



Future health: how can we assure the safety of AI in healthcare?

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What are you hoping to learn today?



Data and technology for the NHS and the people it serves



Who we are

We are the national digital and technology delivery partner for the NHS and social care system with expertise in the design, development and operation of complex IT and data systems, and the independent safe haven for health and social care data.



What we do

**We are harnessing
the power of
information and
technology to
make health and
care better**



WHS
Digital



What we do



We run the core IT **infrastructure and services** of the health and care system



We **design, build and procure** new digital services and systems



We collect, process, link and disseminate **data** for the health and care system



We develop and disseminate **IT and data standards**



We are the **cyber security** partner to the health and care system



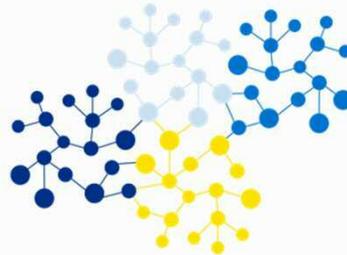
Did you know?

We're often your first point of contact with NHS care



The NHS website, NHS 111, NHS 111 online, and most 999 centres run on our content and algorithms

Nearly all NHS staff rely on our services to do their jobs



1.4m

transactions on the Spine, the NHS's secure network, every hour

We protect local NHS organisations



21m

malicious threats a month are blocked by NHS Digital's Cyber Security Operations Centre



Helping the public



NHS website

>25m
visits a week

Total weekly visits to NHS.UK have risen throughout 2021



Social media support

700m
impressions

The NHS website's social media channels saw an 979% increase in impressions in 2020-21



NHS App

7.3m
logins a week

Use of the NHS App has increased sharply. It was the most downloaded free iPhone app this year



Testing

>325m
results

Nearly a third of a billion COVID-19 test results have been digitally processed and disseminated



Vaccinations

55m
appointments booked

The National Booking Service handled 870k bookings in a single day in November. 100m jabs have been recorded through our systems



COVID-19 advice

>11m
visits a week

NHS.UK's COVID-19 pages accounted for about 40% of traffic at the start of November



NHS 111 online

30%
of triages

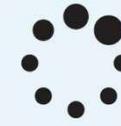
The online service now accounts for nearly a third of NHS 111 triages



NHS login

>500k
new users a week

More than 26m people have an NHS login, with about half a million new registrations a week



Testing

>750
upgrades

We've continuously expanded and improved the system since the beginning of the pandemic



Vaccinations

20k
sites

We've joined up 30 different IT systems and a wide variety of settings, including pharmacies, prisons, MoD sites and NHS providers, into a unified system



Supporting frontline staff



NHS Spine

1bn
transactions per month

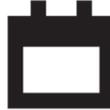
The NHS Spine, which allows secure information sharing across the NHS, connects more than 23,000 healthcare IT systems in 20,500 organisations



100 live services

99.96%
availability

Despite severe pressures, we achieved exceptionally high reliability across more than 100 live services in 2020-21



Electronic referrals

670k
bookings a month

The e-Referral Service allows patients to choose their first hospital or clinic appointments, linking up 70,923 services and 1,547 organisations



Electronic Prescription Services

97.3%
of GPs

Almost all GP practices and pharmacies use our Electronic Prescription Service. Improvements allowed the system to cope with remote working and closed pharmacies during the pandemic



Emergency Department Digital Integration

Delivered in
5 months

This new service allows NHS 111 and NHS 111 online users to book appointments in emergency departments, getting people the treatment they need and managing A&E capacity



Health and Social Care Network (HSCN)

70%
cheaper

The HSCN programme is offering faster, cheaper and more reliable network services to the NHS and social care, with a vibrant marketplace of 21 suppliers



Microsoft Teams

1.26m
new users

Following a 4-day national rollout in March 2020, Microsoft Teams has supported remote working across the NHS. In a single week, 1.3 million virtual meetings were held



Connecting GPs

480k
record views a week

GP Connect allows GPs using different IT systems to share information and bookings



Summary Care Records

265k
views per week

Use of Summary Care Records by clinicians has increased rapidly, with more detailed medical history, COVID-19 status and vaccination information now available



Protecting vulnerable children

700
alerts a day

The Child Protection – Information Sharing service tells clinicians and social care teams when looked after children and those with protection plans attend emergency departments and other unscheduled settings



Protecting traffic

350m
transactions a week

The NHS Secure Boundary uses next-generation firewall (NGFW) and web application firewall (WAF) protection to guard internet transactions across the NHS



Active defence

21m
transactions a week

We actively monitor and protect devices across the NHS and work directly with local teams in response to cyber threats



Enabling care and research through data



Data collections

250

national data collections

We collect data on outcomes, events, workforce, medicines and costs across all healthcare settings. We also collect adult social care data



Data Processing Services (DPS)

1.5k

terabytes of data

We are the statutory, central repository for data required to manage the NHS and adult social care. It is also used for a wide variety of clinical research purposes



Shielded Patient List

2.5m

people

We built and maintain the Shielded Patient List, which enables identification and support of people most likely to be at extreme clinical risk from COVID-19



Dashboards

15

dashboards

We established a rapid, scalable model for delivering secure dashboards on a range of topics including vaccination uptake, vaccine trials and GP appointments



Research

24

COVID-19 studies supported

We provided data to support a range of COVID-19 research, including testing the efficacy of vaccines, assessing therapies and understanding transmission



Vaccine volunteers

800k

recruits

The NHS Vaccine Research Registry has allowed people to sign up to take part in COVID-19 trials



Open data

300

open-data and statistical publications

Each year, we produce official statistics and clinical indicators to reflect the performance of the health service



Data Access Request Service (DARS)

+23%

applications for data to DARS

While requests have increased, we have maintained strict controls to ensure data is only shared where organisations have an appropriate legal basis

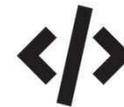


Understanding the pandemic

10

new COVID-19 data sets

We've collected and processed data on subjects ranging from hospitalisations to the virus' impact on different ethnicities



Clinical codes

5x more frequent

We've accelerated the release of SNOMED CT clinical codes to the NHS during the pandemic, allowing the system to track the disease and its effects



NHS DigiTrials

1m

lives saved

The RECOVERY trial, just one of the studies supported by NHS DigiTrials, has recommended vital treatments for COVID-19



Trusted Research Environments

15

new environments

These facilitate research into COVID-19's impact on cardiovascular disease, cancer, respiratory impacts and other conditions



Patient Safety





**“Make the
right thing the
easiest thing
to do”**



Patient Safety

- Patient safety is the avoidance of unintended or unexpected harm to people during the provision of health care. NHS England supports providers to minimise patient safety incidents and drive improvements in safety and quality. Patients should be treated in a safe environment and protected from avoidable harm.
- [NHS England » Patient safety](#)
- [Report template - NHI website \(england.nhs.uk\)](#)



Patient Safety

Insight

- Learning from patient safety events
- National Patient safety alerts
- Patient safety incident response framework
- Never events policy and framework

Engagement

- Framework for involving patients
- Patient safety specialists
- National syllabus

Patient safety improvement

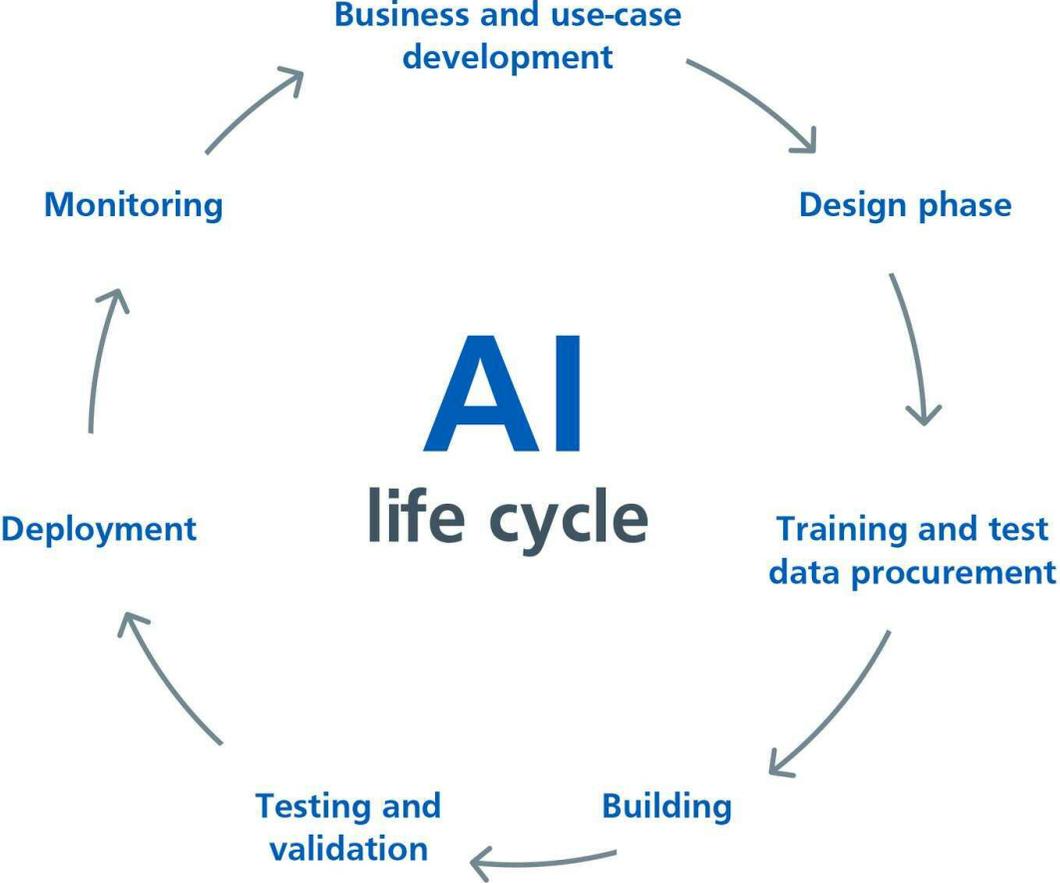
- Patient safety collaboratives
- Case studies



AI Life Cycle



AI Life Cycle



Leadership and oversight

- Define the need – focus on outcomes
- End to end oversight – link to funding and workforce development
- Provide regulatory clarity – within and between countries

- The successful implementation of AI-driven technologies into health systems requires leadership that can deliver the required digital maturity of the health system, regulatory environment and skilled workforce to make the most of AI products. Leaders must also be able to communicate clear use cases for integration of AI into health settings.



Ecosystem

- Aligning innovation with healthcare need – research priorities and appropriate funding
- Access to quality data – aggregate and link data across organisations
- Deployment/development – translate research into the development and implementation of digital applications
- Working across sectors – N.B this will likely require ‘new’ partnerships

- There is a continued need to address the entire ecosystem of AI research, development and implementation rather than just one aspect of the AI life cycle in order to create a facilitative environment for AI-driven technologies to thrive and be scaled. This ‘begins’ with data curation and aggregation of representative datasets, as well as timely and appropriate access to them.



Standards and regulation

- Clear and comprehensive AI standards – national standards to set evidence and expectations. Should be co-created with relevant disciplines and industries
- International standards for benchmarking – promote collaboration link to funding and workforce development
- Robust regulation throughout the life cycle – Transparent, proactive and flexible, recognising the distinct nature of AI driven technologies
- Ensuring the safety and quality of AI-driven technologies requires the development of rigorous standards that facilitate comprehensive regulation and are coherent across the international landscape. A lack of standardisation can result in a range of issues, including quality assurance, ethical concerns, and patient safety concerns.



Engagement

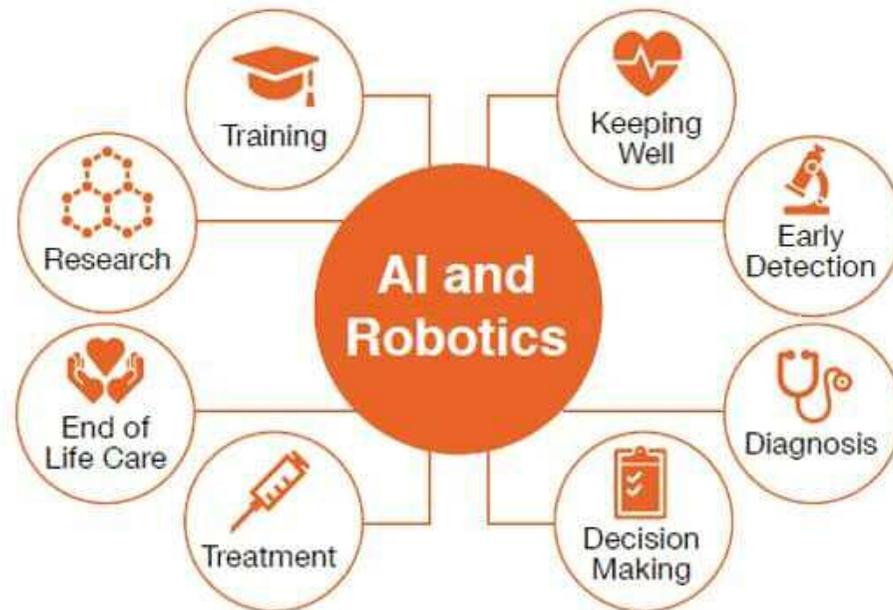
- Design with users – Patients, HCP's and others from the beginning. Needs to complement existing workflows and experience
- Demonstrable benefit – Move away from the theoretical towards concentrating on the needs of the system. This will naturally increase engagement and build trust
- Invest in education – for citizens, professionals and industry. Focus on benefits compared to conventional methods
- There is a clear need for meaningful engagement with patients, the public and healthcare professionals in decision making around AI-driven technologies in healthcare.



Transforming Healthcare



Transforming healthcare



Digital Clinical Safety



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

Digital Safety Strategy Aims



Digital clinical safety refers to the avoidance of harm to patients and staff as a result of digital technologies (i.e. Health IT) manufactured, implemented and used in the health service.

Partnership with NHS England Transformation Directorate Digital Safety Team, NHS Digital, and the MHRA

We aim to:

1

Improve the safety of digital technologies in health and care, now and in the future

2

Identify and promote the use of digital technologies as solutions to enduring patient safety problems.

Aligned to the NHS Patient Safety Strategy



Insight

- **Optimised analytics** of safety data-sets to identify improvement opportunities.
- **Evidence about best practice** in digital clinical safety.
- **Safety metrics** captured across digital programmes.



Involvement

- **Expanded training** for the NHS workforce in digital clinical safety.
- **An online one-stop portal** of digital clinical safety guidance and standards.
- **A raised profile** of digital clinical safety nationally and internationally.



Improvement

- **Opportunities for digital technology** to solve patient safety problems.
- **Application of digital solutions** to safety recommendations.
- **Embedding** digital clinical safety in policy and regulatory documents.



The future nursing workforce



Developing the nursing workforce

The Phillips Ives Review

- Using the same methodology as the Topol review
- Three expert advisory panels
 - Panel 1
 - Genomics
 - AI, data science and research
- The Panels will examine the impact of technological advances both in the ‘here and now’ and over the next 5, 10 and 20 years. They will address four key questions related to the nursing and midwifery workforce and its education and skills:
 - How are technological and other developments likely to change the roles and functions of the nursing and midwifery workforce?
 - What are the implications for the size, shape and skills of this workforce?
 - What does this mean for selection, curricula, education, training, development and lifelong learning of the current and future nursing and midwifery workforce?
 - What are the considerations for inclusion, equality and diversity?

[About The Phillips Ives Review | Digital Transformation \(hee.nhs.uk\)](https://www.hee.nhs.uk/about-the-phillips-ives-review-digital-transformation)





Thank You



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digital.nhs.uk