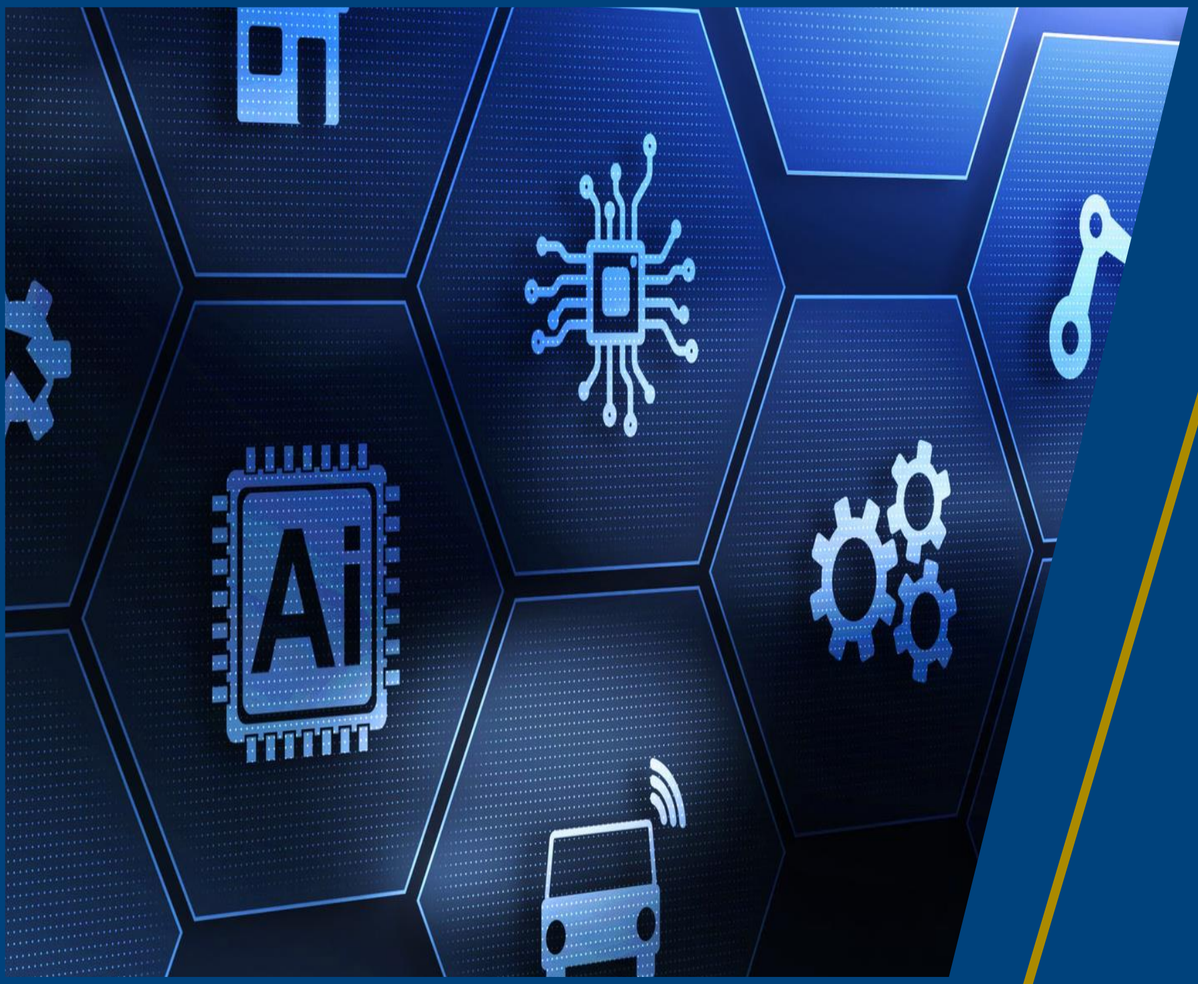


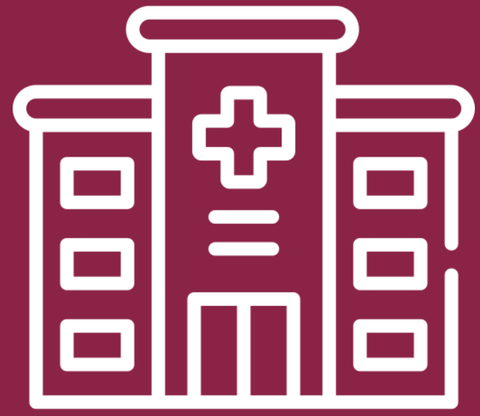
AHLC Solutions

Delivering Sustainable Hospitals

NYHDIF

Andy Williams, 16th November 2023

New Hospital Programme



48 hospitals by 2030

the biggest hospital building programme in a generation

Build national capacity

From improving mental health and learning disability services in Cumbria, Northumberland, Tyne and Wear to building a new Women and Children's Hospital in Cornwall, this programme will bring top-class healthcare services to more people locally.

High quality and sustainable care

These hospitals are part of the Government's wider plans to invest in buildings and equipment across the NHS and ensure our world-class healthcare system and staff have the facilities they need for the future.

Intelligent hospitals

Laying a foundation for interoperable and intelligent systems – the New Hospital Programme will provide outstanding healthcare facilities, which will drive digital innovation and investment in new diagnostics.

Deliver better, faster and a Sustainable Legacy

The New Hospital Programme will pursue standardised designs and productisation to create an NHS kit-of-parts, employing modern methods of construction (MMC) to speed up the build, reduce cost and increase quality.

Digital in the build cycle

‘The New Hospital Programme is transforming the way we deliver healthcare infrastructure for the future NHS’

Digital in the hospital

Digital in the system

Future state and strategic objectives our digital approach will realise

To deliver an intelligent hospital, there are 5 fundamental principles we must adhere to

Digitally empowered patients

Digitally enabled staff

Interoperable and intelligent systems

Hospitals without walls supporting integrated care

Smart building

Challenges that make digital transformation difficult.

Digital Hospital delivery lifecycle

Strategic planning and requirements definition

Design and spec

Manage market and procure

Construct and implement

Operate

Definition

Opportunity 1:

NHP's Digital approach can support Trusts by defining digital hospital best practice

Delivery

Opportunity 2:

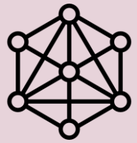
NHP's Digital approach can support Trusts to deliver digital hospitals.

Optimisation

Opportunity 3:

NHP's Digital approach can help trusts to drive value through continuous improvement and optimisation of the hospital

The technology capabilities required to deliver an intelligent hospital have been broken down in to three fundamental categories

Category	Summary	Description				
Fabric	**The technology that is part of the hospital building**	 Underlying Infrastructure	 Enabling technology	 Sustainability built-in	 Enabling architecture	
Footprint	**The technology that connects the hospital to other care settings**	 Patient experience	 Connected care	 Care beyond the hospital	 System interoperability	 Staff engagement
Flow	**Technologies which support the flow of information in a clinical pathway**	 Traceable journeys	 A learning and predictive system	 Next generation and core clinical systems	 Security and data governance	

Adopting an evidence-based approach to continuous improvement

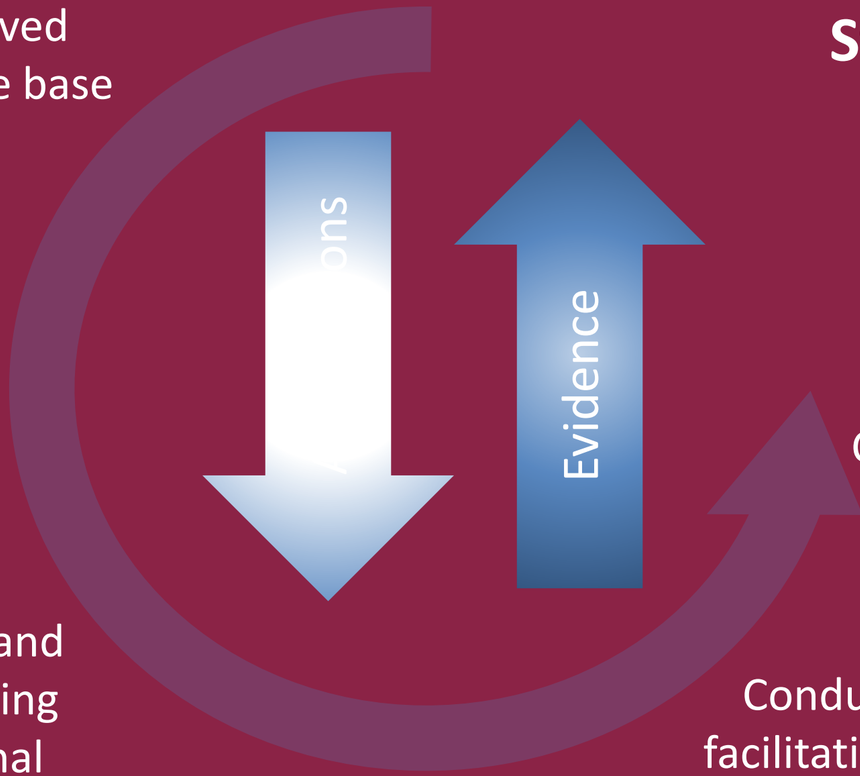
In the early phases of the NHP, we will be reliant on assumptions and existing practices.

However, as the programme matures, we will gain more evidence on all aspects of hospital design and development, and our confidence will increase.

A key part of the Transformation Function is to establish the culture and tools that facilitate continuous improvement throughout the NHP.

Improved evidence base

Standards



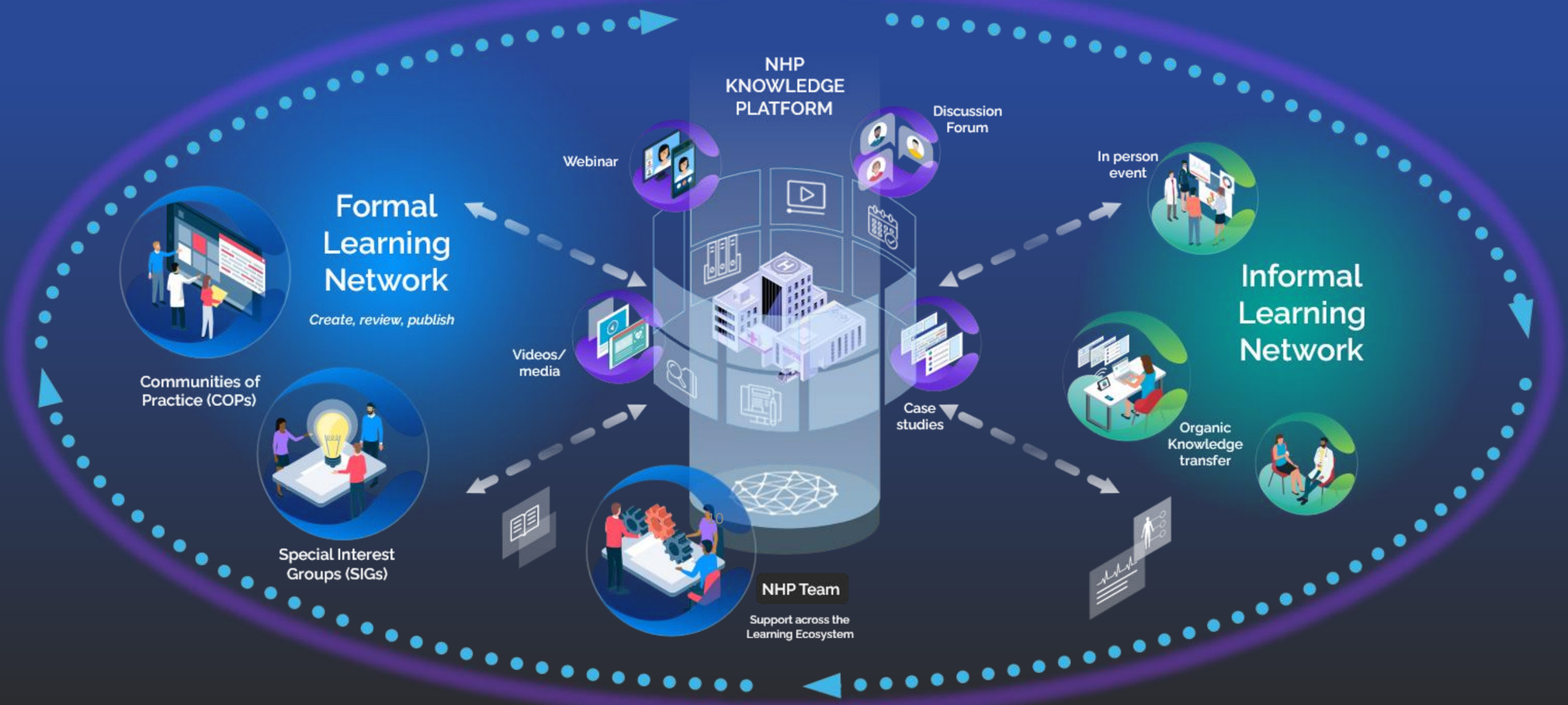
Identifying evaluating, and agreeing Best Practice

Continuous learning

Identifying and understanding international comparators

Conducting and facilitating NHP and NHS research

New Hospital Programme Learning Ecosystem



Leeds Teaching Hospitals

Over
8,500
babies born

1.14 million
outpatients attendances

Almost
339,000
patients attending A&E

Almost
94,000
inpatients

Over
21,000
staff

1.5 million
patients per year

7
hospitals

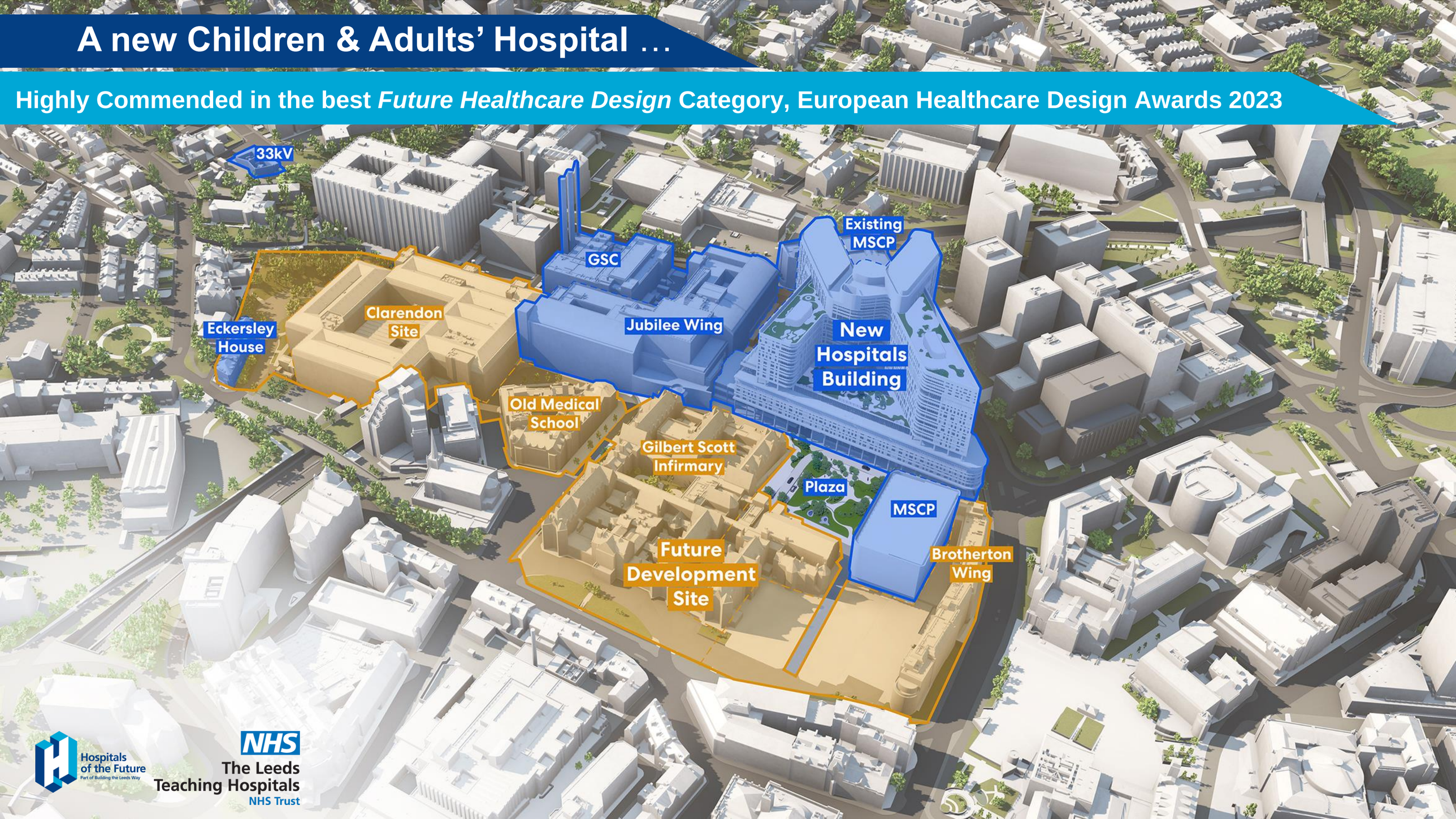
What are the Challenges?

The Leeds Teaching Hospitals NHS Trust

1	BACKLOG OF PATIENTS WAITING FOR CARE	The Trust has made huge progress in reducing wait times however there is still progress to be made with waits for outpatient appointments being the most frequently reported patient concern in 2022/23.
2	LENGTH OF STAY AND DISCHARGE	The Trust has an ambition to cut the average length of stay by half a day whilst ensuring patients receive the right care in the right setting.
3	WORKFORCE CHALLENGES	The Trust are working with staff to improve their working environment and provide the best resources to perform in their roles and deliver excellent patient care.
4	SUSTAINABILITY AND NET ZERO TARGETS	The Trust has ambitions to be one of the greenest hospital trusts in the UK but has challenges around the size and age of the Trusts estate.
5	AGEING ESTATE AND BACKLOG IN MAINTENANCE	The Trust estate is vast and a large proportion of the Trust site is ageing, including Grade I and II listed buildings which are not designed for modern healthcare.

A new Children & Adults' Hospital …

Highly Commended in the best *Future Healthcare Design* Category, European Healthcare Design Awards 2023



Hospitals of the Future
Part of Building the Leeds Way

NHS
The Leeds Teaching Hospitals
NHS Trust

PURPOSEFUL INNOVATION

Delivering Healthcare for the Future

Hospitals of the Future
Part of Building the Leeds Way

NHS
The Leeds Teaching Hospitals
NHS Trust

Efficient Hospital Flows

Real Time Location of assets and people

Adaptability & Flexibility

Ensuring we can transform space to meet surge capacity

Care Closer to Home

Virtual care and wearable technologies

Pro-active Monitoring of Built Assets

Smart Enterprise Asset Management and Digital Twin

Culture of Innovation

Innovation Pop Up and Leeds ARC

WELL GOLD Building

Design to provide optimal environments for staff and patients.

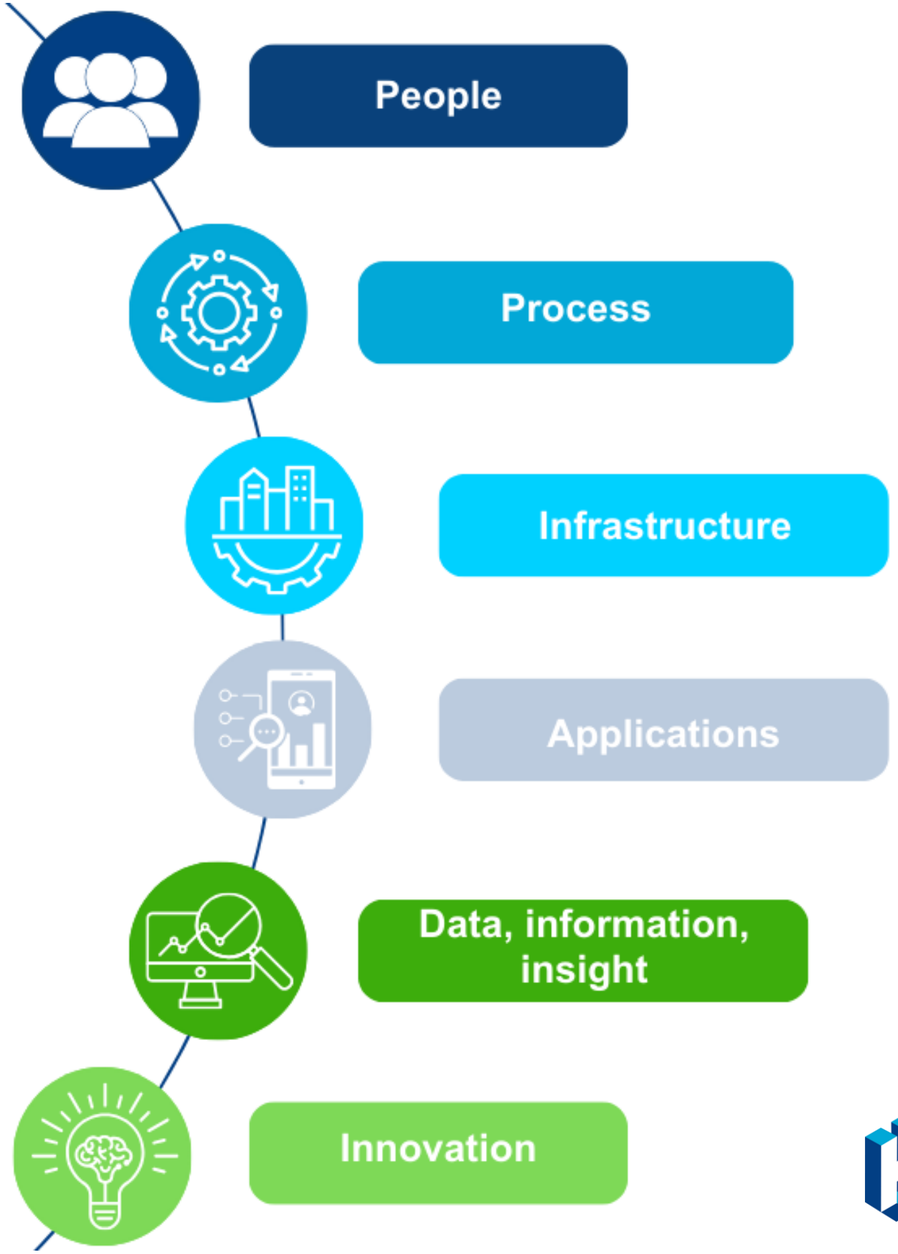
The Leeds Digital Way

The Leeds Teaching Hospitals NHS Trust

The Leeds Digital Way is the Trust's vision to use digital and new technologies to provide excellent, safe and integrated patient-centred care in Leeds and beyond.

Whilst continuing to ensure the digital framework is in place we want to grasp the opportunity for digital innovation that our new hospitals will bring.

6 Key areas of activity

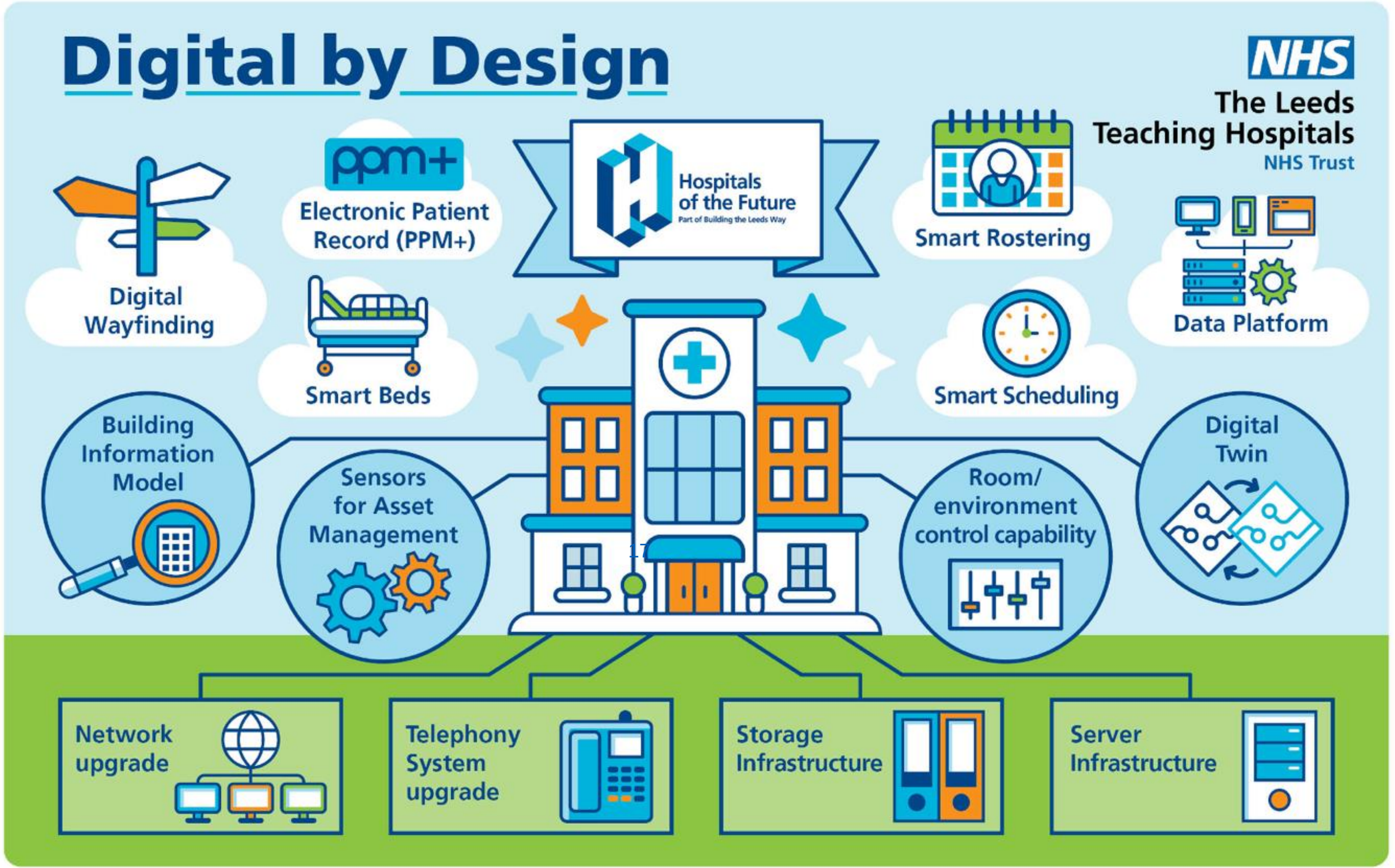


#LeedsDigitalWay

CONNECTS • TRANSFORMS • IMPROVES

Hospitals of the Future
Part of Building the Leeds Way

Digital Driving Design


Digital by Design
NHS
The Leeds Teaching Hospitals
NHS Trust
Digital Wayfinding
ppm+
Electronic Patient Record (PPM+)
Hospitals of the Future
Part of Building the Leeds Way
Smart Rostering
Data Platform
Smart Beds
Smart Scheduling
Building Information Model
Sensors for Asset Management
Room/ environment control capability
Digital Twin
Network upgrade
Telephony System upgrade
Storage Infrastructure
Server Infrastructure

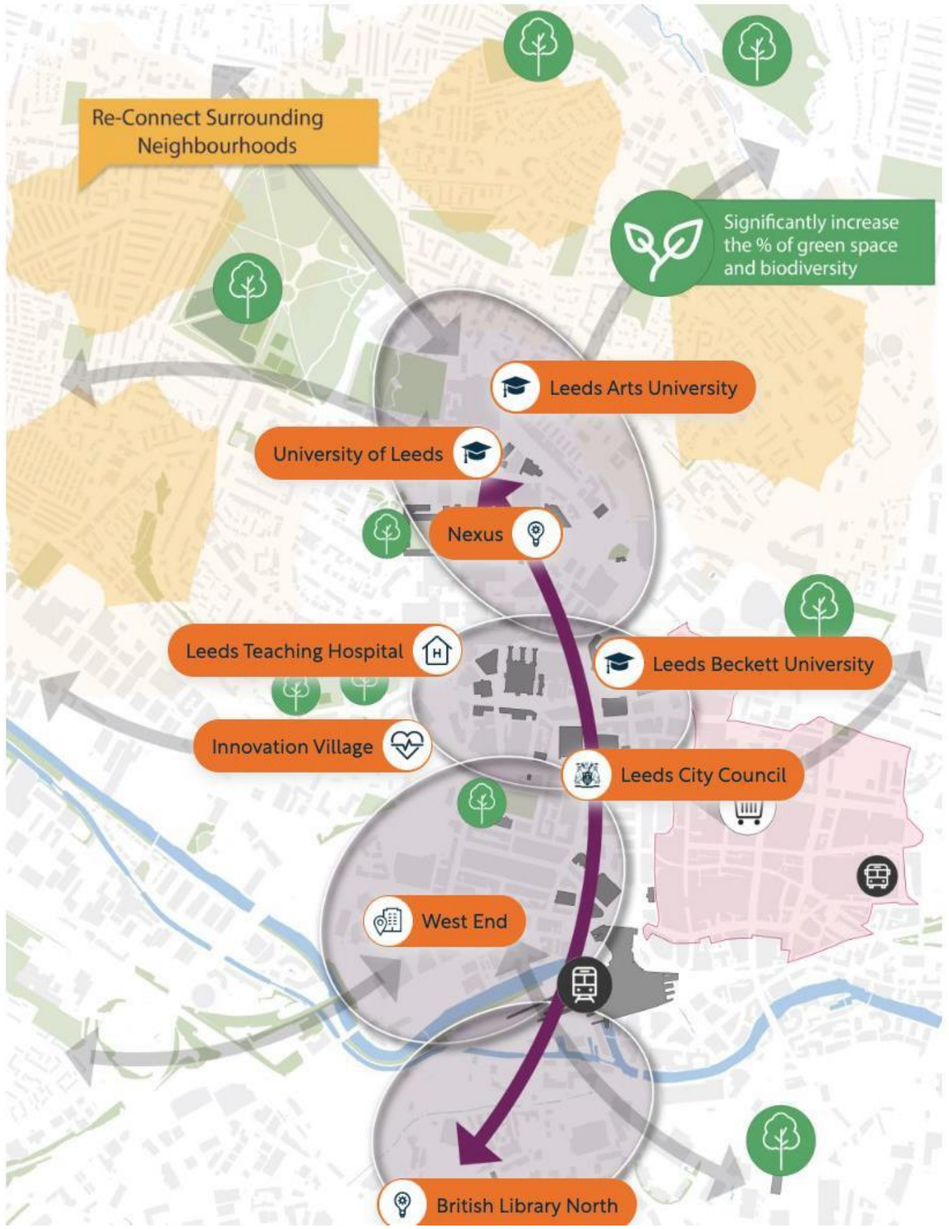
Paediatric Acute and Urgent Care - PCAL/CAT: Jack's Lumbar Puncture and Autism

STAGES	PRIMARY CARE ADVICE LINE (PCAL)	CHECK-IN	APPOINTMENT	THE WARD
STEPS The steps that the user takes in their journey, interacting with different services and technologies along the way	Elaine takes Jack to the GP due to him having a headache, sensitivity to light and high temperature – his mum and main carer (Elaine) is worried and wants Jack assessed ASAP	The GP seeks further advice from a paediatrician, so the GP uses their portal to log into PCAL online and use the virtual chat to speak to the team, inputting Jack's symptoms. Jack is triaged from there and Elaine is instructed by the GP to bring Jack straight into the Children's Assessment and Treatment Unit (CAT) for review, bypassing the emergency department (ED). This online PCAL service helps to bridge the gap between primary and secondary care, speeding up the process and making it more efficient. This eliminates the need for Elaine to bring Jack into an overcrowded ED	Elaine receives instructions sent to her app on her smartphone, which provides her with step by step process to get Jack to the right place for treatment. This includes instructions where to go, the designated parking space and a profile of the consultant who will be carrying out the procedure. Elaine is also prompted to check in using her smart phone when she enters the hospital for speed	Whilst Jack is unwell, he is still not coping well with the unfamiliar environment and he is upset. The doctor uses a sensory toolkit to try and calm Jack down, he provides Jack with noise cancellation headphones and Augmented Reality (AR) which is tuned into one of Jack's favourite adventure stories about space. The doctor then gives him a local anesthetic and carries out the procedure (a lumbar puncture)	The procedure goes well; however it confirms that he does have Meningitis after a quick turn around of results from the digital lab. Jacks doctor sits down to discuss this with Elaine and discusses next steps. Follow up notes and steps are also sent to Elaine, which she can access in her own time too	Jack is admitted to the Paediatric medical ward where he has access to his own isolated room and access to charging points etc. for his tablet. Jack can also control his own lighting and temperature of his room to make sure its just right for him	Jack is very shy around strangers, so to help communication, Jack communicates through his bedside portal, which is where a group chat is set up between himself, the nurse and his mum (carer) to help him to communicate his needs. Jack also uses the bedside entertainment system to video call home to see his dog, Skye, who makes him feel more at ease in an unfamiliar environment
EMOTIONAL EXPERIENCE Patient benefits that will close the experience gap between the current state and future state of the patient journey	This is very stressful for Jack as he hates feeling unwell, however he is pleased that he knows that help is accessible quickly	Elaine is grateful that the GP can access quick help with fast responses as she is anxious about Jack's wellbeing and wants him seen ASAP	Being able to go straight to CAT is great as Jack is already stressed and Elaine is aware that a crowded ED would make his stress levels even higher	Elaine loves having instructions sent straight to her phone, as she can spend less time searching for directions to ward etc., and more time trying to calm and distract Jack, which is necessary at this point	Having noise cancellation headphones really helps Jack here as he is familiar with them and takes comfort in hearing a short story about space, whilst being able to ignore all surrounding unfamiliar noises	Elaine is glad that the follow up notes and next steps are also sent to her as she struggles to concentrate in times of stress	As Jack does not like being in unfamiliar environments, he finds it comforting that he can control his own lights and temperature in his own room, as it gives him the sense of control that he needs	Jack finds it comfortable that he doesn't need to speak to unfamiliar people, especially when he is tired and not feeling his best. Also, being able to see Skye reduces his anxiety about not being at home
TECHNOLOGIES UTILISED FABRIC FOOTPRINT FLOW	**Longitudinal Care Record System** Jack's GP accesses Jack's records across full system to check if there has been any related health issues in the past	**Digital Front Door** GP uses patient portal to access the PCAL service to communicate with PCAL team to get help for Jack's symptoms **Command Control Centre** Alert received and system informs CAT of Jack's arrival and ensures there is a bed available	**Smart Triage** AI-enabled triage tool that facilitates bespoke care pathway identification **Longitudinal Care Record System** Jack's records are shared across the Longitudinal Care Record System between the primary and secondary care **Digital Transfer of Care** Transfer of Jacks care from Primary to acute care	**Smart Parking** Elaine utilises the smart parking and automatic number plate recognition technology, to ensure that a suitable car parking space is available ensuring that the process is as smooth as possible for Jack **Command Control Centre** Identifying busy/quite areas in the hospital to assist with wayfinding **Self-Service Check In Tools** Elaine uses her mobile phone app to check in	**Immersive Technology** Jack uses AR (with a reduced intense light level) to distract him and engage him with characters/a story is comfortable and familiar with	**Digital Front Door** Elaine has access to the audio recording of the conversation so that she can listen back in her own time	**Renewable Generation** Accessible chargers that are powered through renewable energy throughout the hospital to support the use of mobile devices and tablets **IoT Sensors** Patients can adjust lighting and temperature in their environment by motion and voice	**Integrated Bedside Terminals** Devices that provide information and entertainment during inpatient stay **Digital Front Door** Jack is able to use the video technology to communicate with home

Leeds Innovation Arc

Set across **150 hectares** of the city centre the Innovation Arc will stitch together some of the most significant innovation assets in the north of England.

There will be over **3000 new homes** in and around the Arc and the potential for up to **220,000m²** of public realm improvements as well as space for two new city parks creating 4 hectares of new, meaningful green space.



Innovation Village Masterplan

Future for the innovation Village

- >100,000m2 development
- 4000 jobs
- 520 new homes
- 13bn GVA benefit

Project Phoenix – The Old Medical School

A Healthech **innovation hub** at the heart of the Leeds Innovation Arc **co-locating clinicians, entrepreneurs and academics** for the first time with **outstanding learning, education and innovation facilities** for healthcare staff, developing the products, services and people that will change healthcare.

- Aligns with the West Yorkshire Investment Zone
- Aligns with the Leeds Innovation Arc
- First phase of the Innovation Village
- Vacant from mid-late 2024
- Open from 2026/2027
- Potential location for the Innovation Pop and Trust Education and Training (part)
- Potential collaboration with Nexus
- Potential for over 200 jobs

Innovation Pop Up

The Innovation Pop Up is the first of three phases towards a health innovation campus centred at Leeds General Infirmary…

Aims

- Develop the innovation culture in LTH ready for our new digital hospitals
- Be a platform for healthtech innovation for HofF
- Centralise innovation activity at LTH linking staff, partners and industry
- Support local economic growth and promote the regional skills and talent agenda
- Scale in phases towards the site redevelopment

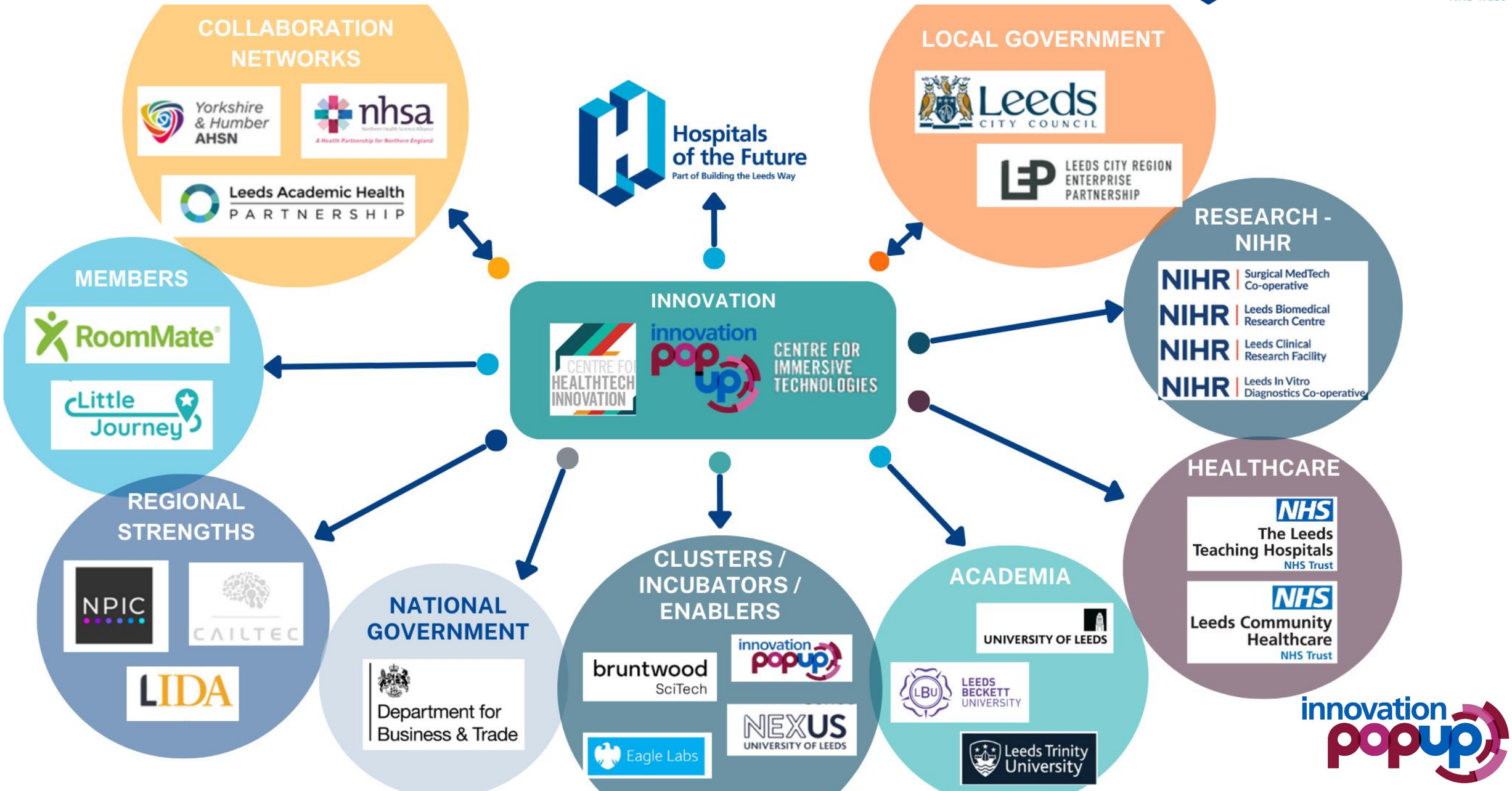
…Creating a compelling destination for healthcare talent, academic and healthtech industry partnerships, on the *NHS side of innovation*.

Innovation Expo Space

Recently refurbished space to create new collaboration, co-creation space together with a digital skills training centre, sponsored by Fujitsu, Intel and our Leeds Hospitals Charity.

@ The Innovation Pop Up

Wider Network and Strategic Partners



Digital Market Engagement Key Themes

Hospitals of the Future
Part of Building the Leeds Way

NHS
The Leeds Teaching Hospitals
NHS Trust

1. Clinical Communications
2. Virtual Care Solutions
3. Operational Solutions (e.g. RTLS, bed management)
4. SMART Building Solutions
5. Inpatient Central Monitoring and Patient Observation
6. Patient Flow Solutions (e.g. wayfinding, mobile check in)
7. Resilient and Reliable Network Provision

Sustainability

Sustainability Principles

Concept Design:

1. *Net Zero Carbon:*

- Be Lean: passive design of building including modelling to influence glass:façade ratio;
- Be Clean: electric heat pumps as a green alternative to the GSC
- Be Green: PV Panels incorporated into the design to provide renewable source of energy;

2. *Wellbeing:*

- BREEAM Excellent and WELL Gold achievable at this Workstage;
- Design maximises natural daylight and has factored in air quality, acoustic and active lifestyle measures.

3. *Adaptable & Resilient:*

- Thermal modelling including 2050 climate scenarios to design for the future;
- Flexibility of spaces considered – build less in the future if spaces can be easily converted (e.g. workspace into outpatient space);
- Digital tools (like telehealth) to reduce travel to site where not required and associated carbon.

4. *Resource Responsibility:*

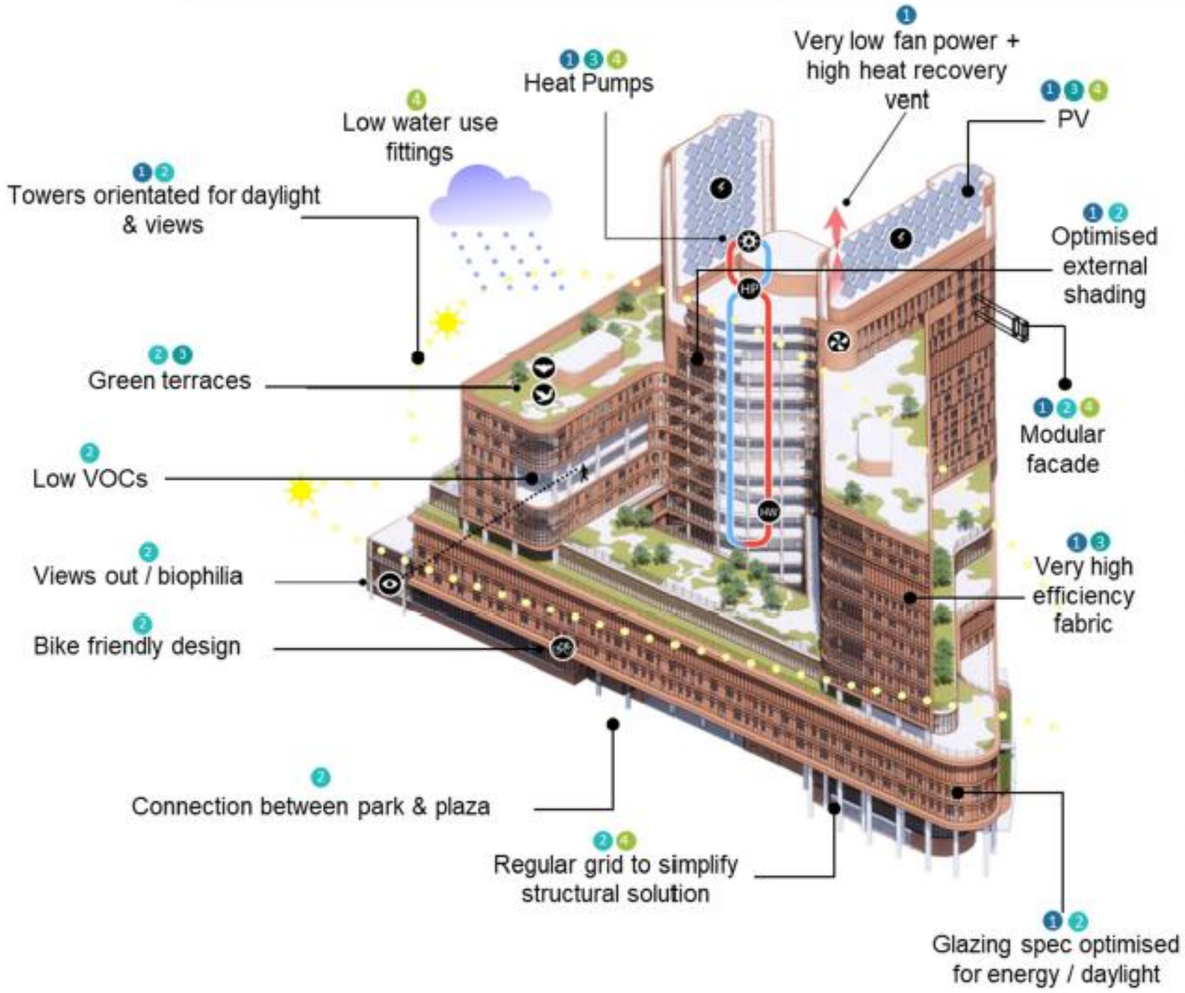
- Embodied Carbon minimised through selection of Sub and Super structure and façade materials, along with MMC solutions to maximise standard materials that can be manufactured locally.

Sustainability

Architectural Strategy

1. Net Zero Carbon | **3. Adaptable and Resilient**

2. Wellbeing | **4. Resource Responsibility**



- ✓ Fossil fuel free design
- ✓ Whole life carbon Calculation
- ✓ Climate change adaptation study
- ✓ Parametric analysis (Energy / solar / daylight)
- ✓ Design for durability and resilience study
- ✓ Material efficiency study
- ✓ Renewable feasibility study
- ✓ MMC / DfMA Scoring / reporting
- ✓ Use of BIM (transparency → adaptably)
- ✓ SUDs Strategy
- ✓ Façade options capital carbon analysis

Figure: Sustainable design features and analysis mapped against project sustainability brief principles

THANK YOU

AHLC Solutions

Andy.Williams@ahlcsolutions.com