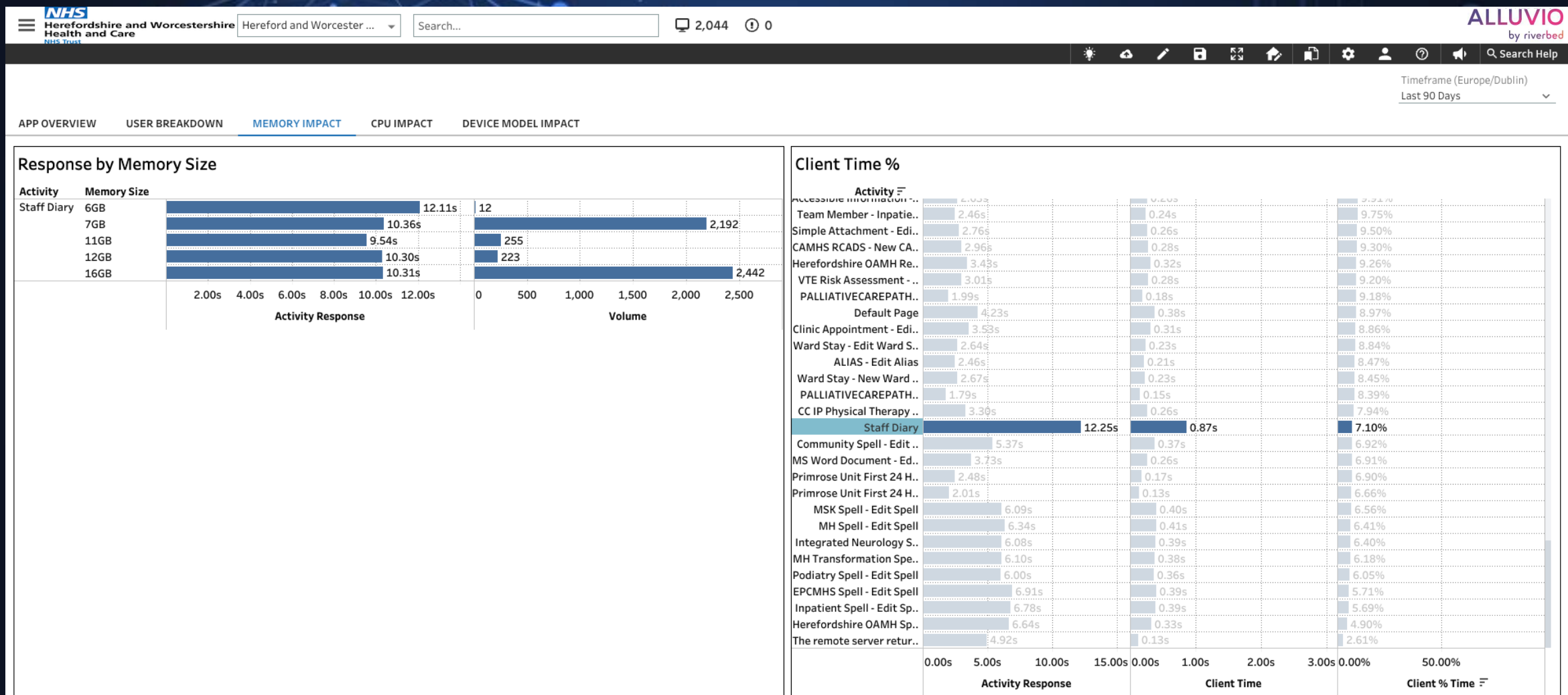
# EPR Vendor Accountability



# EPR Vendor Accountability



# EPR Vendor Accountability





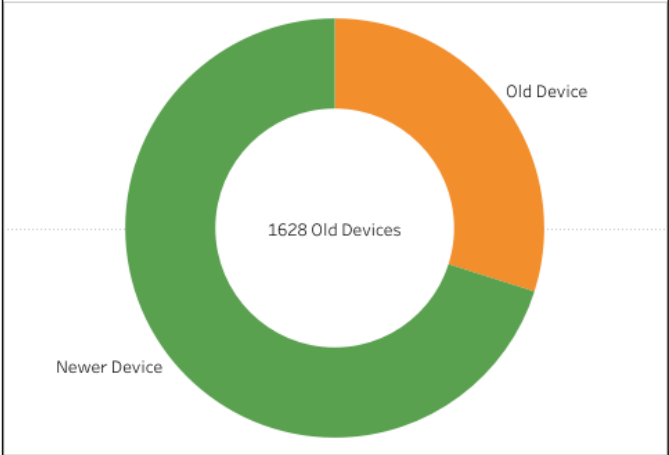
# Smart Hardware Refresh

Based on your selection of devices aged 5 years and older, you would need to replace 1,628 devices for a cost of **£1,302,400**

With a Smarter Device Refresh looking at application performance, device health and resource utilization, you could replace 815 problematic devices instead for a cost of **£652,000**.

A Smarter Device Refresh approach could save you **£650,400**

Aged Devices



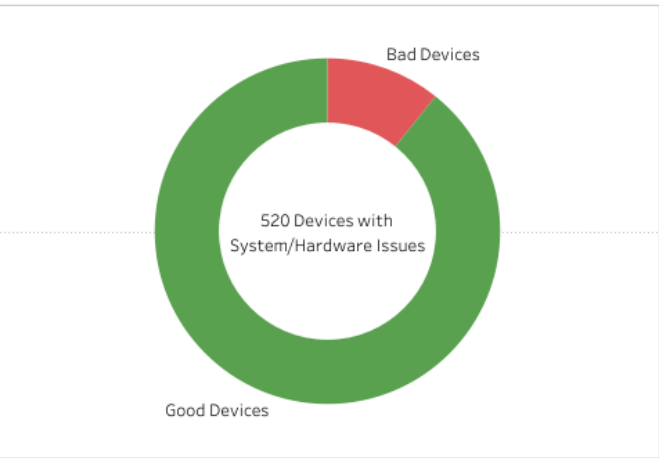
AggregationType  
Daily (3 Months)

Average Device Cost  
800

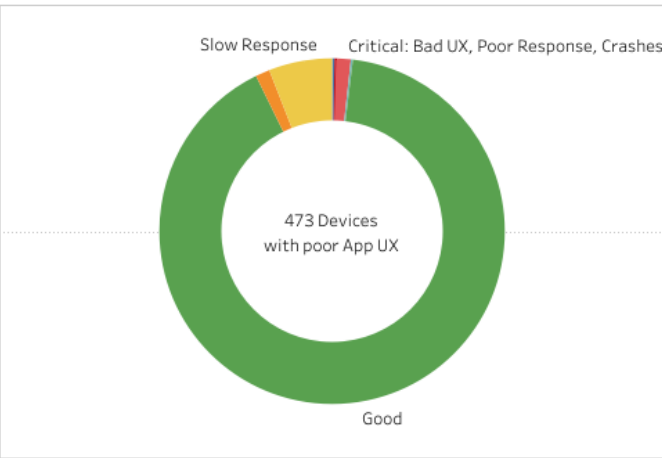
Refresh Age  
5

Exclude Newer Devices  
True

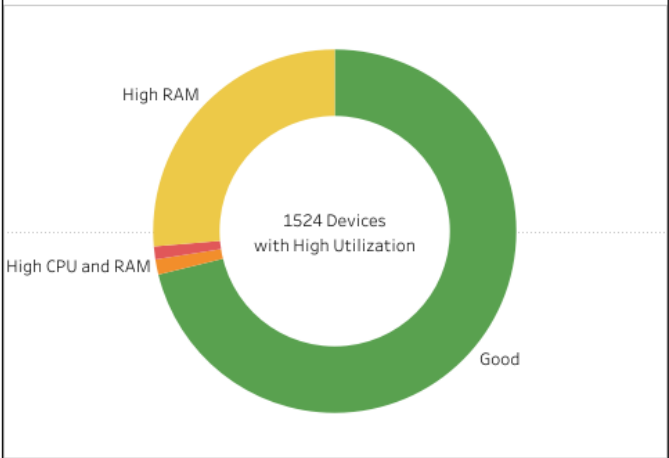
System Health



Application Experience



Resource Utilisation



**Thank you!**

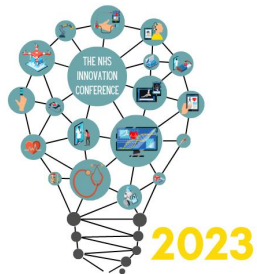
riverbed<sup>®</sup>

# slido



**To engage directly with Riverbed and continue the conversation, Click from the options below**

① Start presenting to display the poll results on this slide.



# The NHS Innovation Conference



## SPEAKING NOW



Darren Atkins

Chief Technology Officer - Intelligent Automation  
The Royal Free London NHS Trust

I will be discussing...

“Making Time Matter  
with Intelligent  
Automation”

# The Future of Automation



**Darren Atkins**  
**Chief Technology**  
**Officer**



**Innovation and  
Intelligent Automation**



# Making Time Matter

## Robots will wipe out humans and take over in 'just a few centuries' warns Royal astronomer

A ROBOT uprising could be closer than ever predicted - according to royal astronomer Sir Martin Rees, who believes machines will replace humanity within a few centuries.

By **SOFIA PETKAR**

PUBLISHED: 06:10, Tue. Apr 4, 2017 | UPDATED: 08:29, Tue. Apr 4, 2017

## Humanoid robots will 'take over the world' and professor warns we won't be able to spot them

Robotics expert Noel Sharkey says androids will soon be completely integrated in society working as shop assistants, bar staff and careworkers

## More than 70% of US fears robots taking over our lives, survey finds

**As Silicon Valley heralds progress on self-driving cars and robot carers, much of the rest of the country is worried about machines taking control of human tasks**

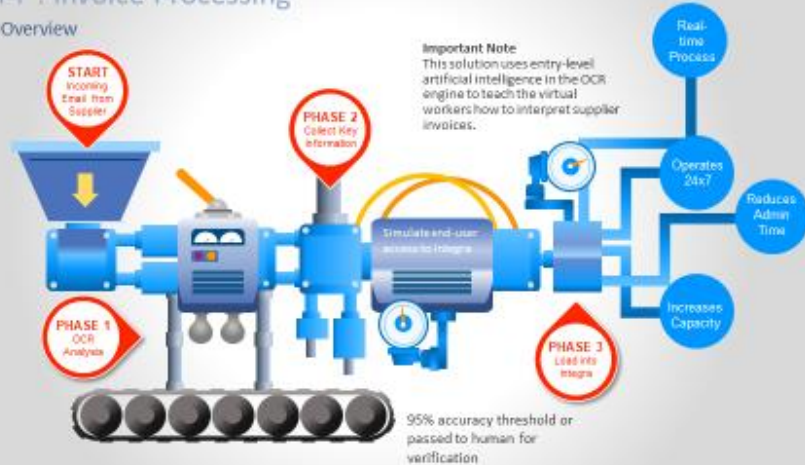


# How are Robots helping us?

400+ Processes – By the NHS for the NHS – Corporate and Clinical across the whole ICS

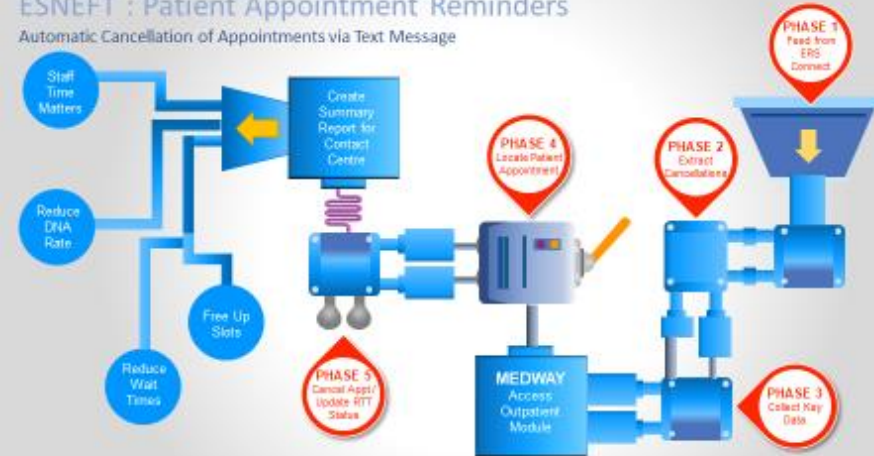
## ESNEFT : Invoice Processing

Process Overview



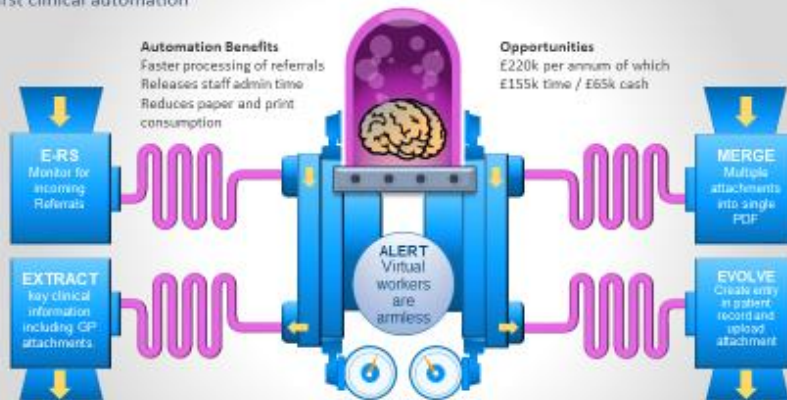
## ESNEFT : Patient Appointment Reminders

Automatic Cancellation of Appointments via Text Message



## ESNEFT : E-Referrals into Evolve

Our first clinical automation



300,000+ HOURS  
155+ FTE  
12 MONTHS

**The NHS should standardise on a common RPA platform to encourage collaboration and sharing, and accelerate the adoption and scaling of processes using NHS talent.**

**By the NHS for the NHS**



**Innovation and  
Intelligent Automation**

**- Darren Atkins 2016**

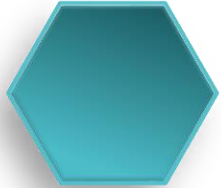


# The Automation Reset

- RPA isn't a magic wand to fix all problems
- Take a step back from the UI
- Work in partnership with Digital Strategy
- Create realistic business cases for RPA
- Many bot platforms are not delivering value
- Virtual smartcards for RPA
- Capability gap in the NHS / Citizen Devs



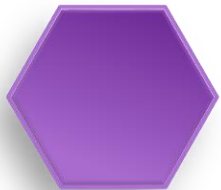
# RPA v2.0 The Reset



Black Box processes – no cost of entry, centrally hosted, pay per transaction, common inputs and outputs



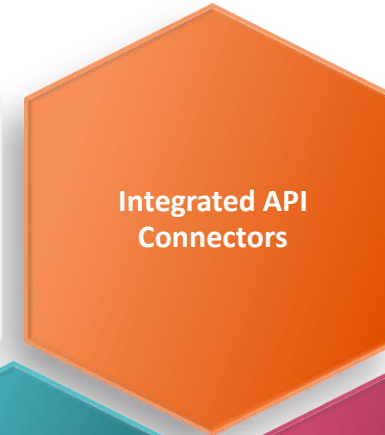
A library of integrated APIs with supporting RPA code. Speeds up automation, reduces bot usage by up to 95%, requires less operational support



Pre-built, user triggered automation macros for common tasks and activities across a range of clinical applications



Evaluating process flows, resource usage and efficiency savings linked to patient flows



**Utility  
Based RPA**



**Process Mining**



**Attended RPA**



# Next Week!

NHS RPA Live in  
Manchester  
Thursday 9<sup>th</sup> March  
#NHSRPALIVE

**NHS**

Royal Free London  
NHS Foundation Trust

SCAN TO REGISTER

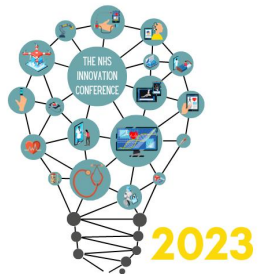


Innovation and  
Intelligent Automation

# Questions?



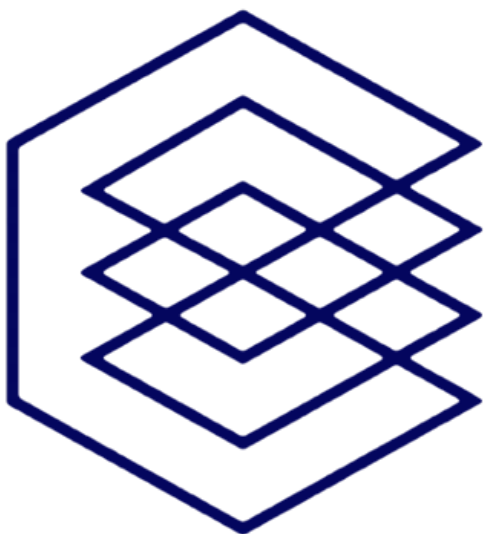
Innovation and Intelligent  
Automation



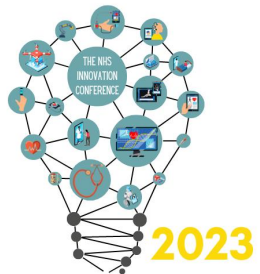
# The NHS Innovation Conference



## UP NEXT...



# CYFERO



# The NHS Innovation Conference



## SPEAKING NOW

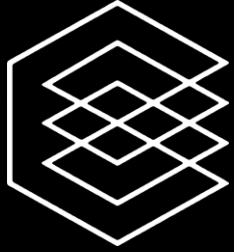


**Matt Heys**

SVP AI and Neural Genesis  
Cyferd

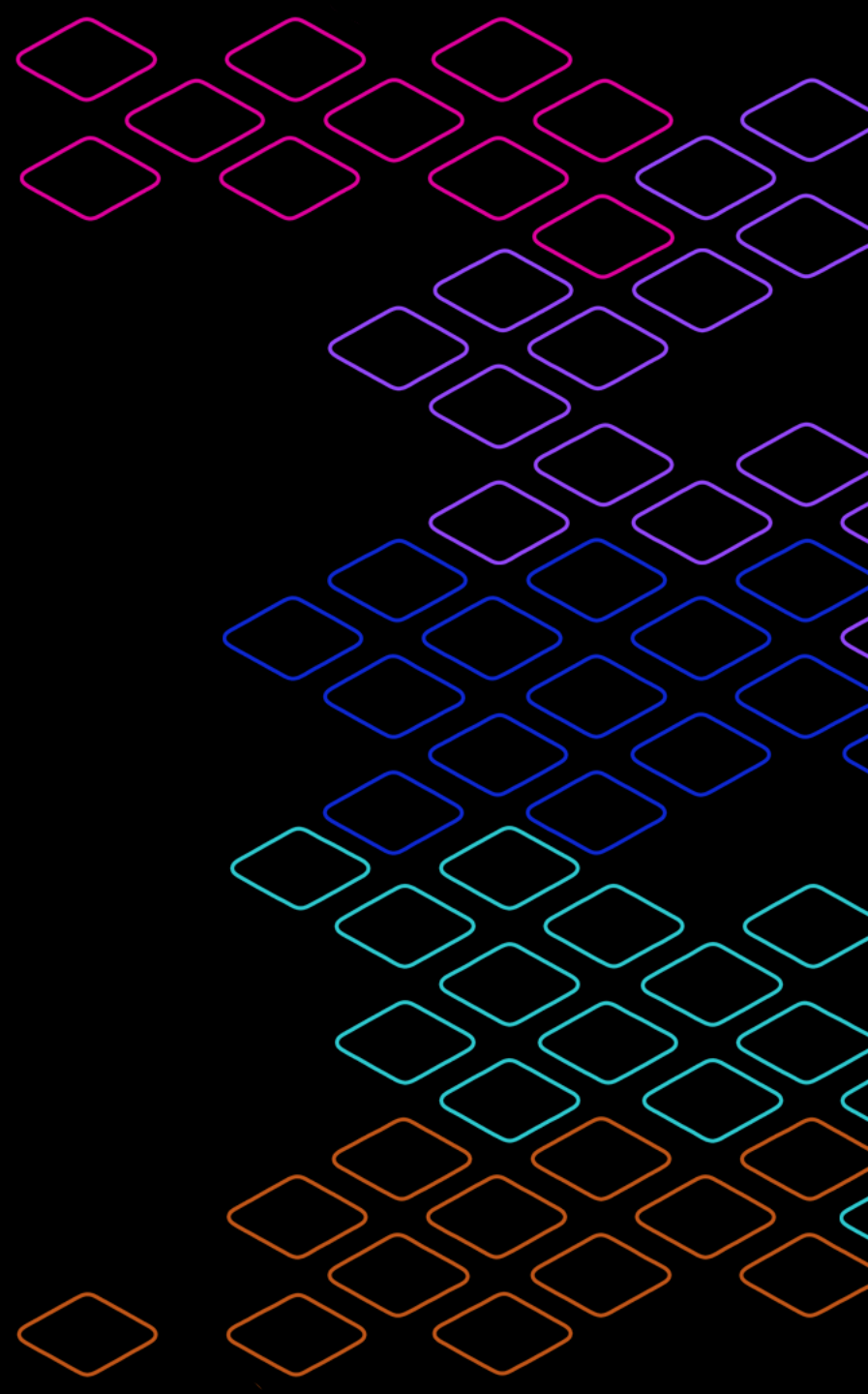
I will be discussing...

“A.I Empowered Digital  
Transformation”



**CYFERD**  
NEURAL GENESIS

**A.I. empowered digital transformation**





# Aims

---

- Who am I?
- What is Cyferd?
- What is Neural Genesis?



# Who am I?

- University:
  - **BSc Physics, Astrophysics and Cosmology**
- NHS:
  - **Informatics security**
  - **Software development**
  - **Business Intelligence**
  - **Data science**
- Cyferd:
  - **Product development**
  - **Healthcare**
  - **Customer Success**
  - **A.I. & Neural Genesis**

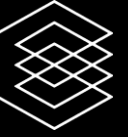


**Matt Heys**

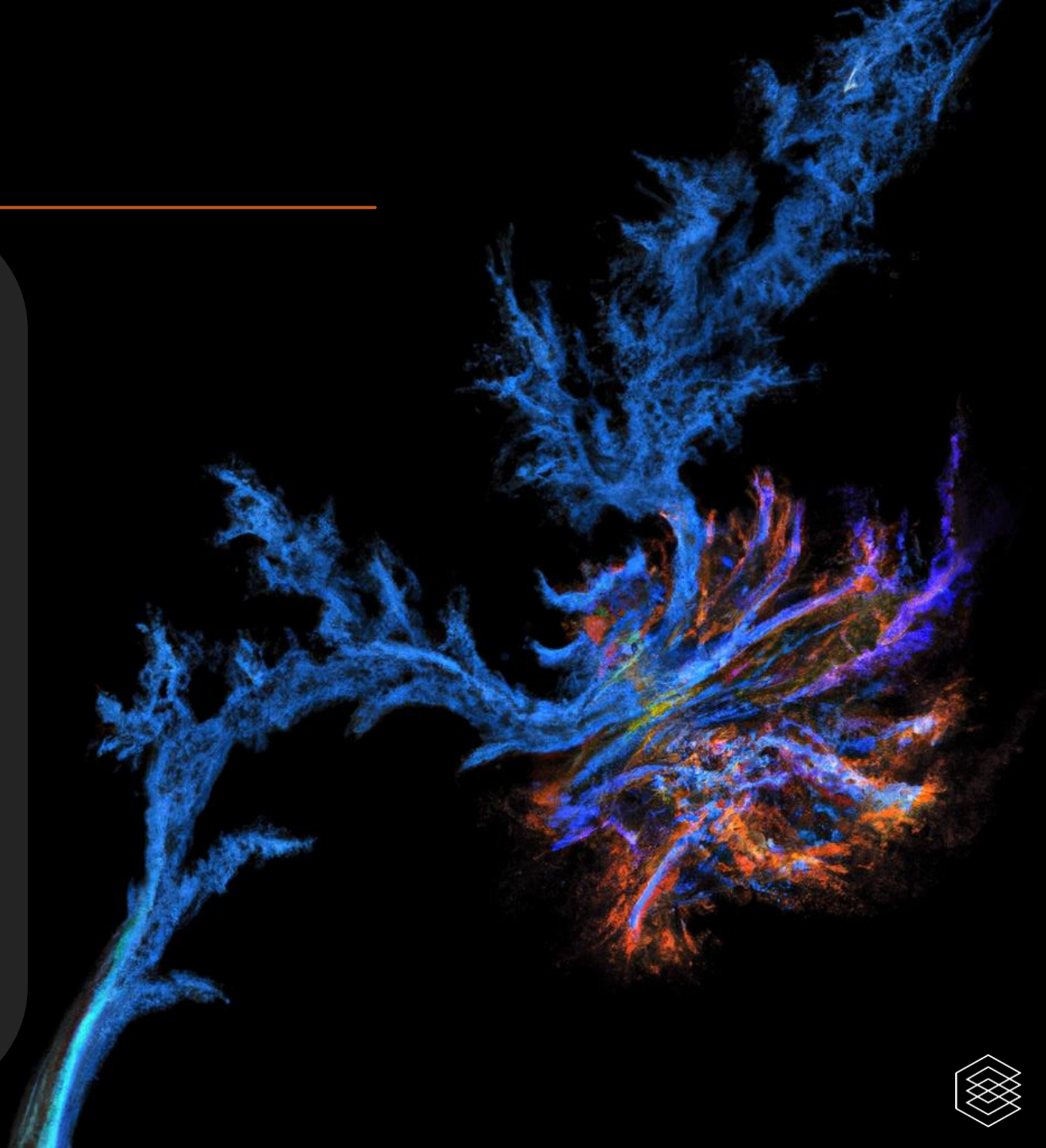
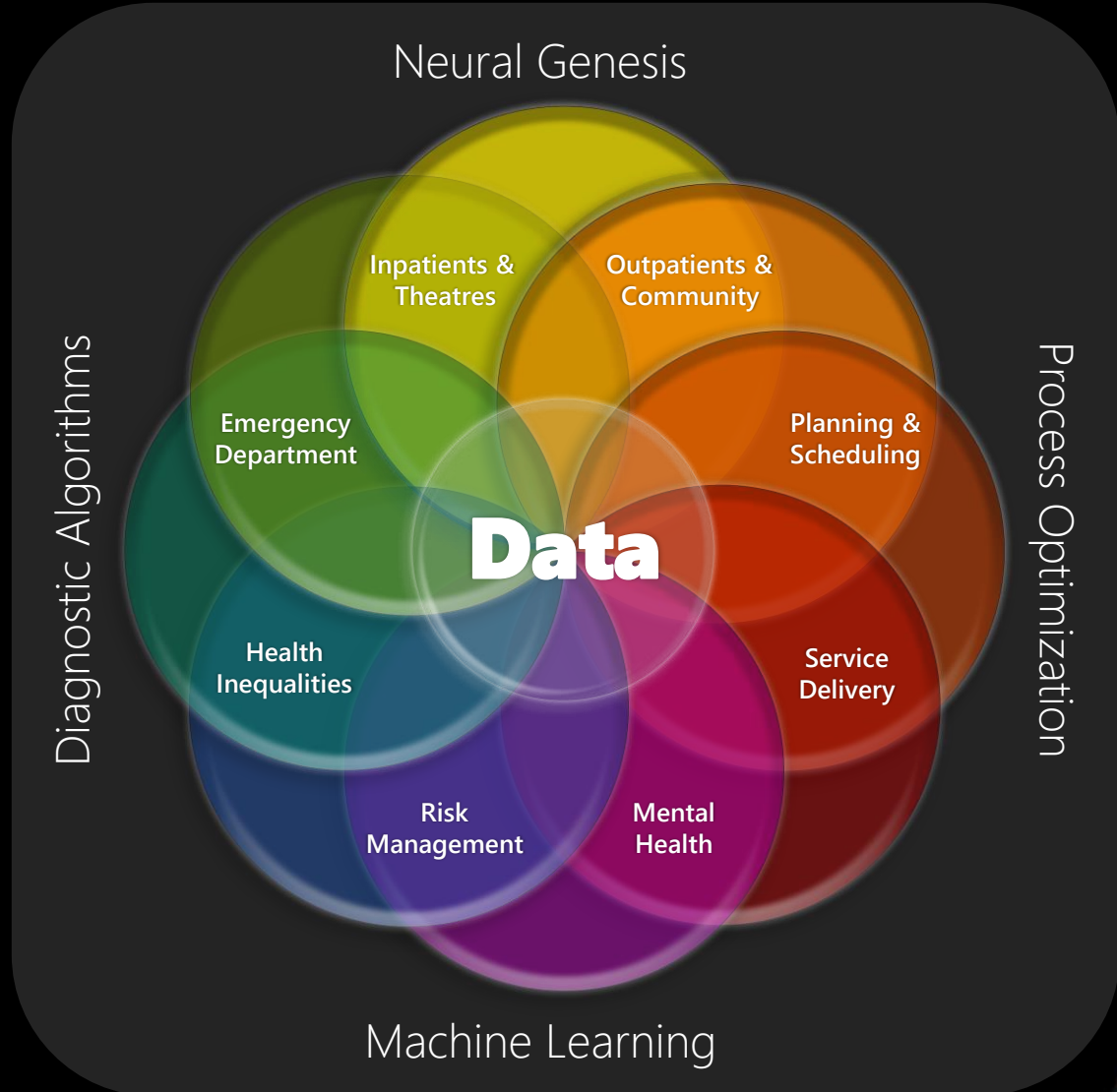
*Senior VP, Artificial Intelligence & Neural Genesis*

# Who am I?

---



# What is Cyferd?





# What is Cyferd?

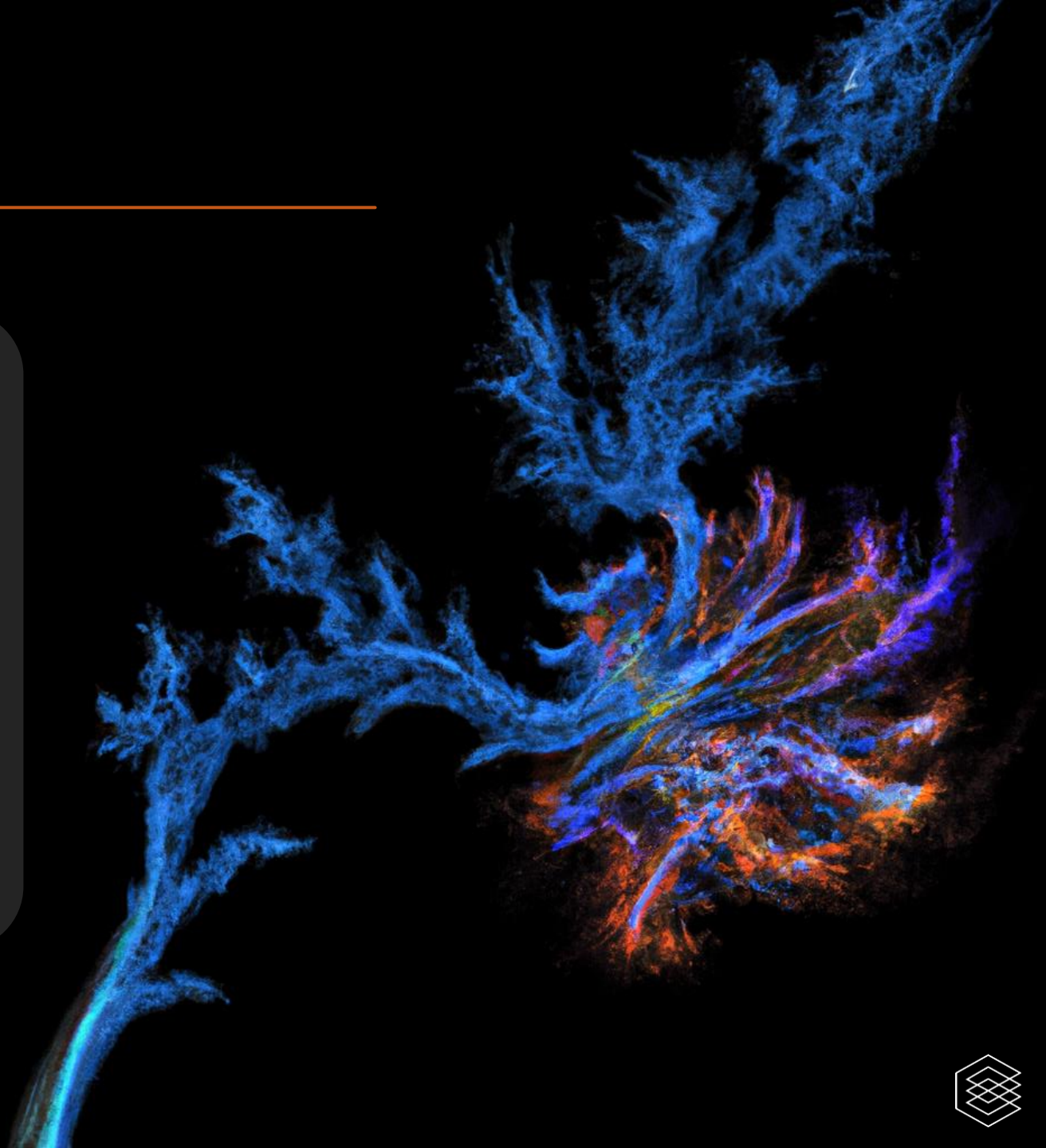
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Enterprise data at the heart

Operational business lenses

Integrated Care Platform

Open interoperability





# What is Cyferd?




Search for anything

MH

← Home (Home) ▾

**Lovato, Margaret**

Patient



**PATIENT DETAILS**

First name \*  
Margaret

Last name \*  
Lovato

Pronouns  
prefer not to say

Date of birth \*  
21/10/1951

Gender  
Female

Blood group \*  
B-

☒ Covid Vaccine


**REGISTRATION**

NHS number \*  
NHS5288867983

Local PAS ID  
PHH0199231

☐ Is deceased?

Photo

 Margaret Lovato 100x100.jpeg

Info

**CONTACT DETAILS**

Country  
+44

Home phone  
7939541002

Country  
+44

Mobile phone  
7939541002

Country  
+1

Work phone

Email address  
m.lovato@outlook.com

**USUAL GP**

GP practice  
Nutwood Medical Practice

Country  
+44

GP practice phone number  
1539400918

Usual GP  
Dr Horan

**DEMOGRAPHICS**



# What is Neural Genesis?

---

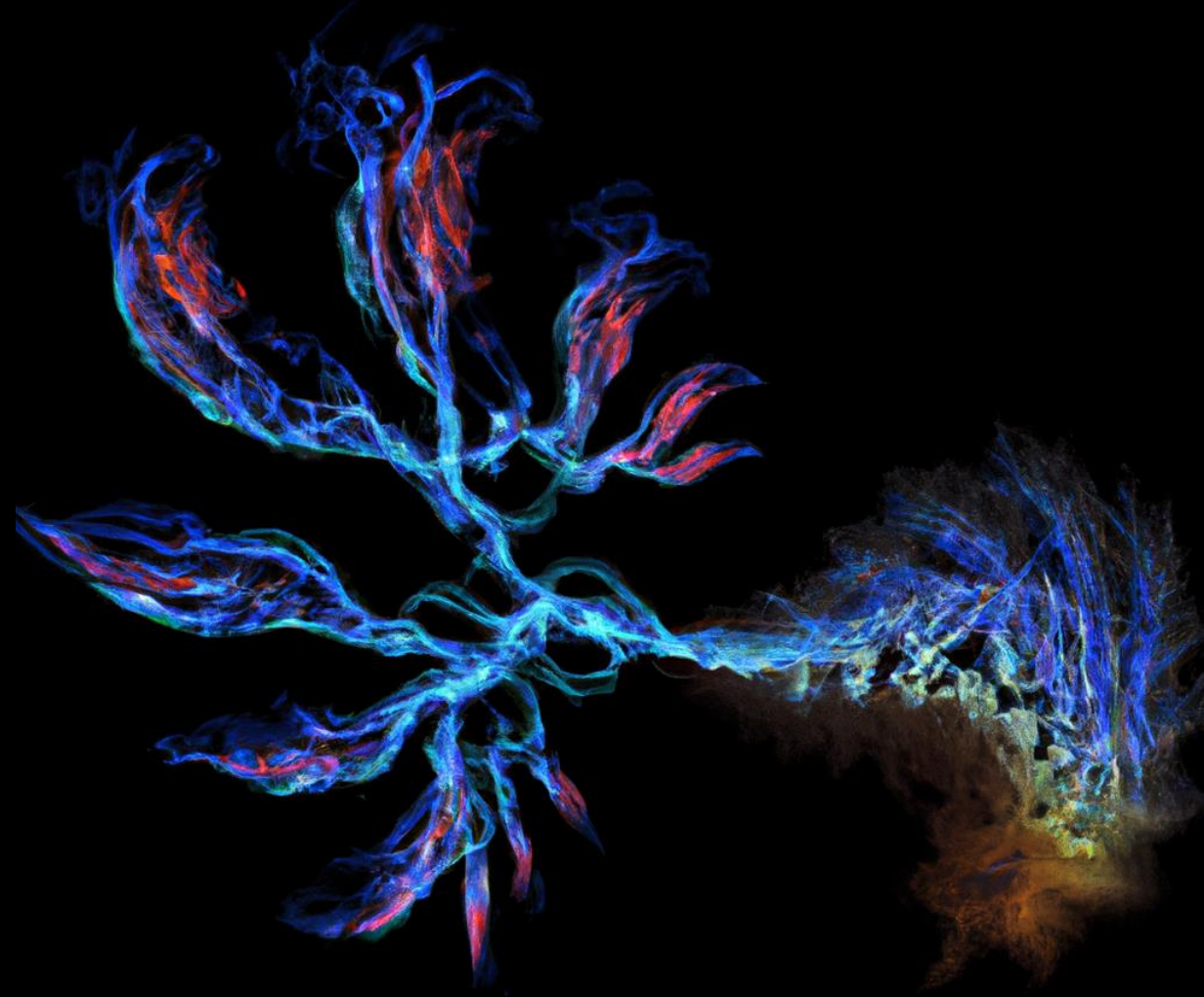
- Generate business apps in seconds using A.I.
- After inputting a few relevant keywords words, CyferdNG uses A.I. to generate business lenses (business applications) that can be implemented enterprise-wide.
- Save your IT and development team months of work at the touch of a button.



# Migrate legacy systems

---

- Close down your legacy systems and move fully to the cloud
- Migrate legacy systems with ease by pointing CyferdNG at your old databases
- Migrate all your data across with no human intervention needed



# Diagnostic algorithms

---



- Leverage millions of data points across the interconnected Cyferd data model to create advanced predictive models
- Select the outcomes you want to predict and let CyferdNG discover the diagnostic features of your data
- Integrate with your workflows to put predictions in front of your users (rather than expecting them to find them in external dashboards)
- Continuous learning and optimisation

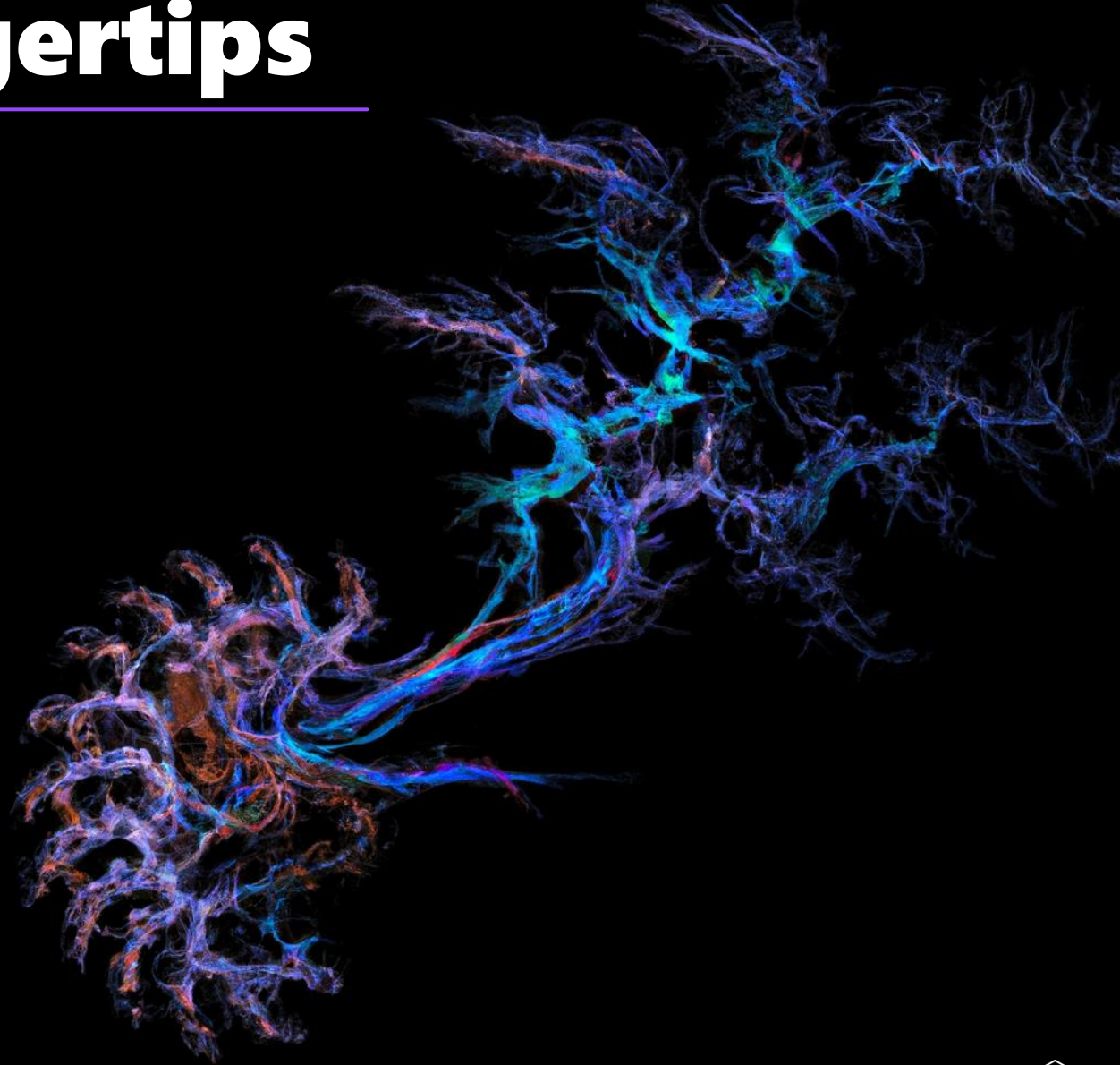




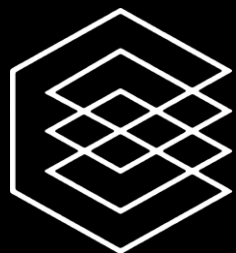
# Answers at your fingertips

---

- All your organizational data stored in the Cyferd Platform is simply a search away
- CySearch helps you access your data without the need to log in to multiple software solutions or applications. Grab the data you need, and begin the task at hand
- Search for dynamically generated analytics with A.I.
- Use natural language to search for analytics







# CYFERD



## **Thanks for listening**

Come say hi!

# slido

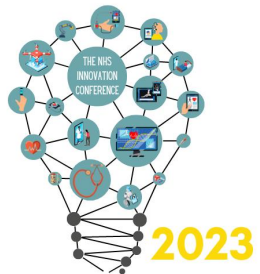


To engage directly with Cyferd and continue the conversation, Click from the options below

① Start presenting to display the poll results on this slide.



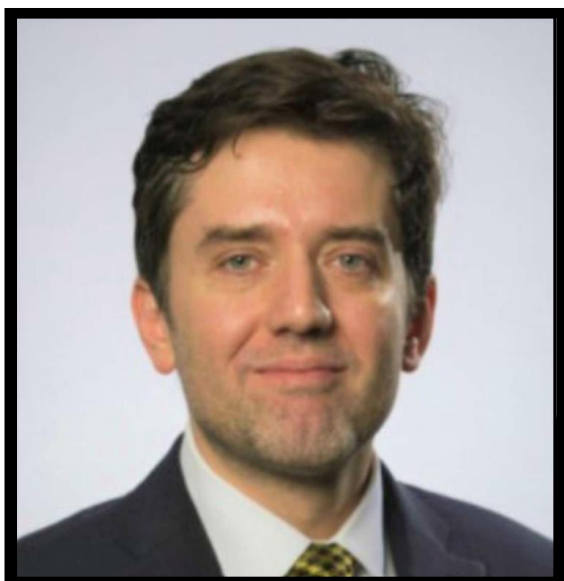
Conference hosted by Convenzis Group Limited



# The NHS Innovation Conference



## Q&A PANEL



**Dimitri Varsamis**

Head of Digital Innovation  
Delivery  
NHS England



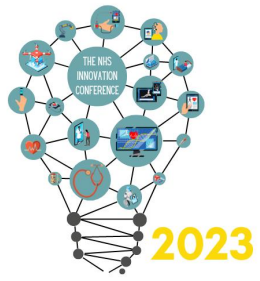
**Darren Atkins**

Chief Technology Officer -  
Intelligent Automation  
The Royal Free London NHS  
Trust



**Matt Heys**

SVP AI & Neural Genesis  
Cyferd

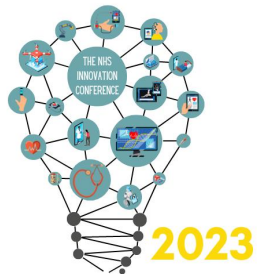


**The NHS Innovation Conference**



# **NETWORKING**





# The NHS Innovation Conference

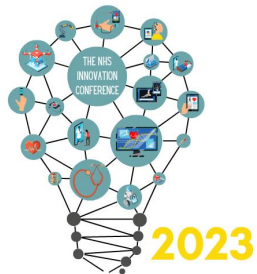


## Event Chair – Chair Afternoon Address



**Dr Dimitris  
Kalogeropoulos**

Senior Independent Advisor,  
Global Health Innovation Expert  
WHO, World Bank, European  
Commission, UNICEF,  
Healthcare Industry



# The NHS Innovation Conference



## SPEAKING NOW



Steven Hipwell

Digital Lead New Hospitals Programme Lancashire & South  
Cumbria Midlands & Lancashire Commissioning Support Unit

I will be discussing...

“Digital opportunities &  
ambitions for the  
Lancashire & South  
Cumbria New Hospitals  
Programme”

# Designing digital infrastructure and services for the Lancashire and South Cumbria New Hospitals Programme

Steven Hipwell – Digital Lead New Hospitals Programme

- A once in a generation opportunity to transform the regions hospitals
- Significant issues with aging estate
- Helping 1.8m people in the region live longer healthier lives
- [New Hospitals Programme :: Home](#)





1980s

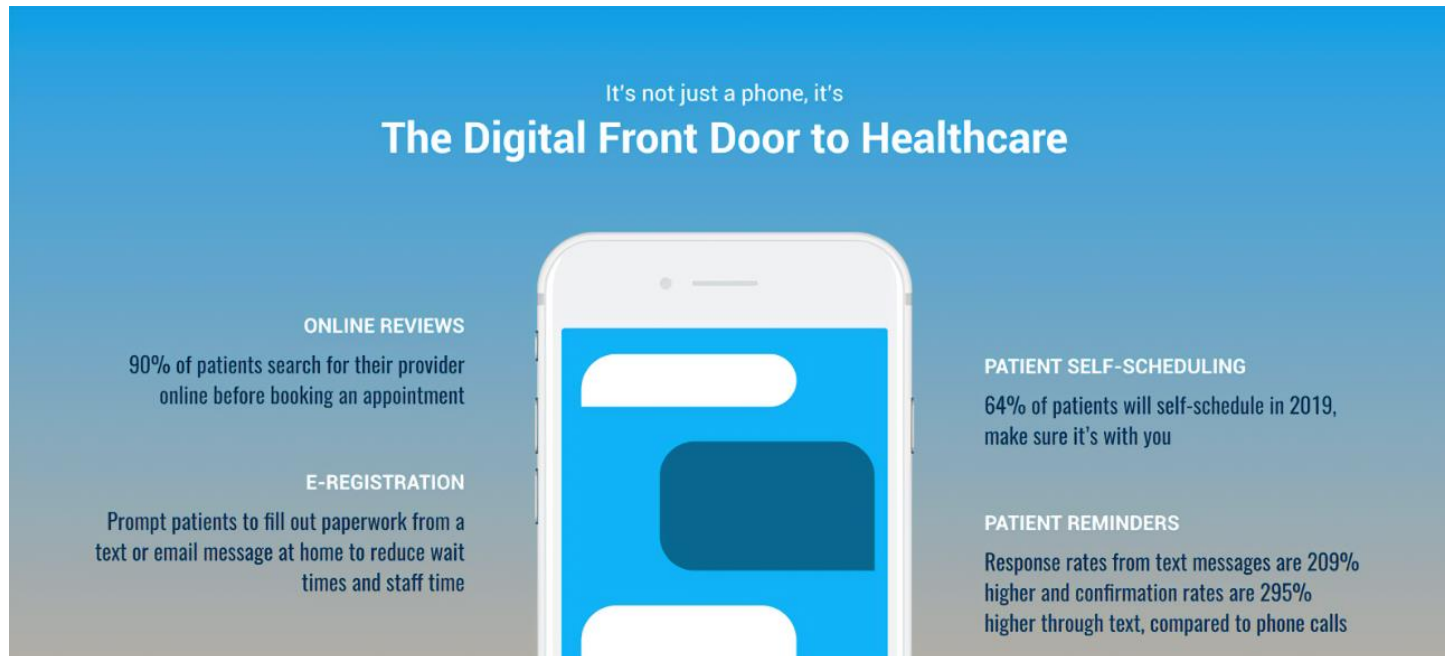


2020s



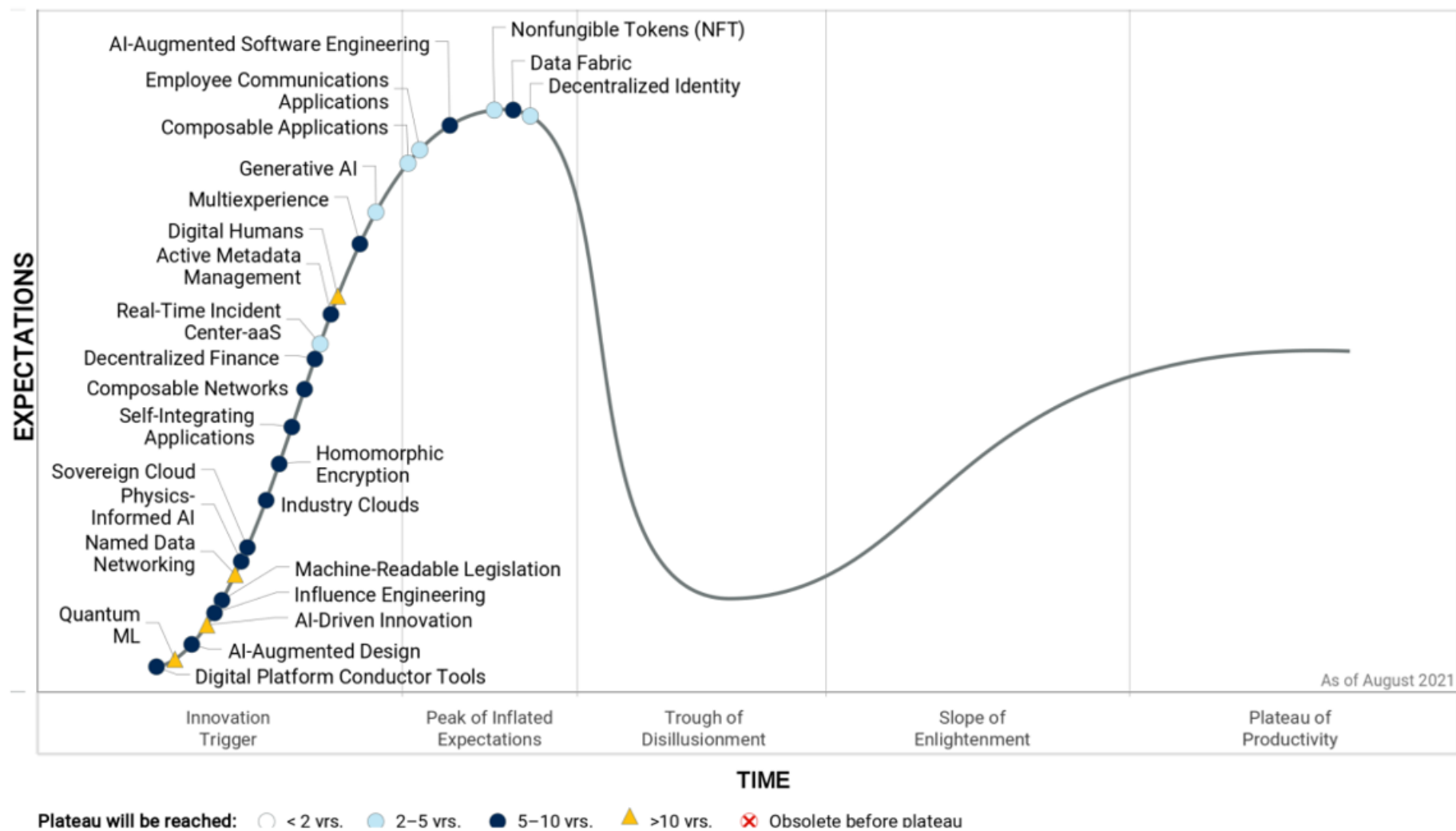


# Merging physical and digital facilities and services



- Healthcare digital services extend far beyond the hospital walls
- The hospital is a digital hub connecting into a network of digital services
- The provision and coordination of digital services will shape processes and building design and operation

# Hype Cycle for Emerging Technologies, 2021



Source: Gartner (August 2021)

747576

# Digital principles

- **Transformation, enablement and support** - of NHP digital systems and services: clinical, administrative, estates, facilities and security and others – to agreed strategies and target operating models – working as a coordinated eco-system, helping to shape future services
- **Scalability of services** – delivering and consuming digital services provided by the ICB's service providers, on-demand and delivered through a cloud-first strategy, personalised services and care
- **Interoperability** – open systems architecture for all systems to feed into Electronic Patient Records (EPR) and the systems estate, mobile, accessibility, empowerment, digital foundations to build off
- **Shared resources** – one network, one EPR, one data warehouse, consolidation, unified and federated services - removing unnecessary capital and operational expenditure
- **Data driven** - to expose required data for insights and in some contexts to automate processes
- **Intelligent building\digital twin** - integrated sensing networks, Artificial Intelligence (AI) and automation, robotics, Internet of Things (IoT), Computer Aided Facilities Management, using all systems within sites to manage operations and facilities, for real time status, for predictive analytics and automated self healing networks and systems, reduced capital and life-cycle operating costs
- **Sustainability, health and well-being** – thoughtful use of technology to support renewable energy sources, natural ventilation, day-light saving, smart lighting, heating and ventilation systems
- **Cyber secure** – securing the digital estate, especially as the Internet of Things (IoT) expands



# Fiona Stanley Hospital Perth Australia



- \$2bn scheme
- Planning started 2007, completed 2013
- 150000 m2
- 22 wards, 18 theatres, over 9 floors, 640 beds, around 600 single suite
- Integrated open digital architecture for building and environmental systems through Honeywell controls
- Use of automated guided vehicles for catering



# Google's new headquarters London



Lancashire & South Cumbria  
**New Hospitals**  
Programme

- £1bn scheme
- Estimated completion 2022
- 80819 m2
- 7000 occupancy, 11 floors
- Integrated systems design used to regulate and use machine learning for service optimisation
- Estimated 75000 connected devices, IoT
- Targeting BREEAM excellent and LEED gold certification



# BIM and Digital Twins



- Creating a 3D BIM model for clash detection through design operational and asset management is a precursor to providing accurate, laser modelled and LIDAR information for virtualisation and creating digital twins for simulations and scenario planning

## Digital Twin healthcare applications

Include: identifying drug risks, simulating human variability, patient specific digital twins, presenting detailed health data in context, providing personalised health information, genomic medicine, predictive and outcomes analysis, drug absorption and whole body scanning, reducing risk by creating accurate replicas and simulations for surgical procedures, streamlining workflows, improvements, virtual organs and hospitals.



# Khoo Teck Puat Hospital Singapore



- Use of biophilic design for sustainability and wellbeing
- One drop-off point, no more than 20m to the emergency department, and 20-40m to all specialist clinics
- Focus on minimising the need to move patients between spaces to provide treatment and care
- The new hospital is more than 30% more energy efficient than its predecessor, saving upwards of S\$1m a year in utility costs
- Systems for natural ventilation and cooling, solar shading and glare and redirection of sunlight to provide natural lighting
- Integrated electronic medical records system combining all data on a common platform



# Humber River Hospital Canada

Lancashire & South Cumbria  
**New Hospitals**  
Programme



- Described as North America's first fully digital hospital
- 722 beds, CA\$1.6bn
- Commissioned a command centre pictured in 2017 reporting an array of analytics including clinical to monitor the status of services, flow and for decision support to improve waiting times, utilization and patient and staff experiences
- Combining professional expertise, Artificial Intelligence (AI) machine-learning for decision-support
- Integrated electronic medical records system combining all data on a common platform as a digital front door
- Sensors to monitor building services and fabric

# Sheba Medical Centre Israel



- Using HoloLens 2 to deliver virtual reality guidance simulations
- Goal to deliver virtual reality guides for every piece of equipment in the centre
- Task-shifting in-mind of staffing constraints, COVID conditions and to minimize contact risk
- Paperless, hosted in the cloud and always available
- Video [here](#)



## Imperial College NHS doctors using HoloLens 2 virtual and mixed reality headsets and Microsoft Teams



- Using HoloLens 2 and Microsoft technologies to react to COVID conditions, including staff shortages, minimizing contact and rethinking resources
- A third of the team down with COVID the decision was taken to conduct ward-rounds virtually
- Bringing clinicians together on and off site and accessing electronic health records, X-rays and images in real-time to collaborate and coordinate
- Using Microsoft Teams as an integral tool to deliver care
- Video [here](#)

# Alder Hey Children's Hospital Liverpool



- Described as the first cognitive hospital
- The Alder Hey team are working with the Hartree centre and IBM Watson teams to develop cognitive computing capabilities
- Gathering insights and learning from patients and clinical teams to share and develop services and practice, putting the patient at the centre of care
- Using avatars, video and other mediums to help children understand procedures and information in ways most friendly to them
- Giving clinicians deep insights into what patients are feeling and thinking in order to anticipate approaches to care
- Enabling collaboration between clinicians, researchers, industry and wider to develop services and share learning
- Video [here](#)

## Communications and entertainment

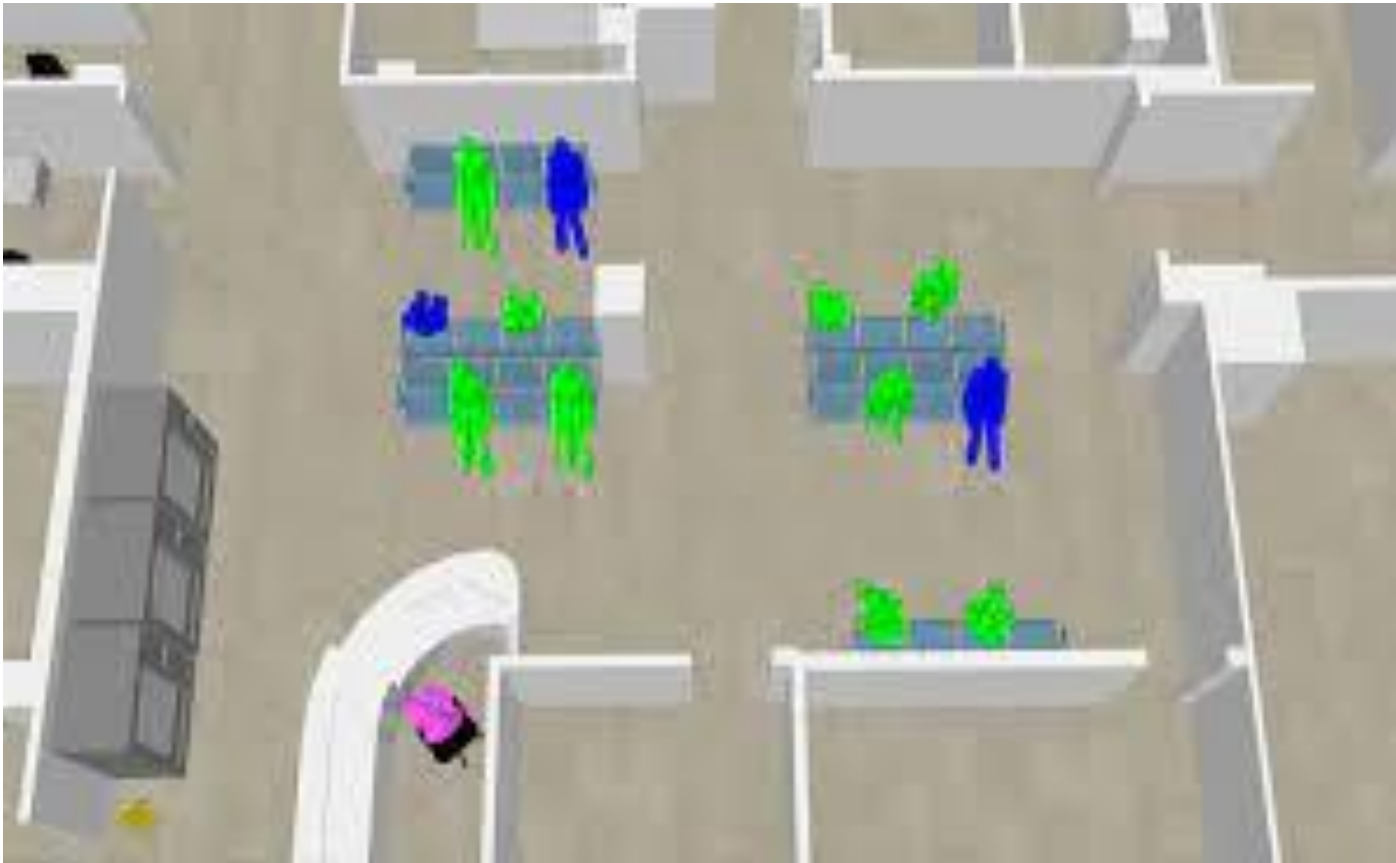
Digital communication and entertainment are very important to help keep family and friends connected, engaged in often the toughest of times.

Key to providing these services is the right infrastructure in the right places and coordination of power, data, audio-visual equipment and the provision and licensing of the applications and services that are to be provided.





## NHS Whittington emergency department flow modelling and mass movement study



- Modelling conducted by Arup to better understand mass movement and flow for services delivery and design and layout considerations
- Modelling conducted for a range of scenarios and conditions such as for social distancing and flow-through to different areas and services against varying capacity profiling
- Fluid dynamics modelling can also be used to add layers of dimension
- The data can be visualized in a command centre and interventions enabled to better manage demand against supply
- Data collected can be used to make incremental service improvements, inform the design of services, for shared research and estates and facilities planning and coordination
- Video [here](#)

## Arup designed health care simulation to measure user responses using a wearable

### Healthcare

# A human designer's perspective on digital healthcare facility



Anni Feng  
Senior Engineer

Two of my first tasks as a graduate were: to propose a new wayfinding design at Canary Wharf and to develop an alarm strategy for one of the busiest stations on the London Underground network. While these tasks might appear to be very different on the surface, both required me to think from numerous other people's perspectives e.g.

- A traveller: how can Person A go from Location 1 to Location 2, and at what point of the journey does Person A need to decide which way to turn;
- A Station Operator: what do they need to monitor to keep the station and passengers safe; how many notification events can one Station Operator handle before it becomes overwhelming, etc.

The design required site surveys, interviews, observations and iterations to get it 'right'.

This early experience shaped my way of thinking as a designer – if a human user is going to



experience the spaces, systems or whatever it is we are designing, then the user need(s) should be considered and addressed by our design. The question then became how can designers, who are also human, anticipate the many different user needs and to design for the different probable scenarios in an effective way.

Human experiences are incredibly personal and can involve many different emotions in a healthcare facility – a space to heal, to rest and to care, as well as a space to share, to learn and to connect. Healthcare spaces are designed on a set of general best practice guidelines, plus a slice of the individual human designers' own experience and perception of what would work well. But it is challenging for one person to design for the complexities of such a diverse set of users – could digital technologies and data optimise this design process?

At Arup we explored this very question to help us optimise the design of these spaces and ultimately, lead to better experiences for patients, visitors, clinical and non-clinical staff. Specifically, we looked for ways to understand how users' emotional responses to a space could be influenced by different architectural features. To do this we ran an experiment.

We first developed a tracking tool to extract and

analyse data from a wrist-worn medical-grade device, which measures wearer's blood volume pulse, skin temperature and skin moisture, etc. to infer stress levels. We then set up a virtual healthcare environment and asked participants to navigate the space and to carry out certain tasks, while wearing the biometric measuring device (see image). By correlating the biometric data with the location and the task data, we could begin to see which areas of the virtual hospital might be causing higher or lower stress levels. For example, negotiating stairs or lifts/elevators in between tasks appeared to be challenging for our participants.

Acknowledging that more research is needed to develop a rigorous design approach with a digital tool such as this, it could be nevertheless helpful in exploring different concepts by obtaining unique user insights.

The idea of correlating biometric data with location and task data can be applied to a physical hospital too. Imagine combining biometric data from wearable devices, data from Real Time Location System and the care pathway, to determine any patterns in emotional responses. This will then enable the designers to receive that continuous feedback on what is working well and what is not working so well in a real-life operational facility

they designed.

Design for the physical world is often done by considering the most probable scenarios. Thinking back on my wayfinding examples, if Person A is at Location 1, there are a number of places we can anticipate Person A may want to go. However, there is always the possibility Person A wants to go somewhere that is not listed on the physical directional signage. Services delivered through digital devices, such as a wayfinding app on a smart phone, would give users the ability to personalise their experience beyond what could be predicted. The user experience would be improved, since they now have the visibility and the control of their own journey – which is something we have found to be particularly empowering in a healthcare environment. For example, in one of our recent projects, allowing patients to control their room temperature and lighting from their beds has found to be a contributing factor to improved satisfaction rating.

Recognising that a level of human control is important in healthcare, the design of digitally-minded facilities should consider the variability and complexity of human needs. For example, in the midst of applying sensors and artificial intelligence so that the building control can be increasingly automated without any human intervention, consideration of what this automation means to the human users, who value a sense of control, remains.

Similar to patients having an active role in the era of Participatory Medicine, I believe there is a role for human designers to become an active participant in a digital healthcare facility. Designers should be involved from design to operation, and back to design when it is needed – making the best use of the digital technologies to capture and to anticipate the diverse and changing needs of the users; to design a healthcare facility that is based on the principles of modularity, flexibility and an open platform approach ready for adaptations; and to monitor the health of the design and the facility through a continuous feedback loop enabled by digital infrastructure and data analytics capabilities. Human designers are flawed and inherently biased. Digital technologies (if used wisely) offer us a way to better ourselves.

- Users' biometric responses measured in reaction to different virtual designs for user centered design analysis
- Wearable used to measure blood volume, pulse, skin temperature and moisture to indicate stress and other emotional responses
- Biometric, task and location data used to provide insights
- Similar models and applications could be adapted for multiple scenarios to provide insights and shape designs, care pathways and operating-models
- Measure and reassure around Electro Magnetic Interference (EMI), 5G and Wi-Fi effects; and in regard to facilities design for placement of MRI and shielding for scanners and other sensitive equipment



## Intelligent LED and circadian lighting, Humber and Doncaster dementia wards



- Circadian lighting that works in harmony with human biological cycles to support the sleep wake cycle, improve the patient and staff environments, promote wellbeing and patient recovery
- Environmentally sustainable solution
- Energy and cost saving
- Highly efficient to install, commission, administer and maintain
- IoT enabled for control, orchestration and utilization data

## Kendal ambulance station installs Internet-of-Things (IoT) sensors and lighting



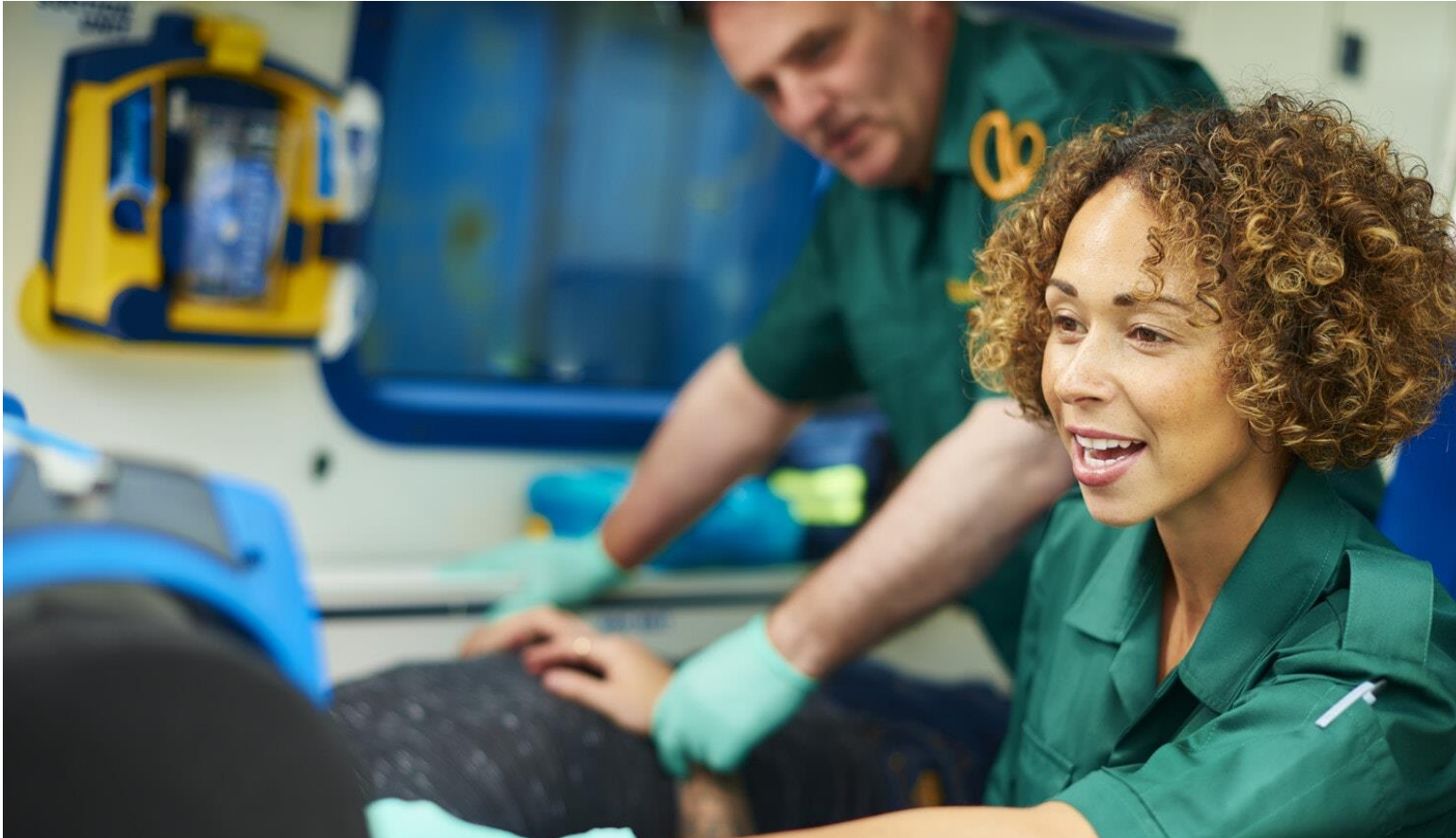
## Lancashire & South Cumbria **New Hospitals** Programme

- Northwest Ambulance Services have installed IoT lighting and sensors at Kendal ambulance station in 2021
- Colour tunable low energy LED lighting installed throughout and parking bay traffic light controls and sensing
- Bin, temperature and parking sensors installed
- Boiler, fan and blind controls installed
- Using Power-over-Ethernet (PoE) and LoRaWAN IoT technologies
- Mobile control through app



## 5G connected ambulances and services

### Lancashire & South Cumbria **New Hospitals** Programme



- Collaboration between Ericsson, University Hospital Birmingham NHS Foundation Trust and King's College London
- Using 5G to perform remote diagnostics in near real-time enabling remote clinicians to collaborate with paramedics using haptic technology
- A high-definition camera using near zero latency 5G enabling Virtual Reality (VR)
- Enabling remote access to medical records
- Allowing clinicians to be present whilst remote
- Potentially reducing the need for accident and emergency or hospital-based treatment

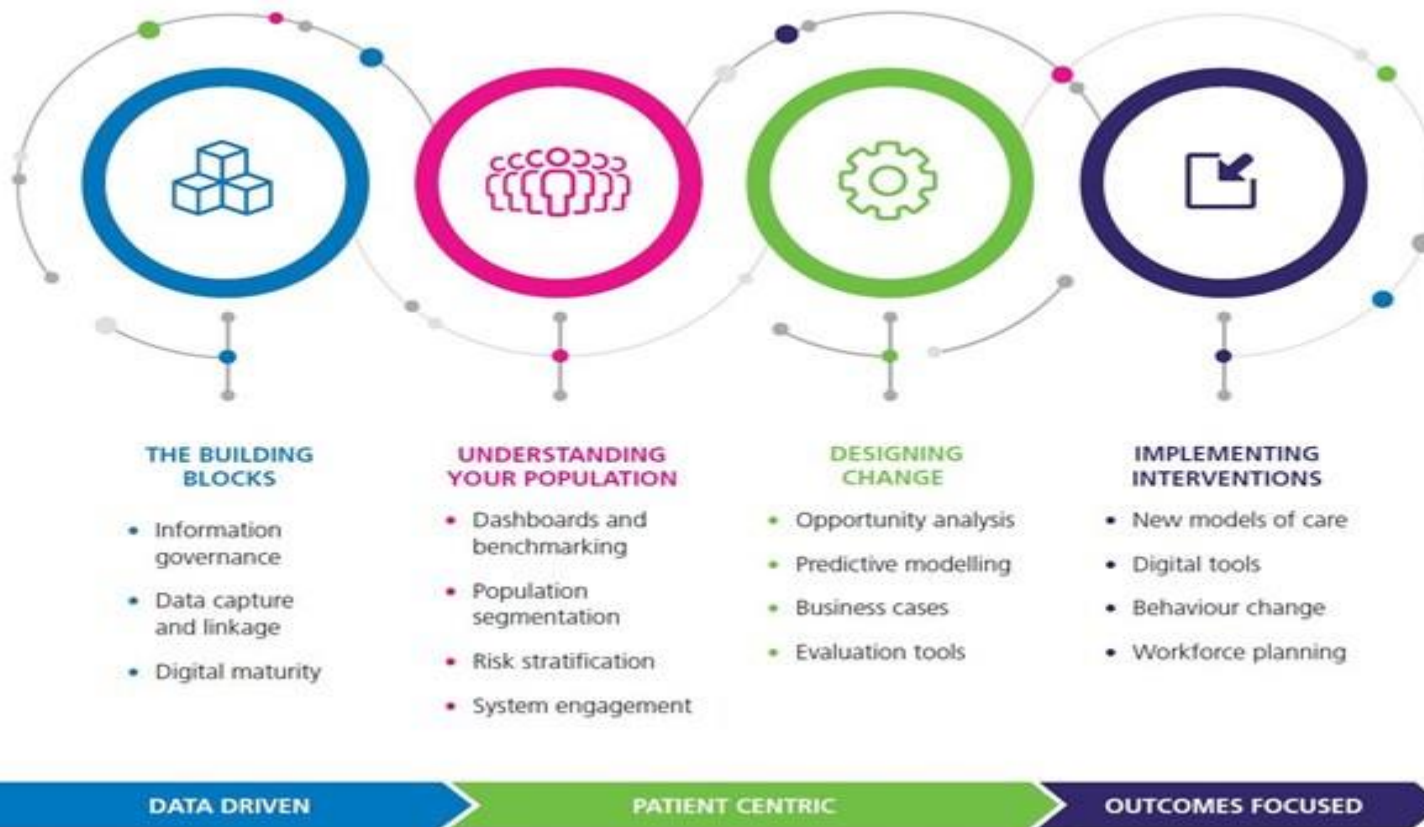
# Telemedicine and telehealth



- An estimate from the American Medical Association predicts that nearly 75% of all doctor\GP, urgent and emergency hospital visits could be safely managed using telemedicine
- Wearables for remote diagnostics and reporting for electrocardiogram, blood pressure, glucose and many other applications
- Aggregating and using real-time data from multiple orchestrated systems to personalize treatment
- Virtual consultations and wards
- Pre-operation and post-operation monitoring and alerting
- Automated drug delivery such as insulin and patient reminders to promote sustainable health and recovery, minimizing re-admissions and additional treatments

# Population health

## Lancashire & South Cumbria **New Hospitals** Programme

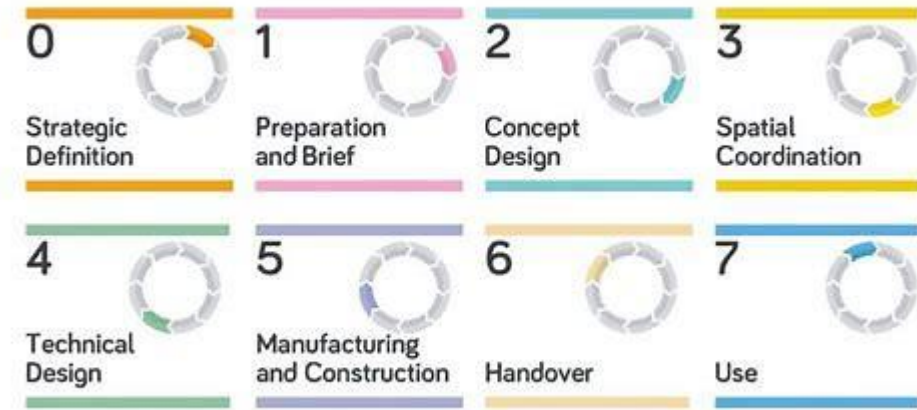


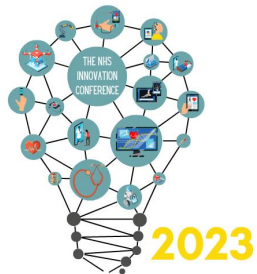
- Promoting and enabling physical, mental and emotional wellbeing
- Empowerment of people to lead healthy lives
- System-wide thinking and approaches to health and wellbeing
- Integrating and collaborating, creating anchor institutions, with healthcare, councils, industry, communities, support groups and partners to identify, join-up and promote opportunities and practice
- Using data to help identify and develop opportunities and promote them in personalized and appealing ways



## Integrating digital through the RIBA stages

- Digital spans across design, development and life-cycle operation
- Digital services extend outside the hospital and are part of an eco-system
- Management of the time and contractual tension and synchronisation of digital and construction commissioning activity
- Fully consider digital requirements contractually to help avoid coordination issues
- Digital designs need close coordination and capture in employer's requirements
- Digital sign-off to be captured as part of practical-completion activities





# The NHS Innovation Conference



## Q&A PANEL



**Steven Hipwell**

Digital Lead New Hospitals Programme Lancashire & South  
Cumbria Midlands & Lancashire Commissioning Support Unit



**Erica White**

Associate Director of Innovation  
Royal Free London NHS Foundation Trust



# The NHS Innovation Conference



## SPEAKING NOW



**Douglas Hamandishe**

Chief Digital  
Officer/Broadcaster &  
Presenter - Context Health &  
Centric Health Media



**James Freed**

Chief Digital & Information  
Officer  
Health Education England



**Chris Fleming**

Partner  
Healthcare Public  
Digital

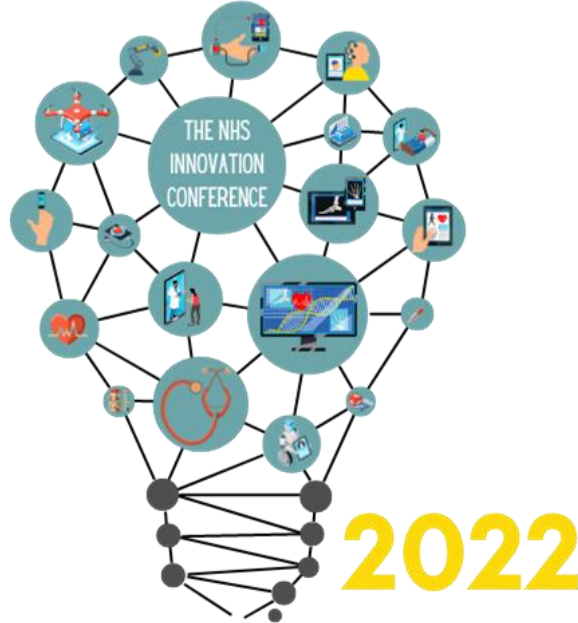


**Erica White**

Associate Director of  
Innovation  
Royal Free London NHS  
Foundation Trust



# THANKS FOR ATTENDING



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Hospitals of The Future**



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