

Leading digital change, interoperability and innovation

Wednesday 6 April 2022





Dr Simon Eccles.

National Chief Clinical Information Officer.

NHS England/NHS Improvement



The only way the NHS can meet the challenges of rising demand, costs and expectations is to transform itself. There is huge potential to improve productivity, safety, experience and outcomes for patients, people in care, and the workforce.

The NHS Transformation Directorate



The NHS Transformation Directorate unites staff from across NHS England and Improvement and the Department of Health and Social Care behind a common goal: **to drive innovation at scale where it can improve care for people and support staff.**

The NHS Transformation Directorate is led by Dr Tim Ferris.



Department
of Health &
Social Care

Transformation Directorate: key programmes of work

Transformation Directorate Strategic Priorities

Recover and transform services in light of COVID through delivery of national priority programmes, including measurably improving population health and reducing inequalities

Develop data capabilities and digitised services, connected together to support clinical integration and service transformation

Develop a thriving innovation ecosystem to transform population health

Support NHS leaders in the adoption by local providers of rapid cycle innovation and outcomes assessment

Key programmes of work

1. Expand functions and uptake of NHS App
2. Home hospital/virtual ward
3. Redesign pathways, end to end, using digital tools
4. Increase diagnostics capacity; build imaging AI delivery

-
1. Levelling up: core levels of EPR everywhere
 2. Data architecture & infrastructure for pop health, planning, research
 3. Population health and personalised prevention
 4. Computer assisted processes and clinical decision support

-
1. NHS as a platform for rapid cycle research and innovation
 2. Targeting our national purchasing power on biggest opportunities
-

Recover and transform services

1. Expand functions and uptake of NHS App

Ambition: A proactive, personalised digital NHS experience that pre-empt and responds to choice, as well as need. The NHS App and NHS Website are a core part of people's health and care journeys and access a consistent set of services. 70% of the adult population will be registered for the NHS App by 2025.

Opportunity:

- NHS App and NHS Login become indispensable - spreading further from current uptake (58% adults have NHS Login, while on track for 50% registered for the NHS App and NHS.uk to have >1 bn visits by end of year) - with prescription refills and appointment booking saving £71m p.a.
- >£1bn savings from people getting help or info from NHS.uk, by not needing a live NHS professional
- Sending digital appointment reminders on a national scale can avoid 300k DNAs a month
- A single NHS account, with one authentication layer, a single NHS identifier (the NHS number), and personalized contact preferences

What we need to do:

- Agree to the universally available functions- starting with: appointment booking, patient record access, repeat prescription management, national data opt out, symptom checker, digital therapeutics, organ donation, etc.
- Align capabilities using national channels/standards e.g., appointment booking.
- Develop the tech stack for better use of notifications, native device functionality, personalisation, consumption of data, integration of third parties, extended B2B offer etc. Underpinned by a stable and secure data architecture
- Clarity from interrelated programmes (e.g. electronic prescribing, electronic referrals) on what's needed to deliver intuitive citizen-facing experience.
- The NHS, social care, UKHSA and other relevant ALBs are aligned in using the national channels.

Recover and transform services

2. Home hospital / Virtual Ward

Ambition: To transform support for independent living and deliver hospital level services to low risk patients through a integrated set of hospital at home services. We will create the equivalent bed capacity of a district general hospital for every ICS over the next 3 years.

Note: this is in collaboration with the Primary Care Directorate.

Opportunity:

- Better connected, more personalised care in people's homes, including care homes
- Faster access to more appropriate and targeted care, without necessarily having to attend ED or GP
- Reduced admissions and length of stay and increased capacity for assessment of acute patients.
- Currently there are 35 "live" virtual wards, with an additional 15 due by end of December 2022. Some bed capacity to be realised in the short term (winter 21/22), however most impact anticipated in 22/23
 - If the pilot data is extrapolated nationally, the equivalent of 180,000 beds days saved per year.
 - By March 2022, 136,000 patients will have been reached, saving the equivalent of 334,000 bed days.

What we need to do:

- Remaining 2021: starting expanding virtual wards with acute respiratory infection and frailty guidance
- Over winter (next 3-4 months): scaling up across other acute infections and other high volume pathways e.g., COPD, Heart Failure etc and build from there to support other locally agreed pathways
- Then incorporate virtual wards into 2022/23 Planning Guidance
- Aim for each ICS to have a virtual ward the equivalent of a DGH (approx. 500 beds) by March 2023
- Roll out of Proactive Care beyond initial 4 ICS sites to support implementation of proactive care pathways.
 - Blood pressure@home: national distribution of 200k+ blood pressure monitors
 - Lung care@home: supporting rehab through home approach

Recover and transform services

3. Redesign pathways, end-to-end, using digital tools

Ambition: A new 'Transformation Engine' team to support the clinically led systematic redesign of the most common care pathways in 18 service lines in 3 years. At every point in the patients journey we will simplify process, reduce patient and clinician friction, embed technology and redefine roles to optimise outcomes, efficiency, and productivity.

Opportunity:

- A Transformation Engine that drives radical redesign and tactical productivity and capacity releasing initiatives.
- Tackle key priority pathways such as Screening, where we will use technology to underpin the whole pathway from cohort identification to call and recall
- Transform outpatients so all systems reach A&G, PIFU and virtual consultation activity targets through a blend of at-scale referral triaging, digital approaches, re-designed pathways and improved outpatients productivity. Release > 780k outpatient attendances in MSK, cardiac and eye care.
- A single repository of clinical benchmarking, incorporating GIRFT, RightCare, Clinical Audits, National Clinical Information Programme so clinicians have accurate and timely information on variation, performance, outcomes.
- Utilise existing platforms and expand their use e.g., covid vaccinations platform.

What we need to do:

- Prioritise and sequence the pathways to transform, informed by volume and urgency to reduce waiting list. This builds on our work around GIRFT and clinical variation.
- Identify which platforms to be scaled and replicated.
- Pool virtually multi-disciplinary teams across clinical, operational, programme, and digital teams. This brings the skills and expertise from the Improvement Directorate, NHSX and NHS Digital.
- Develop strong links with regional teams and ICSs to have a scale and spread model that allows redesigned pathways to be implemented across the country.
- Hone our approaches to pathway redesign, so they can be replicable across specialties (so we do not have to redesign each individual service line in the NHS in isolation)

Recover and transform services

4. Increase diagnostics capacity and build AI decision support for imaging

Ambition: Transform diagnostics by bringing tests closer to home, expanding capacity and streaming elective and UEC pathways. All diagnostic services will be digitally enabled, using AI wherever possible and networking to reduce test turnaround times, maximise staff capacity and enable flexible work patterns.

Opportunity:

Spending Review 2021/22

- 1.8m more tests p.a., in 2020/21 vs 2019/20 (3% to 12% increases in capacity by modality) - eradicating >6 week waits for diagnostic tests within 16 months from hub launch.

Spending Review 2022/25

- Boost imaging and pathology productivity by 10-15% and £200m+ cash releasing benefits.
- Deliver 65% of MRI, 85% of CT, 66% of U/S and nearly 100% of endoscopy capacity needed to clear elective pathway waiting lists by 2024-25.

What we need to do:

- Deliver the Richards Review recommendations: Community Diagnostic Centres, digital diagnostics, pathology and imaging networks and workforce optimisation.
- Focus on diagnostics productivity to mitigate workforce gaps and increase overall workforce capacity in the medium term. The biggest operational implication is on diagnostic workforce capacity, which is already stretched. This risk is exacerbated if funding is not found for the HEE SR21 workforce bid. Rigorous short term workforce optimisation will not deliver expected activity without sustained medium term investment in workforce growth.
- Generate standardised data that reflects the population, which can be easily and legally accessed to aid training and validation of AI that can accelerate diagnostic processes. Every image generated within the NHS should be read by a computer before it is read by a person.

Development & evaluation of AI



ACCELERATED
ACCESS
COLLABORATIVE



NIHR | National Institute
for Health Research



The AI Award makes **funding available** to accelerate the testing and evaluation of **AI technologies** that meet the aims set in the **NHS Long Term Plan**

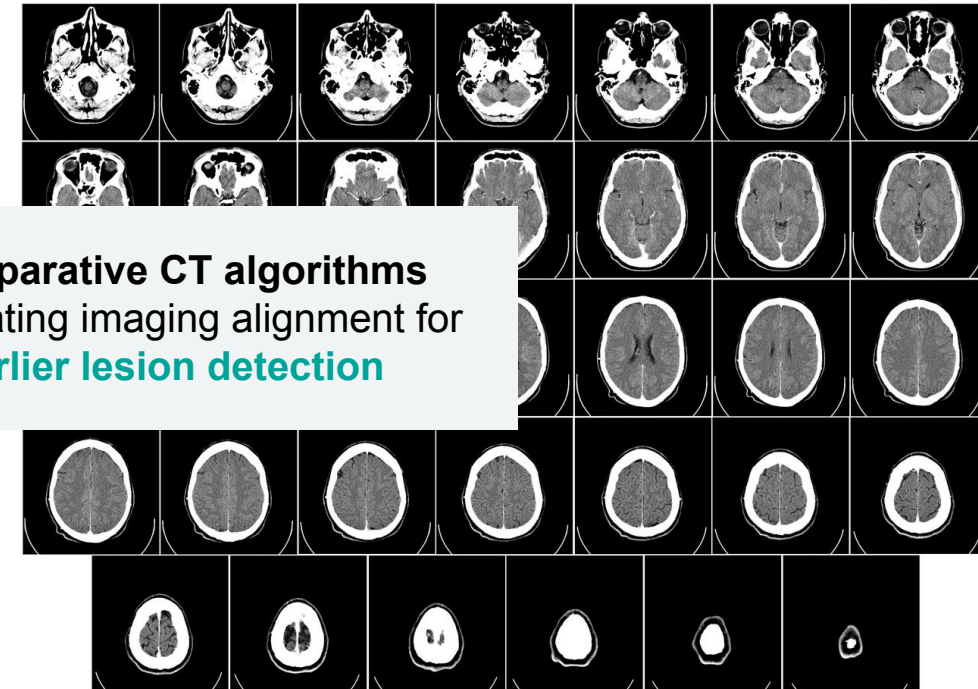
Progress to date:

- 79 projects
- 60+ hospitals across the UK
- ~ 100,000 patients impacted

Supporting the workforce to use AI

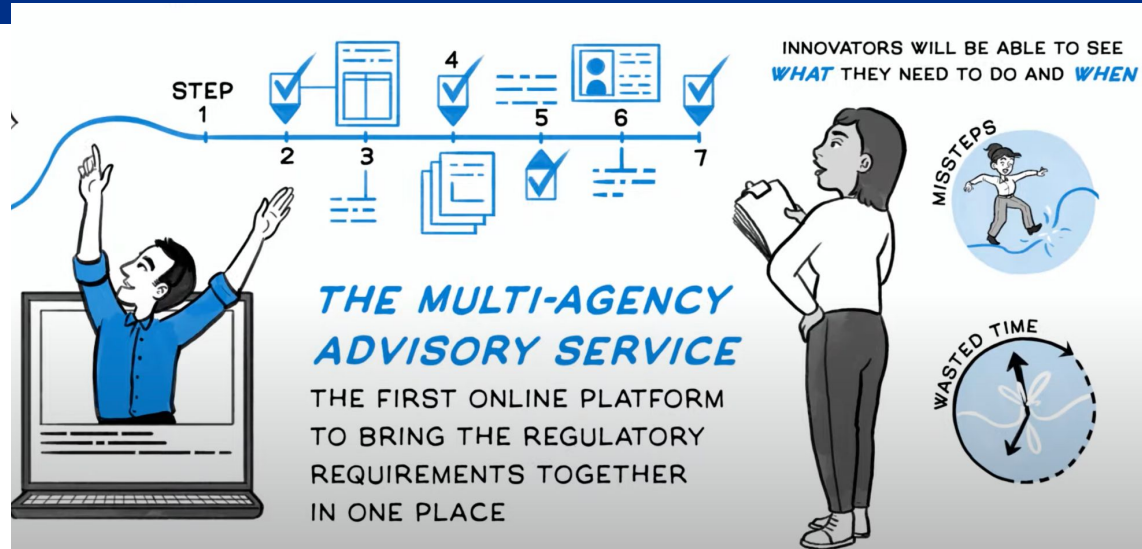


Hospital Long Stayers Forecasting
modelling length of stay through GANs for
better outcomes



Comparative CT algorithms
automating imaging alignment for
earlier lesion detection

Supporting safe and ethical AI



The NHS AI Lab is supporting the creation of a multi-agency advisory service for regulation, which will allow innovators to understand what they need to do and when at each stage of the development process.

The Lab's Ethics Initiative focuses on how to counter the may arise from the ways that AI is developed and deployed.

Artificial intelligence (AI)

Andrew Gregory

Wed 20 Oct 2021 06:00 BST



AI projects to tackle racial inequality in UK healthcare, says Javid

Exclusive: health secretary signs up to hi-tech schemes countering health disparities and reflecting minority ethnic groups' data



AI robot, specialised for traditional Chinese medicine, shown in Beijing, 2020. In the UK, the government hopes new AI technology will lead to better healthcare training. Photograph: Xinhua/Rex/Shutterstock

Data capabilities and service digitisation

5. Levelling up: core levels of digital infrastructure everywhere

Ambition: Ensure a minimum level of digitisation across 100% health organisations and 65% of social care providers by the end of 2024/25, encompassing the universal adoption of EPRs, consistent with the What Good Looks Like framework and foundational to the ICS vision.

Opportunity:

- Help frontline clinical staff to deliver care more efficiently, effectively and safely, while reducing variation and improving clinical quality and outcomes.
- Providers with high levels of digitisation have c. 13% lower activity costs than those who don't, alongside quality and safety benefits, as well as reducing cybersecurity risks.
- Minimum digital capabilities will allow all health and social care providers to share information, effectively enabling a single record of care across an ICS - removing duplication, assisting care coordination, and enhanced patient safety.

What we need to do:

- Work with ICS and Trust CEOs to establish a shared understanding of each ICS' starting point, digital vision and tailored investment and delivery plans.
- Develop a strategy for how we will manage convergence
- Invest strategically, providing clear, stable, pre-agreed financial envelopes, enabling multi-year planning and delivery - with rapid business case approvals and appropriate procurement frameworks.
- Agree a common architecture, minimum data standard.
- Set clear standards for interoperability, and suitable enforcement mechanisms, to require EPR vendors to enable full read-write data exchange.
- Resource sizable, suitably skilled project delivery teams and backfill staff to take part in programme activity or training. Creative solutions will be needed to attract suitable, specialist talent.
- Be realistic - effective digitisation requires extensive changes to ways of working of both clinical and non-clinical teams, as well as cultural shifts - this takes time.

Data capabilities and service digitisation

6. Data architecture and infrastructure for pop health, planning & research

Ambition: Generate a single coherent plan for managing data outside EPRs that uses the ICS as the unit of aggregation, maximises opportunities for population health, planning, and research and ensures only authorised uses and data and cyber security.

Note: this is in collaboration with the CDAO Directorate and NHS Digital.

Opportunity:

- Recent developments in technology allow for a distributed sourcing of data, leaving data in its native source but making it available under authorised situations for use by local leaders.

What we need to do:

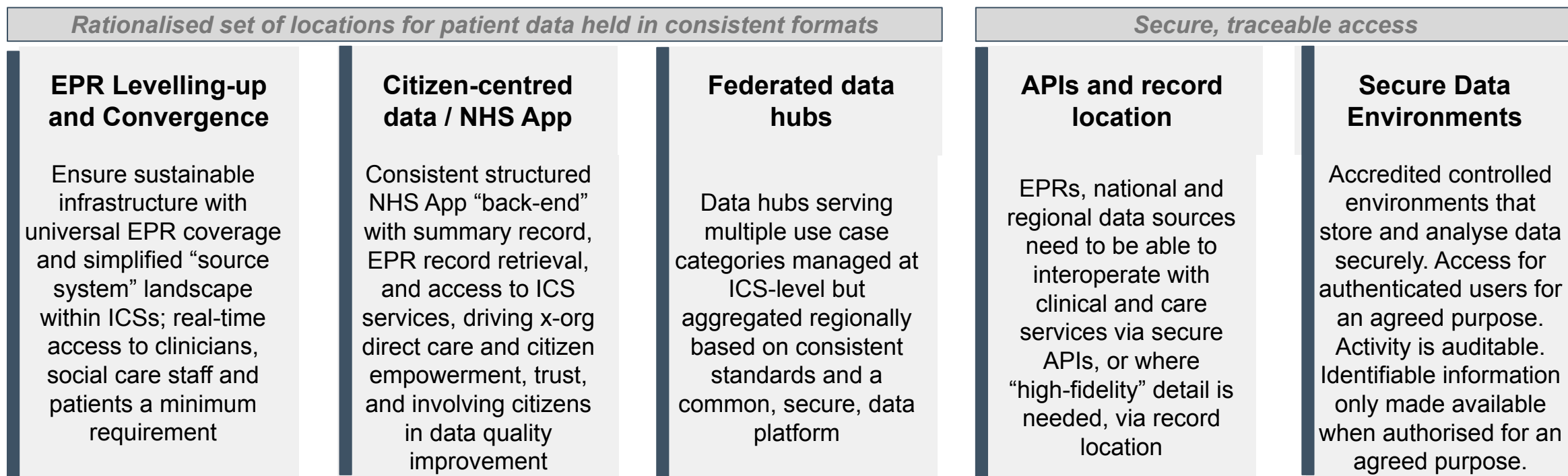
- Develop a data architecture strategy that outlines how data is collected and used for clinical use, planning and research.
- We then implement that plan, considering issues such as stakeholder engagement, addressing local needs, national standards and data definitions.

Data Architecture and ICS's

In order to improve safety, outcomes and productivity, we need to drive five core enablers



These technical enablers provide a rationalised set of locations for patient data and make it transparent to citizens in line with their expectations, whilst also investing in auditable safeguards around secure access



We will need to drive towards the target state by **iterating from the footprint of the current installed base**, which includes Shared Care Record portals, Personal Health Record and Patient Engagement tools (e.g. PKB), Population Health and Operational Intelligence platforms (e.g. CIPHA, Foundry), and emerging secure access environments.

We expect the **functionality provided by these platforms to converge in to the regional data aggregation sites** and to be enabled by common services as has started to happen in some shared care record partnerships. This can be accelerated through use of levers

The architecture approach recognises 4 primary use cases, rooted in linked person-level data



This provides an opportunity to move away from separate systems for each use case, provided appropriate safeguards are in place

Use Case	Examples [alignment to aims/outcomes]	User Types	Access and Latency	Data Types
(i) Direct Care	<i>E.g. safe cross-organisation care delivery (including beyond ICS boundary)</i> [improved patient safety, effectiveness, productivity, experience]	<ul style="list-style-type: none"> Clinical and care staff Citizens 	<ul style="list-style-type: none"> Real-time, read/write access Identifiable data required 	<ul style="list-style-type: none"> Linked event-based patient record Past/future appointments/pathway info Plans, communications, safeguarding etc.
(ii) Population health and proactive care	<i>E.g. Screening/Prevention, Case finding, Proactive care, Decision Support, Outcomes evaluation</i> [improved population health/ effectiveness, reduced health inequality]	<ul style="list-style-type: none"> Authorised health and care staff 	<ul style="list-style-type: none"> Daily / real time updates Identifiable data required by authorised staff to enable direct care (ICS level users and below e.g. place, provider) 	<ul style="list-style-type: none"> Aggregated linked patient records (clinical, demographic, wider social determinants, 'omic, outcomes) Provider/Place/workforce data
(iii) Planning, oversight and service improvement (NHS/care and non-NHS)	<i>E.g. Capacity and demand management, health inequality insight, performance management (safety, quality, experience), workforce planning, financial MI/contracting</i> [improved patient safety, productivity]	<ul style="list-style-type: none"> NHS/care: Authorised health and care staff incl. local authorities Non-NHS: Public, other ALB users e.g. CQC, other gov depts 	<ul style="list-style-type: none"> Weekly -> hourly updates (depending on criticality of action) Must not be identifiable Must have clear principles for what level of sharing is appropriate to whom, including for open data / dashboards 	<ul style="list-style-type: none"> Operational data (capacity, demand, activity/utilisation, cost, experience, safety, assets) Aggregated linked patient records Aggregated linked workforce data
(iv) Research and Innovation	<i>E.g. clinical trial recruitment & follow-up, disease progression and understanding, deep-learning AI, trial set-up/sizing</i> [improved population health, reduced health inequality, economic impact]	<ul style="list-style-type: none"> Academic, charity sector and industry researchers 	<ul style="list-style-type: none"> Weekly Anonymised for majority of use cases Trial recruitment and follow up requires re-identifiable data, imperfect but timely 	<ul style="list-style-type: none"> Rich, linked, clinical and operational data over life course / clinical pathway Including 'omic and patient reported data

Requirements for **identifiability of patient/staff information and refresh rate differ** depending on use case and user type;
Access must be secure and auditable for all use cases

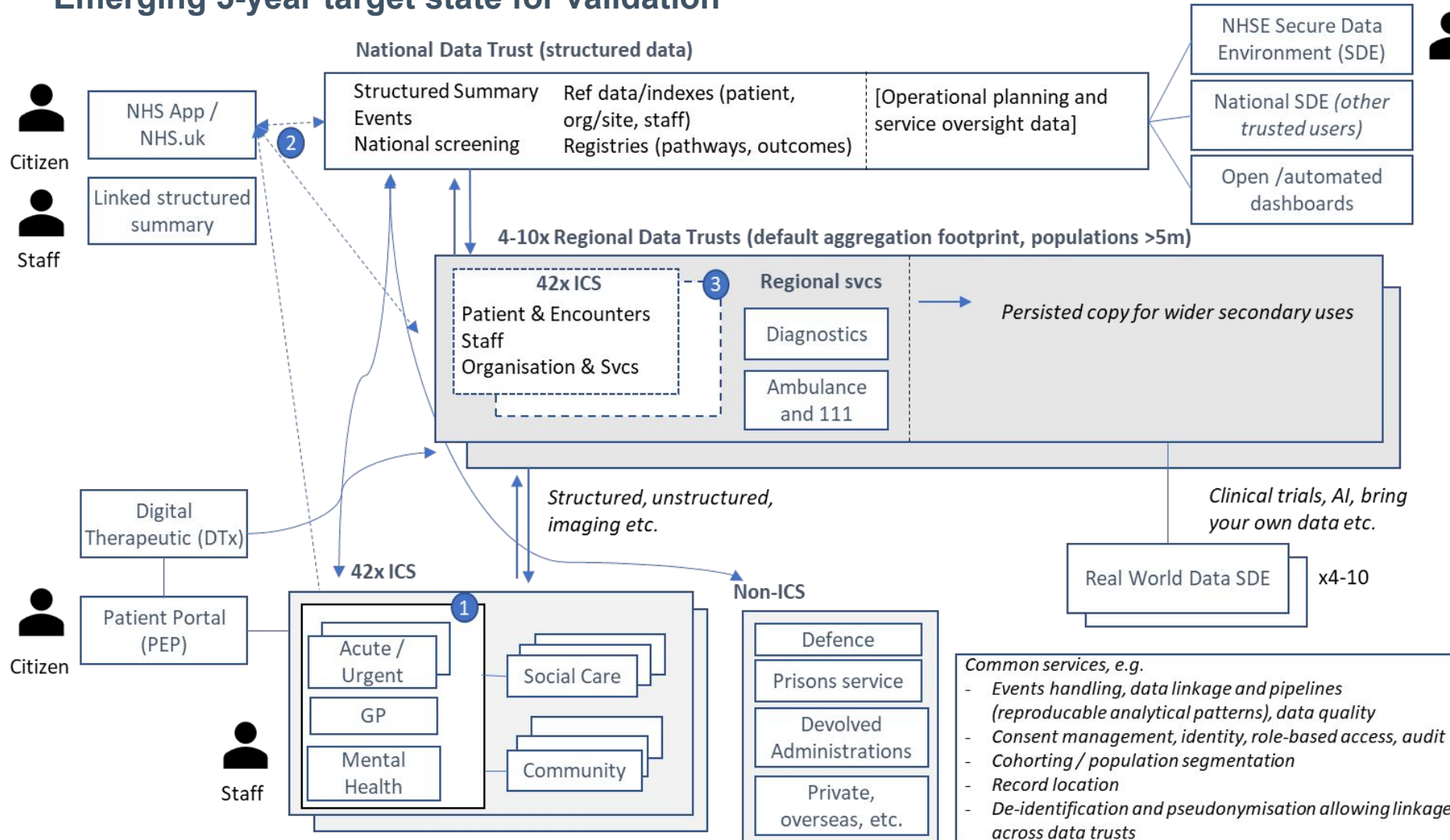
Despite disparate uses, the data types are rooted in **linked person-level data**

It is this common need for linked patient data that underpins our approach, reducing duplication and ensuring traceability of personal data

Our target architecture defines where data should be stored and how it should be accessed



Emerging 5-year target state for validation



Authorised staff – local provider/ place/ICS/national (role-based access)

- 1 EPRs and ICS workflow tools to be the authoritative source** for majority of identifiable citizen health data. Limited point-to-point integration complexity through consolidation of source systems and standards, including expansion of functionality of acute EPRs e.g. to include scheduling and care-coordination and into adjacent and specialist segments
- 2 NHS App and online services for citizens and authorised staff via:**
 - Structured summary records available nationally (citizen-centred, linked)
 - 2-way interfaces to ICS or provider-level software (appointments, referrals, PIFU)
 - Direct access to clinical records at source via API/record location to EPRs
- 3 Regional data trust as the 'default' level of secure aggregation for ICS-generated data** and provision of most services that are not nationally delivered. Enabled by ICSs "docking" into a cloud-based workspace within the regional data trust through common services and standards for clinical, operational and other data e.g social determinants. Drive to a real-time event based model for rapid insight/action

Our priorities: Data capabilities and service digitisation

7. Population health and personalised prevention

Ambition: To better target interventions to those who need it most, based on predictive and personalised approaches to prevention and population health management to shape the planning and delivery of services.

Note: this is in collaboration with the COO and CDAO Directorates.

Opportunity:

- To move from generic and reactive care to personalised and predictive care, based on an individual's risk
- Tactically, to identify people with complex needs who are on multiple waiting lists, and design tailored support for them that can reduce the risk of further deterioration and unplanned admission.
- Over 150 PCNs already demonstrating how population health management supports service recovery.
- Transform screening so that it is digitally enabled and incorporates genomic and other data into risk assessments to stratify populations more accurately and target interventions towards those at greatest risk.
- Whole population segmentation and the application of predictive analytics and risk stratification, accelerating transformation and the use of population-based payment models.

What we need to do:

- Invest in key building blocks: linked person-level dataset; consolidation of ICS analytical resources into a single, coordinated Intelligence Function trained in population health analytics; clear leadership and governance. (Basic building blocks by summer 2022).
- Develop a data architecture combining all data sources bearing on a person's health outcomes – from genomics to step counts, dental records to vaccines – to become available for routine analysis.
- Translate NICE's guidance into machine-readable code to detect 'gaps in care' but also the ability to personalise NICE guidance according to its differential impact on different people (including genomic data where it is available).
- Develop the new Health and Wellbeing hub, where members of the public will for the first time be able to see all of their recommended preventive care interventions in one place.
- Identify ways in which to use polygenic risk scores as potential complements to existing risk assessment tools.

Data capabilities and service digitisation

8. Computer Assisted Processes and Clinical Decision Support

Ambition: to increase the safe and effective use of computer assisted processes and Clinical Decision Support so it becomes the expected norm for all clinicians. For all patients to have access to health related decision support through NHS App.

Opportunity:

- Robotic process Automation, common outside of healthcare, presents an large opportunity for speeding and simplifying back office work.
- CDSs within an EHR improve clinical outcomes and reduce unwarranted variation. They take the form of alerts, clinical calculators, automated order sets or links to educational materials. These systems bring together knowledge (e.g., clinical guidelines) with data specific to a patient, to provide advice relating to a clinical decision.
- Currently, these systems are inconsistently deployed between and within providers.

What we need to do:

- Accelerate the adoption of RPA through funding, leadership engagement, technical support, and a national procurement framework.
- Working with other ALBs, in particular NICE, develop national standards for the deployment/availability of CDS as well as guidance for the content (rules engines).
- Manage the data quality issues (correct coding, structuring, accuracy); work with vendors so they have the ability to agree specifications.
- Data standards need to incorporate requirements for representative data sets to enable the scaling of ai technologies
- Work with ICSs to address key issues such as incentives, training and education support, any restrictions and regulatory support. The focus should initially be on target interventions that address inequalities.
- Embed the decision support functionality into the NHS App

Thriving innovation ecosystem

9. NHS as a platform for rapid cycle innovation and research

Ambition: To build a health ecosystem where innovations flourish and adoption is managed in ways to deliver better clinical outcomes, providing more rapid access to proven novel diagnostics and therapeutics.

Opportunity:

- Actively pursuing the testing of new early diagnostics and treatments for cancer, cardiovascular and metabolic diseases - underpinned by a world-leading data offer for clinical trials and health tech innovators.
- Every ICS should meet or beat the NICE mandated implementation timelines (typically 90 days).
- Providing clinicians with rapid insight from clinical and real-world trials saves lives e.g., RECOVERY
- Become the fastest place in the world to set up commercial trials. Reducing enrolment time from c 200 days to <50 days.
- Unlock £12.3bn over 10 years in patient, NHS, industry and economic benefits from creating at-scale real-world data assets for R&D.

What we need to do:

- Demonstrate our trustworthiness in using health data by articulating benefits of harnessing health data to support R&D, requiring public involvement and transparency in decision-making around access.
- Invest in trusted research environments to surface linked, rich, diverse and timely data in a secure and ethical manner.
- Increase the pace at which the NHS makes NICE approved diagnostics and treatments, including new digital health tools and AI, available - while focussing on tackling health inequalities.
- Broaden participation in research, including through NHS App.
- Develop at-scale genomics, imaging and citizen-generated remote monitoring data asset.

Thriving innovation ecosystem

10. Targeting our national purchasing power on the biggest health challenges

Ambition: leverage the NHS purchasing power to make more evidence-based innovations available to citizens cheaply. We support innovators from ideation to IPO, through signalling explicitly what the NHS needs most, establishing mutually beneficial partnerships, clarifying the pathway to adoption and getting value from NHS assets, including NHS data.

Note: this is in collaboration with the Commercial Directorate.

Opportunity:

- Treat more patients with the newest interventions, leading to better patient outcomes and uptake of population health interventions.
- Shape research to better answer NHS needs and more diverse trial participation. Send clear signals to the market on our priorities.
- Systematically use national purchasing power - making deals like GRAIL and Incliseran common.
- Move EPR and other key pieces of software to a national contracting framework
- Manage the tech ecosystem strategically on behalf of ICSs, ensuring data is liberated.
- Make evidence-based digital health tools, including AI-based, part of mainstream care.

What we need to do:

- Build our national commercial capability to negotiate deals, leverage our scale as a purchaser, and reduce burden of local price-setting.
- Finalise, with NICE and MHRA, new pathways for authorising and appraising technologies so they are clear, proportionate and robust - enabling those proved cost effective to be nationally priced, with interoperable data flows for ongoing impact and uptake tracking.
- Review of the tech market ecosystem to assess where and how best to intervene to ensure ICSs are supported.
- Set up a system to signal NHS demand and horizon scan.
- Visibly prioritise research and innovation, especially clinically
- Refresh NHS intellectual property policy and tech transfer capability.

Supporting NHS Leaders

(11.) Professionalisation of the Clinical Informatics Workforce

Ambition: Clinical Informatics as a recognised professional group drawing on all clinical disciplines. A CCIO and supporting clinical informatics team in every NHS organisation.

Connect with us

NHSX is now part of the NHS Transformation Directorate. We are in the process of transitioning our communications channels.

Web: www.nhsx.nhs.uk

Email: feedback@nhsx.nhs.uk



@NHSTransform



**[www.linkedin.com/
company/transform_
nhs](http://www.linkedin.com/company/transform_nhs)**



Questions