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The Virtual NHS Data Conference



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23rd March 2023 - 10:50am – 15:00pm – Virtual Conference

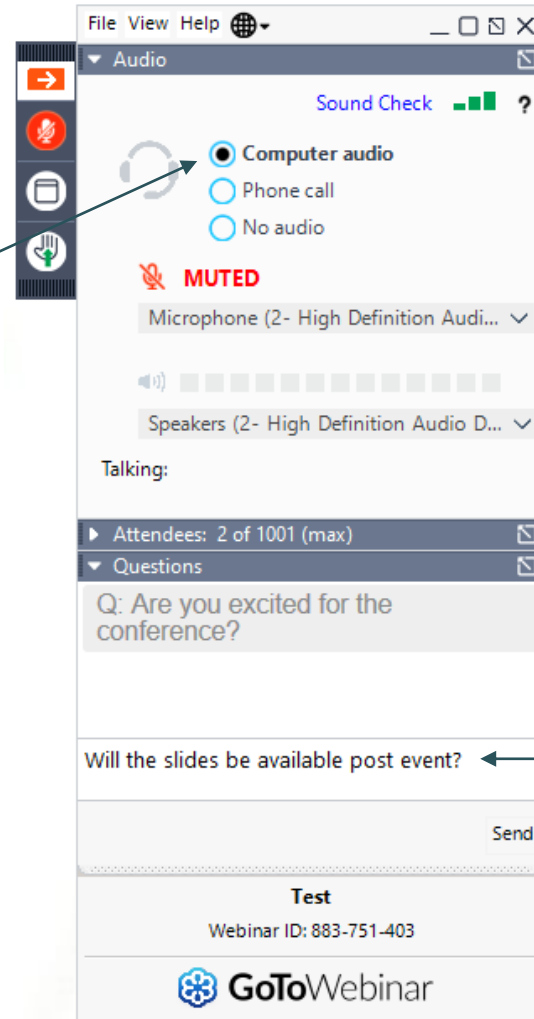
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QUICKPOLL

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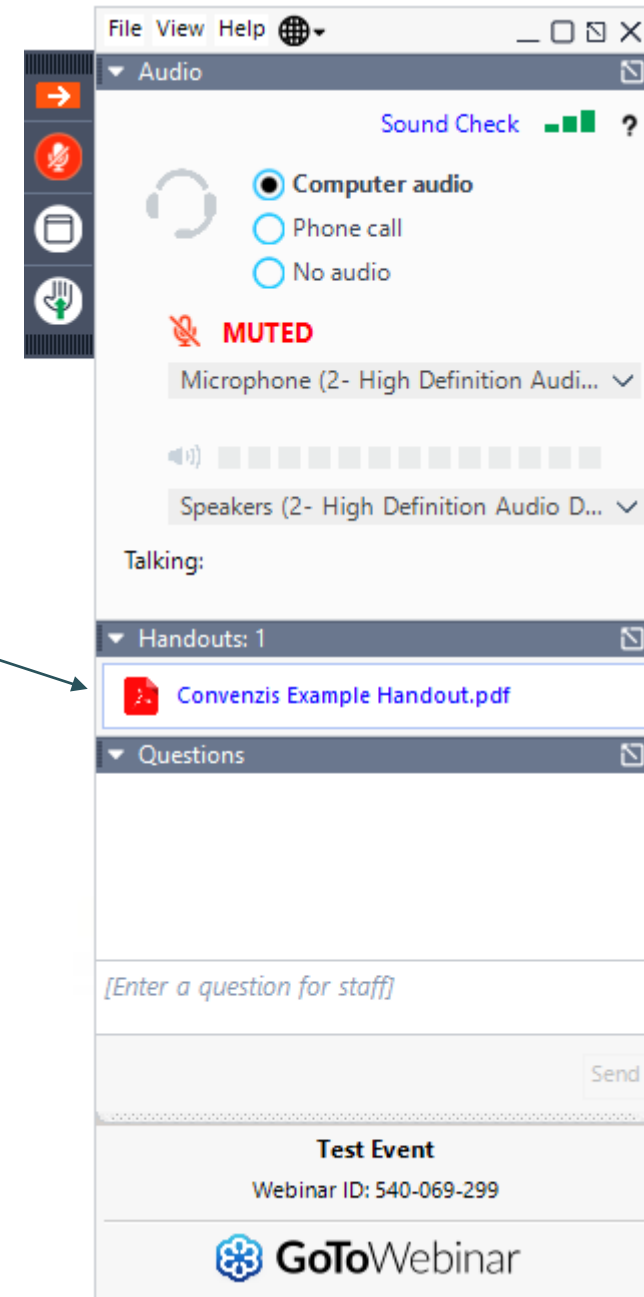




THE NHS DATA CONFERENCE


2023

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THE NHS DATA CONFERENCE 2023



SPEAKING NOW



Ming Tang

Chief Data and Analytics Officer
NHS England

I will be discussing...

“Harnessing the power of data
to change in the NHS”

Harnessing the power of data to drive change in the NHS

*Better Insights. Better Decisions.
Better Health.*



Ming Tang
Chief Data and Analytics Officer
NHS England

Context – The NHS is a complex ecosystem



NHS England

Care Quality Commission

Place Based Partnerships

£190.3 billion

1.227 million
FTE staff

Integrated Care Systems

(42)

Integrated Care Boards



Commission and deliver joined-up approaches to improving health and care outcomes

Integrated Care Partnerships

Providers work together to deliver care by agreeing to collaborate rather than compete.

Local authorities

(152)

GP practices working together with community, mental health, social care, pharmacy, hospital and voluntary services (1,250)

NHS Providers

Acute Trusts

(124)

250,000 daily outpatient
47,000 daily inpatient
67,500 daily A&E attendances

Mental Health

(50)

1.6m contacts

Community

(826)

0.38m daily care contacts

Ambulance

(10)

30,000 daily 999 calls
20,390 daily call-outs

Other Providers

GP Practices

(15,119)

1.3m daily appointments

Voluntary Sector

Social Enterprises

Private

Primary Care Networks

Joining of NHS England, NHS Digital and Health Education England



England



Digital



Health Education England

Beginning of a transformation journey that provides the opportunity to:

Create one function to drive the use of data within health and social care.

- Review what health and social care data is captured.
- Consider the ways we collect data and its purposes.
- Minimise the movement of data across system to enable a rapid analytical pipeline.
- Invest in architecture to implement FDP, SDEs.
- Empower systems to lead locally.
- Professionalising the Data and Analytics workforce.
- And do this all in a smarter way.

Provide secure access to data for analytical insights that support decision making to improve care delivery and system planning, and to support research into new treatments.

Underpinned by Strategies to support the power of data



Data Saves Lives: Reshaping Health and Care with Data

Building and Maintaining Public Trust



Patients

Improving Individual Care



NHS Services

Speed up diagnosis



NHS and Adult Social Care Systems

Plan local services



Medical Research

Life saving medical research

Goldacre Review: Better, broader, safer: using health data for research and analysis

Platforms and security

Modern, open working methods for NHS data

Data curation and knowledge management

NHS data analysts

Governance

Approaches and strategy

Making data more accessible whilst upholding the highest standards of privacy and security



Moving to self-service access using secure environments to underpin everything we do using a federated model with data as an infrastructure, as well as a product.

- 1 Secure Data Environments for operational use, planning and population health management.**
For example: a federated data platform for NHS staff and care providers.
- 2 Secure Data Environments to support research by academia and industry.**
For example: research environments to support medical research.

Secure Data Environments will improve:

- ✓ **Patient privacy:** removing personal detail to keep patient information confidential.
- ✓ **Security:** ensuring that systems have high level of protection.
- ✓ **Efficiency:** connecting data to speed up decisions and discovery of new treatments.

Data storage and access platforms built to uphold the highest standards of privacy and security - adhering to the five data safes.



Safe people



Safe projects



Safe settings



Safe outputs



Safe data

Data Capability Framework – our “navigation”



Data Capability Pillars



Population
Citizen



Place
Place



Channel
Services



Workforce
Workforce



Clinical
Registry /
Medicines



Commercial
Category

360° data

Citizen / patient journeys: build trust with citizens and patients and manage their relationships and interactions with NHS entities.

Channel optimisation: optimisation of access, service delivery, funding mechanism and channel preference to improve health and care outcomes.

Capacity planning: plan and manage key capacity constraints to reduce costs and make investments to improve inequalities.

Clinical variation: understand and improve clinical variation in pathways and clinical practice.

Value for money: maximise our return in funding through the delivery of services in most cost-effective manner.

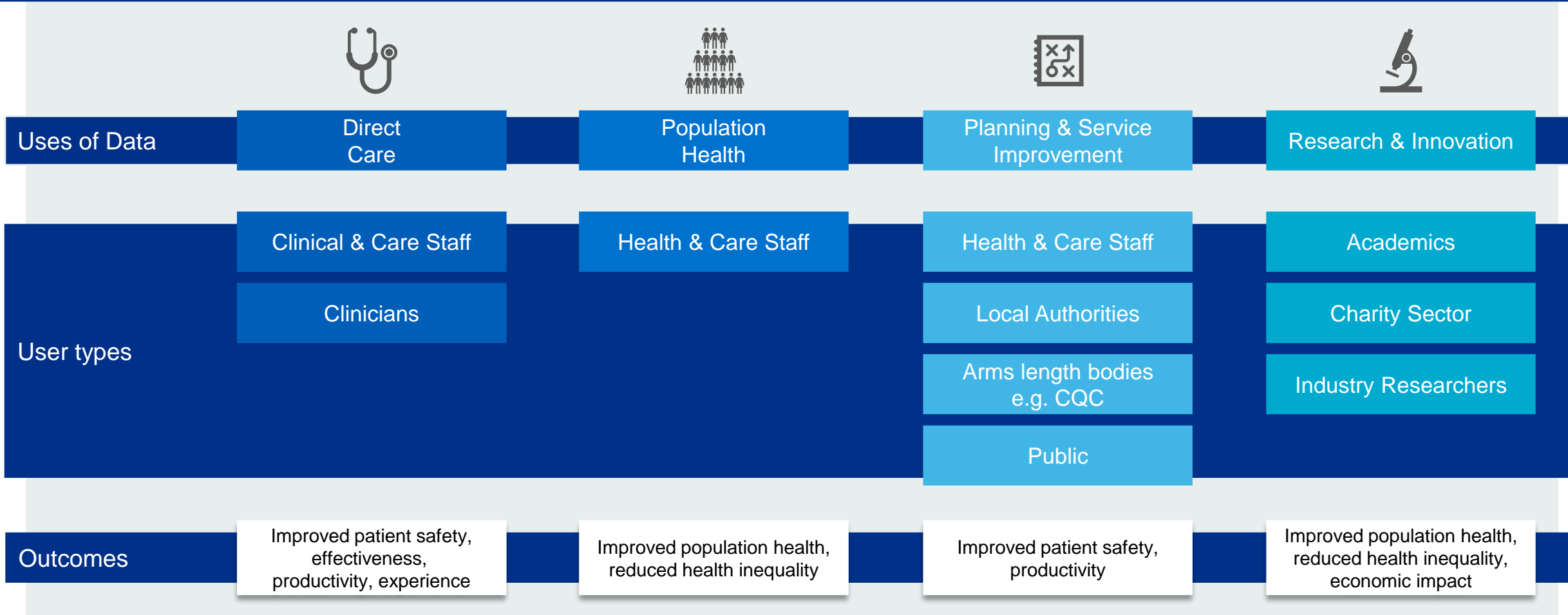
Key activities will be enabled by:

- Core reference data.
- Events architecture.
- Federated data model.

Four key uses of data



Designing appropriate data governance and processes for different uses of data.



Case Studies

ICS Place Tool



- Build a Place, or multiple Places, within an ICS's geography.
- Explore and visualise data and metrics relevant to health and care.
- Inform where to deploy resources to reduce health access inequity and achieve PCN level targets.

The screenshot displays the ICS Place Tool interface. The top navigation bar includes 'Welcome', 'Setup Places', 'Manage Places', 'View Places', and 'Explore Places'. The main content area is titled 'Welcome to Bath and North East Somerset, Swindon and Wiltshire ICS'.

The 'ICS Places' section prompts the user to 'Please select GP Practices in an area to setup a place:'. Below this is a table with the following columns: Title, Nhs Region Name, Pcn Name, Sub Icb Location Name, Town, and Legal Status.

Title	Nhs Region Name	Pcn Name	Sub Icb Location Name	Town	Legal Status
<input type="checkbox"/> MONMOUTH SURGERY	South West	UNITY MEDICAL GROUP PCN	NHS BATH AND NORTH EAST SOMERSET, SWINDON AND	BATH	Active
<input checked="" type="checkbox"/> ST.JAMES'S SURGERY	South West	No value	NHS BATH AND NORTH EAST SOMERSET, SWINDON AND	BATH	Active
<input type="checkbox"/> BRADFORD ROAD MEDICAL CTR	South West	No value	NHS BATH AND NORTH EAST SOMERSET, SWINDON AND	TROWBRIDGE	Active
<input type="checkbox"/> ST. MARY'S SURGERY	South West	THREE VALLEYS HEALTH PCN	NHS BATH AND NORTH EAST SOMERSET, SWINDON AND	BATH	Active
<input checked="" type="checkbox"/> HEART OF BATH	South West	HEART OF BATH PCN	NHS BATH AND NORTH EAST SOMERSET, SWINDON AND	BATH	Active
<input type="checkbox"/> NUMBER 18 SURGERY	South West	No value	NHS BATH AND NORTH EAST SOMERSET, SWINDON AND	BATH	Inactive
<input type="checkbox"/> UNIVERSITY MEDICAL CENTRE	South West	UNITY MEDICAL GROUP PCN	NHS BATH AND NORTH EAST SOMERSET, SWINDON AND	BATH	Active
<input checked="" type="checkbox"/> ST CHADS SURGERY					
<input type="checkbox"/> HOPE HOUSE SURGERY					
<input checked="" type="checkbox"/> WESTFIELD SURGERY					
<input type="checkbox"/> HARP TREE SURGERY					
<input type="checkbox"/> CATHERINE COTTAGE					
<input type="checkbox"/> SMALLBROOK SURGERY					
<input type="checkbox"/> WIDBROOK MEDICAL PRAC					

A 'Setup Place' button is located at the bottom left of the table.

The 'Explore Places' section is titled 'BATH AND NORTH EAST SOMERSET, SWINDON AND WILTSHIRE'. It includes a 'Select CCG' dropdown menu and a 'Select Metric to view by standard rate per 100,000 population' dropdown menu set to 'asthma'. A 'Select Environmental Factor to view by standard rate per 100,000 population' dropdown menu is set to 'IMD'. Below these is a 'Map of Places Environmental Factors' showing a map of the region with various environmental factors overlaid.

Health Inequalities Improvement Dashboard

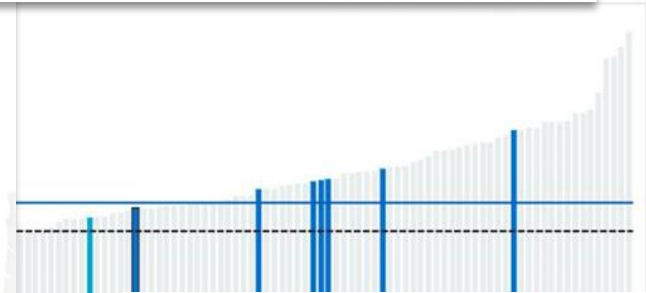


Descriptive statistics through the lenses of ethnicity and deprivation



Provides data cut by ethnicity and deprivation, to enable the NHS to take concerted action to improve health inequalities.

- **Dashboard** measures, monitors, and informs actionable insight to make improvements to narrow health inequalities.
- **Support** the NHS to prioritise what matters through the lenses of ethnicity and deprivation, where inequalities are in their area.
- **Focuses** attention on the CORE20PLUS5 approach, including the five clinical areas.



Similar 10 CCGs

CCG Name	AGI Value
NHS East and North Hertfordshire CCG	322
NHS Berkshire West CCG	1,397
NHS Cambridgeshire and Peterborough CCG	1,715
NHS Bristol, North Somerset and South Gloucestershire CCG	1,829
NHS Northamptonshire CCG	2,066
NHS Nottingham and Nottinghamshire CCG	2,169
NHS Oxfordshire CCG	2,188
NHS Derby and Derbyshire CCG	2,194
NHS Bath and North East Somerset, Swindon and Wiltshire CCG	2,319
NHS Cheshire CCG	2,799

This chart shows a table of your CCG and its similar 10

OK

--- Nation

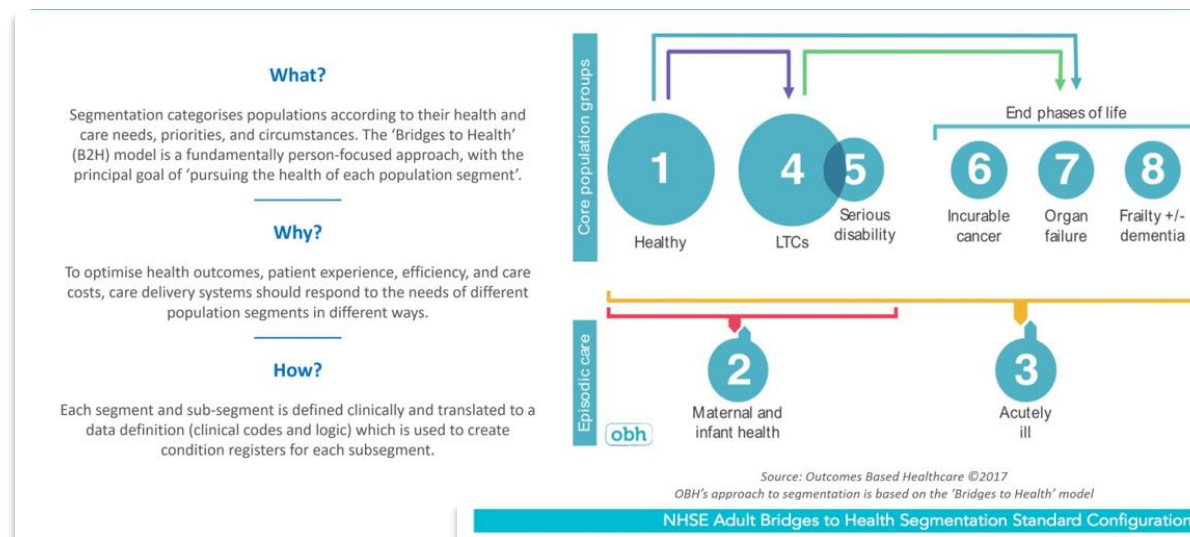
This chart shows the AGI values for your CCG and 1

Bridges to Health Dataset



Bridges to Health segmentation dataset enables deeper insight into:

- People who are healthy,
- People with long term conditions,
- People with disability,
- People who are nearer the end of life with cancer, organ failure, frailty and dementia.



NHSE Adult Bridges to Health Segmentation Standard Configuration					
1 Healthy / Generally Well	4 LTC	5 Disability	6 Incurable Cancer	7 Organ Failure	8 Frailty and Dementia
<p>People (all ages) who are currently healthy / well.</p> <p>Defined as people who do not meet the criteria of any other segments</p>	<p>People (all ages) with one or more LTCs:</p> <p>Defined as:</p> <ul style="list-style-type: none"> Alcohol Dependence Asthma Atrial Fibrillation Bronchiectasis Cancer (incl people on active therapy) Cerebrovascular Disease (incl Stroke, TIA) Chronic Kidney Disease Chronic Liver Disease Chronic Pain COPD Coronary Heart Disease (incl MI, Angina) Cystic Fibrosis Depression Diabetes Epilepsy Heart Failure Hypertension Inflammatory Bowel Disease Multiple Sclerosis Osteoarthritis Osteoporosis Parkinson's Disease Peripheral Vascular Disease Pulmonary Heart Disease Rheumatoid Arthritis Sarcoidosis Serious Mental Illness Sickle Cell Disease 	<p>People (all ages) with learning disability and/or autism, or physical disability.</p> <p>Defined as:</p> <ul style="list-style-type: none"> Learning Disability and/or Autism Physical Disability (incl Neurological, Congenital, ASK, Visual, Hearing) 	<p>People (all ages) with incurable cancer:</p> <p>Defined as people with a diagnosis of cancer, who are known to palliative care via acute or community services</p>	<p>People (all ages) with organ failure:</p> <p>Defined as:</p> <ul style="list-style-type: none"> End Stage Renal Failure Liver Failure Neurological Organ Failure (includes MND, Parkinson's, MS, Huntington's Progressive Supranuclear Palsy) Severe COPD Severe Heart Failure Severe Interstitial Lung Disease 	<p>People with frailty and/or dementia:</p> <p>Defined as:</p> <ul style="list-style-type: none"> Dementia (18+) Intermediate risk of frailty (65+) High risk of frailty (65+) <p>Frailty based on Hospital Frailty Risk Score</p>
<p>2 – Maternal Health</p> <p>Defined as women who receive antenatal and postnatal care</p> <p>An 'episodic' segment, which people can move 'into' and 'out of' from other segments, whilst still remaining in their base segment</p>			<p>End of Life</p> <p>People expected to die over a period of 12 months:</p> <p>Defined as people in segments 6 (incurable cancer), 7 (organ failure) and 8 (frailty and dementia), who are known to palliative care via acute or community services</p>		
<p>3 – Acutely Ill ('episodic' segment)</p>					



NHS England and NHS Improvement



Data Navigator Tool



ICSs will initially assess themselves across 5 use cases:

- 1 Elective Recovery
- 2 Supply Chain
- 3 Care Coordination
- 4 Vaccines & Immunisations
- 5 Population Health

ICSs will be able to:

- Determine what data they collect.
- Which KPIs to monitor to support their delivery.

ICSs can also include any local data collections supplementing their insight capabilities.

ICS Data & Analytics Blueprint and Diagnostic

Welcome to the ICS Data & Analytics Blueprint Diagnostic tool. This application is designed to enable a facilitated assessment of your Integrated Care Systems current data and analytics activity, and support identification of high priority areas for development through targeted use cases.

The diagnostic tool is built around the ICS Data & Analytics Blueprint - an interactive ontology which demonstrates valuable applications related to different use cases, as well as the data that underpins them and the benefits they release.

Throughout this assessment we will:

- Explore your current activity and priorities in relation to these applications.
- Identify key data objects to increase application activity for your ICS.
- Identify the KPIs that will support delivering and monitoring of continuous improvement across operational activities.

To enter, select an ICS below and then click 'Enter Blueprint and Diagnostic'

SELECT ICS

Bath and North East Somerset, Swindon and Wiltshire

Enter Blueprint Application >>

Graph Key

```
graph TD; NHSAnalytics[NHS Analytics Ecosystems] --> SupplyChain[Supply chain]; NHSAnalytics --> CareCoordination[Care coordination]; NHSAnalytics --> Vaccines[Vaccines and immunisations]; NHSAnalytics --> PopulationHealth[Population health and inequalities]; NHSAnalytics --> ElectiveRecovery[Elective recovery]; SupplyChain --> SupplyChain360[Supply Chain 360 Tool National]; SupplyChain --> PersonalProtective[Personal Protective ... National]; SupplyChain --> SupplyChainUnipart[Supply Chain (Unipart) Local]; CareCoordination --> DischargeOptimisation[Discharge Optimisati... Local]; CareCoordination --> ExecutiveSummary[Executive Summary ... National]; CareCoordination --> DischargePathways[Discharge Pathways ... National]; CareCoordination --> StrategicPlanning[Strategic Planning Tool National]; CareCoordination --> EarlyWarning[Early Warning System... National]; Vaccines --> ValidatedVaccination[Validated Vaccination... National]; Vaccines --> WorkforceManagement[Workforce Managem... National]; Vaccines --> VaccineEqualities[Vaccine Equalities Tool National]; Vaccines --> WorkforcePlanning[Workforce Planning T... National]; PopulationHealth --> HealthInequalities[Health Inequalities ... National]; PopulationHealth --> NIVs[NIVs and Pinnacle Ho... National]; PopulationHealth --> SiteReadiness[Site Readiness 360 Tool National]; ElectiveRecovery --> PreOperativeAsses[Pre-Operative Asses... Local]; ElectiveRecovery --> OutpatientsWorkspace[Outpatients Workspace Local]; ElectiveRecovery --> AssistedTheatreSch[Assisted Theatre Sch... Local]; ElectiveRecovery --> IECCPPReco[IECCPP (Elective Reco... Local]; ElectiveRecovery --> IECCPPWait[IECCPP (Elective Wait... Local]; ElectiveRecovery --> ElectiveRecoveryDa[Elective Recovery Da... National];
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Care Coordination Solution



Everything in our hands

Information from multiple sources presented in-context and actionable for faster treatment of patients in most need



All

Inpatient 360
Manage theatre lists, unbooked waitlist, POA, RCS re-prioritisation and 6-4-2 workflows

Cancer Homepage
Manage the Cancer PTL and other cancer workflows and reports

Command Centre Workspace
Manage the Timely Care Hub and other command centre workflows

Outpatient 360
Manage outpatient waitlists, patient led validation text campaigns, data quality, and demand and capacity

Mobile Friendly Homepage
Workflows optimised for use on mobile devices such as smart phones or tablets

OPTICA
Manage discharge pathways using the OPTICA application

Better, faster, information-based decisions.

Operational tools for waiting list management, patient prioritisation and theatre scheduling workflows.

Clinicians, operational staff schedulers and data quality specialists have high quality waiting list data to treat as many different people as possible.

Simpler Processes for Improving elective waiting list data.

Data quality teams can clean and correct data.

Implementing changes back to source systems improves information for all system users.

Better Care Coordination at all levels.

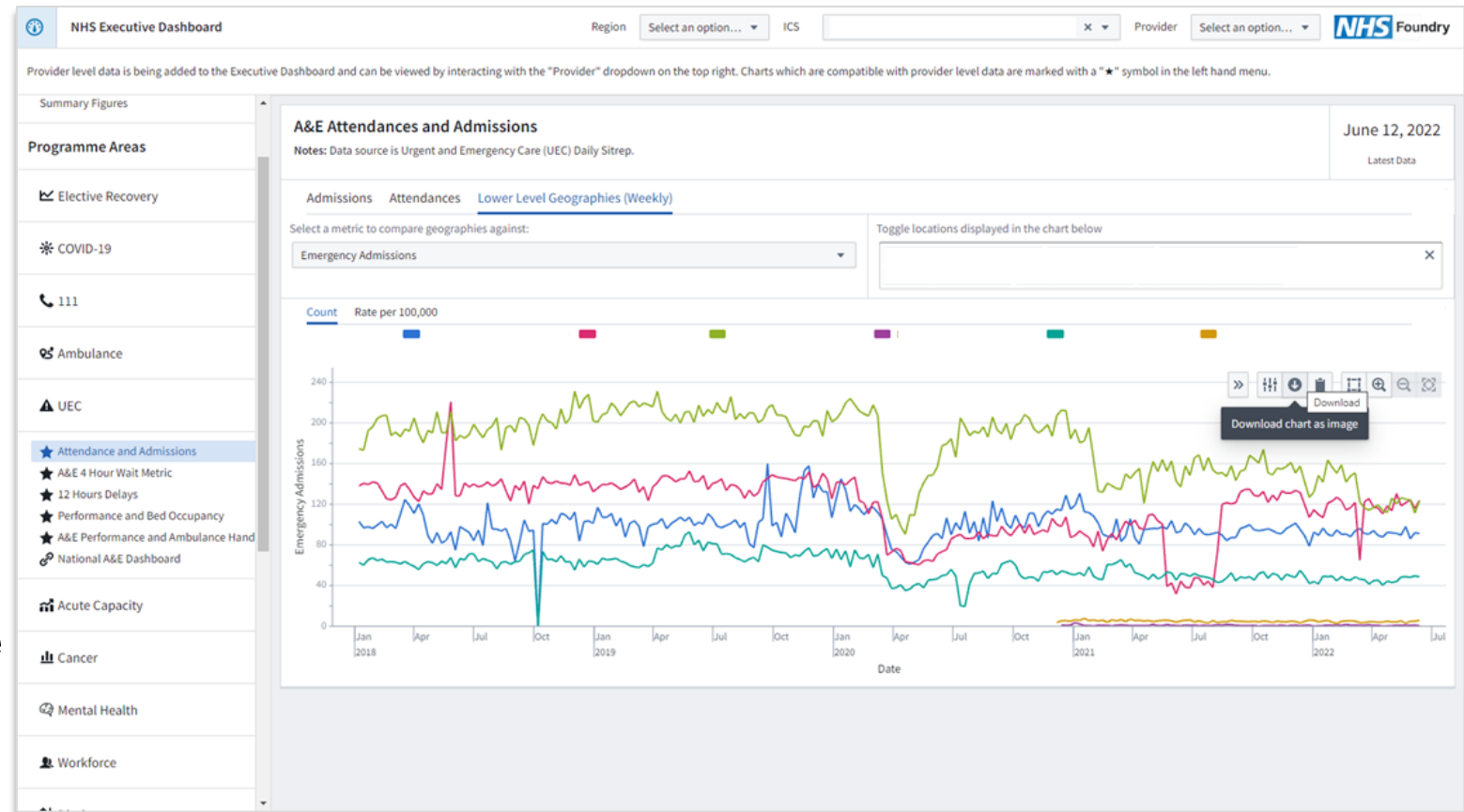
Securely share pseudonymised data within one platform.

Leaders at system, regional and national levels can make better decisions, improving the coordination of care across trusts.

ICB Executive Dashboard



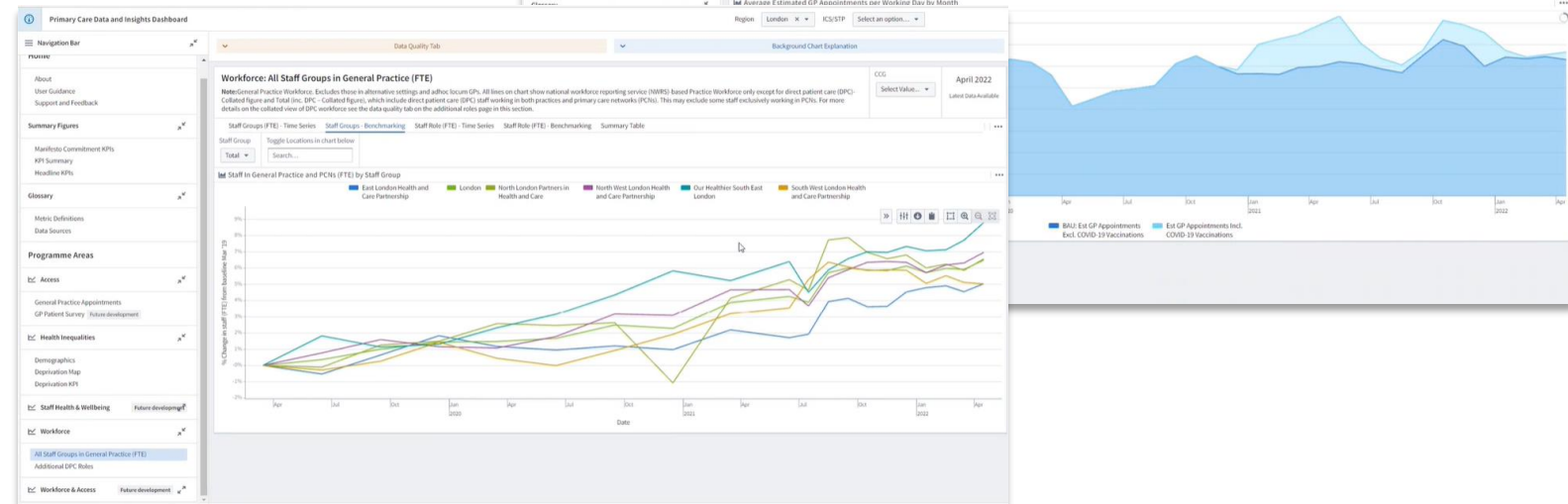
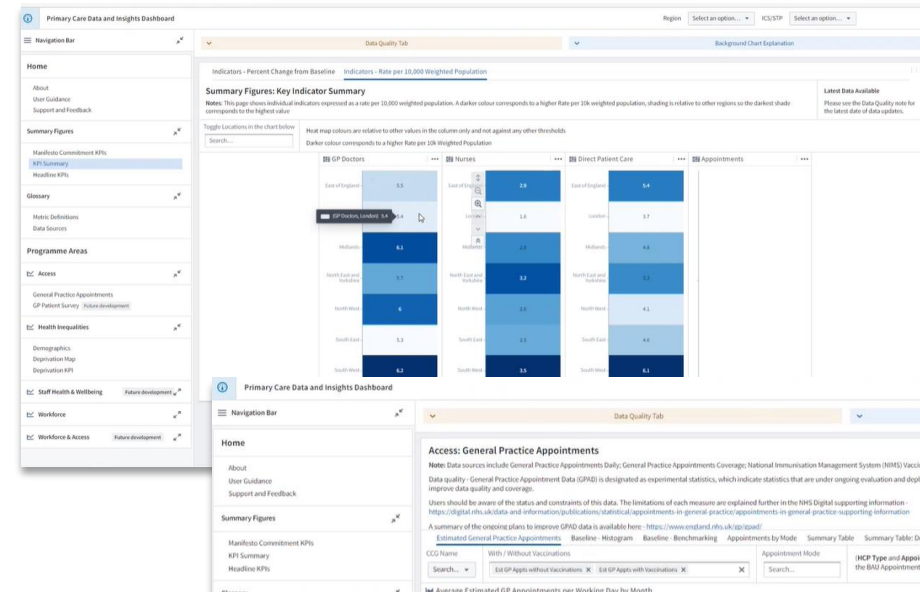
- Support ICBs in strategic planning across the quadruple aim of healthcare.
- Key management information across different areas (acute, primary care, mental health, discharge, capacity).
- One consistent dataset that can be used by all parts of the system.
- Information updated automatically.
- Preparation for Board reporting.



Primary Care Dashboard



- Wide range of data relevant to primary care services.
- Enables improvement and primary care transformation.
- Includes data relating to the national manifesto commitments for primary care.
- Initial health, equity, and population demographic views.
- Ongoing development:
 - GP workforce.
 - Patient satisfaction.
 - Staff health and wellbeing.
 - Community pharmacy.
 - Dentistry.



Thank you.

*Better Insights. Better Decisions.
Better Health.*





THE NHS DATA CONFERENCE 2023



UP NEXT...



insource

BE DATA CONFIDENT



THE NHS DATA CONFERENCE 2023



SPEAKING NOW



Lee Rickles

Programme Director and Chief Information Officer
Yorkshire & Humber

I will be discussing...

“The Value of Standardised data for wider data sharing with NHS and Local Authority partners in the Yorkshire & Humber Shared Care Record.



Humber Teaching
NHS Foundation Trust

Lee Rickles

CIO, Humber Teaching
NHS Foundation Trust



Caring, Learning
& Growing Together



How we do it: Our area

- We deliver our services from more than 80 sites across Hull, the East Riding, North Yorkshire including Scarborough and Ryedale.
- Mental health, children's and community services.
- We annually see;
 - Outpatients : 186588
 - Inpatients : 182702
 - Emergency attendances : 7214
 - Community : 1420
- Budget for 2022/23 is £225m which 4.5% is for digital.
- We use SystmOne and Lorenzo for our EPRs
- Insource data management platform



Our Infrastructure

- Lorenzo EPR extract several times a day
- SystemOne with a daily extract
- Insource data management platform
 - ETL which also normalise, de-duplicate, merge
 - Single source of the truth for data
- Apache NiFi for data routing, transformation, and system mediation logic
- Power BI
- Azure based integration, portal and FHIR proxy for YHCR



ICS & Regional linkage

- Federated Data Platform
 - Front runner
 - Optica Virtual Ward
 - Palantir
- NiFi protocols for encrypted communication to call the Insource data management platform and send to Palantir.
- Working on a subscription model.
- Only to support direct care with ISA/DPIA/MOU.
- Yorkshire & Humber Care Record
 - Shared Care Record
 - Population Health Management Solution
- FHIR Care connect profiles from the Insource data management platform from the FHIR proxy.
- PHM covered via a de-id solution to support the section 251 for secondary usage.

Future

- Use more open source technologies
- Complete the move to cloud with move of the Insource data management platform.
- Faster data feeds for community & mental health
- Use FHIR messaging from the YHCR for direct care use of the Federated Data Platform
- Current procuring our next generation EPR so I expect a rework of data warehouse
- Move to data lake and lake house model and apply AI
- Feed data into a ICS data layer





Thank You &
questions



NHS

Humber Teaching
NHS Foundation Trust



THE NHS DATA CONFERENCE 2023



SPEAKING NOW



**Prasanth
Peddaayyavarla**

Head of Data Science
NHS Arden & GEM CSU



Julia Pledger

Nurse Consultant -
Diabetes - Bedfordshire
Integrated Community
Diabetes Services

We will discuss...

“How Better use of data is enabling proactive, personalised care in Bedfordshire, Luton & Milton Keynes (BLMK)”

Diabetes Warning System

Prasanth Peddaayyavarla

Head of Data Science

Arden & GEM CSU's Advanced Analytics Unit

Julia Pledger

Consultant Nurse - Diabetes

Bedfordshire Integrated Community Diabetes Service

NHS Data Conference 2023



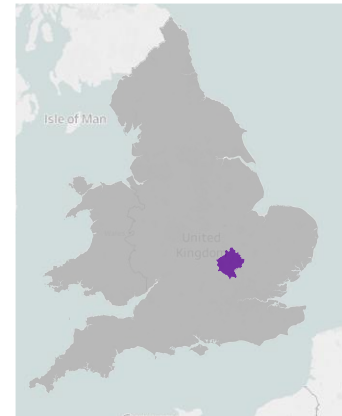
Diabetes background in BLMK

Population: 1.1m

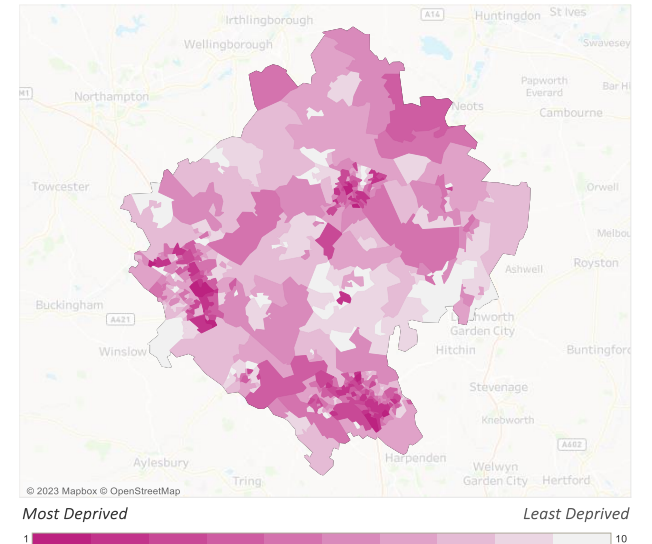
- Ethnically diverse population, with a large Asian and 'Other White' population compared to England.
- The ethnicity breakdown varies across BLMK, with the percentage of non-'White British' ranging from 11% in Central Bedfordshire to 57% in Luton.
- Roughly 24% of the population live in areas in the bottom 3 deprivation deciles.

People living with diabetes in BLMK: 69,167

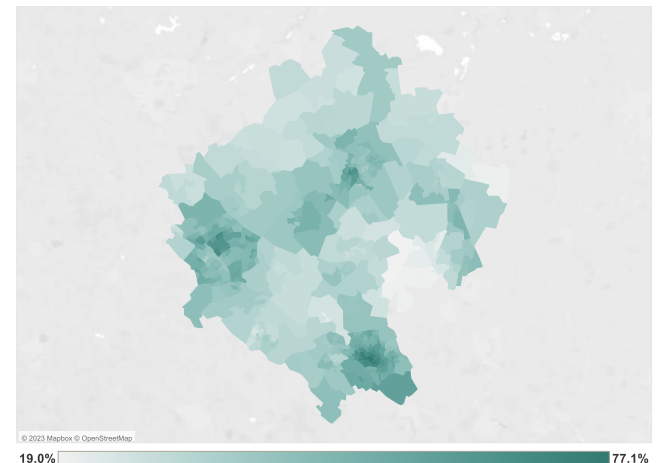
- Over 27% of those with diabetes live in bottom 3 deprivation deciles.
- Approximately 32% of those living with diabetes are from minority ethnic groups.



Deprivation in BLMK



Percentage of Population from Minority Ethnicities by LSOA

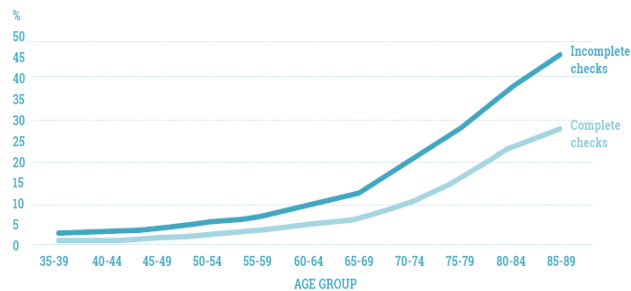


National drivers for Diabetes

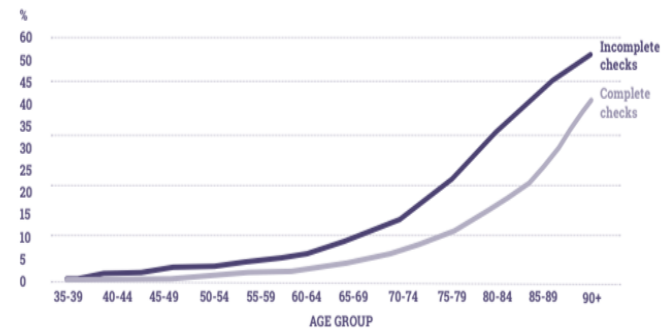


- Agreed processes and agreed targets nationally reported through National Diabetes Audit (NDA)
 - 8 care processes
 - 3 NICE treatment targets

Percentage of people with Type 1 diabetes (by age) who died during the follow-up period



Percentage of people with Type 2 diabetes (by age) who died during the follow-up period



Source: Diabetes.org.uk using NDA 2006-13

What are 'complete' and 'incomplete' healthcare checks?

So that we could compare those who had regularly received their annual healthcare checks to those who hadn't, the group of people with diabetes was split into two groups:

1. **Complete healthcare checks** includes all those who had three healthcare checks (HbA1c, cholesterol and blood pressure) each year for seven years (ie they had had 21 healthcare checks in total)
2. **Incomplete healthcare checks** includes all those who had 12 or less healthcare checks over the seven-year period.

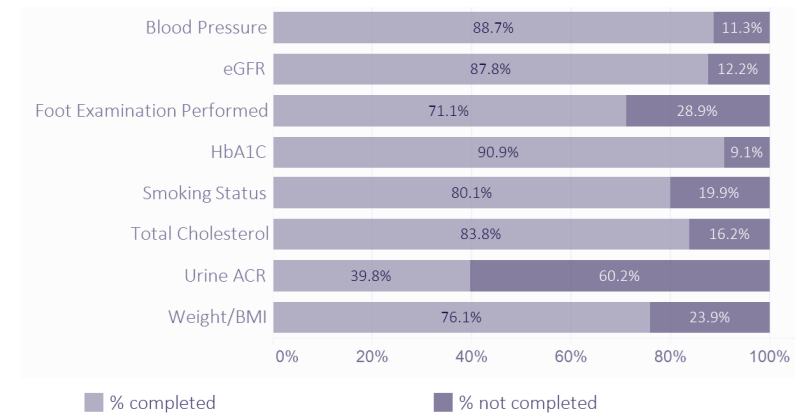


BLMK performance metrics

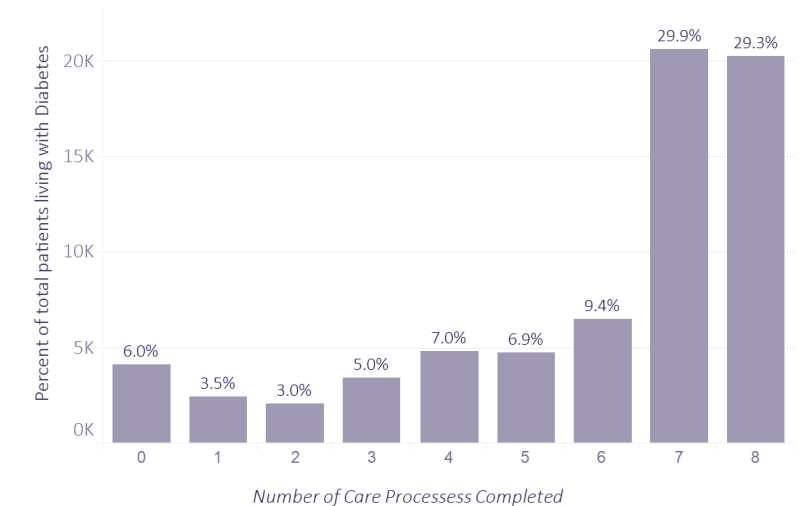


- Variation within BLMK
 - Only 29% of people living with Diabetes have all **8** care processes completed in 2022-23 so far.
 - but a further 30% have completed 7. Urine ACR has least compliance.
 - Practice variation :
 - In 25 GP practices there are at least 10% people with diabetes not having more than 1 care processes completed
 - More than half of the practices have over 10% of people not having more than 2 care processes completed
- NICE treatment target: HbA1c, Blood pressure and Cholesterol
 - Over 47,000 patients don't achieve at least one (2022-23).

Care Process Completion



Number of Care Processes Completed (2022-23)



Historically, we have used the NDA data to explore performance and variation however it is always at least a few months out of date. Critically, it looks only at population level data and does not support identifying specific patients with unmet need. We have therefore largely used SystemOne reports at practice-level to identify people with greater unmet need, however these are very limited in functionality and do not readily support benchmarking across the system. Having a dashboard which not only provides contemporaneous population level data and benchmarking but also supports identification of people with high unmet need (with the ability to define parameters accordingly) would be extremely helpful for practices in optimising proactive diabetes care and population outcomes.

- Chirag Bakhai GP, Strategic Lead for Long Term Conditions, BLMK Integrated Care Board



Purpose of this dashboard



Who will use the dashboard:

- Clinicians from Primary and specialist care
- ICBs and PCNs for benchmarking and strategic planning

Bedfordshire Integrated Community Diabetes Service:

Prioritising patients for review, identify gaps in care and addressing how to rectify this.

Examples:



Women of childbearing age, look at HbA1c, last review, current medication



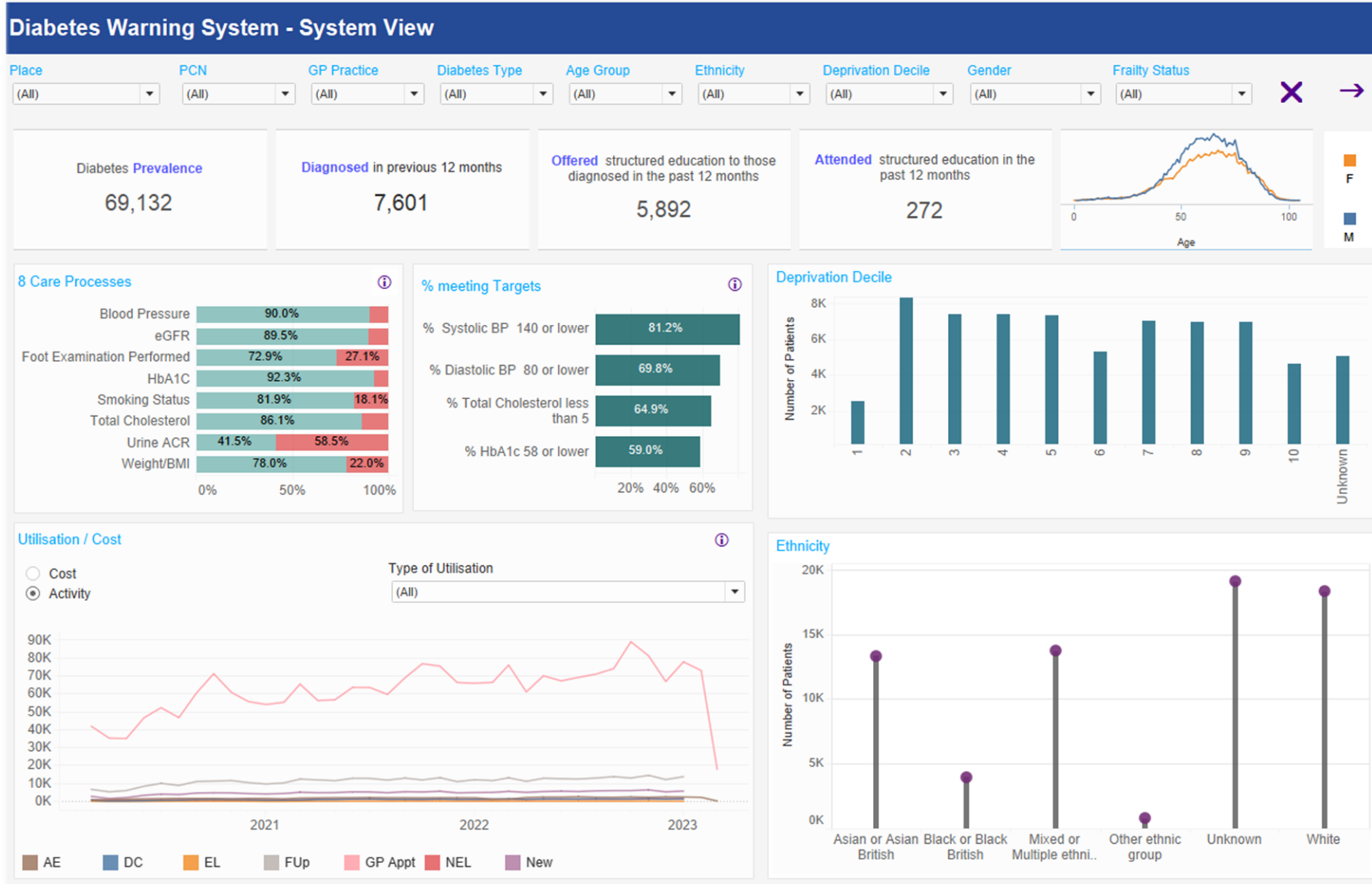
Focus on Frailty, HbA1c targets and medication



Look at health inequalities, access to care and outcome in terms of treatment targets.



Diabetes Warning System – System View



Diabetes Warning System – Benchmarking

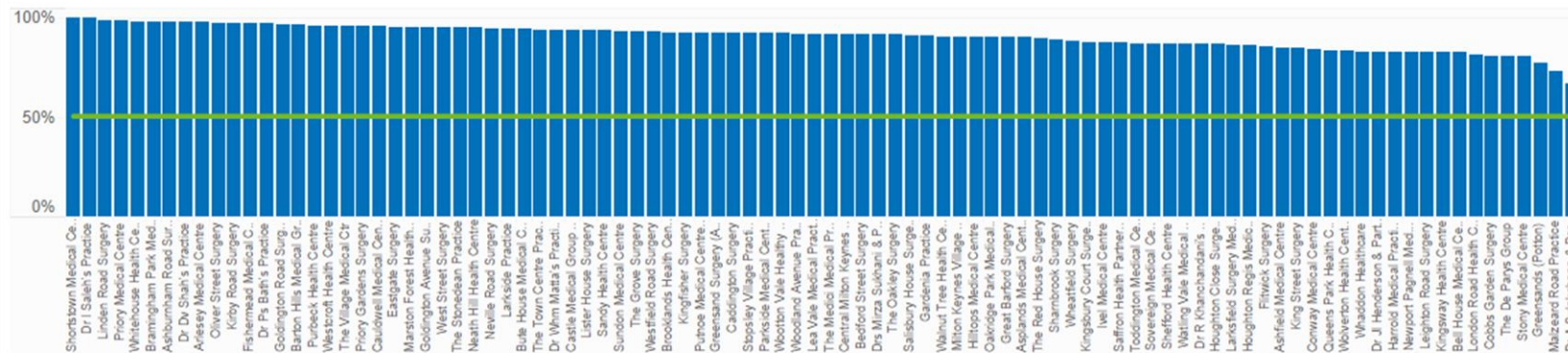
Diabetes Warning System - PCN and Practice Benchmarking % care process completed

(All) |
 (All) |
 (All) |
 (All) |
 (All) |
 (All) |
 (All) |
 (All) |
 (All) |
 Last 12 m...

PCN	GP Practice	% with no care processes	% with all care processes	Blood Pressure	Weight/BMI	Foot Examination Performed	HbA1C	Total Cholesterol	eGFR	Urine ACR	Smoking Status
U93573: THE BRIDGE MK PCN	K82016: Newport Pagnell Med.Ctr.	6.5%	26.6%	84.1%	80.6%	68.1%	90.2%	82.0%	90.6%	33.2%	75.6%
	K82074: Kingfisher Surgery	1.4%	20.2%	88.2%	78.6%	77.9%	86.4%	77.9%	84.6%	26.8%	84.6%
	Y02900: Brooklands Health Centre	6.1%	17.7%	90.7%	75.0%	75.4%	91.8%	85.2%	89.4%	25.3%	79.2%
U91286: LEA VALE PCN	E81032: Lea Vale Medical Practice	2.7%	43.1%	93.1%	89.6%	80.3%	93.1%	88.4%	89.2%	53.8%	93.4%
U90309: NORTH BEDF..	E81037: The De Parys Group	4.7%	23.1%	85.5%	75.5%	67.6%	91.4%	88.3%	90.9%	34.4%	73.2%
U86258: SOUTH WEST PCN	K82039: Bedford Street Surgery	3.7%	23.1%	92.5%	73.2%	65.9%	87.0%	81.7%	87.9%	26.5%	84.4%
	K82015: Parkside Medical Centre	3.2%	50.8%	94.6%	86.4%	85.1%	94.5%	91.3%	93.8%	59.3%	88.9%
	K82059: Westfield Road Surgery	2.9%	25.2%	95.2%	86.1%	73.0%	94.6%	89.1%	93.1%	32.7%	89.5%
	K82633: Westcroft Health Centre	0.9%	32.8%	96.3%	88.7%	89.7%	96.0%	94.3%	95.7%	37.7%	90.9%
U83511: HILLTON PCN	E81046: Dr A Sulakshana & Partners	3.9%	5.4%	80.7%	39.5%	28.0%	89.9%	79.2%	86.3%	16.6%	51.7%
	E81074: Houghton Close Surgery	2.1%	33.7%	92.6%	76.5%	76.1%	94.5%	86.5%	90.8%	42.1%	82.9%
	E81002: Greensand Surgery (Amphill)	0.2%	34.2%	94.0%	80.4%	79.8%	96.3%	88.8%	93.0%	45.7%	88.0%
U79932: HATTERS HEALTH PCN	E81040: Sundon Medical Centre	5.0%	23.0%	89.4%	75.7%	70.6%	92.2%	84.4%	91.3%	41.5%	65.4%
	E81016: Lister House Surgery	2.0%	44.3%	89.8%	83.6%	83.2%	95.9%	92.3%	94.6%	54.6%	87.8%

Select a care process

Urine ACR



% tested in last 12 months (PCN or ICB)

Diabetes Warning System – Case Selector

Diabetes Warning System - Case Selector

Home ←
Age (All) Gender (All) Ethnicity (All) Deprivation (All) Diabetes Type (All) Frailty (All) Rag Rating (All)

Select Care Process/QRISK2 (All) Result Range 0.0 - 807.0 Months since test done 0 - 36 Time Period Last 12 months No of Care Processes completed (All) Structured Education Attended (All) Cohort Size 2,507 Sort list>

QRisk2 Level (All) CVD patients on Sglt2i (All) CKD patients on Sglt2i (All)
Patient list cannot be sorted in this view. Please click on Sort list>> button for that functionality

PatientID (Age)	Systolic arterial pressure		Diastolic arterial pressure		BMI		Foot Examination Performed		HbA1C		Total Cholesterol		eGFR		Urine ACR		Smoking Status		QRISK2	
	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done	Latest Result	Months Since Test Done
██████████	145.0 ✓ 2	97.0 ✓ 2	40.1 ✓ 6	✓ 8	52.0 ✓ 6	6.0 ✓ 6	90.0 ✓ 6	1.0 ✓ 6	█	24										
██████████	132.0 ✓ 6	69.0 ✓ 6	38.1 ✓ 6	✓ 6	60.0 ✓ 7	4.5 ✓ 6	77.0 ✓ 7	10.8 ▲ 18	█	6										
██████████	116.0 ✓ 7	95.0 ✓ 7	22.6 ✓ 7	▲ 14	77.0 ✓ 1	4.1 ✓ 1	84.0 ✓ 1		█	7										
██████████	122.0 ✓ 2	68.0 ✓ 2	32.4 ✓ 12	✓ 1	61.0 ✓ 2	5.4 ✓ 2	84.0 ✓ 2	0.9 ◆ 19	█	1										
██████████	134.0 ✓ 11	78.0 ✓ 11	51.7 ✓ 1	✓ 11	54.0 ✓ 3	4.2 ✓ 3	90.0 ✓ 3	0.7 ✓ 12	█	1										
██████████	137.0 ✓ 2	79.0 ✓ 2	25.1 ✓ 2	✓ 2	61.0 ✓ 1	4.1 ✓ 4	66.0 ✓ 4	1.8 ✓ 2	█	0										
██████████	160.0 ✓ 2	111.0 ✓ 2	19.0 ✓ 5	✓ 5	85.0 ✓ 2	5.2 ✓ 6	90.0 ✓ 5	0.8 ▲ 14	█	5	8.2 ▲ 14									
██████████	122.0 ✓ 0	95.0 ✓ 0	27.9 ✓ 11	✓ 0	68.0 ✓ 3	3.5 ✓ 3	81.0 ✓ 3	4.3 ▲ 15	█	0	13.4 ◆ 21									
██████████	115.0 ✓ 5	78.0 ✓ 5	22.1 ✓ 12	✓ 5	48.0 ✓ 5	4.9 ✓ 8	60.0 ✓ 8	0.5 ✓ 5	█	5										
██████████	110.0 ✓ 1	72.0 ✓ 1	27.3 ✓ 1	✓ 1	76.0 ✓ 1	3.8 ✓ 1	90.0 ✓ 1		█	1										

Months Since Test Done
✓ within last 12 months ▲ 12-18 months ◆ Outstanding for > 18 months

Test Results Conditioning
█ Low Risk █ Medium Risk █ High Risk █ Not Rag Rated

Diabetes Warning System – Patient View



← Patient Pseudonym: [REDACTED]
 Diabetes Type: **Type II**
 Age: **43**; Gender: **M**; Ethnicity: **Unknown**

List of Conditions

Diabetes Type II, Neurotic Stress-related Somatoform Disorders

Theograph →

Frailty Status: **Fit**

Date of Diabetes Diagnosis: **01/12/2020**

Resource Utilisation Band: **5**

AE Attendances: **9**

Hosp Admissions: **2**

Total LTC: **2**

Risk of IP Admission: **73**

QRISK2: **8.190**

Preconcept. Counselling Attended On:

Structured Education Attended On:

Incomplete Care Processes in Current Financial Year: **1**

Care Processes

Care Process	Latest value	Months Since Event
Systolic arterial pressure	160	2
Diastolic arterial pressu...	111	2
eGFR	90	5
Foot Examination Perfo...	1	5
HbA1C	85	2
Smoking Status	1	5
Total Cholesterol	5.2	6
Urine ACR	0.8	14

GP appointments (most recent 5)

Event Date	Type of Event Detailed
07/05/2022	Session
11/04/2022	Pharmacy Tech
09/02/2022	Session
07/02/2022	Pharmacy Tech
31/01/2022	Diabetic

AE attendances (most recent 5)

Event Date	Type of Event Detailed
28/02/2023	Pain in lower limb
27/02/2023	Abdominal pain
15/11/2022	Pain in lower limb
13/11/2022	Pain in lower limb
23/05/2022	Pain in lower limb

Admissions (most recent 5)

Event Date	Type of Event Detailed
21/12/2022	D10-D36: Benign neoplasms
19/10/2022	K55-K64: Other diseases of intestines

Medications (All)

03/03/2023	Repeat Medication, Glucose Lowering - Other Repeat Medication, Other Medication	Metformin 1g modified-release Fluoxetine 20mg capsules Oramorph 10mg/5ml oral solutio Paracetamol 500mg tablets Thiamine 100mg tablets
14/02/2023	Repeat Medication, Glucose Lowering - Other Repeat Medication, Other Medication	Metformin 1g modified-release Fluoxetine 20mg capsules Omeprazole 20mg gastro-resista

Date	Systolic	Diastolic
12/01/2022	156	91
13/01/2022	134	80
15/01/2022	158	110
16/01/2022	160	111
10/01/2023	160	111

Date	Value
12/01/2022	4.3
27/09/2022	5.0

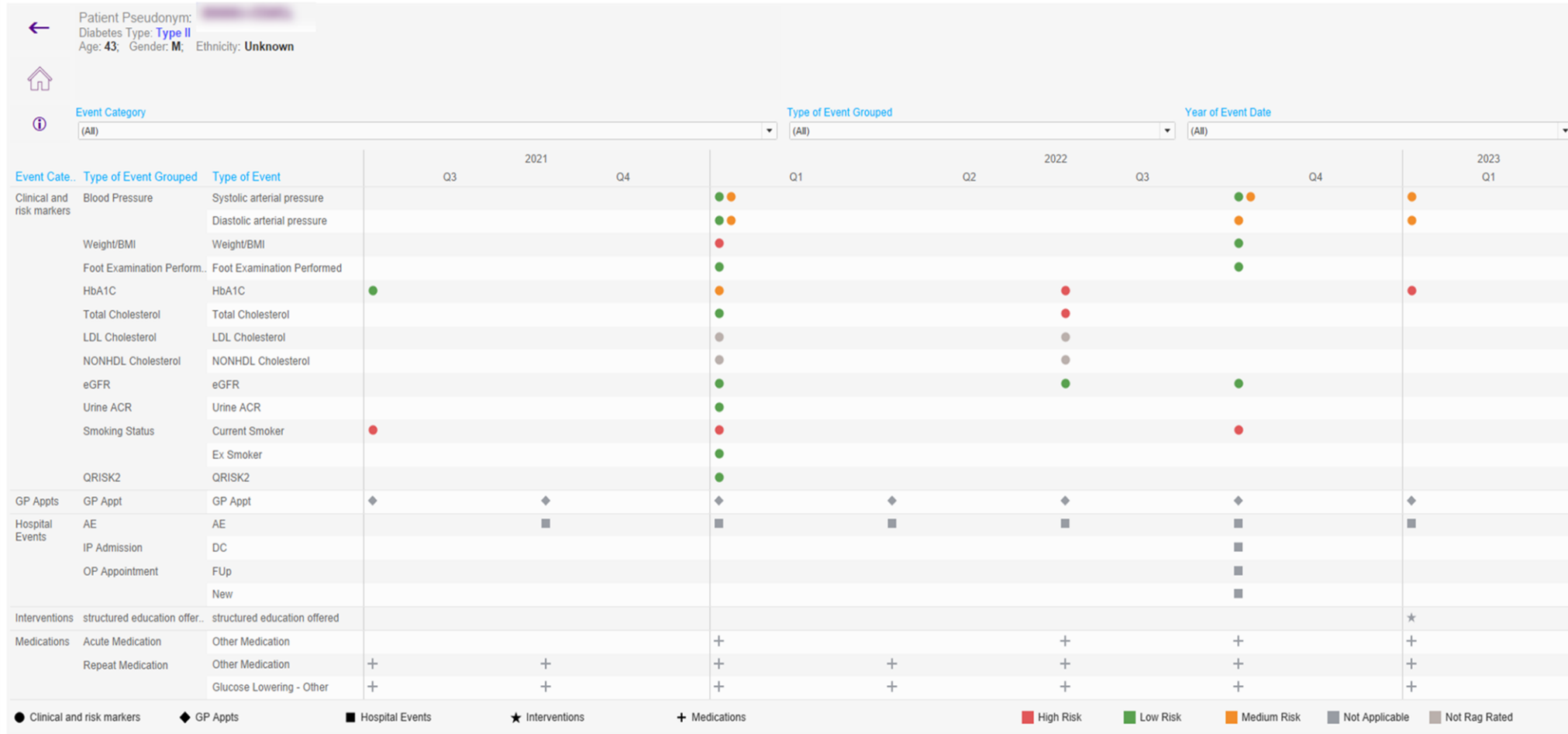
Date	Value
12/01/2022	18.5
13/10/2022	19.4
13/10/2022	19.0

Date	Value
02/08/2021	57
09/02/2022	69
09/02/2022	85
10/01/2023	85
10/01/2023	85

Date	Value
17/01/2022	0.8

Date	Value
12/01/2022	90
08/10/2022	90
08/10/2022	90

Diabetes Warning System – Theograph



Development process



Polly Chandler



Robbie Deegan
(previous team member)



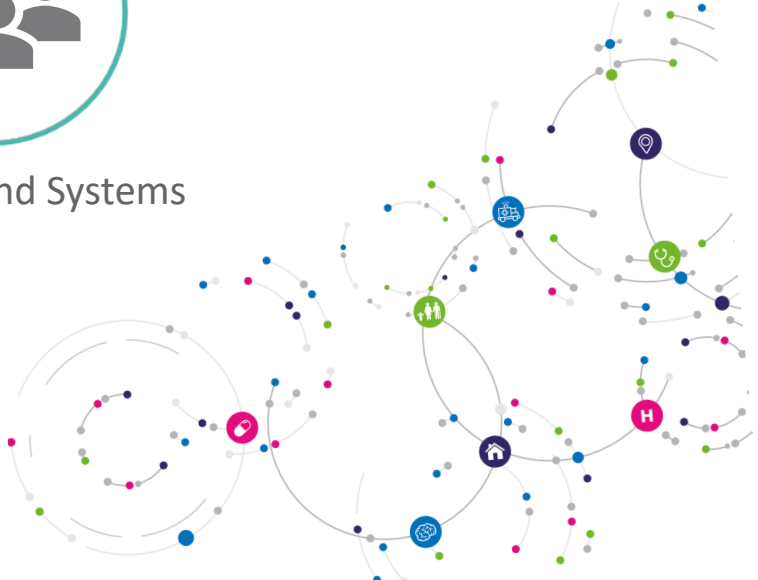
Kamil Barczak



GEMIMA Team



Data and Systems Team



Other AGEM Advanced Analytics projects



- 1 A social prescribing case find tool powered by Machine Learning models
- 2 An evidence based COPD case finding tool powered by Machine Learning models
- 3 Applied Analytics and Health Inequalities
- 4 Population Segmentation
- 5 Forecasting and Clustering Models



Benefits and aspirations



A vehicle to help improve outcomes for people living with diabetes



Allows benchmarking at ICB, PCN and practice level

Target patient groups with the benefit of live data

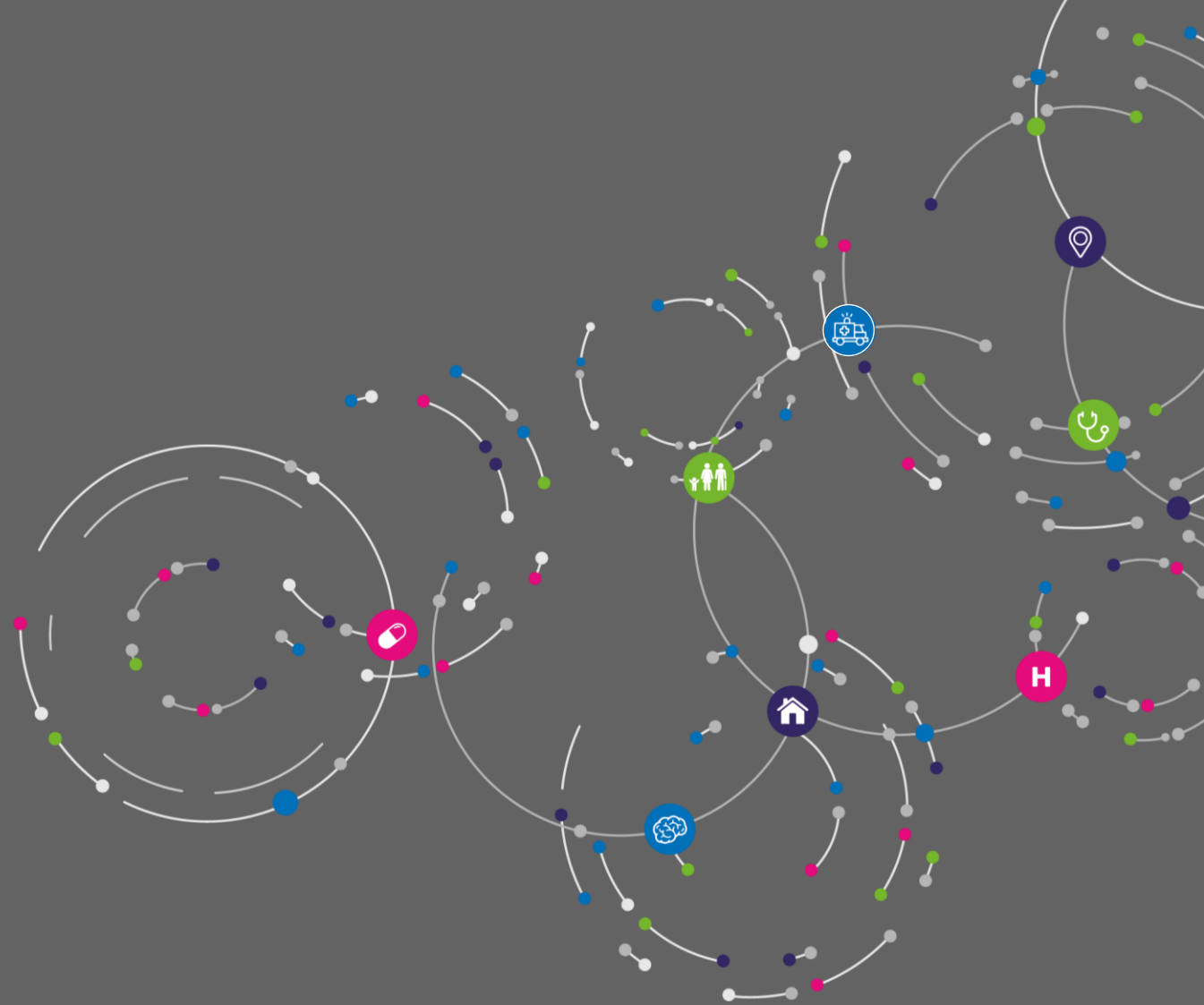
Utilise resources effectively

Plan workstreams

A tool for strategic planning



Questions



Get in touch with us at:

 www.ardengemcsu.nhs.uk

 [@ardengem](https://twitter.com/ardengem)

 agem.advanced.analytics@nhs.net



Arden&GEM
Advanced Analytics Unit
SHAPING DECISIONS FROM DATA



THE NHS DATA CONFERENCE 2023



UP NEXT...

HITACHI
Inspire the Next



THE NHS DATA CONFERENCE 2023



SPEAKING NOW



Darren Challender

Director of Healthcare Advisory
Hitachi Vantara

I will be discussing...

“Using Digital Twins in
Healthcare”

Digital Care & Operations

Using Patient Digital Twins in Healthcare

Darren Challender
Director Healthcare

March 2023



- 1 Hitachi – what we do**
- 2 Global Challenges**
- 3 Digital Twin**
- 4 Next Steps for Patient Digital Twins**

Digital Care & Operations

Hitachi

Healthcare – what we do

Hitachi Healthcare Focus Areas

Digital Experiences

Regenerative Medicine

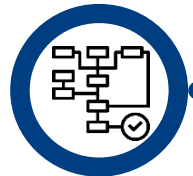
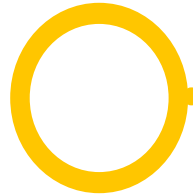
- Automated cell culture system
- Hitachi Value Chain Traceability Solution for Regenerative Medicine

Precision Medicine

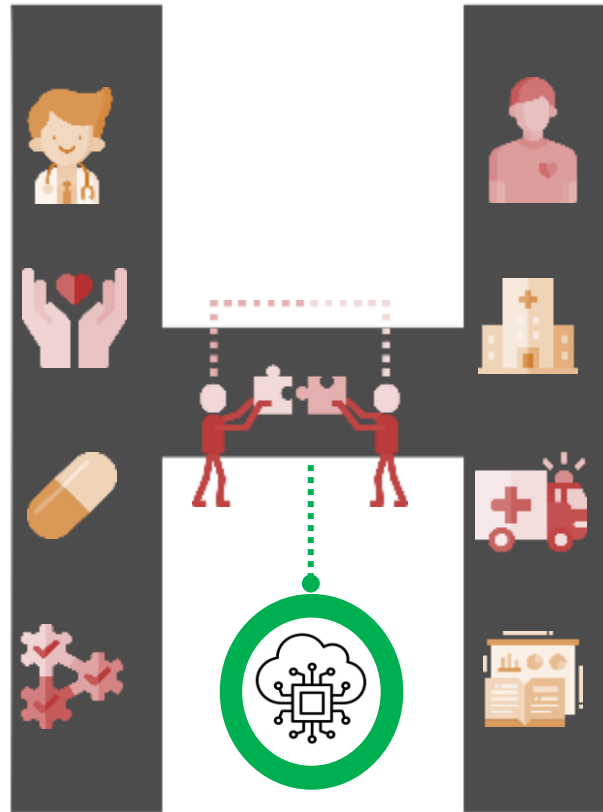
- Precision Medicine Platform
- Risk Simulator
- Clinical Process Visualizer

Robotic Automation (JRA)

- Pharma, life sciences manufacturing, processing, testing, dispensing



Digital Infrastructure



Health Infrastructure

- Hitachi Application Reliability Centers
- Hitachi Digital Care Infrastructure

Digital Solutions

Digital Operations & Care

- Care System Transformation
- Digital Hospital
- Digital Diabetes Prevention

Oncology

- Carbon / Proton Therapy
- Radiation Oncology
- Liquid Biopsy

Digital Eco-System

- Remote Patient Engagement
- Decentralized Clinical Trials
- Novel Drug Discovery



Digital Care & Operations

Healthcare

Global Challenges

Today's Global Challenges

1

Capacity

Increased and more complex demand is challenging available operating capacity with organizations frequently at > 95%. Increased backlogs, waiting lists and bottlenecks are delaying care and impacting quality.

2

Workforce

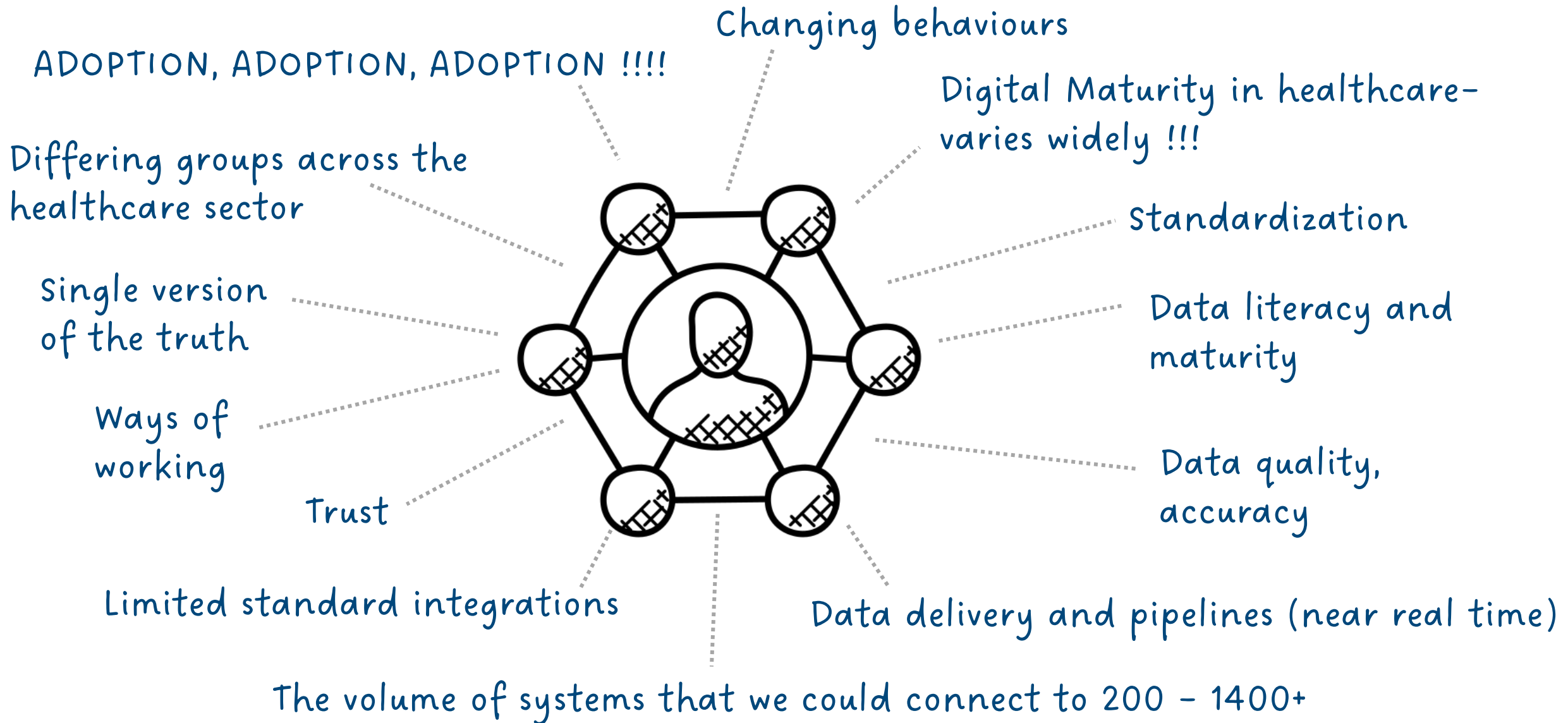
Growing demand for care is outpacing supply putting strain on healthcare systems globally. COVID19 has exacerbated this challenge. Staff retention is a growing challenge.

3

Performance

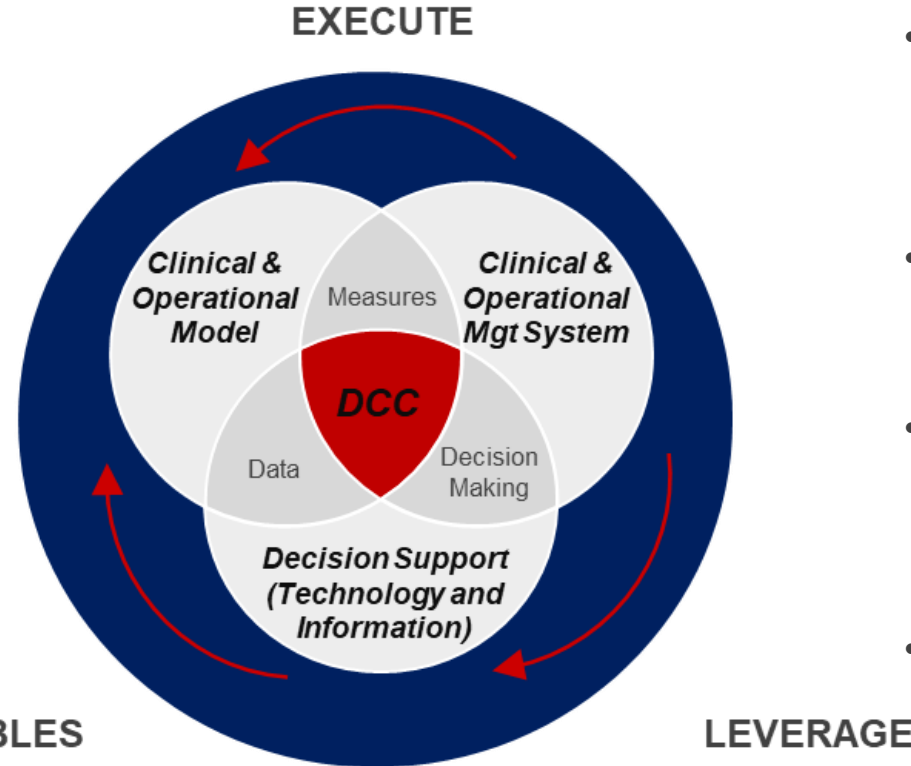
Increasing cost of care demands continuous improvement in operational performance despite the challenges to capacity & workforce.

Delivery Challenges



New Ways of Working

- Create a new operating model to drive a step change in performance
- Development of new behaviours with staff to drive innovation and underpin the new operating models
- Integration of existing clinical and operational information within the DCC to drive new insights and opportunities for improvement
- Creation of a decision excellence approach to support clinical and operational staff



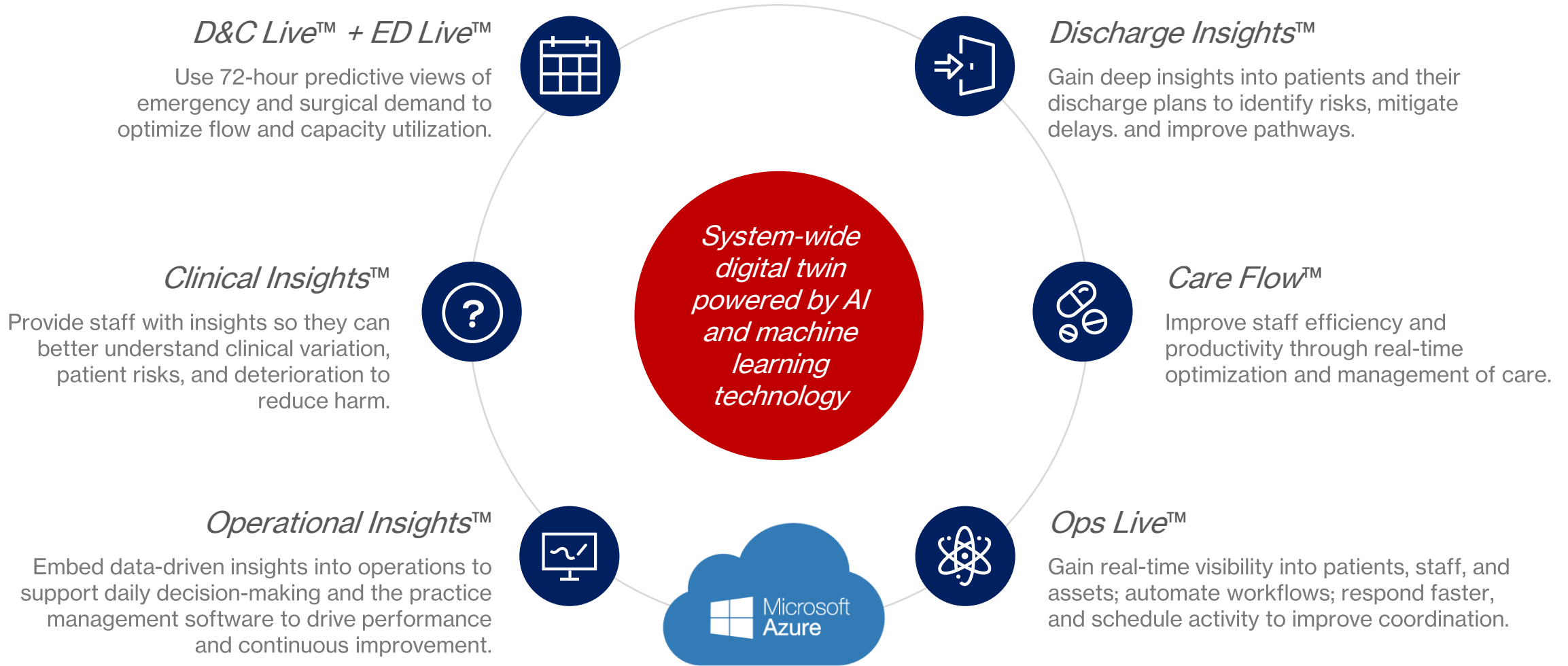
New Ways of Managing

- Using Data, AI, ML and new technology to support new behaviours using decision support tools
- Providing insights and measures to drive and realise new outcomes and track value
- Enhanced operational insights driving an improvement culture to provide a step change in performance
- Agile model development approach to “fail fast and learn faster”.

New Ways of Making Decisions

- Single source of the truth for demand, capacity and flow through the system
- Data driven decision support tools to enable the organisation to focus and prioritise action
- Tracking of patients, staff and assets within the system

Decision Support tools



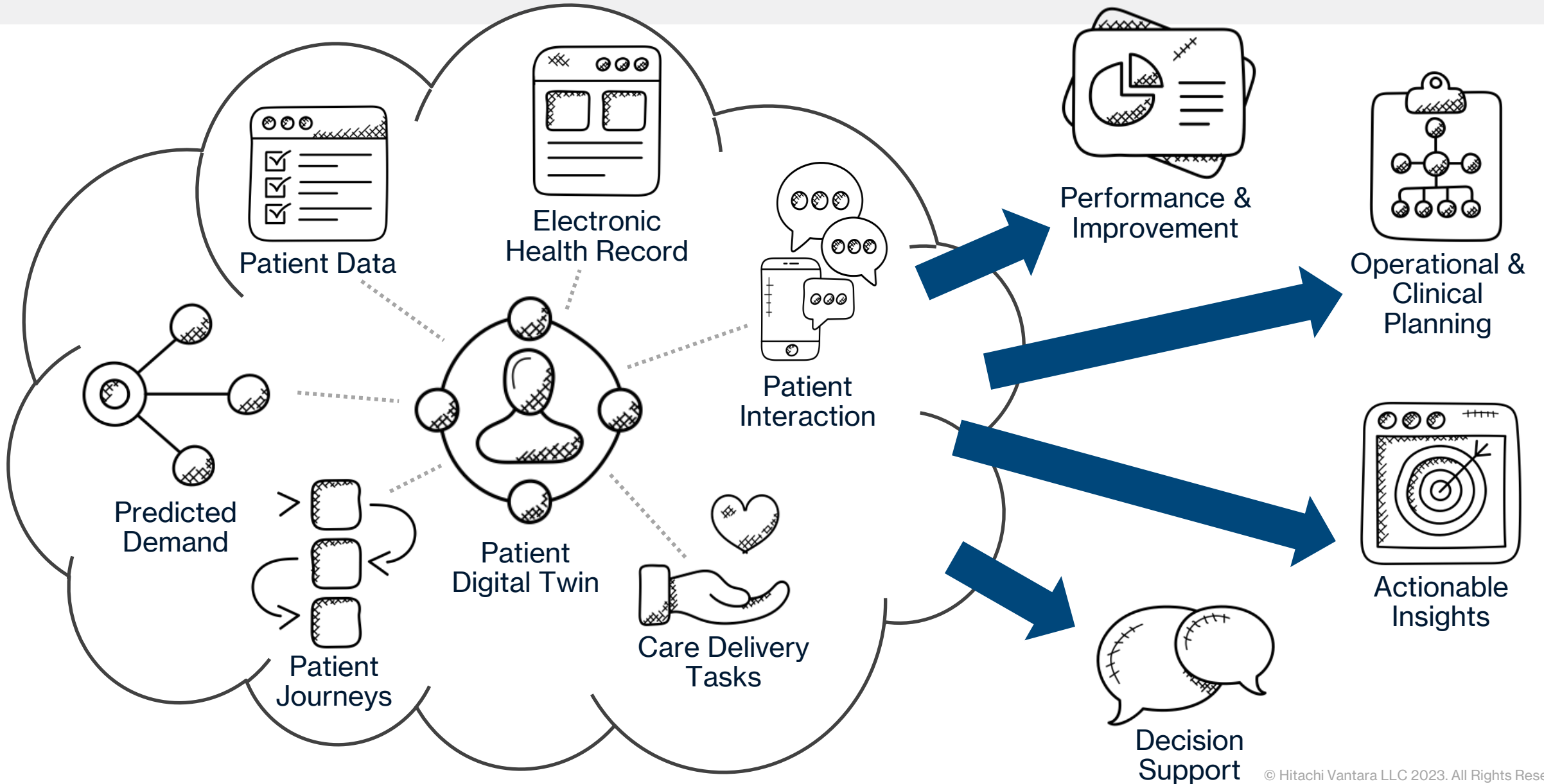
Hitachi Application Reliability Centers
Hitachi Digital Care Infrastructure

Digital Care & Operations

Digital Twin

Patient Centric View

Digital Twin – Our View



Typical Patient Journey & Digital Twin



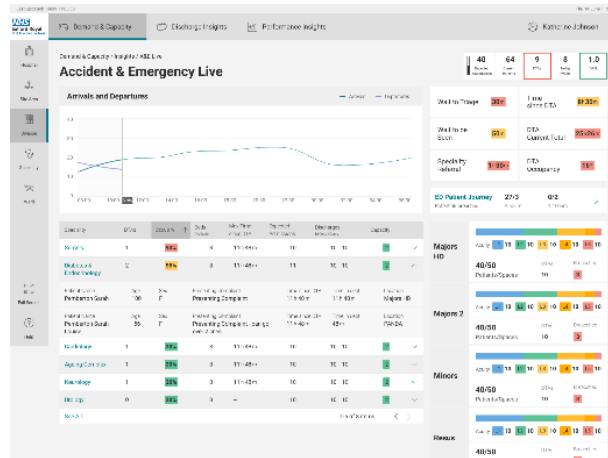
Anticipating Primary Care



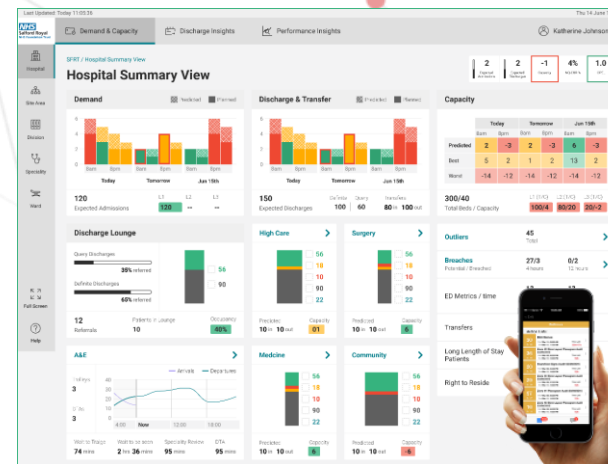
Optimising Secondary Care



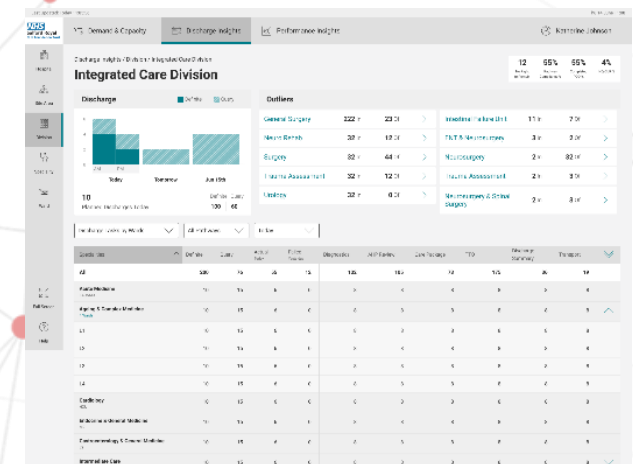
Coordinating Ongoing Support in the Community



- Predicted demand forecasting
- Front door / back door A&E
- Patient streaming & rerouting
- Patient flow management.
- AI/ML risk assessment

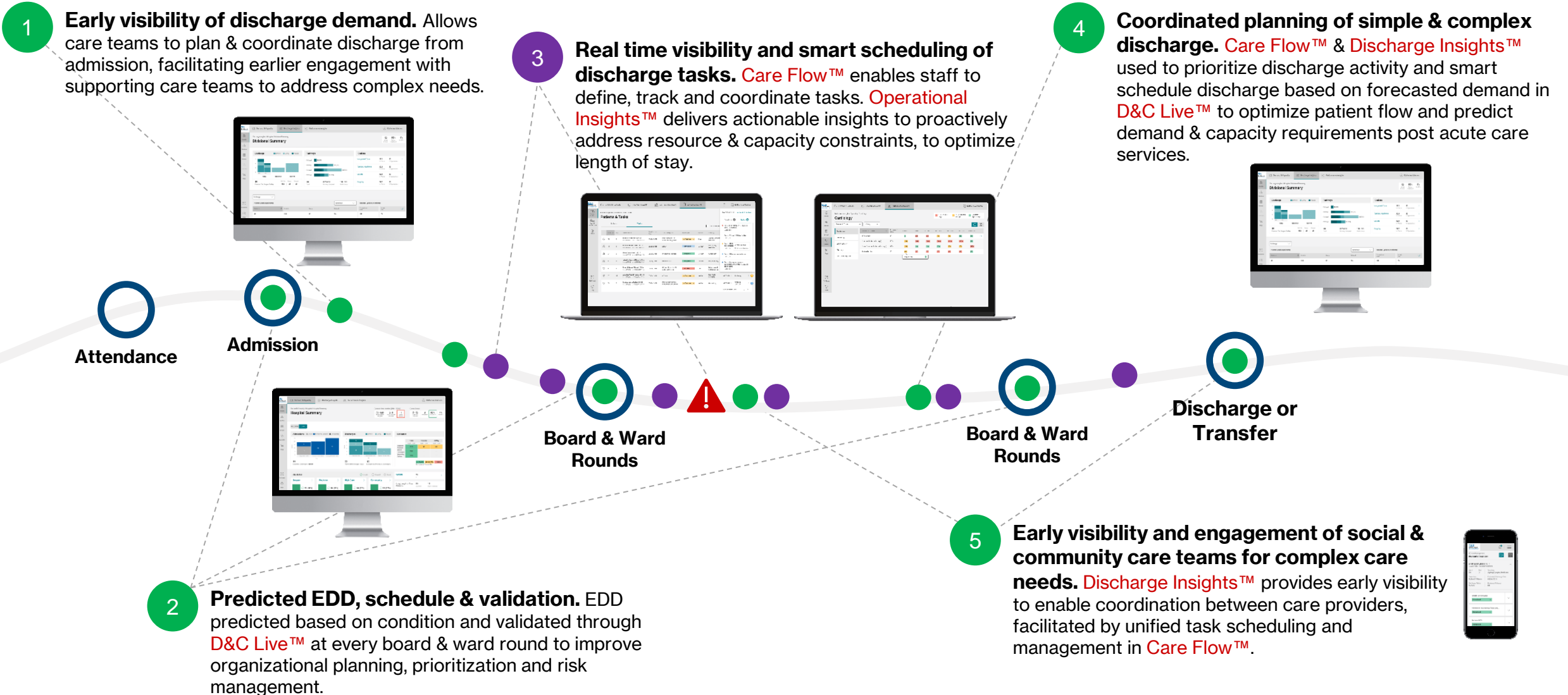


- Proactive demand & capacity mgmt.
- Proactive bottleneck resolution
- Smart scheduling of resources
- Operational insights
- Real time task management



- Proactive care pathway management
- Patient risk stratification
- Community staff allocation
- Discharge insights & optimisation
- Tertiary flow management
- Proactive demand & capacity mgmt.

New ways of working, data-driven, digitally-enabled



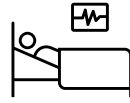
Predictive Model development



Admission Specialty

Models are trained to predict the most likely outcome for a patient after triage assessment in A&E. The outcome can be either predicted 'discharge' or the predicted admission to one of 25 hospital specialties.

Early warning of if the patient will be admitted to one of the hospitals 25 specialties or discharged, is pivotal for the proactive planning and management of patients. The aim of predicting admission specialty or discharge is to improve the flow of patients through the hospital.

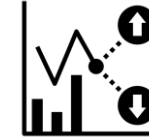


Length of Stay models

Models are trained to predict how long a patient will stay in the hospital at the point of admission.

Length of Stay (LoS) of patients is a crucial factor for the effective planning and management of hospital resources. The aim of predicting the LoS of patients is to improve patient care, control hospital costs and increase service efficiency.

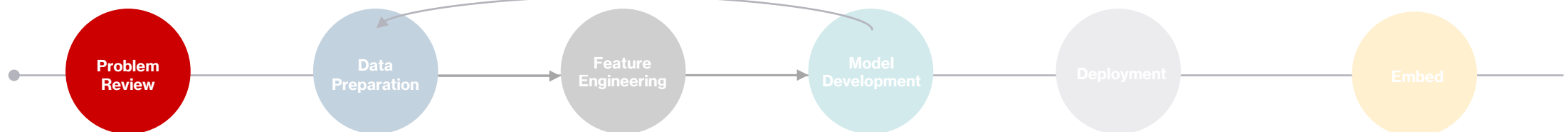
LoS is calculated as the time in minutes between a patient's admission and discharge.



72-hr Predictive Demand & Capacity Forecasting

Models are trained to produce 72 hours of forecasts for demand for each of the hospital's specialties.

Whilst the Length of Stay and Admission Specialty model support planning and management of resources for patients that are currently at the hospital, the Admission and Discharge forecasts provide a longer horizon on which to understanding the upcoming demand on the hospital system.



Next Steps for Digital Twins

1

Capacity

Increased and more complex demand is challenging available operating capacity with organizations frequently at > 95%. Increased backlogs, waiting lists and bottlenecks are delaying care and impacting quality.

>10%
CAPACITY
UPLIFT

Better care coordination and flow

DC&O improves visibility, planning and coordination by giving care teams predictive insights on demand and capacity, enabling them to optimize capacity utilization, proactively address bottlenecks and accelerate flow.

2

Workforce

Growing demand for care is outpacing supply putting strain on healthcare systems globally. COVID19 has exacerbated this challenge. Staff retention is a growing challenge.

ZERO
DUPLICATION

Simplified ways of working

DC&O connects care teams with unified task management, real time intelligence and actionable insights to improve efficiency, productivity and staff experience – giving your staff more time to care for patients.

3

Performance

Increasing cost of care demands continuous improvement in operational performance despite the challenges to capacity & workforce.

>10%
REDUCTION IN
ALOS *

Better patient experience & outcomes

DC&O drives system-wide improvement and transforms care delivery by embedding a digitally enabled operational management system. Reduced delays, cancellations, readmissions, outliers and stranded patients – improve patient flow, experience & outcomes

Digital Care & Operations

Digital Twin

Next Steps and the Future

What else could be done?

1

Capacity

Increased and more complex demand is challenging available operating capacity with organizations frequently at > 95%. Increased backlogs, waiting lists and bottlenecks are delaying care and impacting quality.

2

Workforce

Growing demand for care is outpacing supply putting strain on healthcare systems globally. COVID19 has exacerbated this challenge. Staff retention is a growing challenge.

3

Performance

Increasing cost of care demands continuous improvement in operational performance despite the challenges to capacity & workforce.

Future Digital Twin Usage

There are multiple areas where the use of a digital twin when integrated with other digital capabilities such as AI/ML could rapidly change the way the healthcare system currently works, such as:

- **Strategic Scenario and options analysis – multi-level**
- **Hospital and healthcare system design**
- **Population health management**
- **Disease progression**
- **Resource optimisation**
- **Capacity analysis**
- **Operational efficiency**
- **Value & benefit analysis**
- **Clinical outcome / variation analysis**

The outcomes of these types of use of Digital Twins could lead to:

- **New models of care**
- **New healthcare systems**
- **Optimized clinical pathways & diagnostics**
- **Automated scheduling of care**
- **Enhanced data science models**
- **Better patient outcomes**
- **Reduced costs**
- **Etc.**

Thank You

Darren.Challender@Hitachivantara.com

Director Healthcare
Hitachi Vantara

Digital Care & Operations

Appendix

Hitachi, 70 years in Healthcare



Hitachi Hospitals (Japan)

- Operates 5 Hospitals (>3000 beds)
- Healthcare Insurer, using Big Data Risk Analytics
- Digitally Integrated Community Care for 3 cities (Japan)



Breast Cancer Screening (UK)

- Outsourcing provider for UK National screening
- Supporting 3M women for screening annually
- Assisting with transformation of the service



Medical Equipment (Globally)

- MRI, CT, Ultrasound, Particle Therapy (e.g Proton)
- AI Predictive Maintenance
- AI Imaging & Diagnosis, Smart Operating Theatres



Lifestyle Disease Management (Japan)

- Lifestyle service for citizens at risk of lifestyle related diseases (type 2 diabetes, Hypertension, etc.)
- Served 40,000+ patients since 2007



IoT Facilities Optimisation (Global)

- Advanced Analytics, RTLS, LiDAR
- Ward / Theatre Optimisation
- Asset tracking and smart scheduling



Digital Diabetes Prevention (UK)

- Co-Designed with NHS (Salford CCG / SRFT)
- CATFISH Clinical Service Trial (2014-17)
- UK National Digital Diabetes Programme (2019)



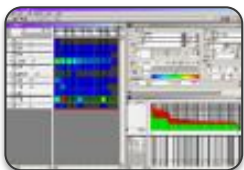
Precision Medicine Platform (Global)

- Cloud based secure data exchange
- Supports diverse data-sets, facilitates research collaboration and accelerates research activities



Smart Hospital (DCO) (Global)

- Transformation / Change programme enabled through digital modules which span the entire hospital (A&E, In-Patient settings, and Discharge lounge)



Clinical Process Variation (Japan / UK)

- Clinical Process Visualiser
- ML-based identification of clinical / operational variation



Clinical Analytics (Global)

- Cardiac Readmission Risk Prediction (Partners)
- Pharmacology Outcome Prediction (PDSS, Utah)
- Precision Medicine Platform (AHA)

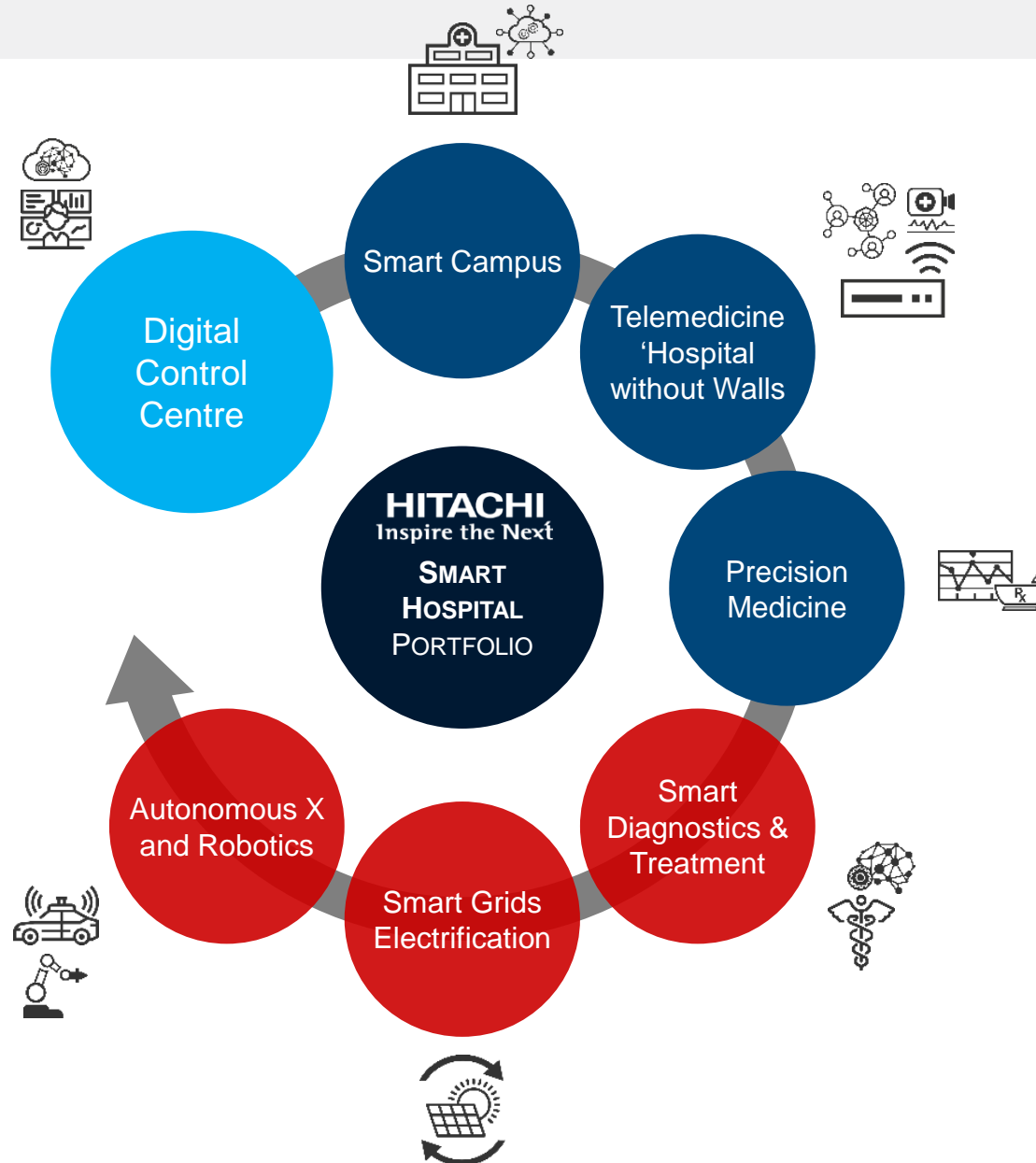
One Hitachi Digital Healthcare

Provider Transformation

- **Digital Control Centre** delivers the core platform and foundation for IoT and Connected Care expansion
- **Hitachi Smart Campus capabilities** (facilities, security, vehicles, retail, IoMT) and centralised visualisation for integrated care operations

Sustainability & Innovation

- Leverage / expand **Smart Campus** through **Hitachi Group** extensions
- Address decarbonisation in healthcare with **Smart Grids** / renewable energy
- **Hitachi mobility / fleet electrification** solutions for ambulance / transport
- **Hitachi Automation & Robotics** to expand autonomous patient transport, guided medical equipment, etc.



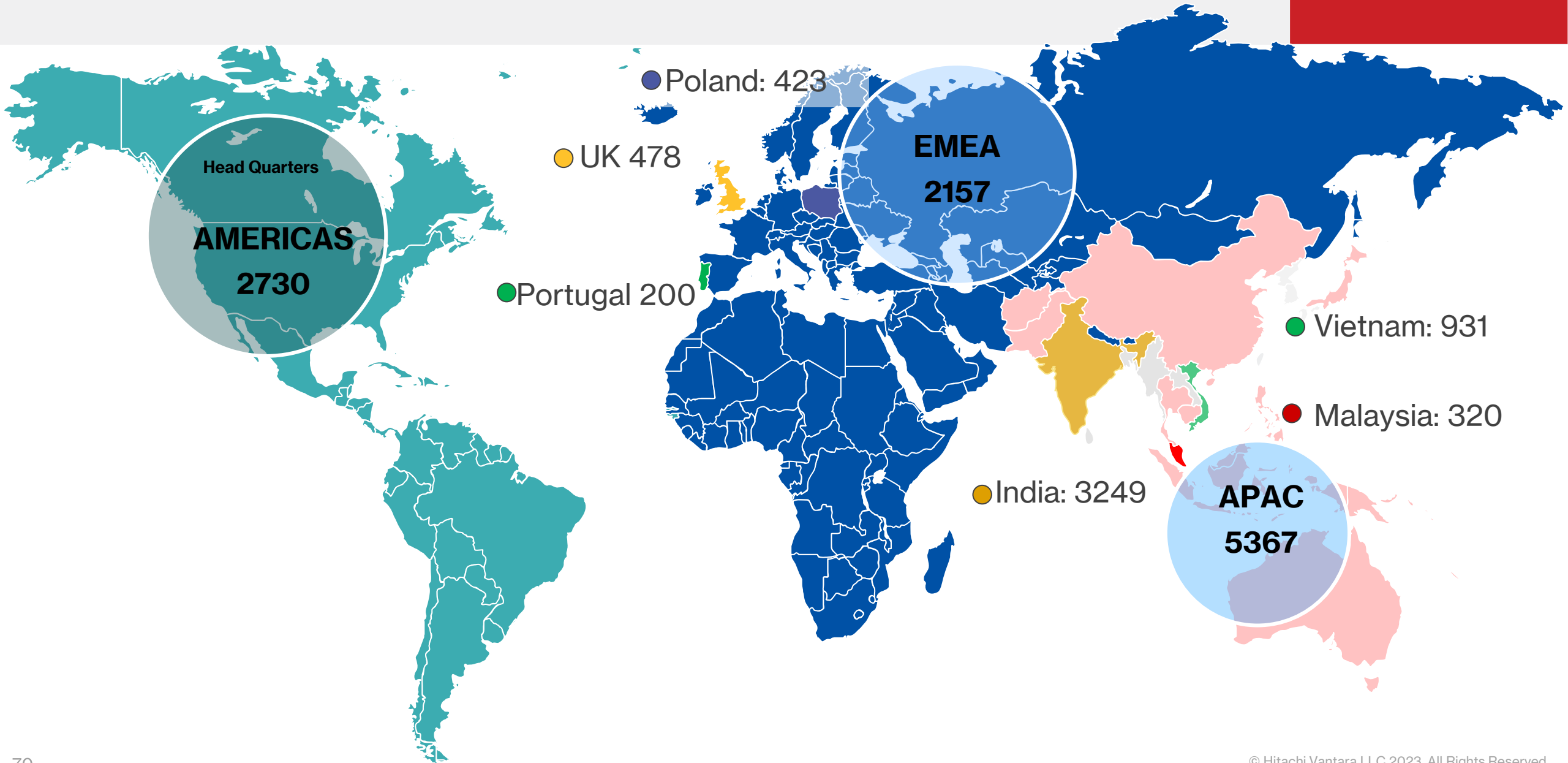
Connected Care

- Delivering the 'Hospitals without Walls' capability by leveraging **Hitachi groups companies, Industry partnerships and Eco System partners** to deliver telehealth across integrated care systems

Personalised Care

- Development of **Hitachi personalised care and population health management** through the development of AI capabilities and products with **Hitachi R&D**
- **One Hitachi collaboration** and ecosystem for Precision Medicine from research to operations
- **Hitachi Smart Life offerings:** PBT, Regenerative Medicine, Cancer Diagnosis

HV Global Headcount: Over 10,000



Innovating Healthcare, Embracing the Future

HITACHI
Inspire the Next

DIGITAL HEALTHCARE



Hitachi & NHS
collaborate to fight
diabetes with digital
health

DIGITAL TRANSFORMATION

WIRED

The digital tools that could save the NHS

NHS hospitals face smaller budgets and more patients — but there are digital tools that can lower costs while significantly improving care.

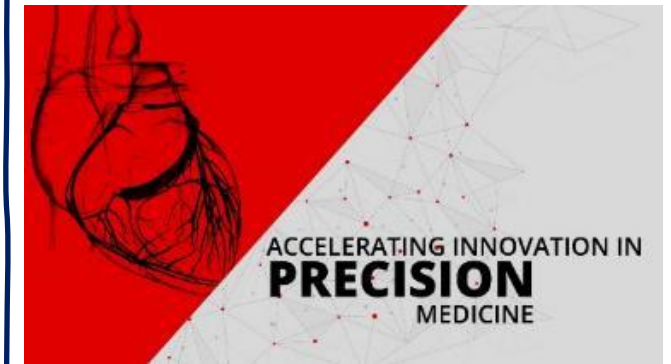


DATA-DRIVEN HEALTHCARE

NEXT
2020

NOVEMBER 16-18 | LAS VEGAS

Cloud Technology Brings the American Heart
Association Precision Medicine Platform to Life



Case Study - Hospital – Digital Transformation – (Digital Care & Operations)

We partnered with a digitally advanced acute Hospital in the North of England with 840 beds and approximately 8000 clinical and operational employees, to transform siloed systems and processes into a Smart Hospital. We combined design, advanced analytics, and healthcare strategy to launch a first-of-its kind digital control center, enabling clinical decision making and operations to improve the delivery of care.

Client Background & Challenge

- ◆ The acute healthcare sector has been under intense pressure in terms of demand, capacity, workforce and cost challenges, all of which have been exacerbated by the global pandemic
- ◆ The client was particularly challenged with respect to its ability to meet the increasing demand on its capacity and the flow of patients through the hospital
- ◆ Therefore, a vision and a series of requirements was created which it believed would address these challenges, this included:
 1. Vision - Create a learning Healthcare system and culture across the organization and to become the most digitally advanced organisation in the world
 2. Improve outcomes and experience for the Patients and users across the organization
 3. Create a quality-based culture of learning and improvement across the organization
 4. Implement a data-driven digital transformation, to support enhanced decision making for operational and clinical staff
 5. Co-create digital tools and services to enable staff to work more efficiently and effectively across the hospital.
 6. Embed sustainable ways of working to enhance patient and user experience
 7. Provide decision support and operational insights from across hospital systems

Solution

Hitachi worked with the clinical & operational teams and patient advocates utilizing a patient and user centric design service design approach to address these challenges; which culminated in the development of; a new operating model, a digital control center to support decision making and an underpinning management system to improve the delivery of care and to drive continuous improvement across the organization and an outline implementation plan.

A joint team worked in partnership to create and implement a detailed design and change program which outlined the operational & clinical processes, the organizational structures, operational & clinical routines, services and products required to deliver the operating model and the new ways of working.

This resulted in:

- ◆ The creation and deployment of a new digital operating model and supporting operational management system that utilised lean & quality thinking and new technology products to support decision making
- ◆ New core products to manage, demand, capacity, flow, discharges, care tasks and ED; and analytical products to generate operational, discharges and performance insights in near real time
- ◆ The creation of a data engine and KPIs to create a single source of truth regarding the patient journey and the integration of existing and new clinical and operational systems and information within the control center to derive new insights.
- ◆ Implemented machine-learning & AI to drive efficiencies within the management of hospital demand & capacity and to generate predictions of LOS and discharges
- ◆ Implemented a real-time location system increasing the visibility and operational efficiency of clinical and operational workflows.
- ◆ The creation of a new Centre of Excellence to own, develop and continuously improve the operating model, management systems and products across the organisation
- ◆ Implemented a modular solution, to enable scaling of products across the control center and the wider organisation

Digital Transformation

- Effectiveness Benefits
 - Improved flow
 - Released Capacity
 - Enhanced Decision making through decision support
 - Single line of site
 - Enhanced operational management system driving continuous improvement
 - Near Real time hospital performance
 - Predictive capability
 - Enhanced board and ward rounds
 - No lost tasks
- Efficiency Benefits
 - Reduced Length of Stay
 - Increased Bed Utilisation
 - Reduced stranded and super stranded patients
 - Released value / benefits
- Qualitative Benefits
 - More time to focus on patients, quality and safety improvements
 - Increased morale
 - Better patient experience
 - Finding 'lost' equipment

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COMFORT BREAK

Please remain logged into the platform.



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UP NEXT...



In Partnership with





THE NHS DATA CONFERENCE 2023



SPEAKING NOW



Graham Beales

Head of Business Intelligence
NHS Greater Manchester

I will be discussing...

“NHS Greater Manchester -
Adopting cloud first data
management with our fantastic
team, Snowflake and Matillion”



Graham Beales | NHS Greater Manchester

Using Data to Support People's Health & Social Care

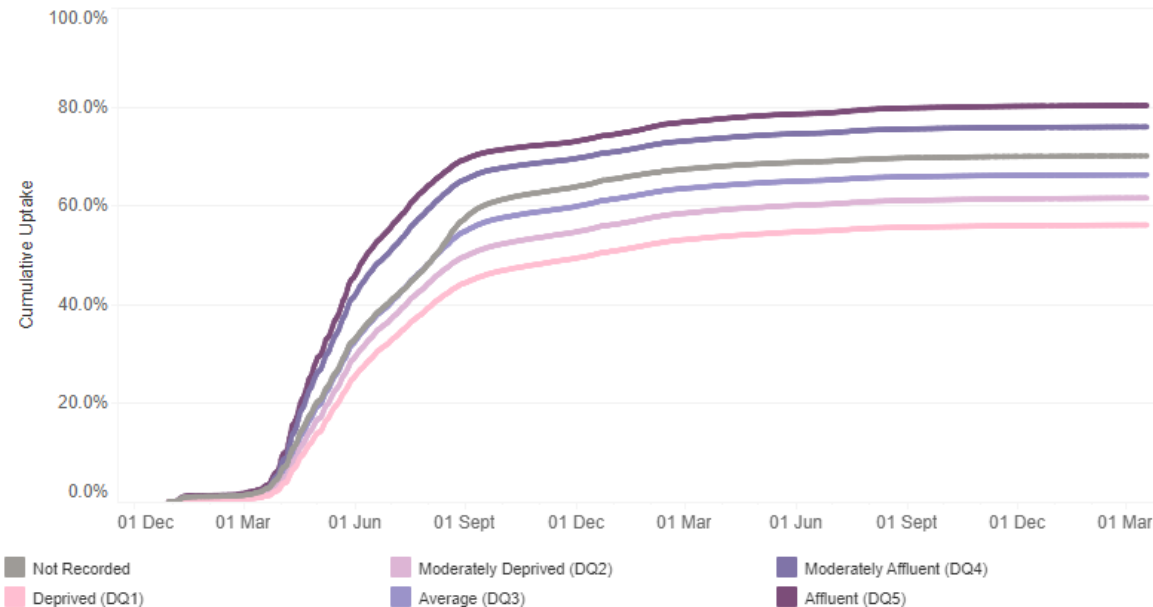


ABOUT US



JCVI Cohorts Included: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Uptake Over Time by Deprivation Quintile (Quintiles within Greater Manchester)



Case for Devolution

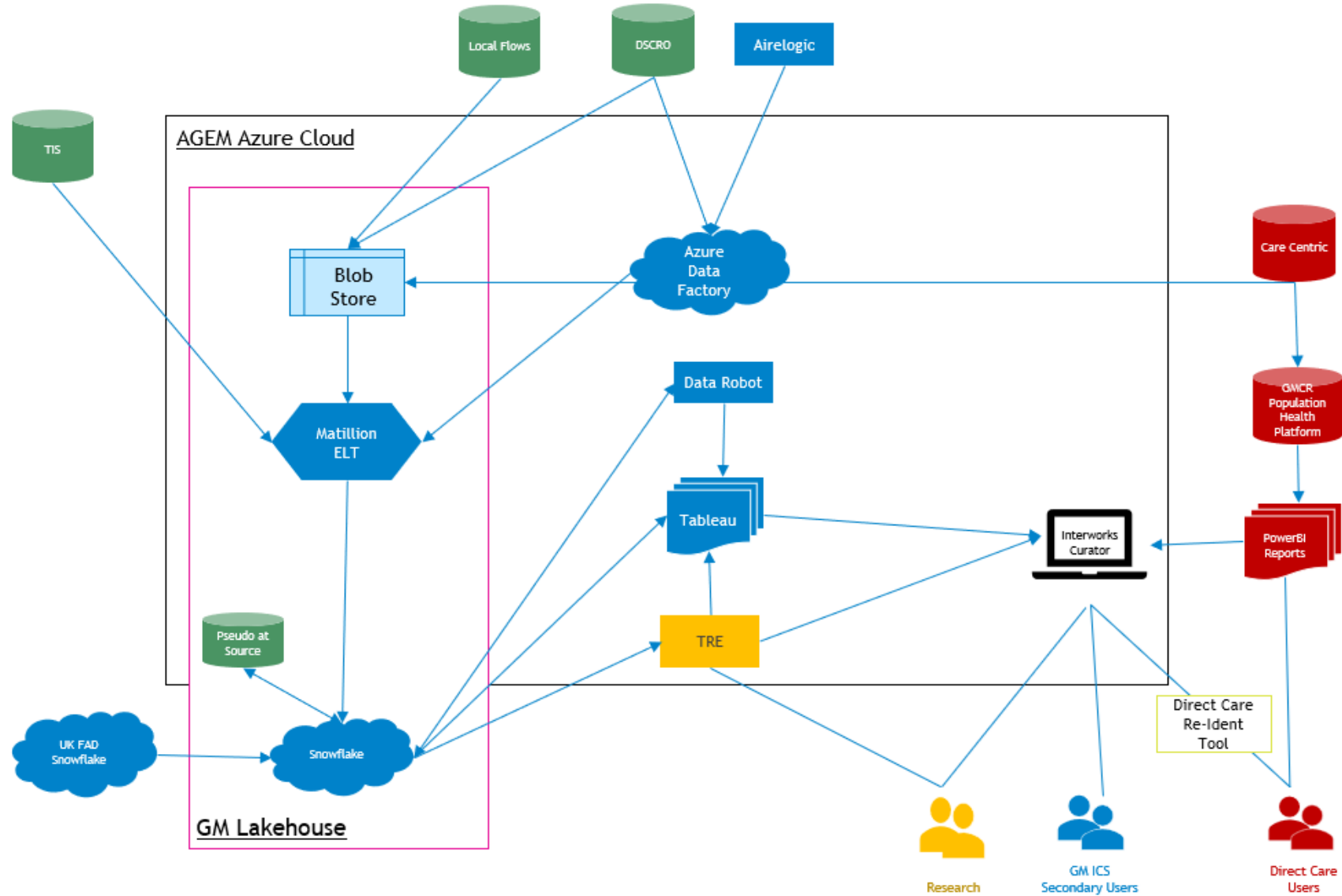
- GM (Greater Manchester) has typically worse health outcomes than the England average.
- GM has some significant pockets of deprivation
- The City of Manchester has an unemployment rate of 7.3% nearly 50% higher than the UK average.
- North Manchester areas are also all higher than the average of 4.8%

ABOUT US

Case for Devolution

- Round 1 Devolution – GM Health and Social Care Partnership
- More control over budgets and how they were spend
- Many transformation projects inc. CYP Dental, Social Care, Mental Health & Cancer.
- My role was to build collaboration & deliver as a system, building on strengths, encouraging transformation
- GM Tableau was one of my first objectives to deliver a shared platform.
- As a Local Health & Care Exemplar region we have expanded beyond many regions to include some mature data capabilities including Snowflake, Matillion & Data Robot.
- Today the GM ADSP (Analytics and Data Science Platform) has significant investment and capability with over 6k registered users across the GM system.

NHS GM ADSP (SDE)

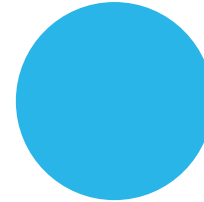


What has changed?

Everything!

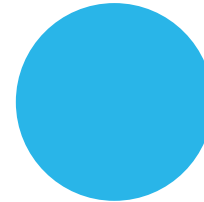
A perfect storm has created the conditions for change, but how we have approached it as a team has enabled us to take advantage.

- Solid plan worked up over time
- External support (Interworks) to learn quickly
- Strong leadership
- Investment in training and support
- Shared purpose or mission statement
- Collective subject matter expertise



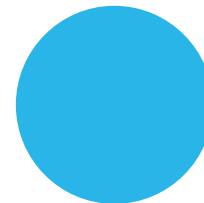
Secure Data Environment

National policy around unified data layer and secure storage of data. GM are part of the wave 1 national programme.



Demand

Reform of services as part of ICS transition, budget pressures and breadth of intelligence to make decisions have grown demand.



Collaboration

Reducing duplication, developing efficient pipelines and progressing as a collective has created conditions for sharing and collaboration.

Transition as an ICS

1.

Common

- Be prepared – It's a total change!
- Need a plan to take advantage of whole stack
- Initial fear of Unknown
- Champions help to lead the message
- Empowered to develop own training

2.

Snowflake

- Commonality with the known became quickly apparent.
- Most MS T-SQL developers took to the platform very quickly.
- Formal training gave good grounding with principles.
- Clear approach supported by expertise led to moving in the same direction.

3.

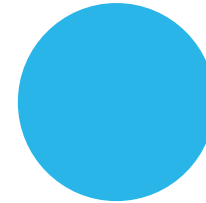
Matillion

- Similarity with SSIS eased concerns.
- Key features made sense quickly
- Web hooks in to MS Teams team to report problems
- Replicable processes enabled rapid onboarding of multiple datasets.

Meta Data Approach

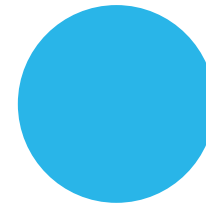
Replicable process

- Data sets are processed driven by accompanying meta data.
- Datasets can change but we will always bring the data in.
- A flexible process but audit is stronger.
- Changes flagged and addressed rather than updates falling over.



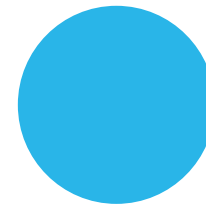
Single pipeline coded

Data is all onboarded using the same pipeline, meta data directs the how.



Multifaceted

Works regardless of the provider of the data and sets a standard



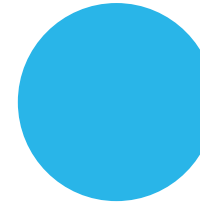
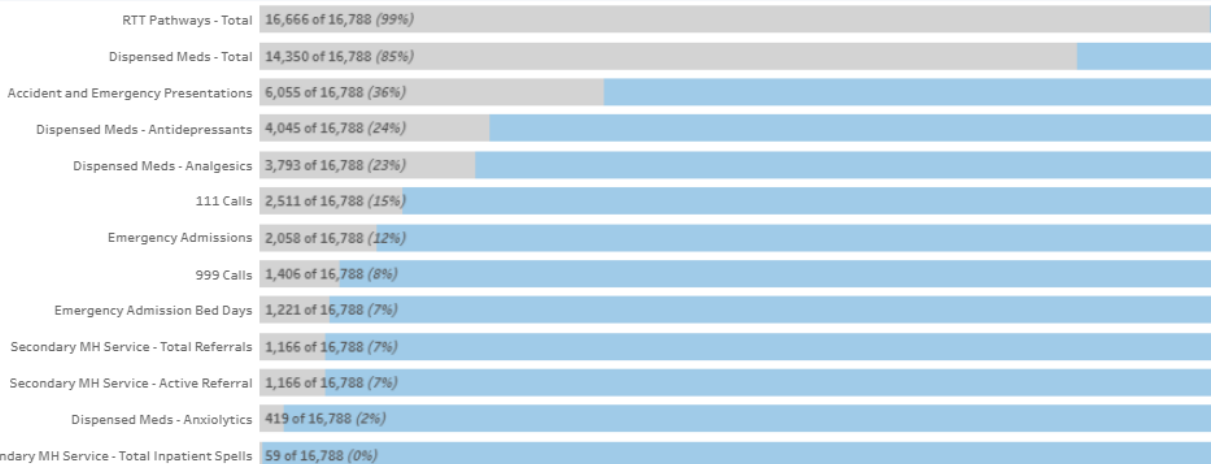
Data Catalogue

Supports a robust data catalogue approach meaning meta data generated as we go populates the catalogue.

Longitudinal Record Analytix

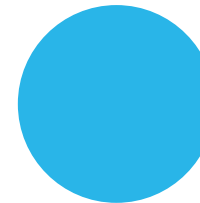
Greater than the sum of parts

We can now take data from hundreds of providers through national and local routes to deliver a view of our patients across all. This enables us to explore risk and equalities for strategic, tactical and operational delivery.



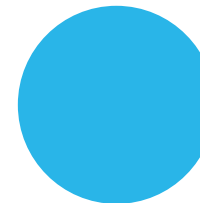
More holistic view

Providers usually cannot see other providers data as part of their analysis but benefit to all



Population Health

Better understanding our patient cohorts through linked data will enable a more intelligent and focused approach



Direct Care

We conduct analysis on pseudonymised data but can enable those clinicians with a legitimate relationship to re-identify where a direct care requirements is identified.

Elective Use Case

Shared View of Waiters

Post covid restrictions people are waiting longer for elective treatment and may wait at another provider than they would usually attend. Shared data enables a view across providers to understand the risk of waiting and service utilisation whilst waiting.

Clinical Engagement

- Clinical groups are stood up across GM to support continuous improvement.
- These groups are supporting the process and iteratively feeding back
- Clinical support is vital as they are the ones who will create a change.

Complex Lives

- Patients are people, they do not live to be a patient
- Many patients are waiting on multiple pathways
- Services are quite siloed in comparison
- Common problems identified can support pathway redesign to support access

More to Come

- GP Data to support long term condition understanding
- Social Care Data to support understanding of risk and complexity
- Wider partner data will offer a view on non clinical risk and complexity

NRTR Use Case

No Reason to Reside

Increased complexity of patients in hospital can cause increased complexity around discharge, especially due to pressures in community and social care. Averages really skew any analysis of the situation so a granular approach was required.

Whole System View

We can look at the problem through a variety of lenses including from the accountable discharge agency, aiding practical conversations and identify persistent problems.

Long Delays Visible

Some patients had waited significantly longer than the average for discharge, which aggregate numbers somewhat hid. Having them visible daily has supplied the evidence to progress operationally.

Dispel Myths

Assumptions and commonalities had been applied to cohorts, e.g. less complex pathways would never see long waits. This turned out to not be true as non clinical reasons such as accommodation status also cause delays.

WHAT'S NEXT

Final push to full cloud



A huge amount of work has been done to get us where we are, but there are still some legacy issues to be resolved.



Relational Analytics Data Model



The timing of the noodle model in Tableau has been impeccable, enables us to adopt a longitudinal record and more complex data model's without developing specific datasets



Longitudinal Analytics Maturity



We will mature our longitudinal record capability but also harness the power to reform our analysis. The linked data is a world of opportunity but will also support consistency to equalities analysis.



Improved Patient & Population Outcomes



The insights generated to support the development of pathways and intervene with individual patient risks will support our system to identify interventions and focus change where we can demonstrate the biggest impact.

Find Out More About Matillion and Snowflake



robin.mcarthur@matillion.com

07502 398 820



ellie.gibbs@snowflake.com

01727 638236





Graham Beales | NHS Greater Manchester

Using Data to Support People's Health & Social Care





THE NHS DATA CONFERENCE 2023



SPEAKING NOW



Rosie Underwood

Head of Data Security, Privacy and Records Management
NHS Blood and Transplant

I will be discussing...

“Delivering Strategic Change in
Data Security and Data Privacy”



THE NHS DATA CONFERENCE 2023



UP NEXT...

VERITASTM



THE NHS DATA CONFERENCE 2023



SPEAKING NOW



Andy Spencer

Technical Account Manager, Public Sector Team
Veritas Technologies

I will be discussing...

“Defend your Patient Data -
Don’t Pay the Ransom”



VERITAS™

Defend Your Patient Data – Don't Pay the Ransom

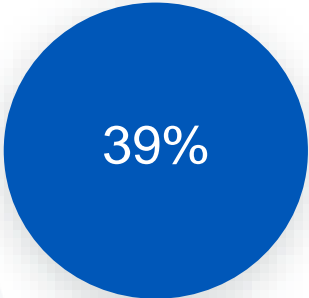
Andy Spencer

Technical Account Manager

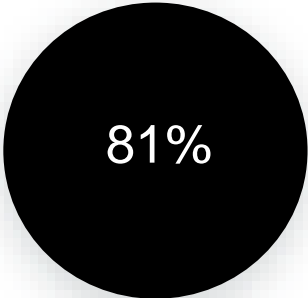
Number of Breaches or Attacks Identified in Last 12 Months



All UK businesses



UK Healthcare Organisations



UK Healthcare Organisations who paid a ransom



UK Healthcare Organisations who refused to pay ransom and lost data

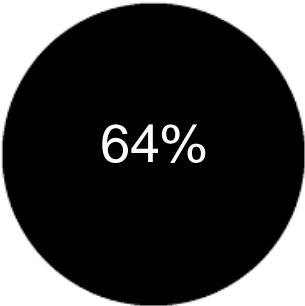


Statistics as at 2021, courtesy of <https://www.infosecurity-magazine.com/news/healthcare-ransomware-last-year/>

Feared Repercussions of Ransomware Attacks in Healthcare



UK Healthcare Organisations
cancelling appointments



UK Healthcare Organisations
who fear loss of life



Statistics as at 2021, courtesy of <https://www.infosecurity-magazine.com/news/healthcare-ransomware-last-year/>

What it's Like to be a Ransomware Victim?



National Cyber Security Centre - 10 Steps to Cyber Security

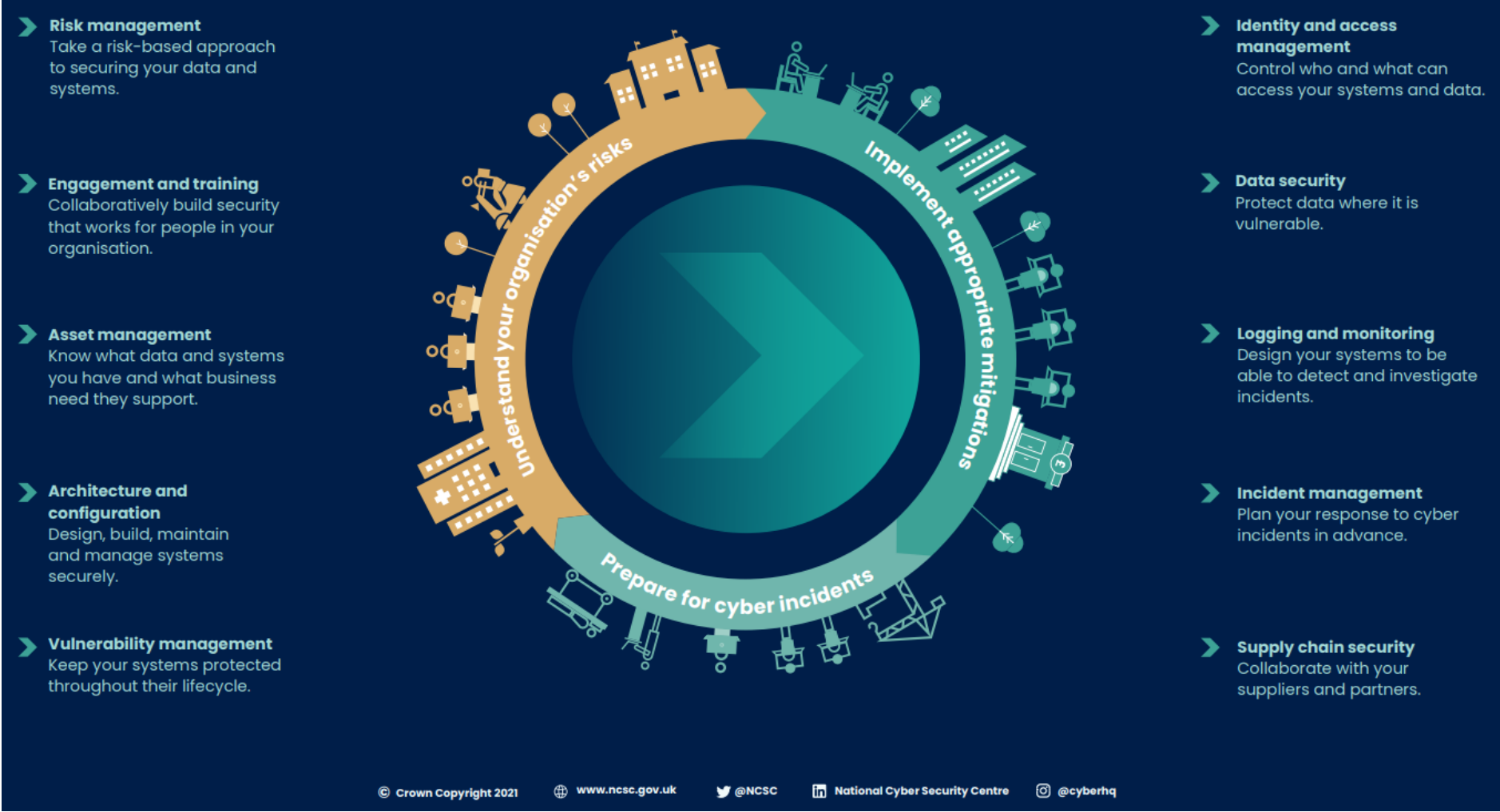


Image from <https://www.ncsc.gov.uk/collection/10-steps>

NCSC Recommendations for Ransomware Mitigation

- Risk Management
- Engagement and Training
- Asset Management
- Architecture and Configuration
- Vulnerability Management
- Identity and Access Management
- Data Security
- Logging and Monitoring
- Incident Management
- Supply Chain Security

Extrapolated from <https://www.ncsc.gov.uk/collection/10-steps>

Ransomware – Evolution of Attacks



“With the rise in increasingly tailored ransomware attacks preventing organisations from accessing their systems and data stored on them, other relevant security measures should include maintaining up-to-date, isolated, offline backup copies of all important data.”

Quote from <https://www.ncsc.gov.uk/collection/10-steps/data-security>

**RETURN
ON
INVESTMENT**

Ransomware Groups – Going After your Backups

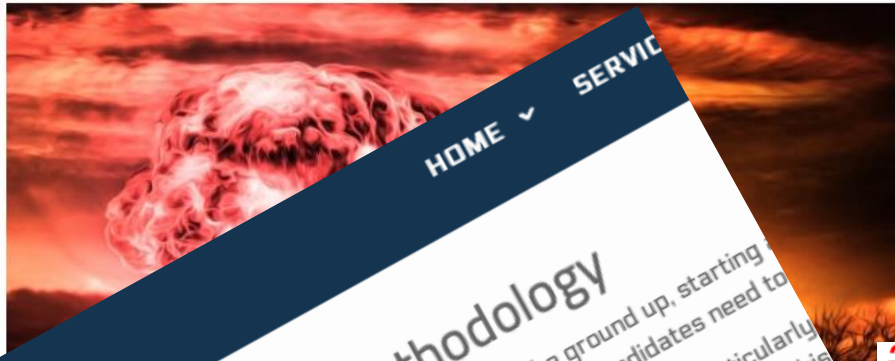
Conti Ransomware Expands Ability to Blow Up Backups



Author:
Lisa Vaas
September 29, 2021
/ 11:43 am

4 minute read

Write a comment



HOME ▾ SERVICE



publishing persists," the researchers wrote.

Conti's Backup-Obliteration Methodology

Advintel has found that Conti builds its backup-removal expertise from the ground up, starting with a team of penetration-testers. While selecting network intruders for their divisions also known as 'teams,' Conti is particularly interested in those who are also known as 'pen-testers,' according to Advintel's analysis. "This is among their top priorities for a successful pen-tester," according to Advintel's analysis. "This assemble teams, equipped with knowledge and skills aimed at backup removal."

m Vivisection

Sep 29 · 5 min read

Backup "Removal" Solutions - From Conti Ransomware With Love

Updated: Oct 8
By Vitali Kremez & Yelisey Boguslavskiy



2SPYWARΞ

News Malware Software Files Ask us

ADWARE RANSOMWARE BROWSER HIJACKER MAC VIRUSES TROJANS

Conti ransomware remains dangerous and can now encrypt Veeam backups

by Jake Doevan - - 2021-09-30

UNDERSTAND INSTANTLY

CISA and FBI warns about ransomware that attacked at least 16 networks last year: new tactics ensure failed data recovery

CISA and FBI warns about ransomware that attacked at least 16 networks last year: new tactics ensure failed data recovery

Ransomware removing a major obstacle –

VEKI IAS™



How do I avoid becoming another statistic?



Guard against cyber attacks and maintain business continuity



Recover with confidence and get business back online without delays

3-2-1 Rule for Data Backup

- At least 3 copies of data, on 2 devices, and 1 offsite
- Enhanced 3-2-1 rule – The 3-2-1-1 rule, where one or more backups are offline

“Using cloud storage to hold an offline backup is a good idea because it guarantees physical separation from your live environment.”

Quote from <https://www.ncsc.gov.uk/blog-post/offline-backups-in-an-online-world>



- Veritas data protection solutions give you this capability

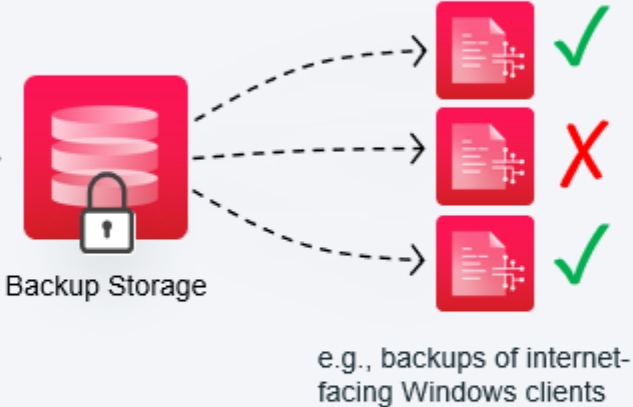
Best Practice One - Malware Detection

During Backup



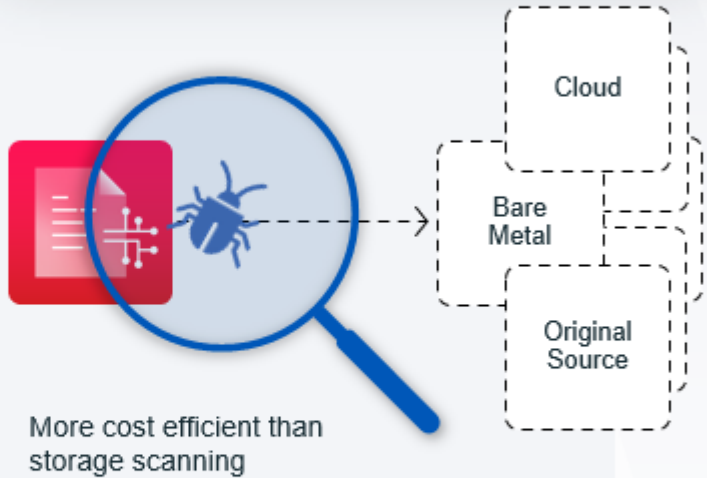
Anomaly detection Enhancements

Post Backup



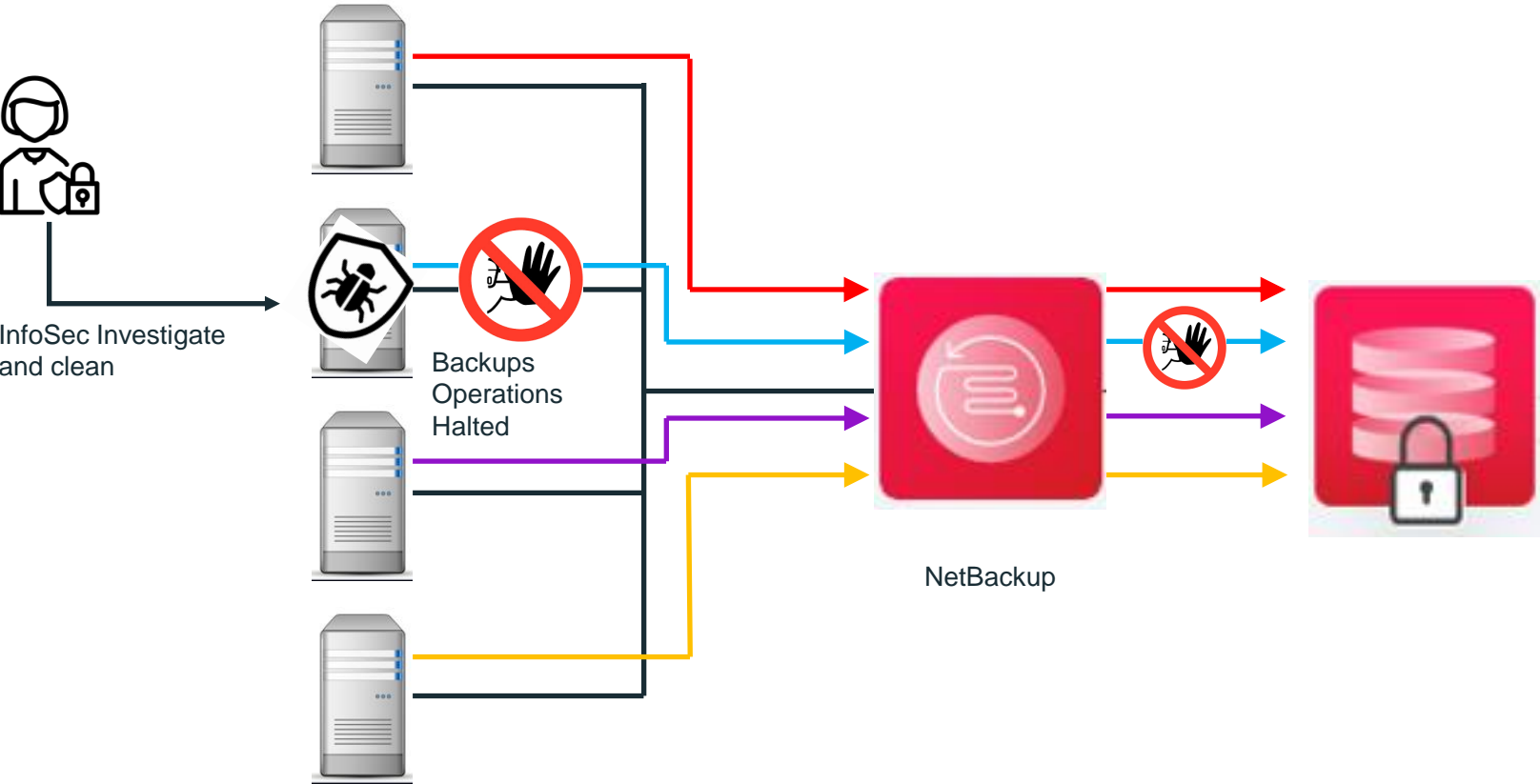
On-Demand Malware Scan
Automated Malware Scan for high-score anomalies

Before Restore

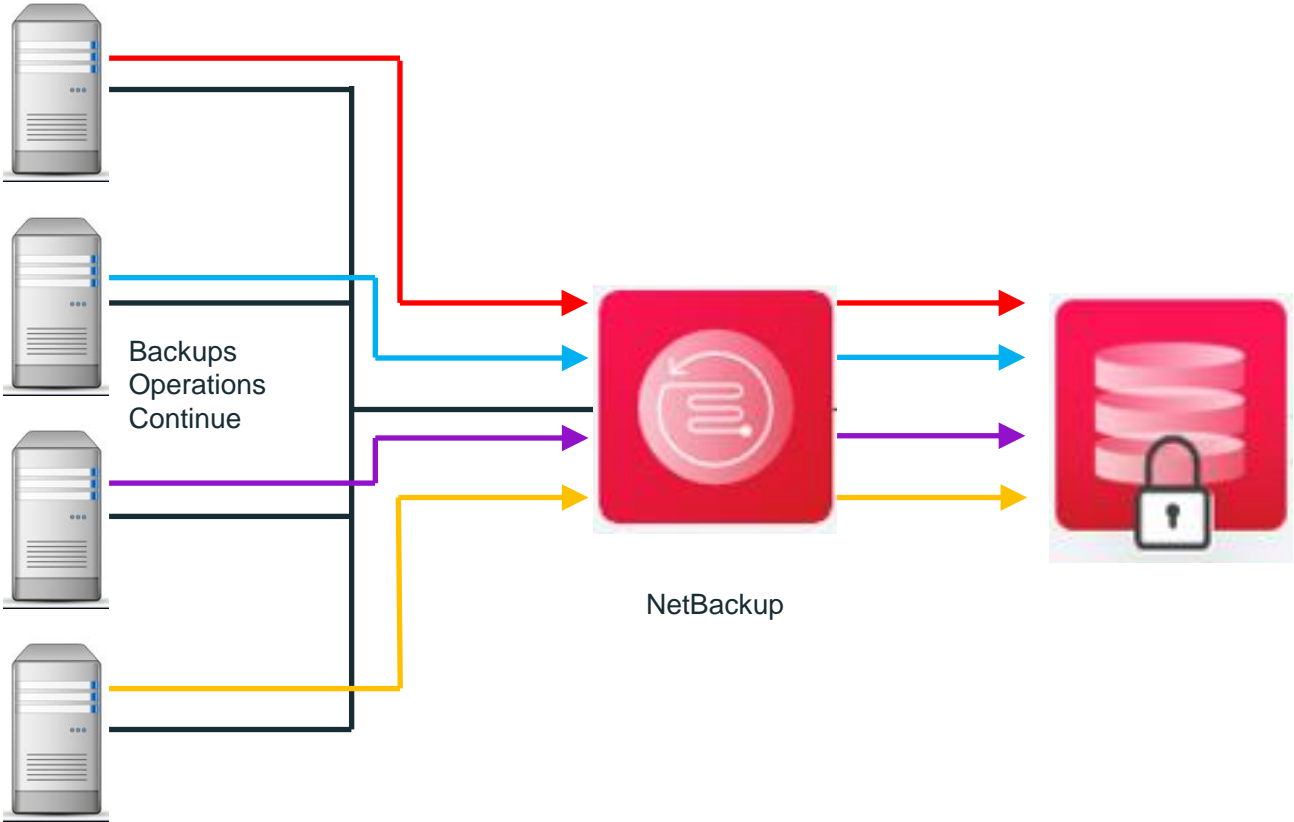


Scan status awareness at restore time
Restore only clean data from backups

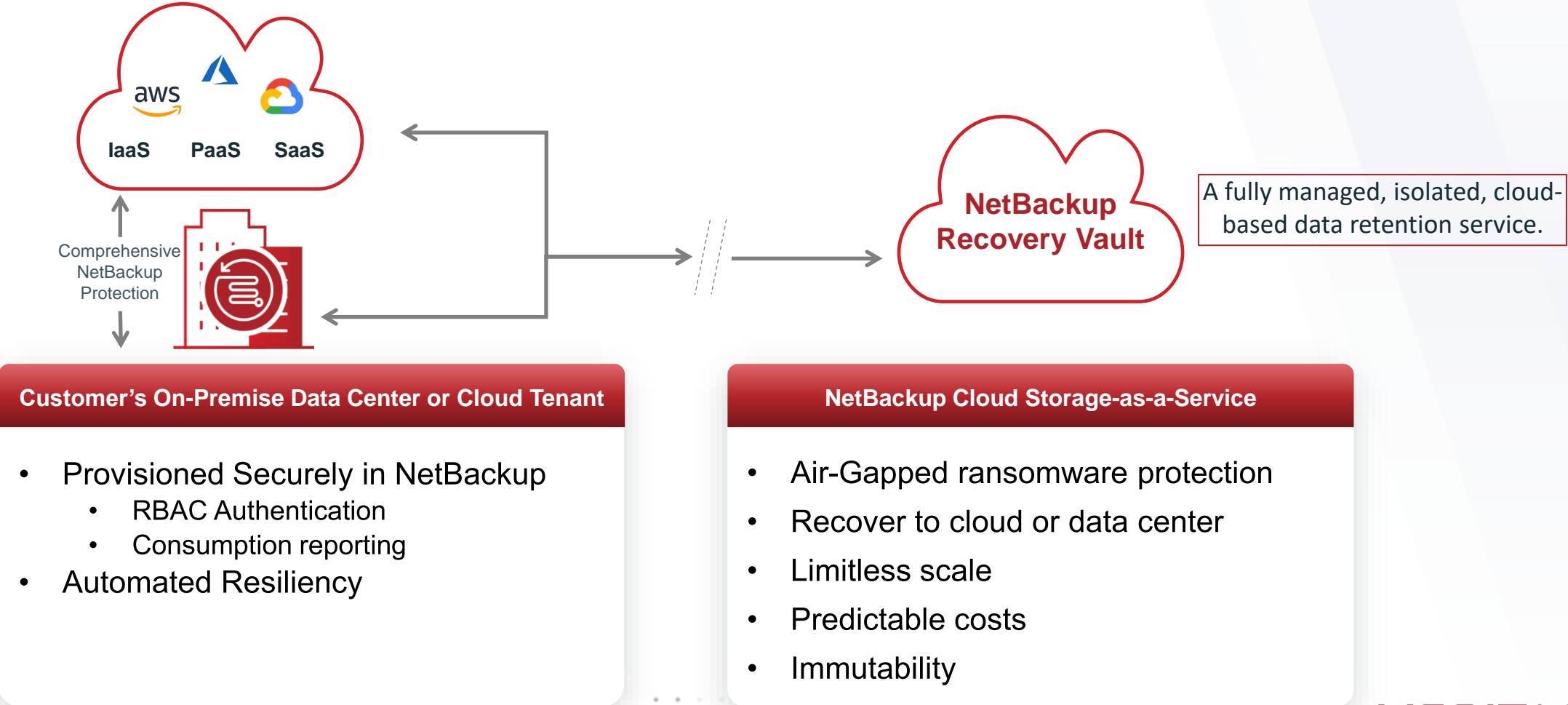
Best Practice Two - Pause Data Protection Workflow On Infection



Best Practice Two - Pause Data Protection Workflow On Infection



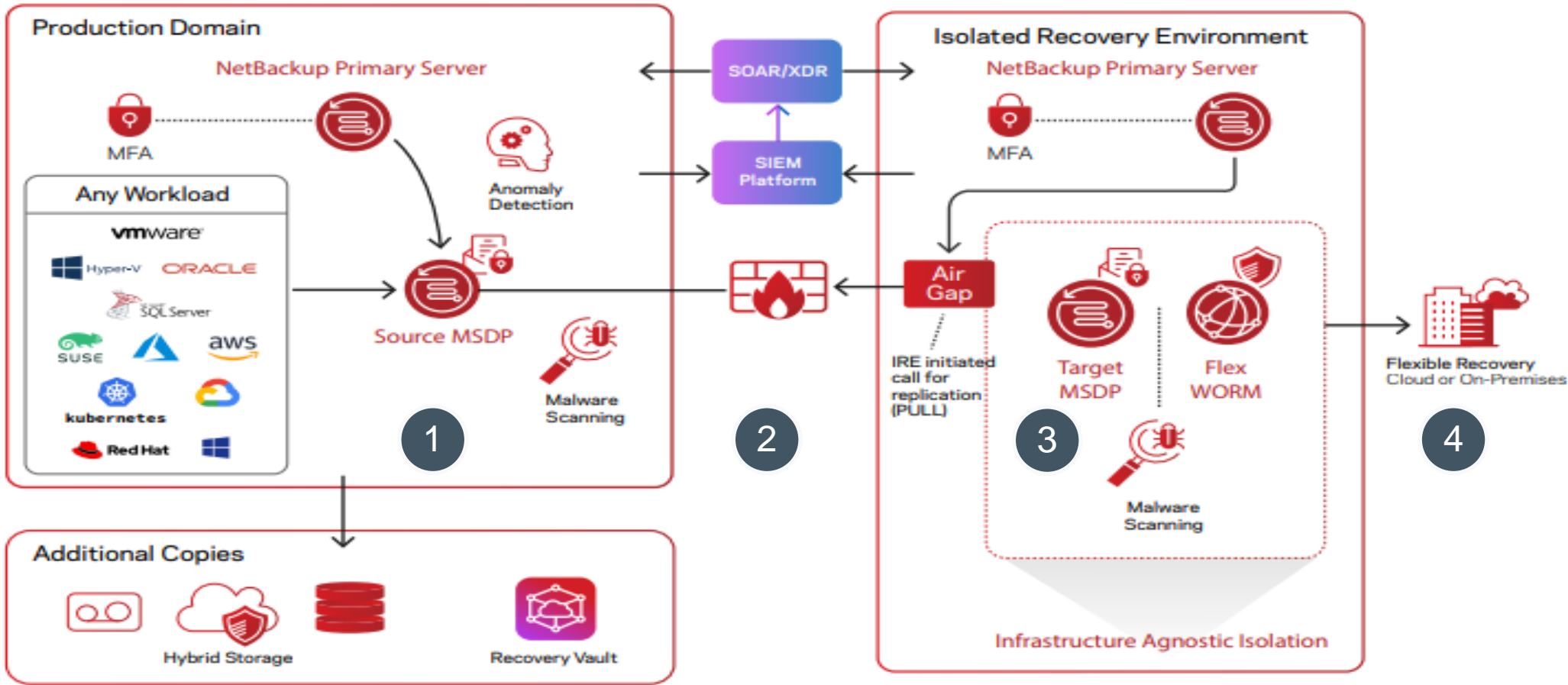
Best Practice Three – Secure Backup Repository



- Customer's On-Premise Data Center or Cloud Tenant**
- Provisioned Securely in NetBackup
 - RBAC Authentication
 - Consumption reporting
 - Automated Resiliency

- NetBackup Cloud Storage-as-a-Service**
- Air-Gapped ransomware protection
 - Recover to cloud or data center
 - Limitless scale
 - Predictable costs
 - Immutability

Best Practice Four - Isolated Recovery Environment (IRE)



- 1

Real-time Anomaly Detection and On-Demand Malware Scan
- 2

Data Isolation using an operable air gap.
- 3

Data Integrity with multi-tenant WORM storage
- 4

Recover at scale to Last Known Good State

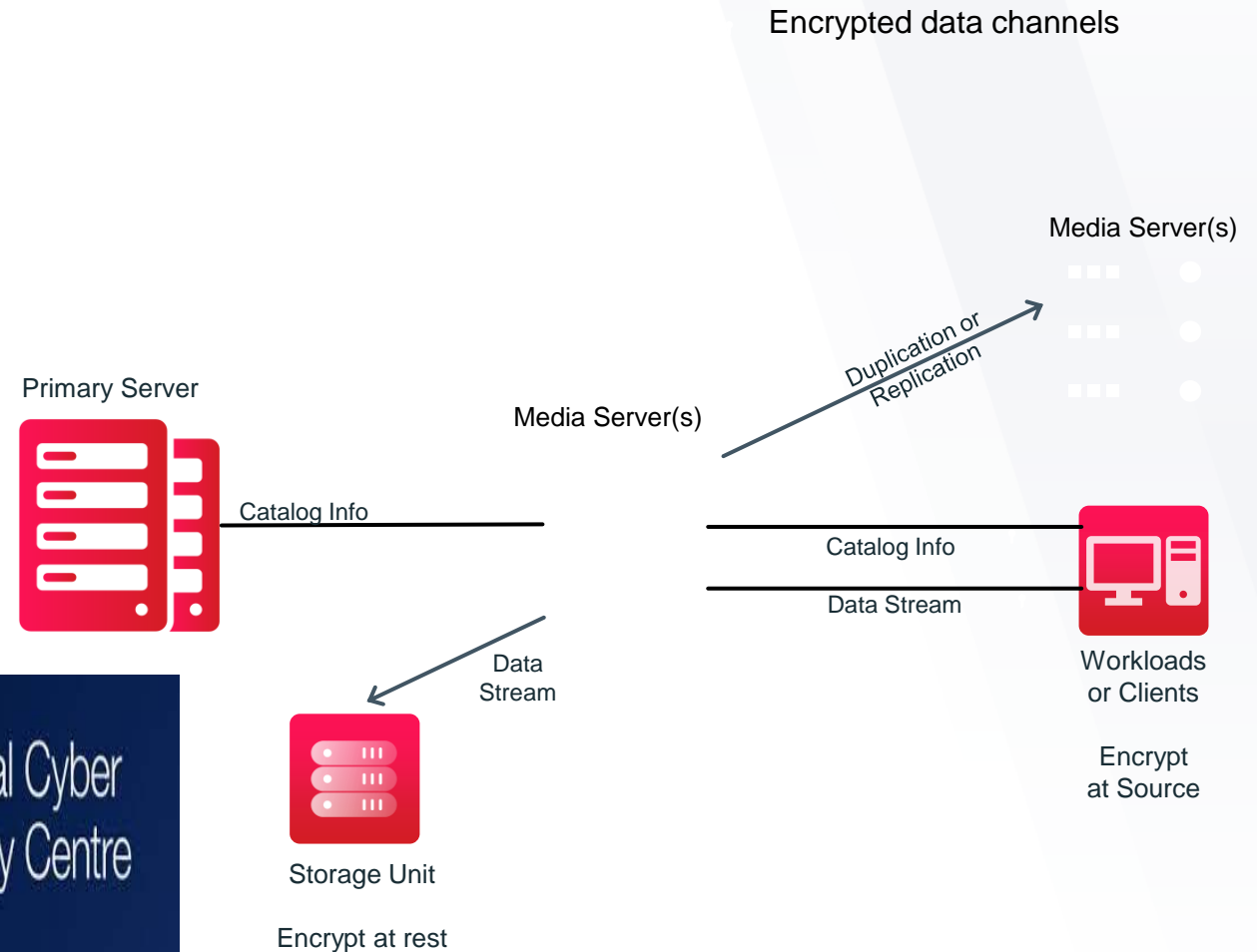
Best Practice Five - Data Channel Encryption

Control communication encrypted using TLS and X.509 certificates since NBU 8.1

- All Data channels encrypted
- Data at rest encrypted

Data Channels

- Backup Data
- Catalog info
- Duplication/Replication activity



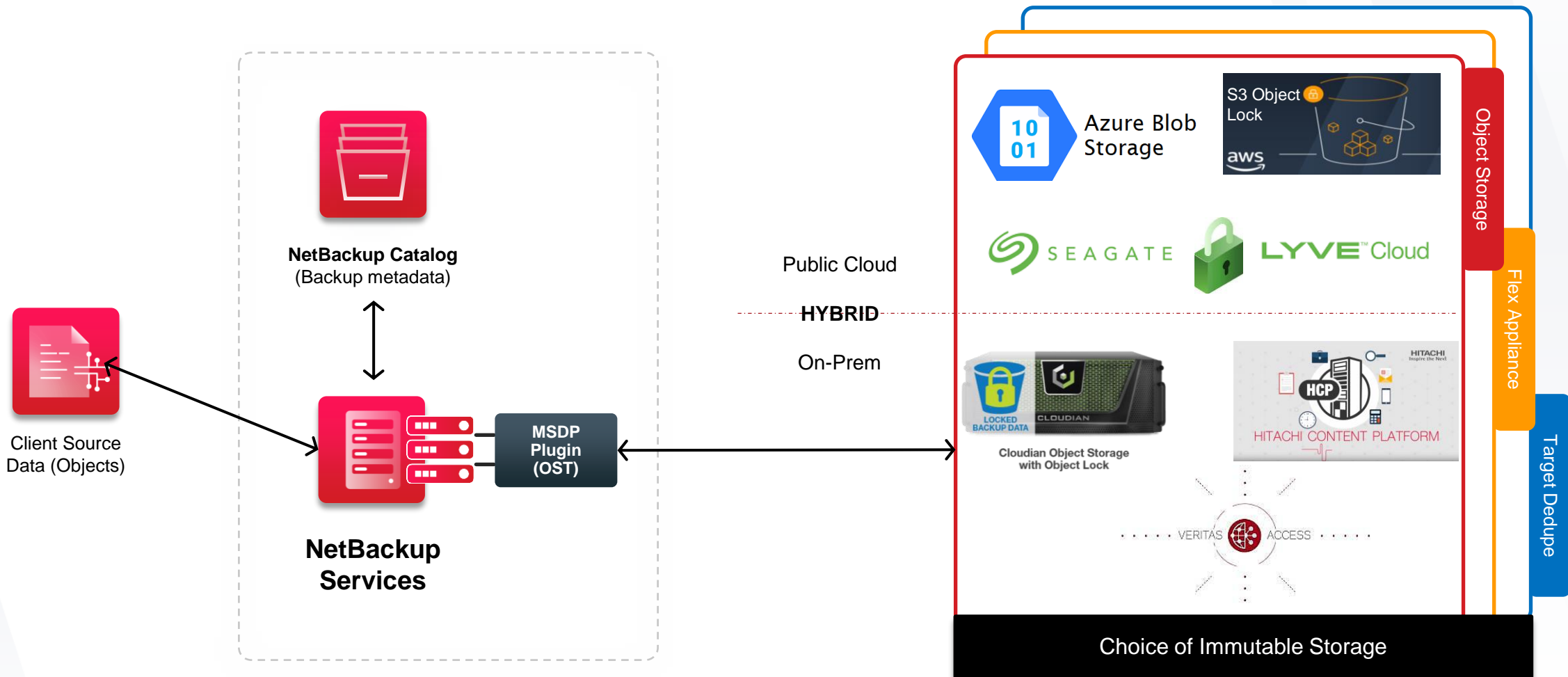
“Use current standardised cryptographic algorithms to protect your data.”

Quote from <https://www.ncsc.gov.uk/collection/10-steps/data-security>



Best Practice Six - **WORM / Immutability Support**

Object Storage - Azure, Veritas Access, Hitachi, Cloudian, Seagate Lyve Cloud

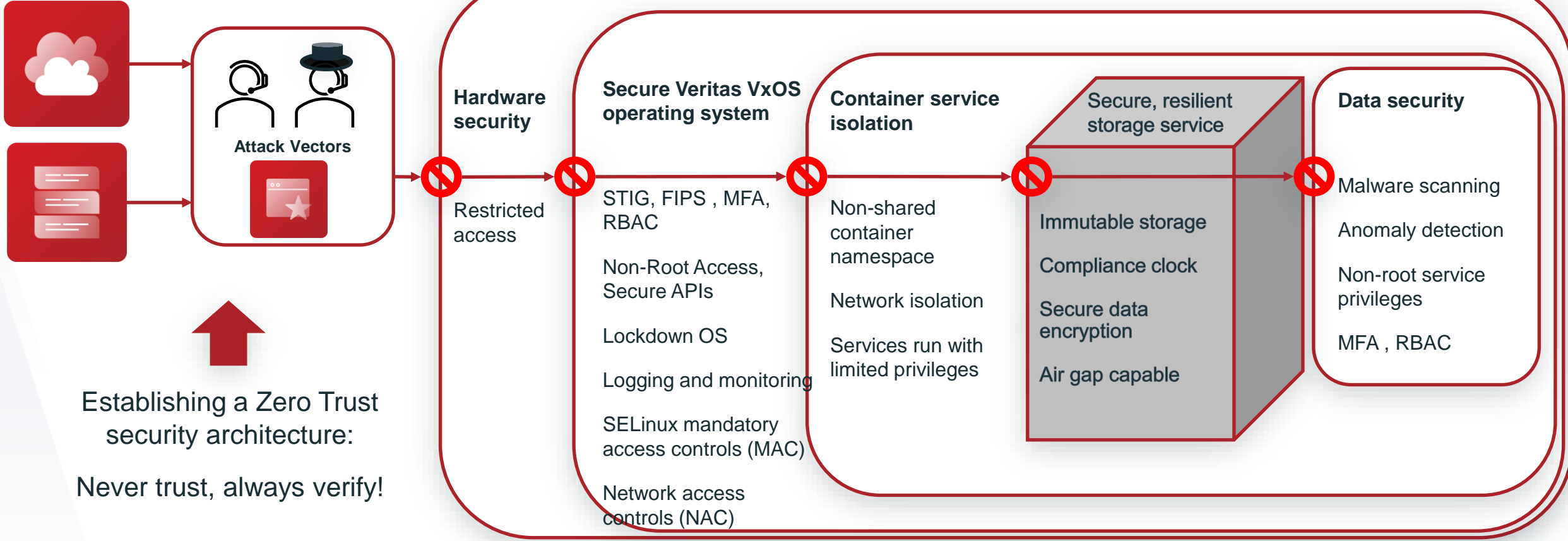


Best Practice Seven - Multi-Layered Security

How to protect against day-zero cyberattacks



FLEX Appliance



Establishing a Zero Trust security architecture:

Never trust, always verify!



Best Practice Eight – Prepare to Recover at Scale

Have a plan



- Be ready to start from Ground Zero
- Know the recovery priorities for all your IT applications
- Understand the dependencies
- How do you identify the last known good copy?

Ensure you can recover rapidly at scale



- Backup environments are typically sized to backup a fraction of data each day & to restore a few systems at once
- Consider technologies like Snapshots & Continuous Data Protection
- Automate wherever possible

Test at scale



- Identify the last known good copy
- Simulate loss of critical infrastructure services
- Test recovery of complete business services

“Test your backups regularly and ensure you know how to restore files from a backup before you have to do it for real.”

Quote from <https://www.ncsc.gov.uk/collection/10-steps/data-security>

Veritas Data Protection Solutions: Confidence Restored



100% recovery success rate for customers that have been hit by a ransomware attack using Veritas Appliances



Ultra Secure Backup



Truly Secure Immutable Storage

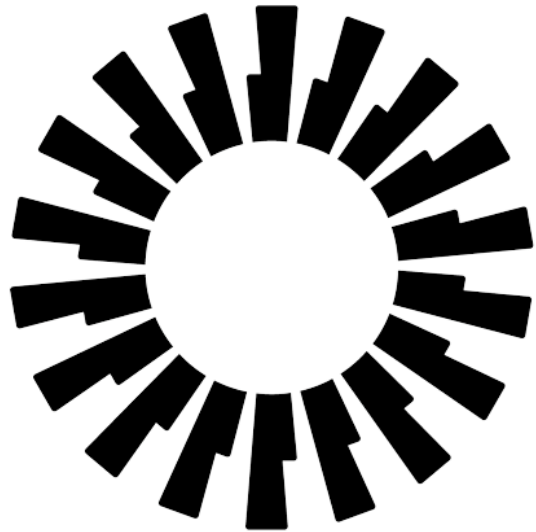
Thank You



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UP NEXT...



okta



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SPEAKING NOW



Pranam Codur

Senior Solutions Engineer at Okta

I will be discussing...

“Identity and Data”



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SPEAKING NOW



David Sgorbati

Chief Analyst
Health Economics Unit

I will be discussing...

“What about tomorrow? Using data to plan for future morbidity trajectories in our aging population”



THE NHS DATA CONFERENCE 2023



SPEAKING NOW



Dr Austin Tanney

Chief Data Analyst
Health and Social Care Northern Ireland

I will be discussing...

“Health and Social Care Data -
The Northern Ireland
Perspective”



Digital Health & Care
Northern Ireland

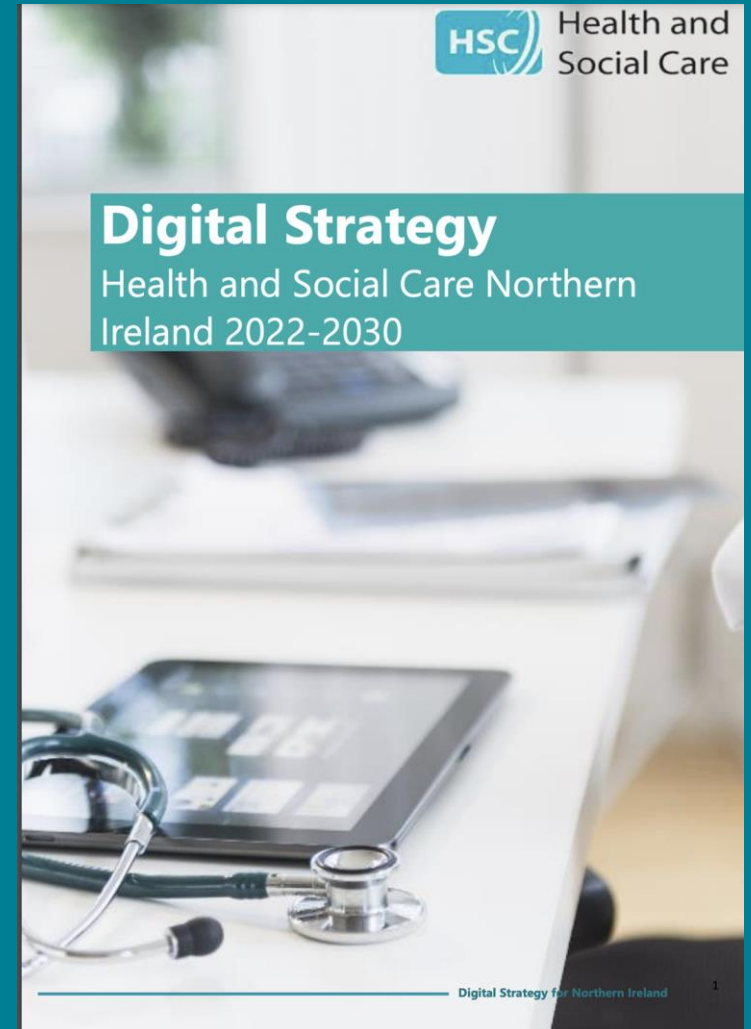
DELIVERING CARE TOGETHER



Health and Social Care Data - The Northern Ireland Perspective

Dr Austin Tanney - Chief Data Officer - Mar 2023

HSCNI Digital Strategy



In context - Our Digital Vision

Making lives better for the people of Northern Ireland, using digital to transform the way we deliver health, care and well-being services

What does the future look like?

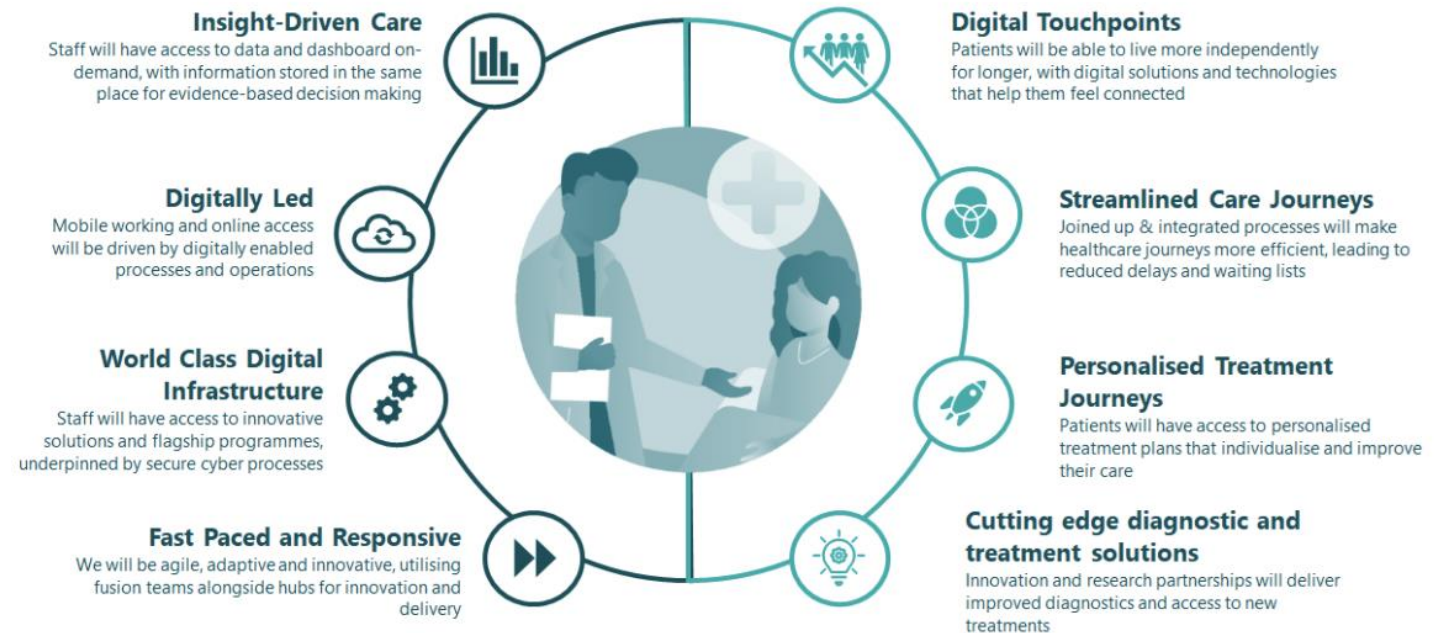
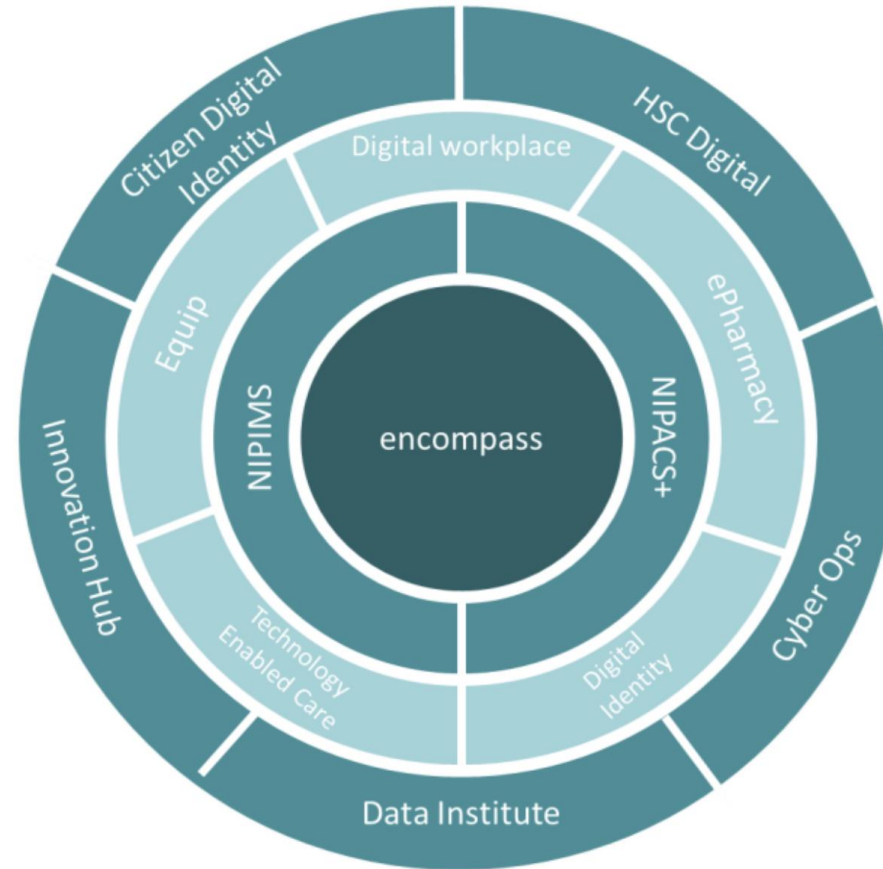


Diagram 1 – Our digital vision for care providers (left) and the Northern Ireland population (right)

Our Digital Portfolio



Our key programmes and supporting initiatives for the delivery of our digital vision

HSCNI Data Strategy



Core messages of the data strategy

- Data in HSCNI is disjointed and not used in the optimal manner
- Data quality is an issue in many areas, from core clinical coding right through the system
- Data skills are limited and siloed
- We face increasing challenges to retain the data professionals we have
- The sheer workload upon the stretched resources is significant. Covid has increased this, as has the major programs
- The covid response and use of data in the covid response has highlighted the value of data in many areas, in a sense we are now victims of our own success
- We need an organisation that establishes, builds, maintains and develops a data profession within health and social care and that can support the system in ensuring our data is of high quality and is used effectively.

Core Messages... the simple version



Core Messages... the simple version

- We have a lot of data
- We don't use it very well
- We need to get better at it

Our Principles



Driving Research and Innovation

Using data to drive innovation and research across health and care systems, both internally and through external partners



Supporting our HSC people and Services

Making it easier for our population and our people to do their day to day work and drawing insights that drive system-wide efficiencies.



Improving Service-user Experiences

Using data to improve the way that our population experience services and care journeys at HSC



Using Data Safely and Securely

Ensuring that our people and population feel confident in the security and best-practice use of their data, in line with cyber governance protocols.

Strategic Outcomes



Data collection is carefully managed, including accuracy of information and verification of sources, with increased frequency and quantity of data ingestion



Our analytics capabilities drive actionable insight generation for use across a range of services



Our data visualisation and presentation capabilities enable us to illustrate insights that are actionable and facilitate evidence-based decision making



We create transparency by sharing more insights across our organisation and externally with the communities we support



We harness insights from our data to deliver improved outcomes, including tackling service challenges and generating population health insights

Our Data Enablers



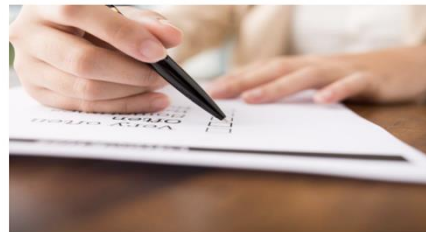
People, Population and Culture

Data education, shared data ownership with our population, data literacy, sharing insights/ keeping people informed



Centralisation and Interoperability of data

Connecting data across the ecosystem , data quality improvement, standardisation, clinical terminology, reducing duplication



Information Governance

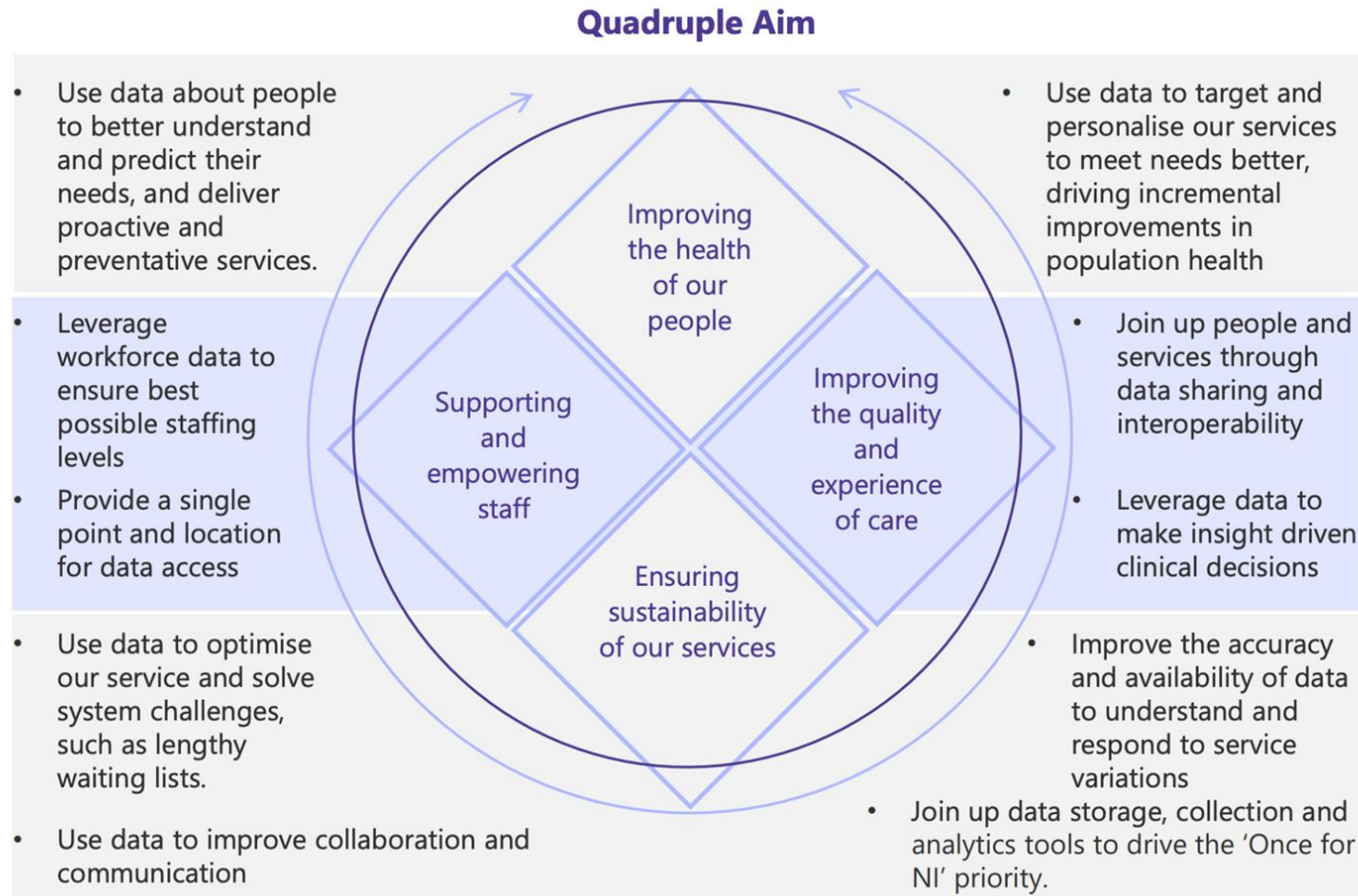
Making sure we use our data right, ensuring security and privacy at the core of all we do



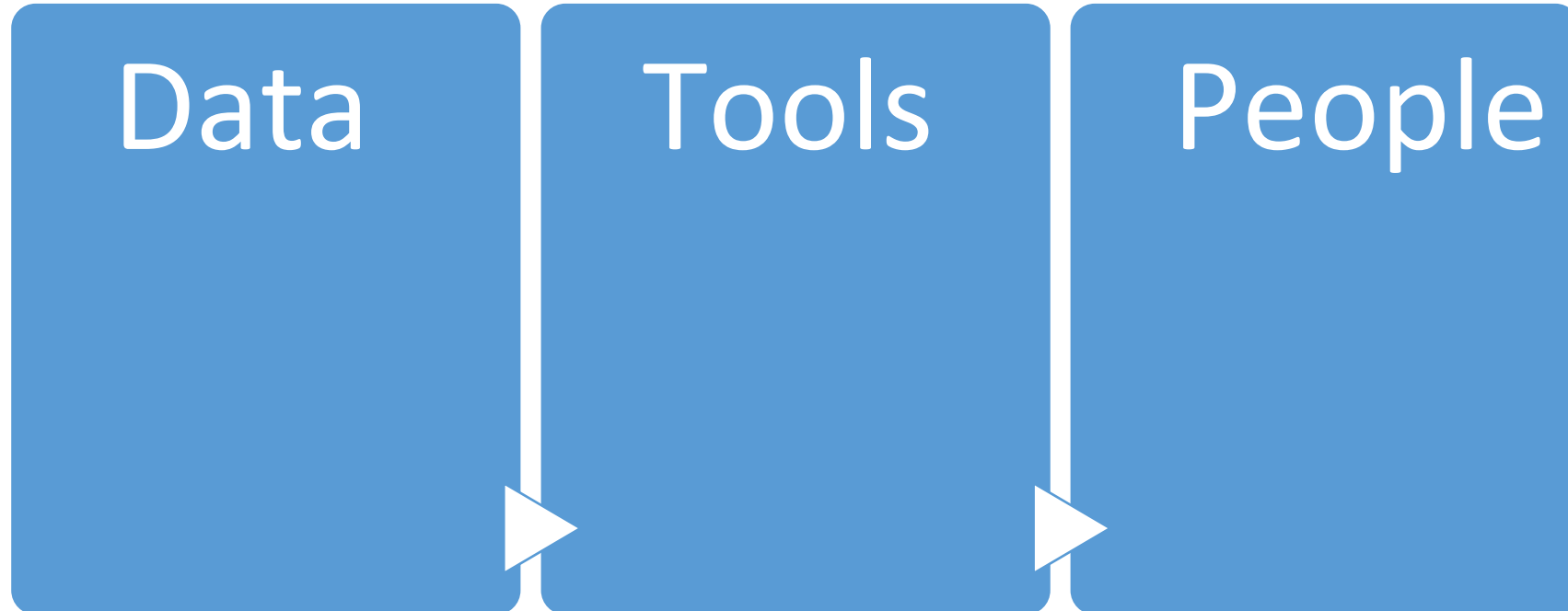
Data-enabling Infrastructure and Technologies

AI, Data visualisation, mobilisation of encompass, automation

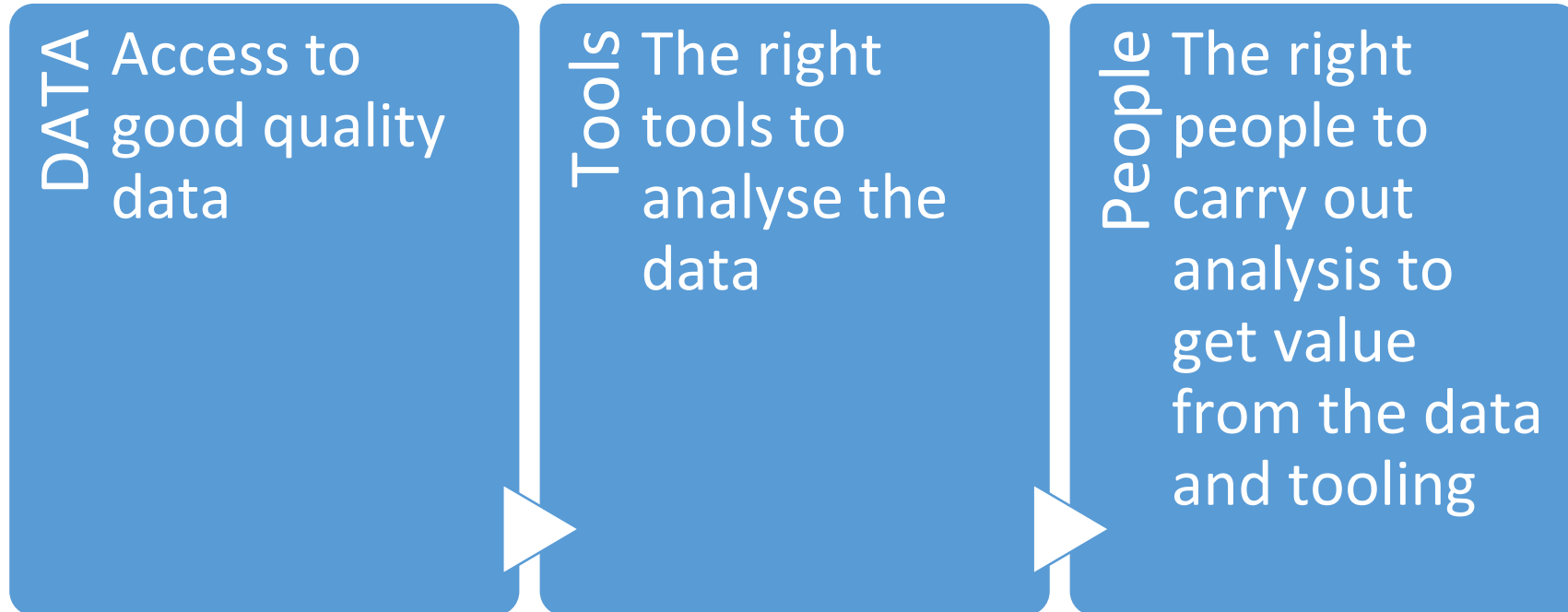
Supporting the Quadruple Aim



What do we need to get insight/ value from Data?



What do we need to get insight/ value from Data?



Health and Social Care Data Institute (HSCDI)

- We propose the establishment of the HSC Data Institute (HSCDI) to support HSCNI in becoming a data driven organisation
- The objective is to ensure that we effectively use data and analytics to benefit our staff, patients and citizens
- We aim to maximise the use of the our resources in making better use of data and getting the best value from the highly important and limited resource of skilled data professionals within our organisation
- We also aim to develop further capacity and capability in the analysis and use of data

Pillars of the HSCDI

Data

Tools

People

HSC Data Institute



**Education and
Evangelism**



**Training / Skills
Development**



**Infrastructure &
platform Development**



**Analytics & Insight
CofE**



**Information
governance**



Education and Evangelism

- Focus on showing our people and our citizens the importance of data in healthcare
- Use examples and case studies to raise awareness about the importance of data and data quality
- Embed a culture of the importance of data and data driven decisions in all parts of the service



Training / Skills Development

- Broad training across HSC
- Baseline understanding (digital and data academy)
- Hire good people and use them to develop internal skills
- Build a culture of training, mentoring and internal staff development. We need to build our own internal capability
- Information governance and information security / cyber security also key, need regular refresher training
- Ensure range of training options from data academies and workshops to MSc courses and PhDs



Infrastructure & platform Development

- We have build an analytics platform during covid - the Northern Ireland Health Analytics Platform (NIHAP)
- This gives data analysts and data scientists access to the data they need in a safe and secure environment with the tools they need to analyse the data
- We are currently expanding the usage of this platform and enhance its capability ensuring we deliver this as a Once for NI analytics solution for Health
- This will become all the more critical as we look to the rollout of encompass, equip, NIPACS, NILIMS... we need one place to keep our data that enables analytics across the service from performance management to patient risk stratification



Analytics & Insight CofE

- We need to develop an internal centre of excellence for data analysis and insight
- This will be available as an internal analytics service to anyone in HSCNI that needs support
- The focus should be on advance analytics, predictive modelling, AI, ML etc.. not just descriptive analysis
- We need a good senior team who can deliver, but also coach and mentor more junior staff
- We need to identify the rising stars who will be the senior team of the future and help them become those leaders
- We need to develop a career progression pathway, ensuring that the data profession in HSCNI is recognised and its value understood
- We want to make this the place that anyone with an interest in health data and analytics would want to work



Information governance

- We need to improve how we use data and streamline the process of accessing data while ensuring good legal basis and information governance across the board
- We need to better understand the data and data governance landscape across HSCNI
- We need to fully and properly catalogue this, ensuring we have a comprehensive data dictionary and data catalogue for all our data with all the associated IG logged and clearly laid out and to determine if our current governance structure is fit for purpose (especially in light of encompass)
- We need to expand how we use data in research, both internal and with academic partners, by expanding and fully embedding the Northern Ireland Trusted Research Environment (NITRE)
- We need to drive forward secondary uses legislation

Regional Support Across HSCNI

The objective is to support all of HSCNI regionally through provision of

- Training
- Data Analytics Infrastructure
- Data science and advanced data analytics capability (Centre of Excellence shared service)
- Data capability frameworks

In scope and out of scope

HSCDI is **not** expecting to take on all data and analytics across the board

It is **not** an attempt to centralise all data analytics and BI staff

It is **not** a replication of existing functions, but an enhancement and addition of new capability

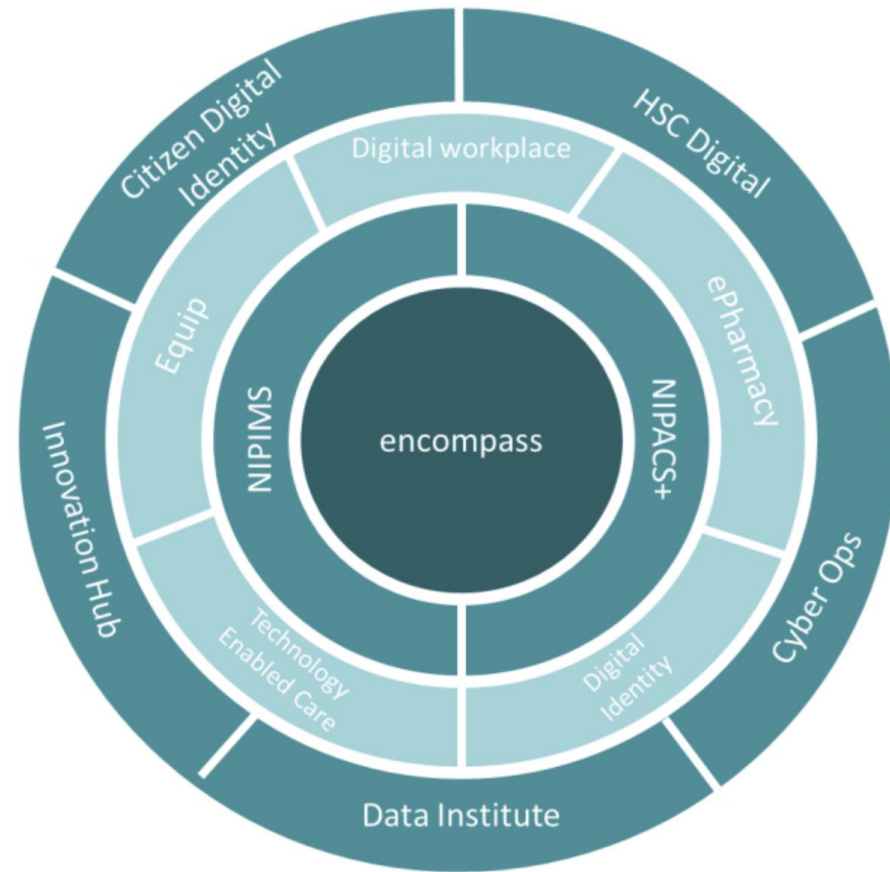
HSCDI will provide data and analytics services and platforms

It **will** develop data science and advanced analytics capability to support all of HSCNI

It will also support other orgs in their development of capability through frameworks, capability matrices, recruitment/ hiring support, training

Data Insight Centre of Excellence: Organisations bring projects or challenges to the CoE, if possible CoE will deliver solutions, contract in solutions or support the org in getting the right people to deliver

In context - Our Digital Strategy



Our key programmes and supporting initiatives for the delivery of our digital vision

Questions / Comments



THANKS FOR ATTENDING



THE NHS DATA CONFERENCE 2023



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