

# WELCOME TO

The NHS Estates & Facilities Conference 2022



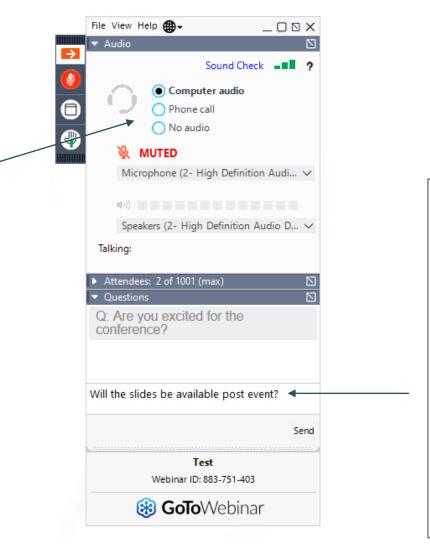




# The NHS Estates & Facilities Conference 2022



Make sure you are connected via Computer Audio for the conference. You can test your audio via the 'Sound Check' tab.

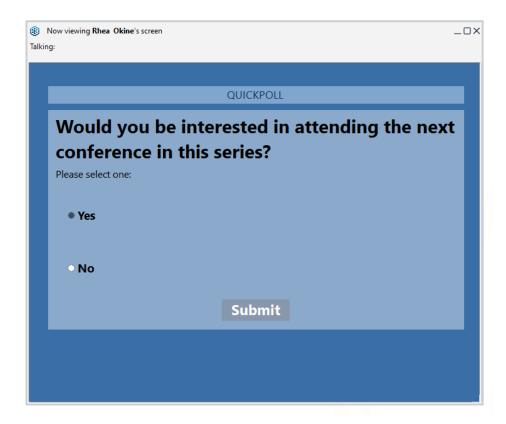


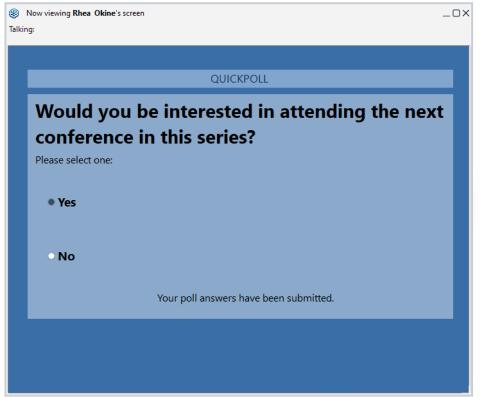
If you have any questions or comments for Speakers across the day, please expand the Questions Section on the GoToWebinar panel. You will not be able to see each others questions.



# The NHS Estates & Facilities Conference 2022







Click on **one** of the multiple choice options, then press 'Submit'

Once **Submitted** your screen will look like this



# The NHS Estates & Facilities Conference 2022:



## **SPEAKING NOW**



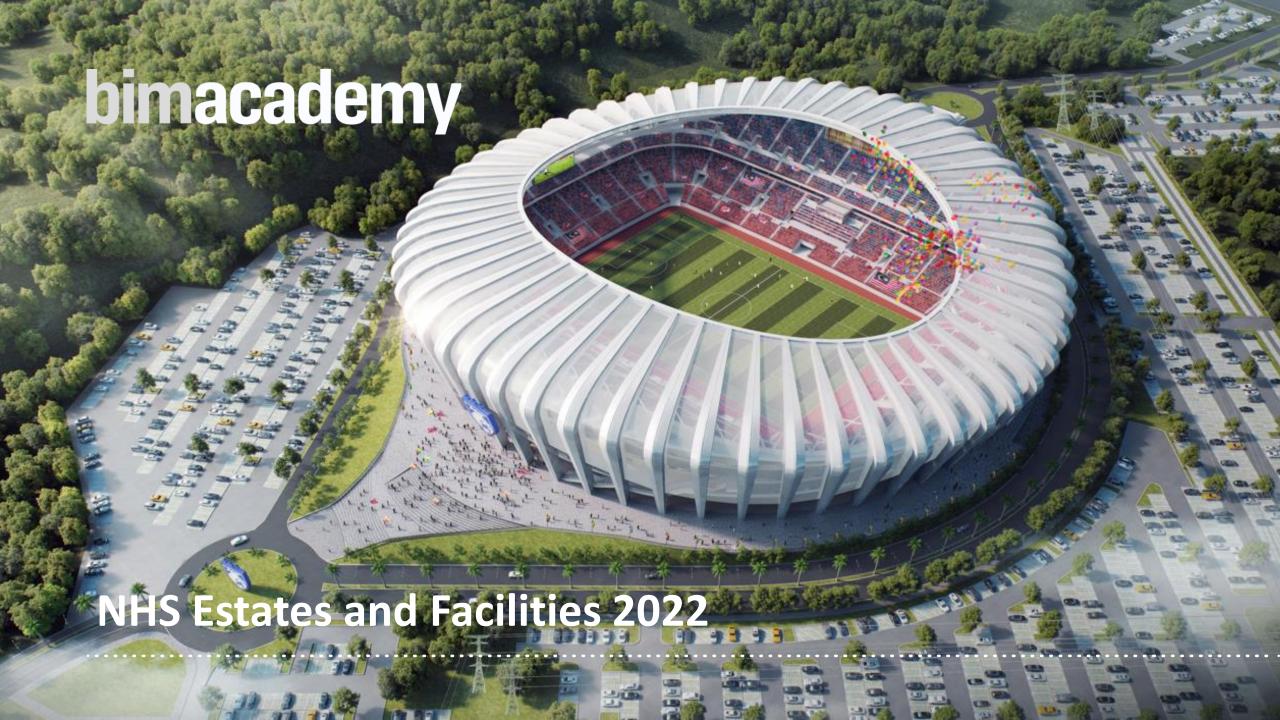
Paul Thorpe

# <u>l will be</u> discussing...

"The Value of Digital
Transformation for
Healthcare Estate

Owners"

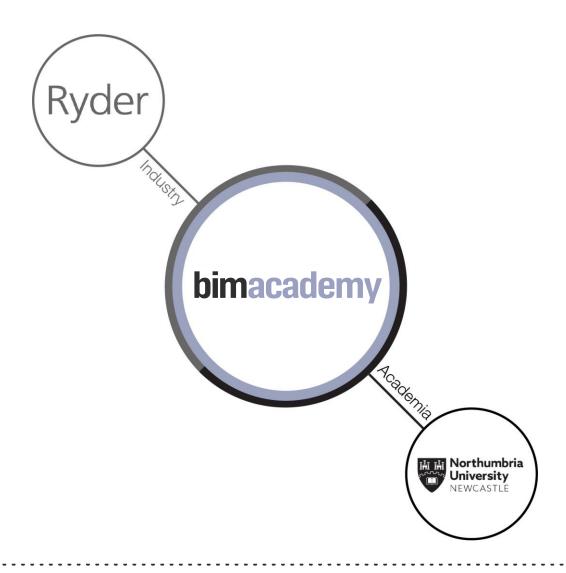




## Paul Thorpe

Director

#### **About**



### Introduction | Our healthcare estate



There are 1978 hospitals ...



... and 217 providers in the NHS ...



... which provides care for 56.4M people in England.



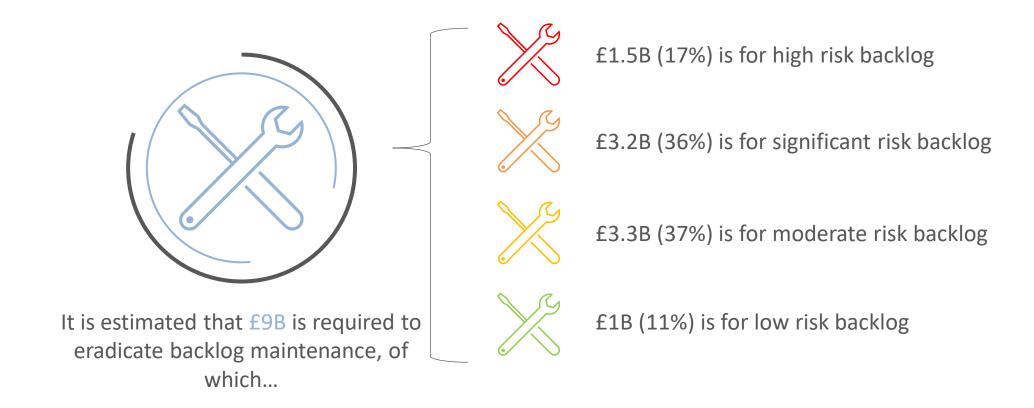
£192B was spent on health services in 2020/21.

#### **Introduction** | Cost of Facilities Management

The cost of occupancy to the NHS Estate is £9.7B, of which...



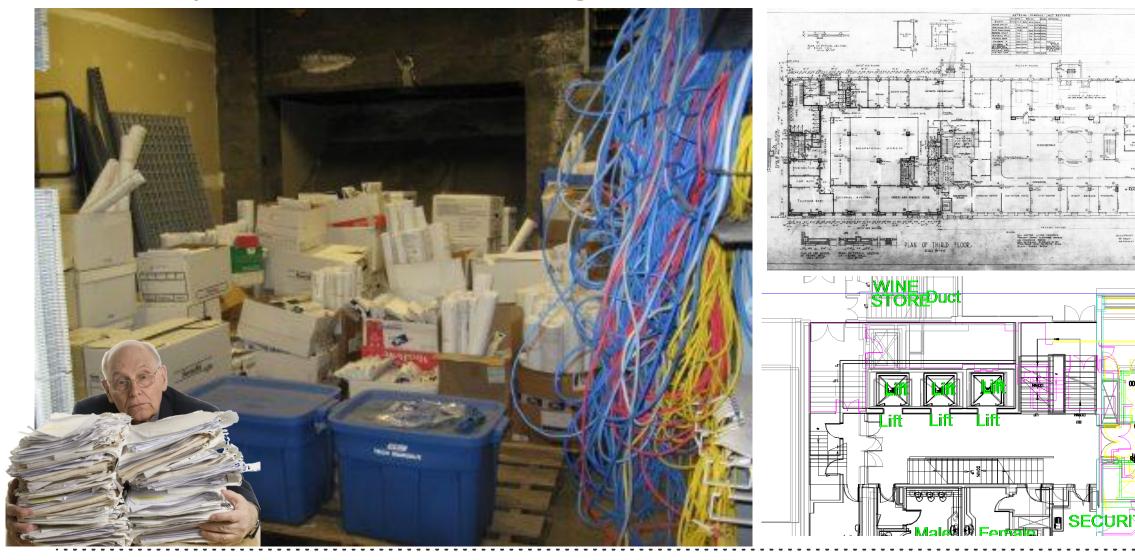
#### **Introduction** | NHS building quality



#### **Introduction** | New buildings and estates



#### **Introduction** | The difficulties with existing estates...

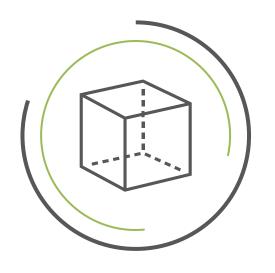


"The use of information management could potentially secure between £5.10- £6.00 of direct labour productivity gains for every £1 invested in information management, and £6.90 in total cost savings."

Centre for Digital Built Britain (CDBB)



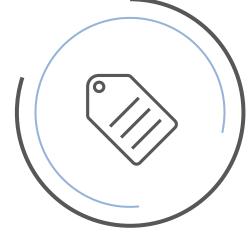
#### Digital Asset Information | Types of information



Non-Geometric information is data that reflects the physical and functional characteristics of an asset.

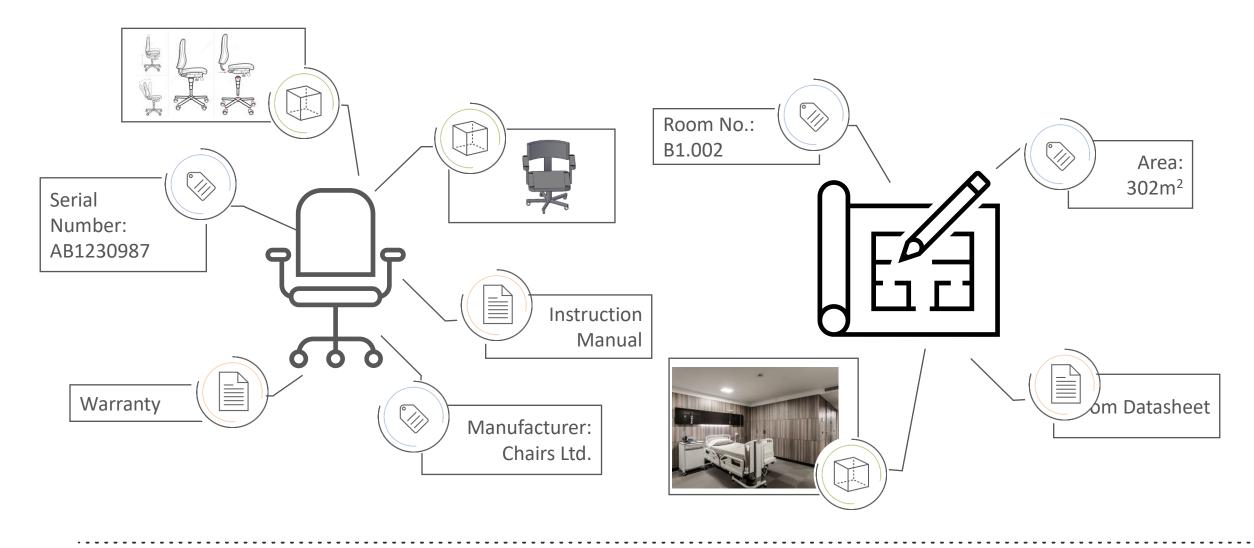


Geometric information is a dimensional representation of an asset, either in 2D or 3D.

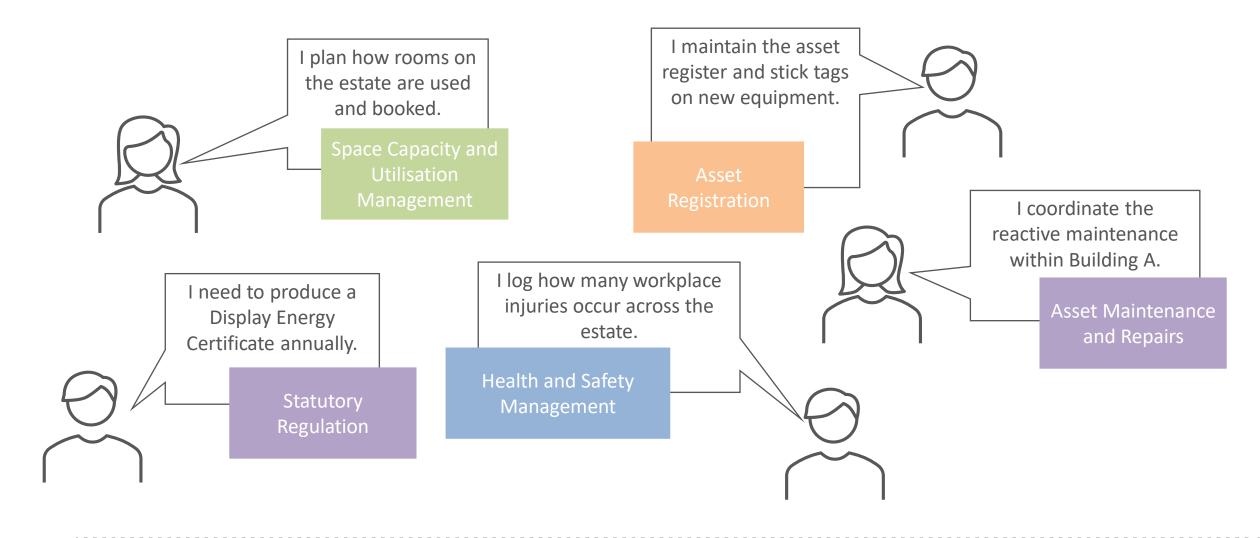


Documentation is a static record of an asset representing a snapshot in time.

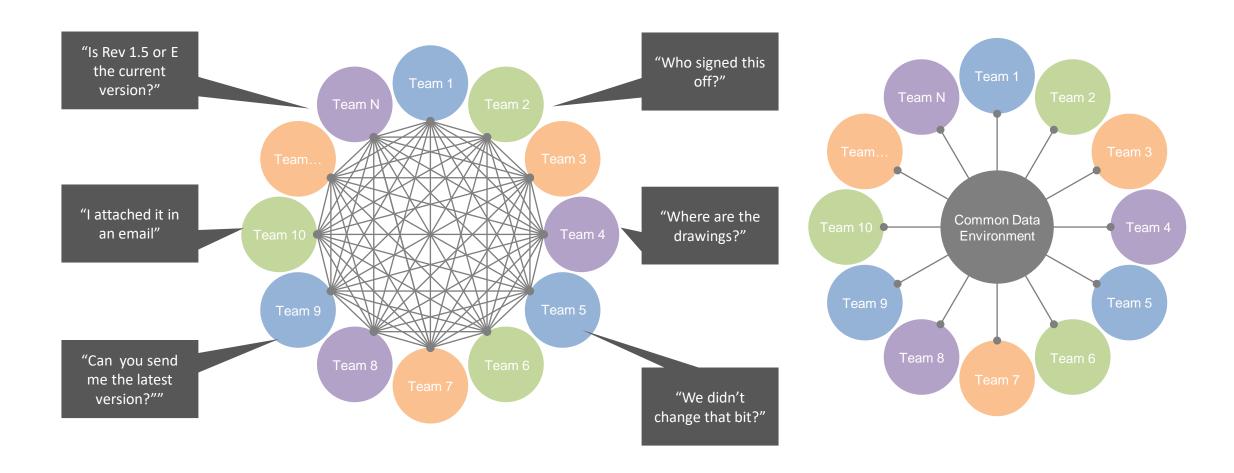
#### Digital Asset Information | Types of assets



#### Digital Asset Information | Information purposes

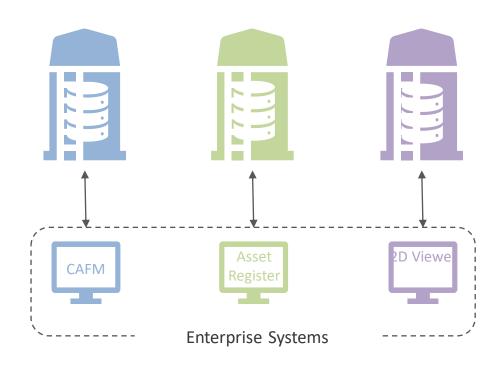


#### Digital Asset Information | Information sharing



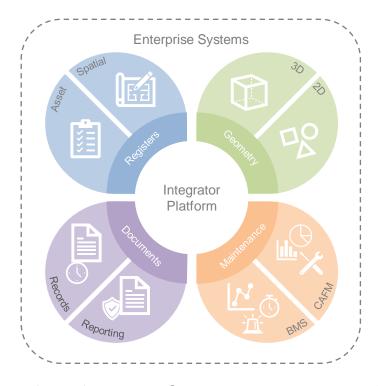


#### Digital Asset Information | Information utilisation



Information may be utilized in siloes and draw from individual data stores.

Information is at risk of being duplicated and unstandardised.



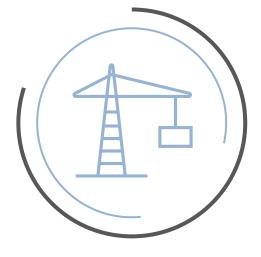
A digital asset information strategy will consider how an integrator platform could be used to support the existing enterprise systems and present single view of the truth.



#### Digital Asset Information | Developing an 'inter-strategy' approach



Environmental Strategy



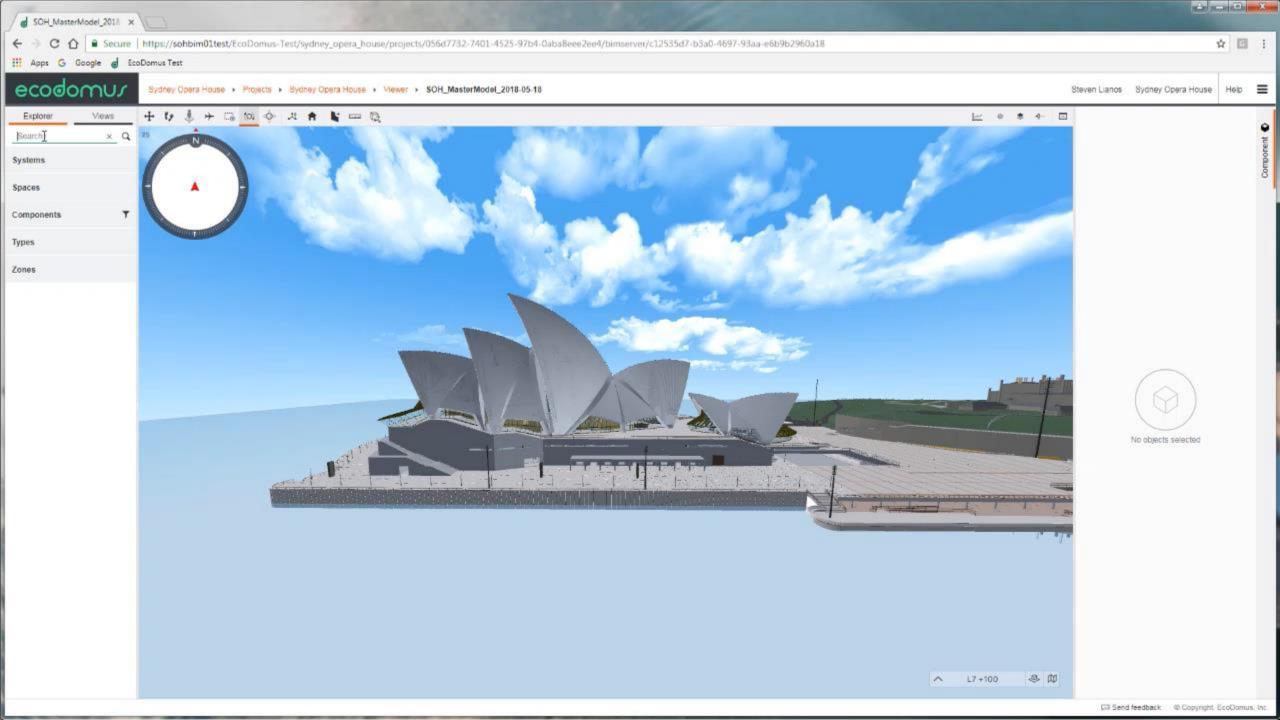
Design and Construction Strategy



Digital Strategy

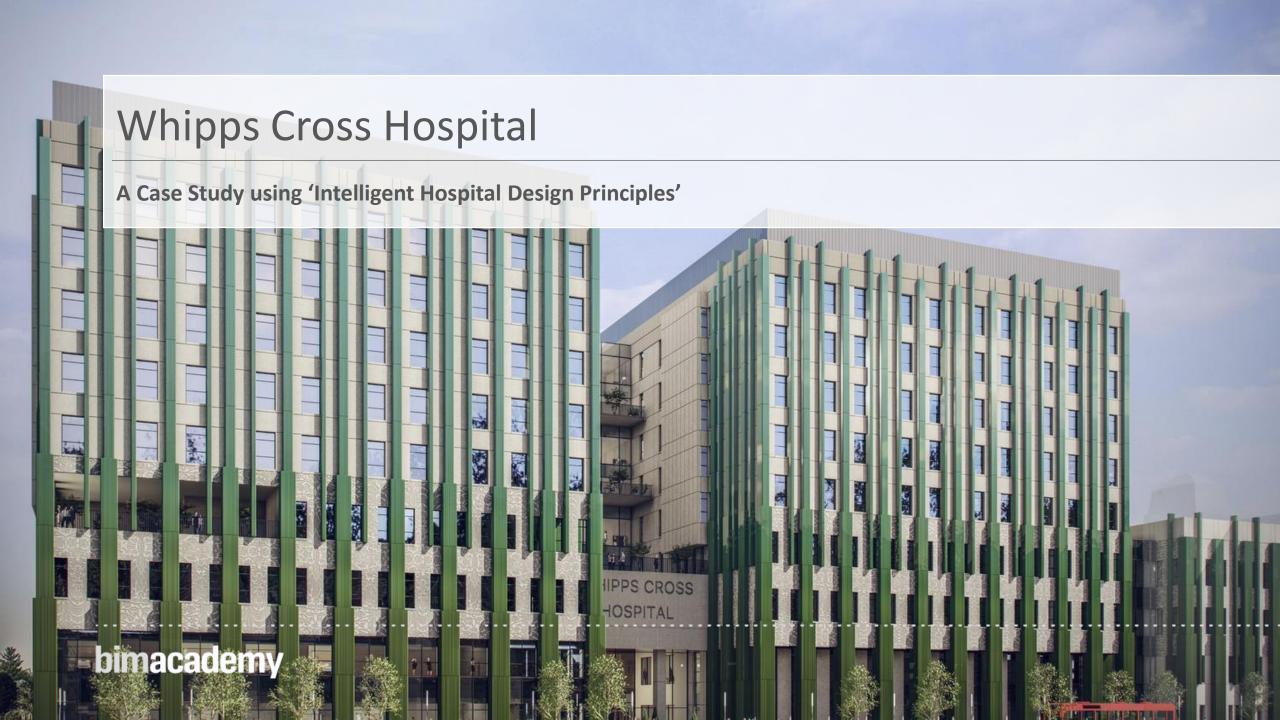


Estates Strategy



#### **Digital Asset Information** | Revisiting the acronym

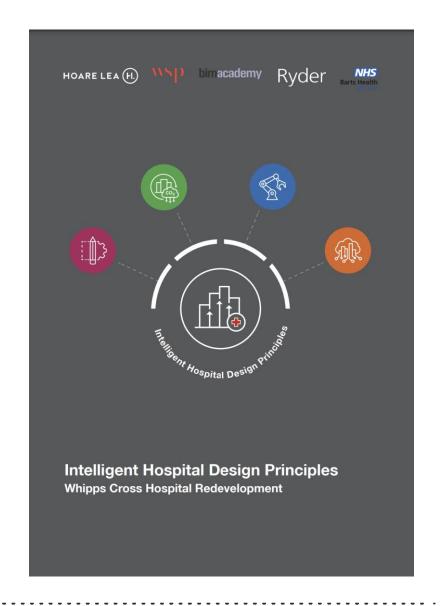




#### Whipps Cross | Design principles

"The key aspiration is to create a brighter future for Whipps Cross, leading the way as a local hospital of the future and creating an exemplar for care of the frail and elderly.

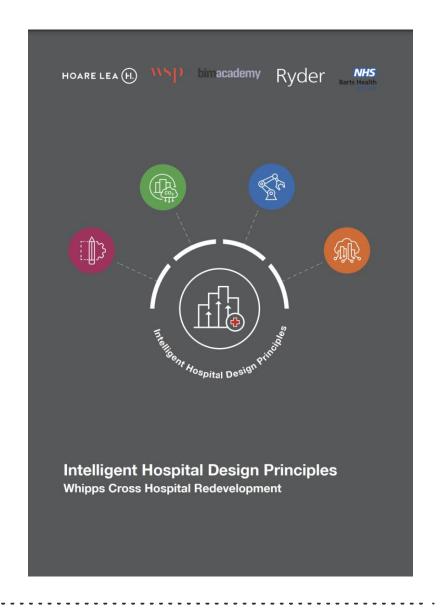
Realising that brighter future requires an environment that engages the senses, reduces stress and promotes wellness."



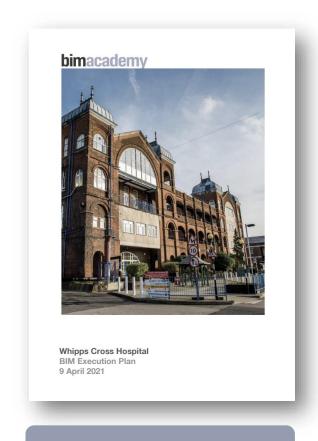
#### Whipps Cross | The value of digital

"Digital technologies will help the hospital move from episodic to collaborative and longitudinal care.

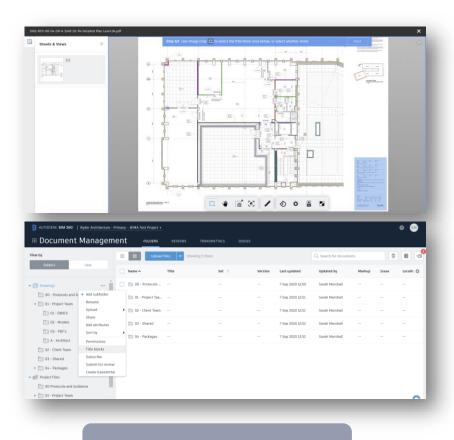
To realise optimal value an intelligent hospital must consider from the outset how data and digital technologies can bring value to the design, construction and operation of the new facility."



#### Whipps Cross | Using IM and BIM on the project



BEP



CDE (BIM360)

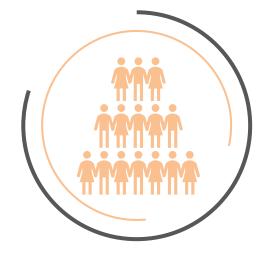
#### Whipps Cross | Evidence of the need for information management



There are currently 326 drawings ...

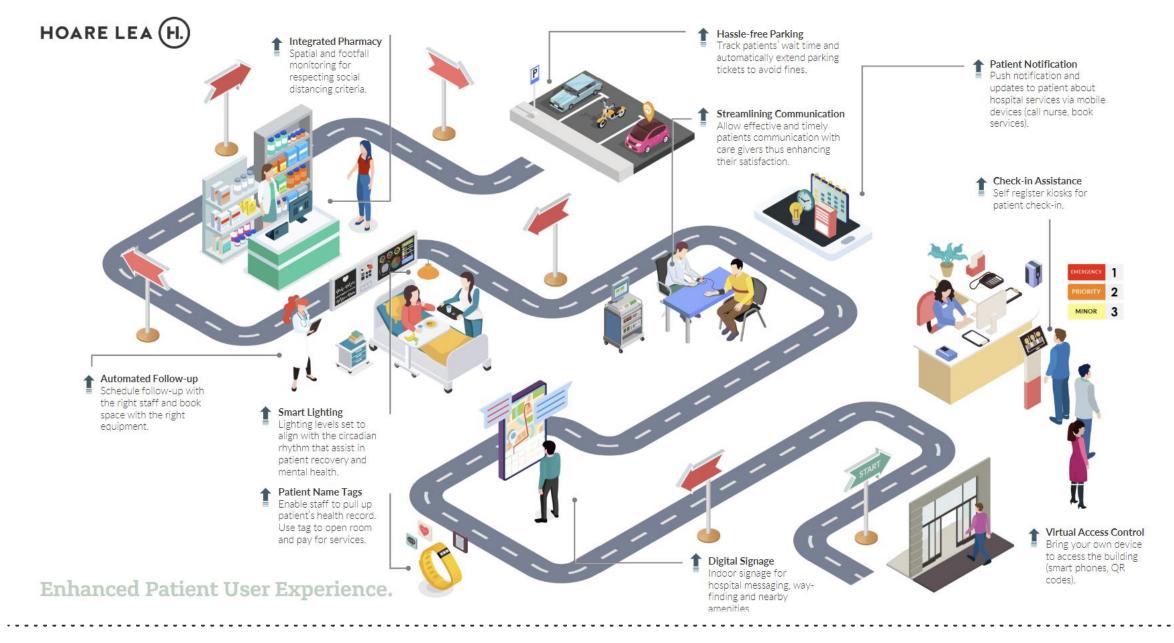


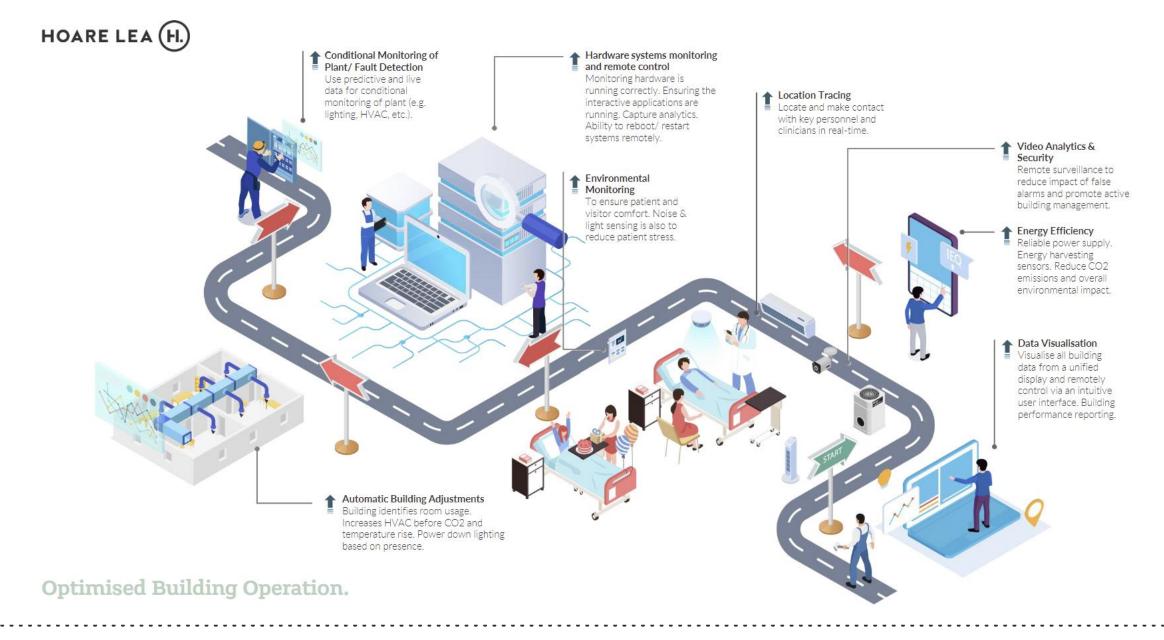
... 471 project documents ... ... and 96 team members



using the CDE.

...and we're only at the Outline Business Case of the project!





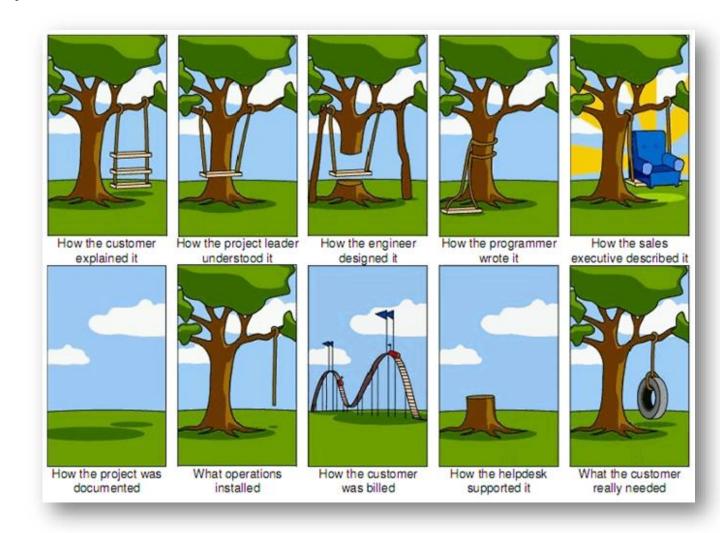
#### Whipps Cross | Examples of 'smart hospital technology'

- Reducing touchpoints via contactless strategies
- Managing flow and space density
- Locating key personnel and equipment
- Creating intelligent buildings...

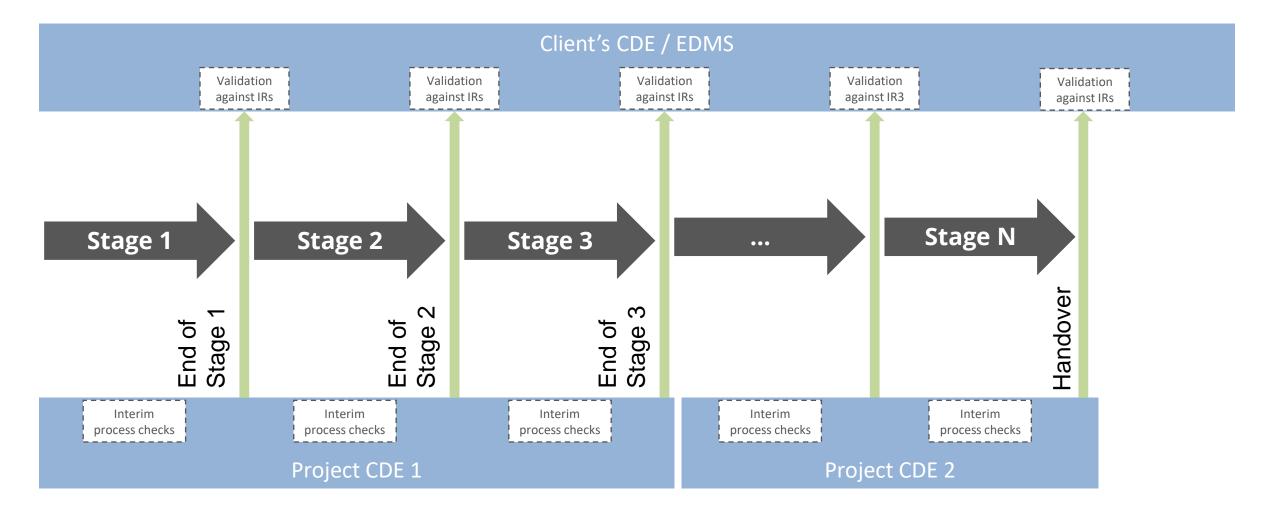


### Whipps Cross | Information requirements

...but only through structured data and clear information requirements.



#### Whipps Cross | Quality assurance

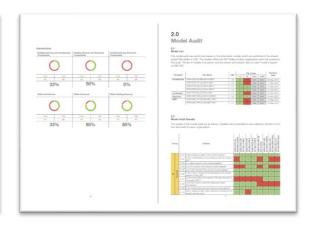


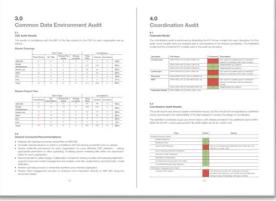


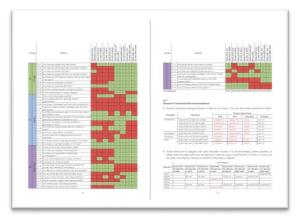
#### Whipps Cross | Quality assurance









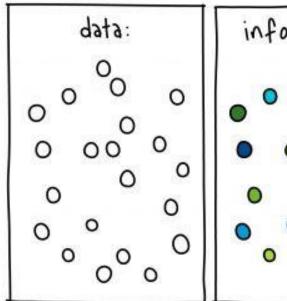


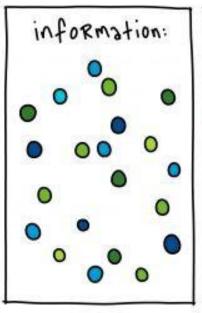


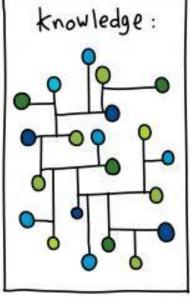
### A Self Study – Coopers Studios

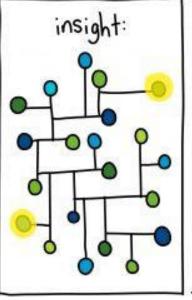


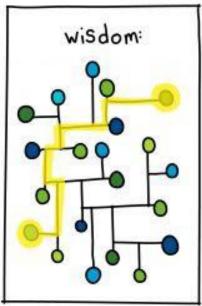
### **Smart Hospitals** | Data Saves Lives

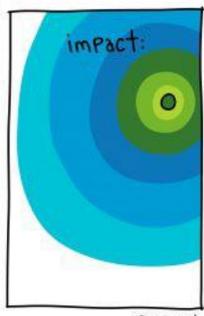












@gapingvoid

#### **Smart Hospitals** | Exploiting Data

BIM Smart Connected Buildings Platform – Autodesk Forge Viewer Energy & **IEQ** Comfort & Wellbeing Utilisation Fire Safety (in relation to IEQ) (Internal Environment Quality) Carbon Density **19** Operational Count Wellbeing Temperature Location Temperature Density Humidity energy  $CO^2$ Carbon % Utilisation Humidity Noise Noise emissions **#** Light Pressure Air Circulation Air Quality

Realtime sensor data **RAG** Thresholds

Individual survey data from web tool AM/PM

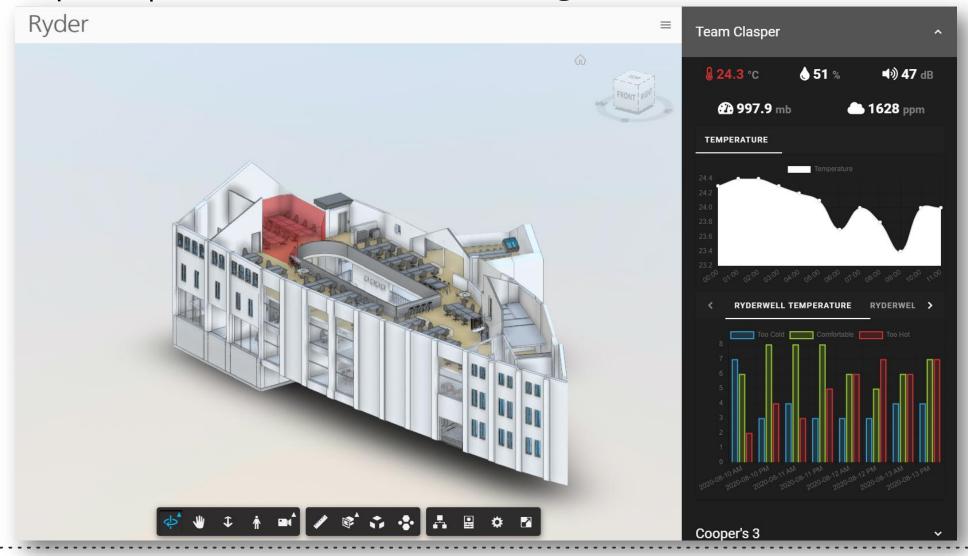
Data from energy clamps

PIR sensor data CO<sup>2</sup> sensor data CO<sup>2</sup> sensor data



 $CO^2$ 

### Smart Hospitals | Smart Connected Buildings



### **Internal Environment Quality Thresholds**

Humidity min=39 optimum = 40 – 60 max = 61
Humidity outside the optimal range, particularly low humidity is proven to contribute to viral transmission

Noise min=29 optimum = 30 – 45 max = 55

70 decibels is acceptable for simple transactional office work, below 55 decibels is the requirement for "mainly intellectual work." characterized by high complexity and demanding creative thinking, decision-making, solving problems and effectively

Pressure optimum = internal higher than external
It is generally accepted internal atmospheric pressure should be higher than external. Understanding atmospheric pressure and air flow is important for indoor air quality, comfort levels, mould, fire spread and virus transmission

■ 1658 CO<sup>2</sup> optimum = 400 - 600ppm
"Moderately high indeer CO<sup>2</sup> can sign

"Moderately high indoor CO<sup>2</sup> can significantly impair people's decision-making performance". The best cognitive scores occurred at 600ppm CO<sup>2</sup>. At 1000 - 3000ppm we start to see cognitive decline and drowsiness

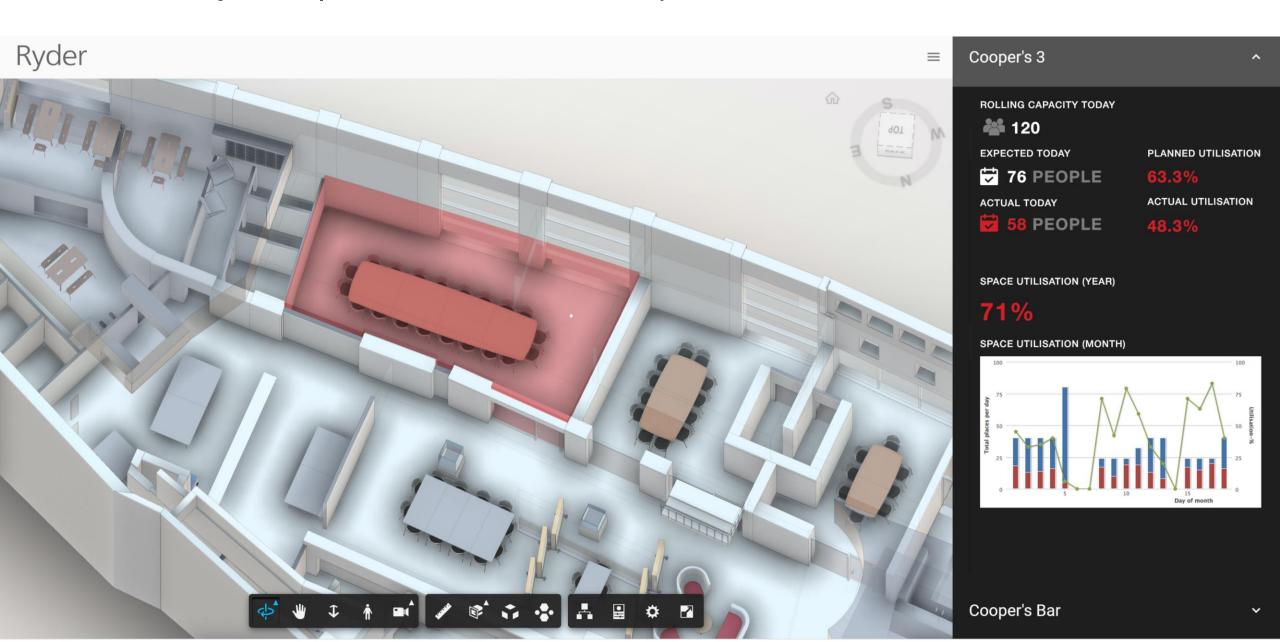




### **Smart Hospitals** | Carbon and Energy Monitoring



### Smart Hospitals | Predicted vs Actual space utilisation

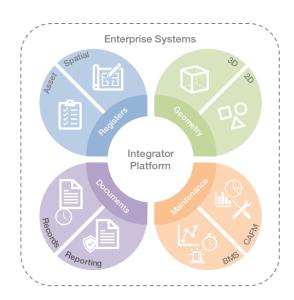


### **Opportunities – Estate Digital Twin**

A smart hospital of the future isn't smart in isolation

A smart hospital of the future is part of digital ecosystem of the entire estate

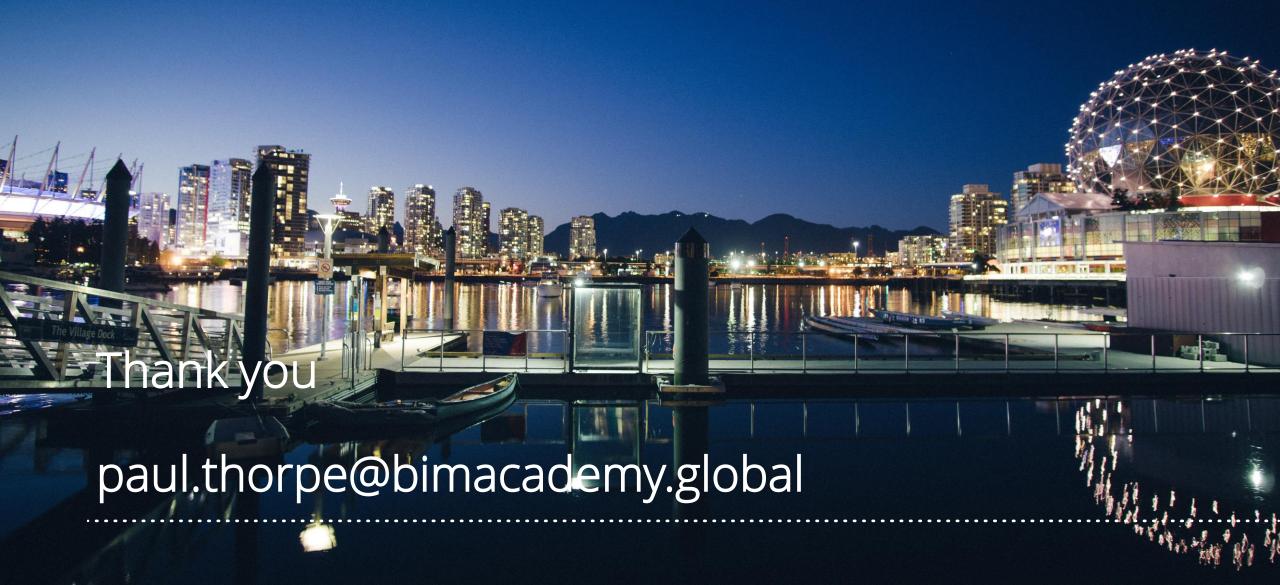
Taking the principles discussed today but applied on a macro scale for greater impact







## bimacademy





## The NHS Estates & Facilities Conference 2022:



### UP NEXT...





### Impetus to Innovate

Gill Stafford – Managing Director

Hannah O'Brien - Director of Operations



### We care. We can. We do.

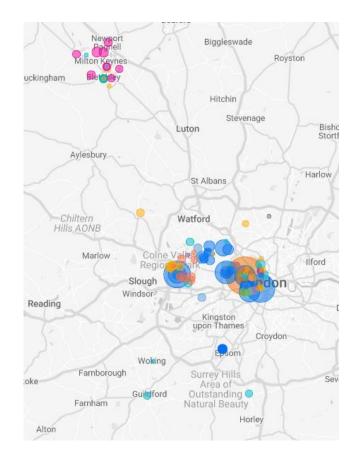
Quality Trusted Solutions – Estates expertise from within the NHS, for the NHS

#### Who are QTS?

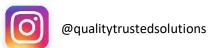
- Wholly owned subsidiary of Central North West London NHS FT.
- Experts in the comprehensive management of strategic estates and facilities.
- ▶ 122 sites from Milton Keynes to Guildford, in 4 ICS geographies.
- Specialists in Mental Health and Community

#### We were established in 2018 with clear goals and purposes

- Use commercial freedoms to attract and retain expert staff;
- Expand our estates offering, be more commercial to generate benefits for our community and health systems;
- Seek out investment, and invest differently in our estate; and
- Generate new and innovative approaches to managing the estate.











### Conference Themes

The impetus to innovate

Leadership and Workforce

Capital Investment Strategy Maintenance and Backlog

Innovation

Delivery of Net Zero







# "40 New Hospitals" – Perspectives from Mental Health and Community









## The Fight Against Covid

We have been really proud to be involved in the delivery of Covid vaccination support.

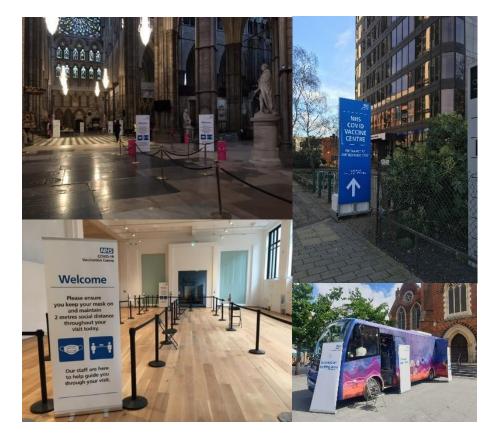
- 10 NHS Trusts
- 8 Local Authorities
- 11 vaccination hubs
- 10,000 plus journeys
- Over 3 million vaccines

"QTS have always been helpful in working at pace to deliver the vaccine centres across North West London... against a backdrop of an incredibly tight programme and fluid brief...

This has all been carried out with the same level of dedication and excellent delivery...

We couldn't have done it without them."

**Pippa Nightingale MBE Chelsea and Westminster NHS Foundation Trust Chief Nurse** 











## Maintenance, Backlog and Investment

So how to prioritise?

- There is a growing maintenance backlog issue in the NHS the figure of £6.5bn, rising to £9bn, is widely accepted.
- Our ability to invest in new estate or refresh the ageing estate is hampered by revenue pressure and a lack of capital cover leading to an increased demand for already stretched revenue streams.
- Adhering to national standard across the NHS (e.g. HTMs and the sustainability agenda), means we need to continuously reprioritise our resources. We need to continually review this in line with our risk based approach.
- The impact of hyperinflation is being tracked in relation to our contracts
- The lack of real time data management (ERIC, Digital Hospital), makes it difficult to understand the real pictures and hinders accurate analysis.











## Digital Estates

Bringing digital solutions to common problems

- Everyone wants to make decisions based on evidence and data but what do you do if your data is... 18 months out of date?
- Our Digital Estates and Facilities Tool provides real time date and is user friendly.
- Our Automated Tool reduces any ambiguity around data and measures returns year on year.
- Automation significantly reduces manual input and saves time and resources.
- Managing the quality and meaning of your data is absolutely vital.









### Conference Themes

The impetus to innovate

Leadership and Workforce

Capital Investment Strategy Maintenance and Backlog

Innovation

Delivery of Net Zero







### Help us shape our approach

We want to work with colleagues to drive change in the NHS

- QTS is growing and maturing we are here to support the NHS and reinvest into patient care.
- We are happy to *listen* to feedback so please do talk to us.
- Social media links and emails are in the slides, QR codes are to the right, please get in touch.







## The NHS Estates & Facilities Conference 2022:



### **SPEAKING NOW**



Mark Songhurst

Programme Lead – Scan4Safety Leeds Teaching Hospital NHS Trust

<u>I will be</u> discussing...

"Effective Location Management – Benefits beyond NHS Estates"





# hello my name is...

**Mark Songhurst** 

Programme Lead Scan4Safety

















#### What have we introduced?



Patient using a Global Service Relationship Number



**Place** using a Global Location Number



**Product** using a Global Trade Item Number



**Process** using a PEPPOL



Barcodes to identify



Patient



Staff



Place



Procedure



Product



To give us information















### **Patient identification**



























## The Leeds Teaching Hospitals NHS Trust

### **Deploying GLNs**





















### Make sure you have a procedure

#### Global Location Number (GLN) Procedure

Date approved	
Approved by:(Board Director)	
Version	V2
Executive Lead	Deputy Chief Medical Officer
Procedure Lead	Head of Supplies
Procedure Author (if different from Lead)	Scan4Safety GLN Work-stream Lead
Governance Group	Quality
Review Date	31 December 2018
Link to Policy	Not Applicable
Other Associated Documents	Not Applicable

### The Leeds Teaching Hospitals NHS Trust

Paragraph		Page
	Staff Summary	3
1	Purpose	3
2	Scope	4
3	Definitions/Abbreviations	4
4	Procedure to be Followed	5
5	Roles and Responsibilities	12
6	Links to Other Documents	13
7	Monitoring Arrangements	14
8	References	
Appendix A	Estates and Facilities Room Detail Change Form	15
Appendix B	Process Flow Diagram	16
Appendix C	Room Function List	17
Annex 2	Checklist for Review and Approval	24















### **Establishing a location**



Level 1

Organisation



Level 3

Building



Level 4

Floor



Level 2

Site



Level 5

Room

















### **Creating the data in the Property Register**

Region	Code	Site	Code	Building	Code	Floor	Code	Room	Code	GLN	Drawing
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Loading Area	001	5055218925503	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Plant Room	002	5055218925510	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Workshop	003	5055218925527	皇
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store	004	5055218925534	
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store	005	5055218925541	宁
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Corridor	006	5055218925558	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store	007	5055218925565	<u> </u>
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store	800	5055218925572	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store - Gas	009	5055218925589	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store - Clinical Waste	010	5055218925596	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store Linen	011	5055218925602	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Corridor	012	5055218925619	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Lobby	013	5055218925626	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Control Room	014	5055218925633	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Office	015	5055218925640	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Office	016	5055218925657	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store	017	5055218925664	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Corridor	018	5055218925671	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store	019	5055218925688	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Staff Rest Room	020	5055218925695	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Office	021	5055218925701	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store - Linen	022	5055218925718	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Lobby	023	5055218925725	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Staircase	024	5055218925732	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Hub Room	025	5055218925749	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Store - Equipment	026	5055218925756	9
Leeds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Electrical Cupboard	027	5055218925763	95

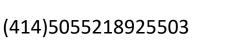










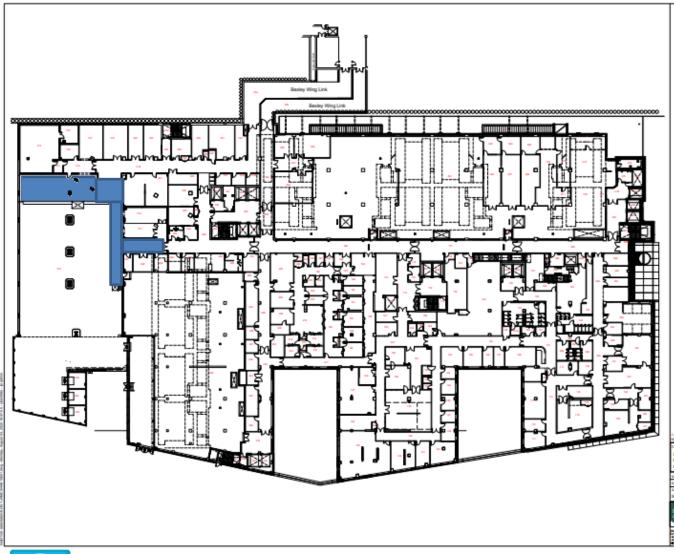






### **Double check the mapping**



















### Worked example in real life

Re	gion	Code	Site	Code	Building	Code	Floor	Code	Room	Code	GLN	Service Name	Share	e Department	Space Occupied M 2	2 Drawii	ng
Lee	eds Teaching Hospitals NHS Trust	LTH	St James's University Hospital	SJH	Bexley Wing	44	Level B1	SJH44B1	Loading Area	001	5055218925503		1009	(Corporate Services Division\Trust Headquarters\Finance\Supplies & Procurement	t 910.28	3	
Tot	al for :1 rooms														910.28	3	

















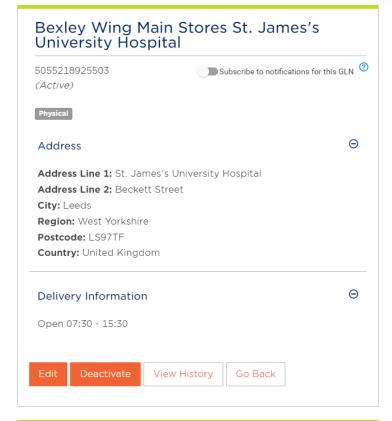








### **Share the information (where appropriate)**



Leeds Te NHS Tru	eaching Ho st	spitals								
Prefixes 5032628, 5051364, 50552187, 50552188, 50552189, 50552193, 50552239,										
50552240, 50552288										
Subscribe to all GLN notifications										
Subscribe to	all GLN notifications	3)								
Subscribe to	all GLN notifications	<i>უ</i>								
Subscribe to	all GLN notifications	<i>y</i>								
	all GLN notifications	<b>2</b> )								

#### **GLN Hierarchy**

▼ The Leeds Teaching Hospitals NHS Trust (5055218800008)
Bexley Wing Main Stores St. James's University Hospital (5055218925503)















### **Deploying GLNs**





#### **Global Location Numbers (GLNs) in Ordering**

Trust Identification: Organisational GLN Ship to: Physical GLN of the goods bay

Deliver to: Function GLN of the service provided

Bill to: Digital or Function GLN for Accounts payable

#### Why use Function GLNs?

Healthcare settings are never set in stone, they respond to the needs of a community and an organisation. A ward or department in a hospital is more than a physical place, it is the interaction of staff and patients. The stock is unique to the circumstances. Registering stock by physical location will show an audit history in retrospect that would identify inappropriate stock holdings when compared to the current usage. Therefore we need to be able to maintain the history of the stock wherever that group of specialised staff interact with that specific genre of patients.













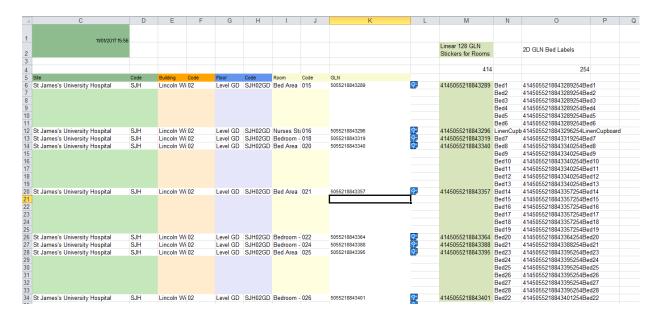






#### The Leeds Teaching Hospitals

#### **GLN Extensions**



414		254
		Mark Songhurst:
4145055218843289	Bed1	4145055218843289254Bed = CONCATENATE(\$M\$6,\$O\$4,N6)
	Bed2	4145055218843289254Bed2
	Bed3	4145055218843289254Bed3
	Bed4	4145055218843289254Bed4
	Bed5	4145055218843289254Bed5
	Bed6	4145055218843289254Bed6



















### How does this work for a patient?



First of the demonstrator sites to label down to bed space level and start unlocking the potential



Action	Ward	Bed	Patient	Age	Scanned Location	Time Since Arrival	Consultant	Specialty	LOS	EDD	MFFD	Planning	EDID	Needed For Discharge / Transfer	Clinical Summary	eDAN	eMeds
	91 (SJUH)	,	RASPBERRY Robert	32y	Bed Area, J91 05-Oct-2017 06:53	18d 22h 18m	AA	General Medicine	19d	0		On Ward			This is some text to test carriage	Pharmacy C	
	91 (SJUH)	2	PLUM Henry	47y	Bed Area, J91 04-Oct-2017 02:32	4d 18h 27m	ADJ	Urology	5d	0		On Ward				0	
	91 (SJUH)	3	PEAR Pamela	37y	Bed Area, J91 06-Oct-2017	3d 8h 15m	MRM	Anaesthetics	4d	0		On Ward				Pharmacy 2	
	91 (SJUH)	4	GRAPE Bella	57y	Xray, 06-Oct- 2017 14:53	2d 3h 5m	ADJ	Urology	3d	0		On Ward				0	
	91 (SJUH)	5	BLUEBERRY George	32y	Bed Area, J91 06-Oct-2017	30d 5h 22m	AA	General Medicine	31d	0		On Ward				0	
	91 (SJUH)	6	PINEAPPLE Peter	45y	Examination Room, Outpatients 06-Oct-2017 15:10	12d 8h 27m	MRM	Anaesthetics	13d	0		On Ward				0	
	91 (SJUH)	7	OLIVE Adrianne	37y	Bed Area, J91 06-Oct-2017	18d 22h 18m	ADJ	Urology	19d	0		On Ward				0	
	91 (SJUH)	8	PEACH James	57y	Room 3, Endoscopy 06-Oct-2017 14:12	8d 23h 19m	JHB	General Medicine	9d	0		On Ward				0	
	91 (SJUH)	9	ORANGE David	32y	Bed Area, J91 06-Oct-2017	3d 8h 15m	JHB	General Medicine	4d	0		On Ward				0	















## The Leeds Teaching Hospitals NHS Trust

### **Function GLN**





















### **Building into the future**







































### **Discussion**











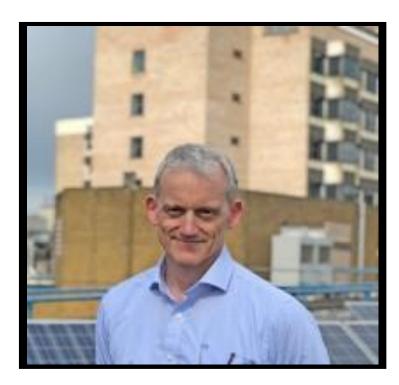




## The NHS Estates & Facilities Conference 2022:



## **SPEAKING NOW**



#### **Richard Hales**

Energy & Sustainability Manager
Cambridge University Hospitals NHS Foundation Trust

# l will be discussing...

"The NHS Net-Zero commitment: A hospital Trust perspective on closing the gap between what we say and what

we do"



## The NHS Estates & Facilities Conference 2022:



## **SPEAKING NOW**



Darren Sloof
AirPurity

# l will be discussing...

" AAirDS

Addenbrookes Air Disinfection
Study

"





Addenbrookes Air Disinfection Study

**Shaping Today** 



### Disclosure



- Air Purity is an independent R&D and Innovations company founded to facilitate the Addenbrookes Air Disinfection Study (AAirDS)
- Darren Sloof is the founder, director and shareholder of Air Purity Ltd
- Air Purity designed and supplied the air filtration units and air sensors used in this study. Air Purity Ltd had no role in the study design or analysis of the data. Darren Sloof does however collect the data and liaise with other authors over its interpretation.
- Study has both internal and external ethics approvals (South West Central Bristol Research Ethics Committee)
- Air Purity has no influence on the study and its results, only to facilitate the study. While independent Air Purity acts with
- Study is UKHSA approved and funded



## Primary Goals AAirDS



To unequivocally prove if health care acquired infections occur via Aerosol dissemination

Develop monitoring, risk proxies and commissioning standards for interventions



## **AAirDS**

#### Addenbrooke's Air Disinfection Study

## 1.Clinical Outcomes AAirDS-C (clinical)

#### a) Primary

- i) Incidence of SARS-COV2, adenovirus, HMPNV, Flu A|B, parainfluenza, RSV, picornavirus, norovirus, s.aureus, c.diff, and any Abx Rx c CAP or HAP as indication.
- ii) Incidence of SARS-COV2 alone

#### b) Secondary

- i) Respiratory viruses excluding SAR-COV2
- ii) C.diff
- · iii) S.aureus
- · iv) norovirus
- v) HAP by Abx indication
- · vi) All other HAIs
- vii) Severity of C.diff, SARS-COV2 and S.aureus
- viii) Length of stay
- ix) Bed days lost
- x) Abx usage
- xi) Abx cost
- xii) 30 day mortality

## 2. Feasibility AAirDS-E (environment)

#### a) Air sampling weekly

i) Fluidigm 90+ targets

#### b) Air sensors

- i) PM counts
  - 1
  - 2.5
  - 4
  - 10
- ii) CO2 levels
- iii) RH
- iv) Temperature

#### c) Cleaning

- i) Soap usage
- ii) PPE usage
- iii) Alcohol hand sanitisers usage

#### d) Validation

i) Standard AGAR/MALDI

## 3. Acceptability AAirDS-Q (quantative)

- a) Patients survey
- b) Staff
  - i) Survey
  - ii) Flu/Covid vaccine rates
  - iii) Sickness

A pragmatic controlled before-and-after study.



Implimentation of air disinfection to prevent hospital-acquired infections in medicine for older people wards.









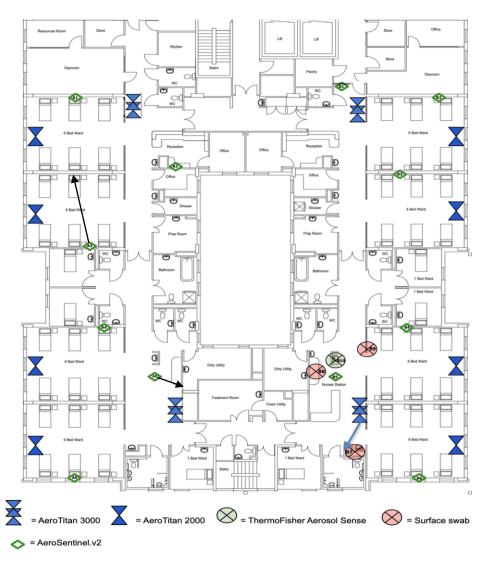


## Unique Features of the Study

- Technology
  - Environmental Sensors to measure and track how Aerosols move (sub 1 micron) and communicate to Air Disinfection Units (worlds first)
  - Air Sampling more than 90 targets from bacteria, pathogens to fungi (worlds first)
  - Air Disinfection units, developed within hospital environments using a new configuration to effect and clean large areas
- Historical records of HCAI's previous 5 years EPIC system
  - Pre-existing conditions
  - Medication
  - HCAI acquired or externally
- Genome Mapping
  - Patient to Patient
  - Health Care Worker to Patient
- Real world data, no CFD modelling (Computational Fluid Dynamics)



## Study Layout



- Study conducted on elderly care wards with poor ventilation for 1 year 3 months (Sept 2021-Feb2023)
- Worst performing wards selected regarding HCAI's
- Mirrored wards, same patient groups and layout
- Control wards with monitoring no interventions

## Visual Aids of Technology



Corridors and larger spaces (AeroTitan 3000)



Patient Bays (AeroTitan 2000)



Environmental sensors (AeroSentinels)

## Observations is the Intervention working?

While anecdotal until the study is complete there is noticeable change within the ward using Sars-Cov2 as a proxy

Jan 2021- Aug 2021

4 ward closures full outbreaks

WT, Alpha, Delta

Sep 2021- May 2022

0 ward closures 1 partial bay outbreak via contact HCW to Pt

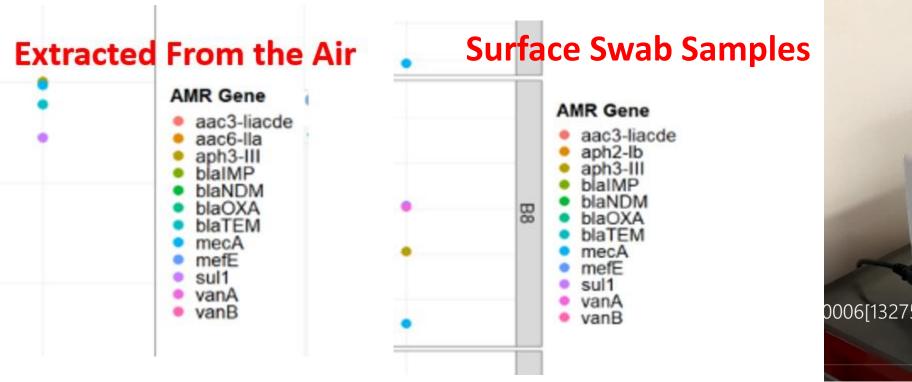
Omicron (more transmissible)

- Worst performing ward to possibly the best within the trust regarding Sars-Cov2 transmission\*
- Secondary Sars-Cov2 transmissions thus far appear lower\*
- No more odours within the ward
- Staff feedback positive with noticeable changes to ward environment and mental health
- Est cost saving £205k-£1.2m

<sup>\*</sup>Final study report/publication due May 2023



## Clean Surfaces – Prevention should start from the air





We extract almost the same organisms in the air as on surfaces throughout the ward



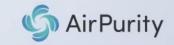


This study is funded by the UKHSA in partnership with Cambridge University Hospitals, University of Cambridge and AirPurity UK









#### Impact of supplementary air filtration on airborne particulate matter in a UK hospital ward

Sloof D1, Butler MB2, Peters C3, Conway Morris A4,5,6, Gouliouris T6, Thaxter R7, Keevil VL2,6, Beggs CB8\*

#### **Figures**

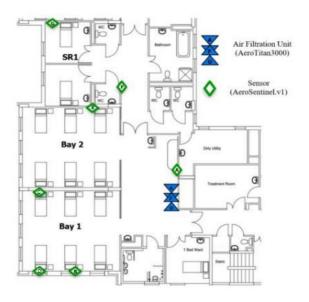


Figure 1. Layout of the medicine for older people ward showing the positions of the AFU and sensors.

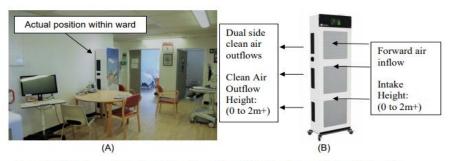
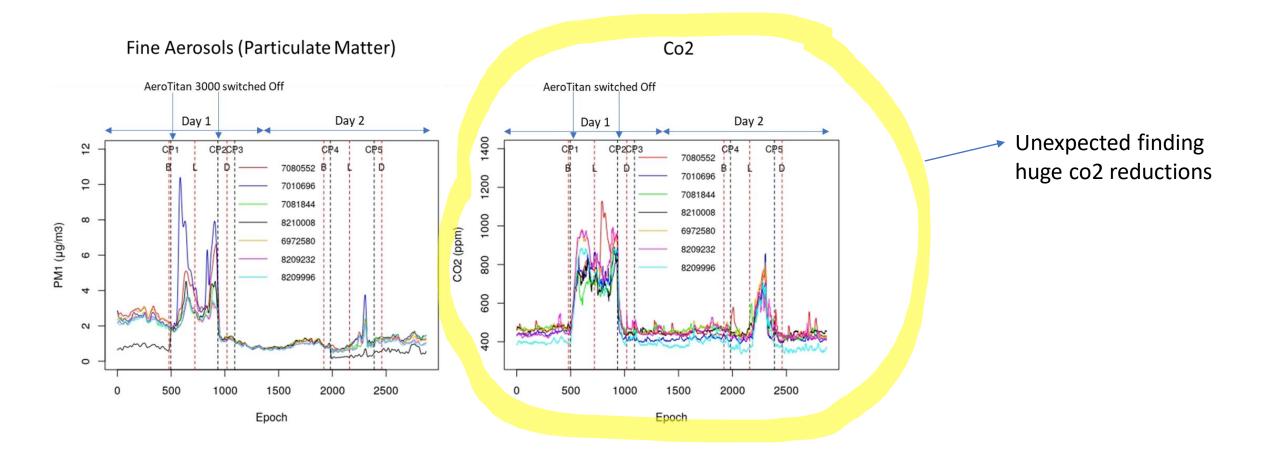


Figure 2. (A) Photograph showing the location of the AFU in the ward, and (B) detail showing the air intakes and outlets of the AFU.

 Natural Experiment when the ADU was switched off for a period of time understanding its effect to the environment

#### **Practical implications**

- Aerosols can freely migrate throughout whole wards, suggesting that social distancing measures alone are not enough to prevent SARS-CoV-2 transmission.
- Appropriately sized supplementary room air filtration, if utilised correctly, can greatly reduce aerosol levels throughout ward spaces.
- Air filtration devices are often placed in rooms without any consideration given to their performance. It is therefore important to commission air filtration devices using PM and CO2 sensors before they are utilised in order to demonstrate that they are effective throughout entire ward spaces.

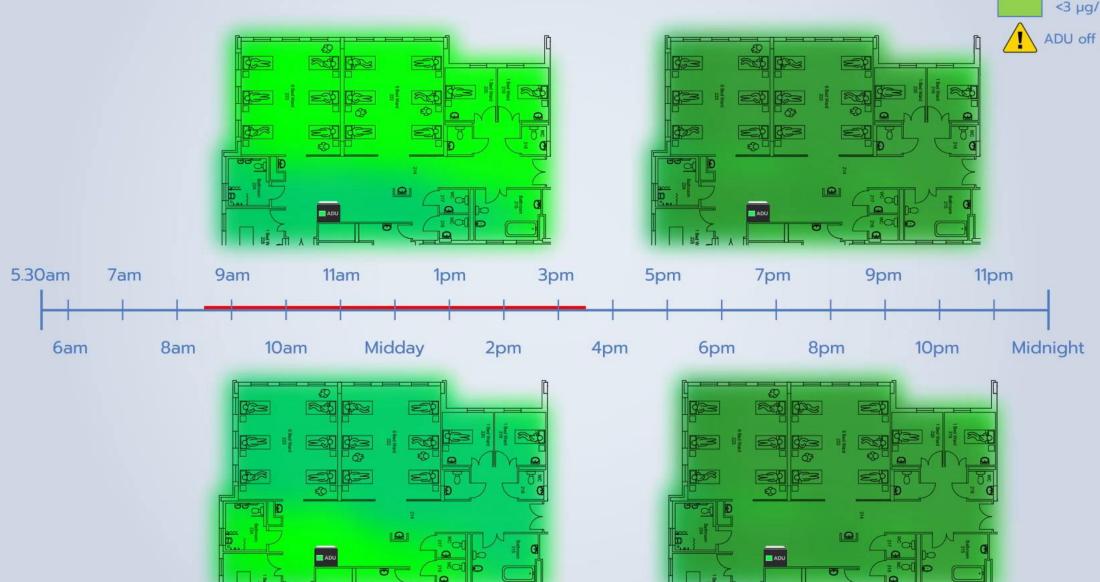


 Can using the Air disinfection units supplement poorly ventilated spaces through strong clean and recirculation? – Answer Perhaps we need to fully understand the science first!









## Key deployment learnings



- Environmental control of a large ward (3,000+m3) could be achieved using less than 500 watts! With no remedial work and significant capital costs
- Significant increased patient and staff safety, delivering significant cost savings (Nova virus cost per case £500-£61,000)
- Real world environmental (IAQ) and ventilation to map airflow paths, ventilation rates, aerosol contamination risk proxies, recommendations, data storage, governance & auditing, IPC points
  - A control test via nebuliser to map ideal conditions
  - Natural rolling 7 data test to identify how the environment (IAQ) & ventilation behaves day to day
- Maintenance backlog: All things HVAC identifying the highest risk areas which is highly likely to impact IPC, supplement via mapping and with ADU's

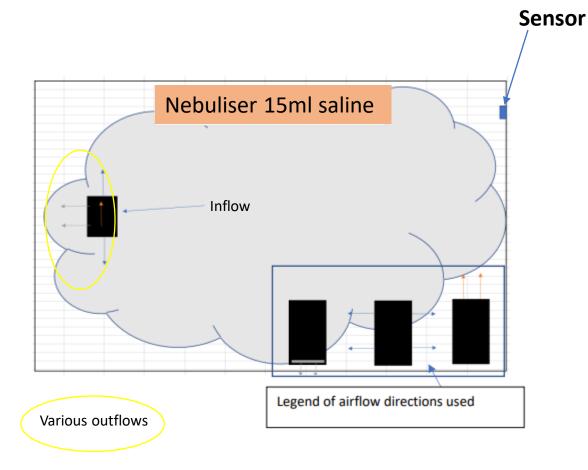
## Key deployment learnings



- Off the shelf air disinfection units (Air Purifiers) do not necessarily control an environment and thus could have a very limiting effect possibly none to prevent infections
- Lab testing/certification of units does not necessarily mean applicability in the real world
- Environmental assessment before and after commissioning is required to show effective implementation
- Plugs, space & noise! servicing & accountability. Ideal locations rarely exist units should be designed for purpose, noise should be below as an average 55db but will compromise air flow significantly
- Intervention units should be viewed as semi-portable/permanent

## Rethinking air change rate

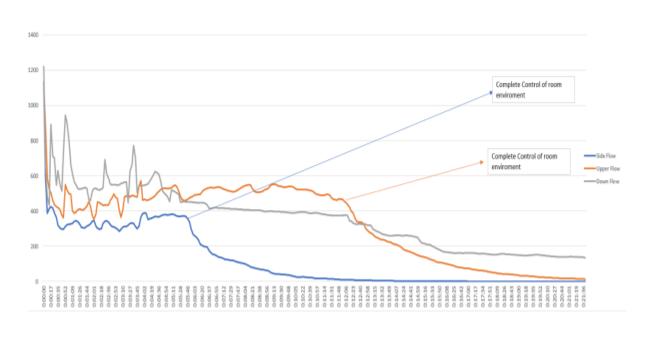




- Unit Configured to 1,000 m3/hr using 3 different types of laminar outflows
  - Bottom
  - Side
  - Top
- Unit and environment remained controlled in each test PM1 measured ug/m3 within sealed room of 180 m3 to match a large bay area where the Aerotitan 2000 occupies
- Sensor placed at 1.6m high and furthest point of unit

## Rethinking air change rate – Performance vs Reality





 Air Change calculation would mean approx. 9-10 min room clean time

Bottom: 42mins

• Side: 12mins

Top: 24mins

- Same unit, same CADR, same environment, only difference was the outflow
- Lab/computational performance is not enough, real world assessments are needed if we are to meet the challenges that NHS Trusts face



### Please follow AAirDS Any Questions Please contact Darren Sloof directly on

M: 07712116467

E: darrensloof@airpurityuk.com











## The NHS Estates & Facilities Conference 2022:



## **SPEAKING NOW**

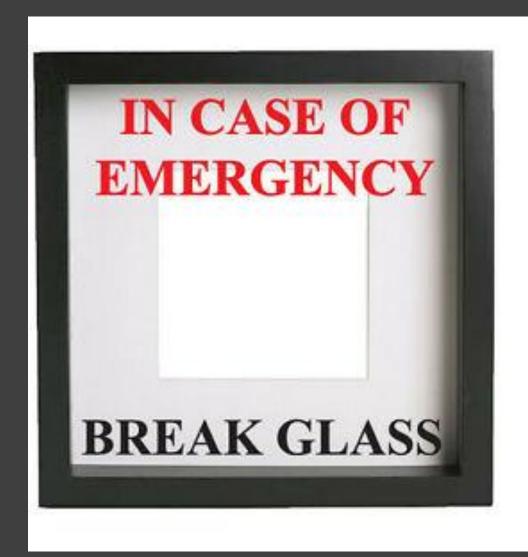


Angela Hayes

Clinical Nurse Specialist, Specialist Palliative and Supportive Care - The Christie NHS Foundation Trust

## <u>l will be</u> discussing...

"Climate Change: A Health Emergency"



# Climate Change: A Health Emergency!

Angela Hayes
CNS Palliative/Supportive Care
(Clinical Lead Sustainability)
The Christie Foundation Trust

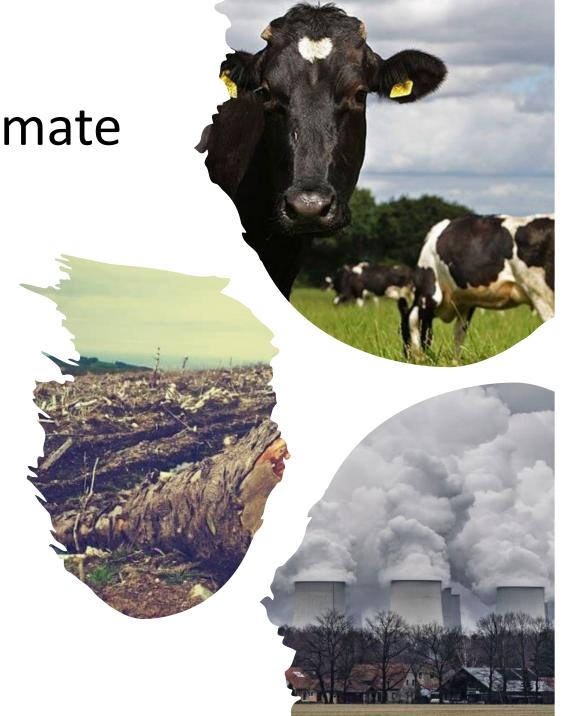


Causes of Climate Change

#### Human Activity!

- Burning fossil fuels
- Farming
- Deforestation = 36 football fields/min

Health Care plays a big part!



# The Global Impact of HealthCare

NHS produces around 25 million tonnes of carbon/pa

Equivalent to all emissions of Sri Lanka!

(kingsfund.org.uk)



# "Climate Change is a Medical Emergency

... and demands an emergency response"

Hugh Montgomery,
Professor of Intensive Care Medicine,
Director, Centre for Human Health &
Performance,
University College, London





















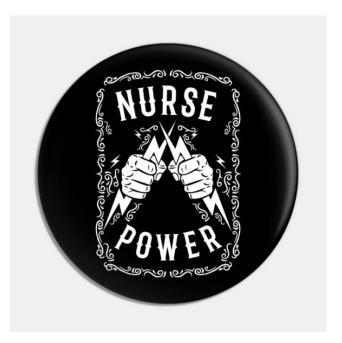


Climate Change and ill-health

- Strong links
- Threatens undermine public health gains of last 50yrs!

## Climate Change

- Undermines foundations of good health
- Deepens Health Inequalities
- Nurses have duty to protect/improve public health
- Nurses should Demand 'Stronger Action!





#### BMJ Special Climate Change Edition, Editor's Choice, Oct 2021

### "A world on the edge of climate disaster"

- Call for action from HCPs & Managers
- Hold to account, those in authority promote & protect health



Human Cost of Climate Change

#### Air pollution

Extreme weather & rising sea levels - Floods, Fires, Storms, Droughts

Scarcity of resources – safe water/cultivatable land

Conflict & wars

Displacement of people

Exploitation of vulnerable (shelter? Security? trafficking, slavery)

Health
Effects of
Climate
Change

#### Increased:

Risks of further pandemics

Disease (asthma, cancer)

Heat-related disorders

Vector/food/water bourne disease

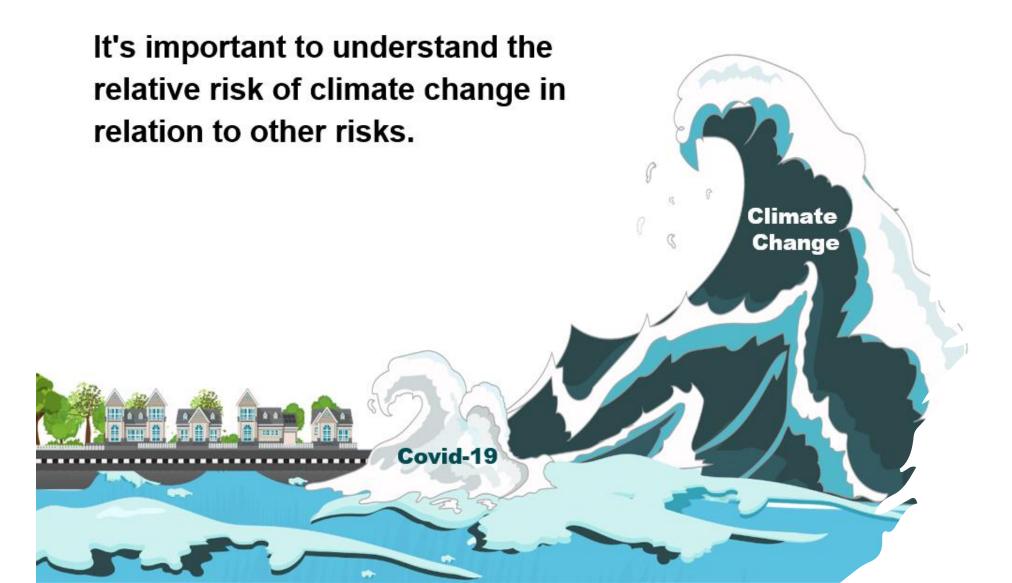
Respiratory/allergic disorders

Malnutrition

Social & Mental health issues



#### Climate Change and COVID-19





Ella Kissi-Debrah – Aged 9yrs



Ella – Inquest Findings 2014 'exacerbated by air pollution/ traffic emissions'

Ella's mother **not given information** "about health
risks of air pollution and
exacerbation of asthma".

Address pollution.org





Services at The Christie?
We can't put off action any longer!



We're all in the same boat?





Same storm! Some on yachts...

#### Climate Injustice: Vulnerable are the Most Vulnerable

- Children
- Elderly
- Poor
- Minority Groups
- Those with Chronic disease/disabilities
- Women
- Low income countries



## Those from low income countries

usually have the **lowest** carbon footprint. Yet...

- MORE likely to be affected
- Far LESS resilient



#### The Facts!

- Over 90% of people breathe unhealthy **levels** of air pollution
- Environmental factors are responsible for around 13 million deaths a year
- Less than 2% of finance goes to fund health projects to tackle climate change

World Health Organisation



## With a 2-3 Degree increase in Global temperatures...

- ¾ of Spain faces becoming desert-like
- 99% of land in Cyprus, could turn to dust
- Iberian Peninsula could experience drought for over 7 months/year

The European Court of Auditors, Dec 2018



With a 2-3 Degree increase in Global temperatures...

- ¾ of Spain faces becoming desert-like
- 99% of land in Cyprus could turn to dust
- Iberian Perinsala could experience drought for over 7 months/ ear

The European Court of Auditors, Dec 2018



Ask the Audience!

Raise your hand if, in your working life, you've ever discussed Climate Change?



The NHS declared...

Climate change is a **Health Emergency**'



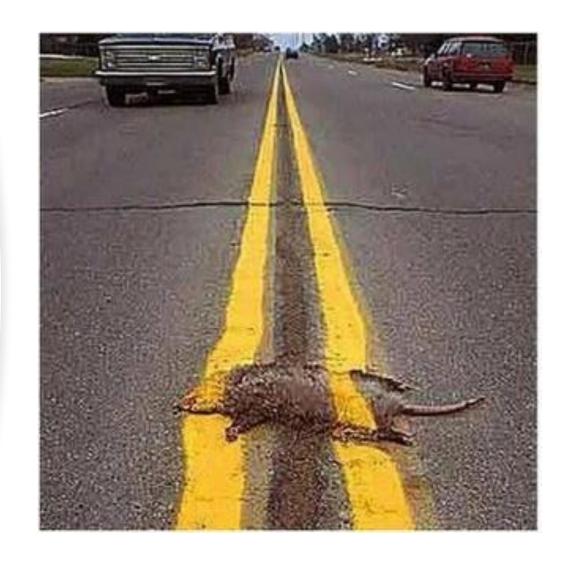


How do we act in an Emergency?





Not my job!



#### Health Care Professionals

- Have a moral duty to act!
- Protect Human Rights
- Promote Social Justice
- Trusted Messengers!

To ACT in response to an **EMERGENCY!** 



# Sustainability on the Agenda!

- Literally!
- A Priority

#### Talk about Sustainability:

- Managers
- Colleagues
- Patients
- Family
- EVERYBODY!

Again & again & again...



#### Is there a difference between...

A Metered dose inhaler?

A Dry powder inhaler?





## Green inhalers?



Equivalent tailpipe greenhouse gas emissions from a Ventolin Evohaler (containing 100 2-puff doses) and a Ventolin Accuhaler (60 1-puff doses). Assumes car achieves 100gCO2/km.

## Cut down Meat & Dairy!

Effective way to reduce carbon footprint (up to 70%)

Health Benefits - reduces

cardiac disease

diabetes

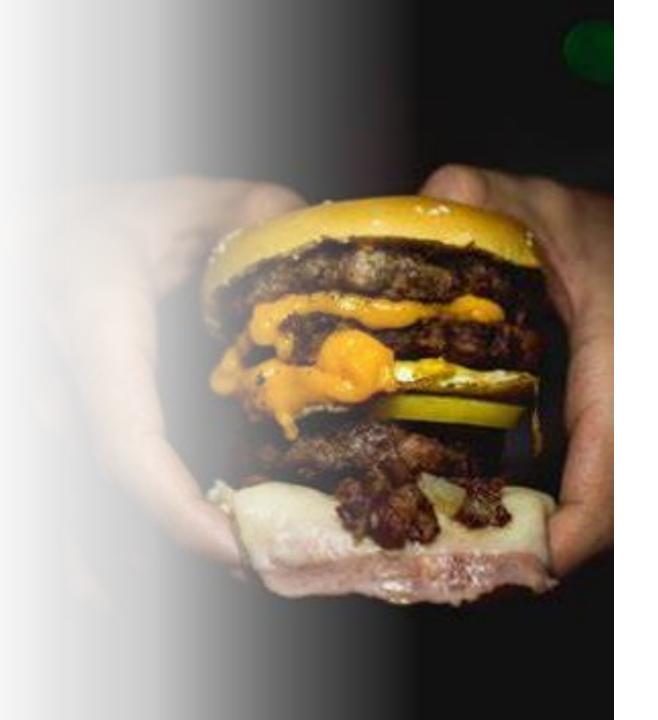
cancer

strokes

weight

Saves pounds (& pounds!)

Oxford University 2020



### Less car, more exercise!

#### Less fossil fuels = reduces

- Air pollution
- Road traffic accidents
- Respiratory disease
- Cardiac disease
- Obesity
- Diabetes
- Strokes
- Cancer
- Increases health!!





#### My Green journey

















Climate breakdown. Act now!

If not you, who?

If not now, when?

"You'll be a long time gone & the choices you make, they linger on..."

The Hayes Sisters

A Note from Greta - starring the Christie's Nursery kids - YouTube







The Green Ward Competition

Green ideas in your area?

- 1. Carbon Savings?
- 2. Cost Savings?
- 3. Patient benefits?



The NHS is part of problem but, can be part of **The solution!** 

What changes can **you** make?



## Ripple effect – I'd urge you to ...

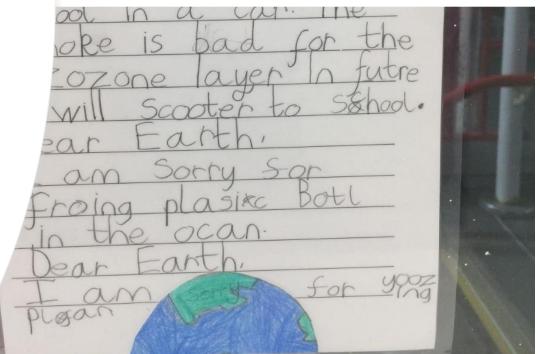
- DOT!
- Green ward ideas?
- Speak about Climate Change!



## Their Future in Our Hands!

"The path that the world chooses today will irreversibly mark our children's futures."
Stella Hartinger, The Lancet, 2019





#### References

- Carbon literacy project, 2022
- <a href="https://www.greenmatters.com/p/how-do-carbon-emissions-affect-environment">https://www.greenmatters.com/p/how-do-carbon-emissions-affect-environment</a>
- https://www.politico.eu/article/how-climate-change-will-widen-european-divide-road-tocop26/
- https://pubmed.ncbi.nlm.nih.gov/26615065/
- https://www.who.int/
- https://www.youtube.com/watch?v=2iJRtya1GHE&list=PLoHXnVng2SVD-tVRfz4g6qffHC807rDE
- https://www.kingsfund.org.uk/projects/time-think-differently/trends-sustainable-services
- Lancet 2019 REVIEW | VOLUME 394, ISSUE 10211, P1836-1878, NOVEMBER 16, 2019
- Oxford University 2020 Climate Change



### The NHS Estates & Facilities Conference 2022:



#### **SPEAKING NOW**



Jane Taylor

Senior Estates Development Manager NHS Suffolk & North East Essex

## <u>l will be</u> discussing...

"Transforming NHS Owned
Assets to Enhance Healthcare
Services to Local Communities"





## Transforming NHS Owned Assets to enhance healthcare services to local communities

Jane Taylor

Senior Estates Development Manager, NHS Suffolk and North East Essex





- NHSPS Freehold was used for Community Services Tendring Base
- Ground floor under-utilised
- Part of ICS Estates Strategy
- 2 GP practices in NHSPS Estate relocated enabling expansion of local Renal Unit and disposal
- of premise to enable £301k reinvestment into another critical redevelopment
- Has created; 8 consultation rooms, 4 treatment rooms, 3 admin offices
- 1 interview room, 1 staff room, 1 large Community Room, 2 Digital Suites,
- 1 Library/GP Training Centre
- 66 car park spaces dedicated to primary care for patients and staff



## Constrained existing premises can be designed to meet the health needs of the local community

- Important to get partners, Patient Participation Group, and practice staff onboard early on
- Listen!!
- Support the ambitions and local strategies consider social value
- Place Based Alliance Approach
- Primary Care Networks and PCN Estates Strategies

"It's very exciting that Kennedy House is now open....it's absolutely fantastic and amazing...it's indescribable the difference between this and our old surgery"

Rita Garnett, Chair Frinton Road PPG

"Kennedy Way Medical Centre will be able to support almost 12,000 patients in the area, three thousand more than the two practices it replaces.... The whole project represents much-needed investment in the health of our local population and I hope that with the additional training facilities for clinicians, it will also help us to recruit more staff locally"

Dr Farrukh Shamshad, GP for CCP





**BRINGING UNITY TO OUR COMMUNITY** 



**Clinical Commissioning Group** 

'The Kennedy Way community garden is an amazing facility for local residents. Evidence has shown that access to green community spaces has a significant impact on a person's health. The garden includes a Men's Shed which has already transformed the lives of a group of men who collectively are recovering from a number of health issues including stroke, bereavement and depression.

The outdoor gym is very popular and can accommodate people with mobility issues. The project is a good example of what happens when people are put in the lead, achieving healthier, happier and more independent lives and encourages connectivity'.

Sharon Alexander Chief Officer, Community Voluntary Service Tendring







Social Prescribing Day - CVS Tendeng



### THANKS FOR ATTENDING



The NHS Estates & Facilities Conference 2022