

Digital foundations for an AI-enabled NHS

co-authored by the
Electronic Patient Record (EPR) Network

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Executive summary

Artificial Intelligence has the potential to transform healthcare — from enabling earlier interventions and automating routine tasks, to personalising treatment and improving system efficiency. But that potential cannot be realised unless the NHS builds the right digital foundations.

This whitepaper argues that AI readiness begins not with algorithms, but with infrastructure. Specifically, it begins with Electronic Patient Records (EPRs). These systems are the primary source of the structured, real-time clinical data that AI depends on. Yet across the NHS, variation in EPR maturity, configuration, and use continues to undermine data quality and interoperability.

Without addressing these foundational gaps, national ambitions for the Single Patient Record and AI-enabled care will remain out of reach.

Drawing on the expertise of the [UK EPR Network](#) — a vendor-neutral collaboration platform convened by Healthcare Innovation Consortium — this paper presents shared insights from across the EPR ecosystem. It outlines what it means to be AI-ready, what capabilities still need to be built, and how organisations can progress safely and strategically.

Key messages include:

- EPR presence is not the same as digital readiness. Structured, complete, and real-time data must become the norm.
- AI must be embedded into clinical workflows — not layered on top — with tools that are explainable, usable, and clinician-led.
- Shared infrastructure, modular procurement, and aligned governance are essential for scalable, equitable adoption.
- Legal, regulatory, and contractual frameworks must evolve in tandem to support responsible innovation.

Together, these examples show that safe, scalable AI is not just a technology challenge — it's a systems challenge. And it starts with getting the foundations right.

This paper is a call for purposeful evolution — connecting what already exists, learning from real-world practice, and working collectively to ensure that AI can be deployed safely, sustainably, and in service of patients.

By strengthening the digital backbone of the NHS, and by fostering collaboration across sectors, the healthcare system can lay the groundwork for truly intelligent, integrated care.

Why this paper, why now

The pace of AI innovation in health is accelerating. Expectations around AI deployment are increasingly shaping national policy — from the Single Patient Record (SPR) and Federated Data Platform to the NHS Workforce Plan and the recent 10-Year Health Plan refresh. Vendors are rapidly expanding AI capabilities, and Trusts are under pressure to deliver more efficient, data-driven care.

At the same time, variation in digital maturity persists. Some providers operate advanced, embedded EPR systems with integrated decision support. Others are still transitioning off paper or face fragmented infrastructures and poor data quality.

National ambitions for AI and SPR presume a level of readiness that does not yet exist across the NHS.

This paper exists to help bridge that gap.

It does not aim to prescribe a single solution, nor to criticise where organisations are starting from. Instead, it offers collective guidance — a snapshot of practical experience and strategic insight from those working across the EPR ecosystem. It provides a grounded view of what it means to

be ‘AI-ready’, what foundational work is still needed, and how that work can be accelerated through collaboration. Now is the time to align on shared principles, strengthen digital foundations, and ensure that AI serves the NHS — safely and sustainably.

The UK EPR Network — a neutral, vendor-agnostic forum created by the Healthcare Innovation Consortium (HIC) — has authored this whitepaper to support collective progress across the NHS digital ecosystem.

Bringing together an active and growing community of Trusts, suppliers, clinicians, and policymakers, the Network aims to share learning, align on national goals, and tackle shared barriers to digital maturity.

This whitepaper shares real-world insights gathered from current members across the EPR landscape, providing a powerful resource for shaping policy, accelerating readiness, and ensuring that AI adoption is built on strong, connected foundations.



Laying the groundwork: why AI needs EPR foundations

Artificial Intelligence cannot operate in isolation. It is not a self-contained technology, but a system-level capability that depends on the quality, consistency, and accessibility of the data it consumes. In the NHS, that data resides primarily within Electronic Patient Records (EPRs). These systems hold the clinical observations, test results, treatment plans, medications, and histories that define the day-to-day realities of care. They provide the raw material from which AI tools must learn, predict, and assist.

Yet the presence of an EPR alone does not guarantee digital readiness. Many systems remain incomplete, poorly integrated, or inconsistently used. Paper persists. Data fields go unfilled. Clinical documentation is delayed or diverted into parallel systems. Under these conditions, the dataset required to support safe and effective AI simply does not exist. What is recorded may be inaccurate. What is accurate may be inaccessible. And what is accessible may not be interoperable, understandable, or actionable.

For AI to fulfil its promise — whether in diagnostics, triage, workflow automation, or population health — the underlying information architecture must meet a higher standard. EPRs must be configured to capture structured data reliably. They must be connected across care settings,

enabling longitudinal insights rather than isolated snapshots. And they must be embedded into clinical workflows in ways that clinicians trust, use, and continuously improve.

This is not just a technical exercise. It is a matter of safety, transparency, and equity. Poor data quality undermines clinical decisions. Fragmentation introduces blind spots. Datasets that fail to represent the full diversity of patients and pathways can amplify bias. The infrastructure that supports AI must therefore be intentionally designed to reflect real-world complexity, safeguard integrity, and evolve over time.

The NHS has invested heavily in infrastructure, standards, and capability. However, progress has been uneven, and national initiatives often assume a digital baseline that has yet to be achieved system-wide. If the ambition is to embed AI meaningfully into clinical care, then EPR systems must move from being passive repositories to active enablers. They must become the reliable, real-time foundation on which intelligent healthcare is built.

This paper explores what that foundation entails, and how different elements — data, integration, legal structures, and system architecture — must come together to support an AI-ready NHS.

Foundations first: data, integration, and infrastructure

A foundational challenge in scaling AI across the NHS lies in the underlying ecosystem that supports data access, integrity, and movement. AI systems depend on clean, structured, and timely information — yet in many Trusts, clinical data remains fragmented, siloed, or locked within legacy infrastructure.

Without addressing these fundamentals, any AI deployment risks being superficial at best, and unsafe at worst.

Data fragmentation: unlocking the full clinical picture

[BridgeHead Software](#) highlights a critical reality: up to 70% of patient data resides outside the core EPR — in unstructured documents, imaging

systems, laboratory databases, or even on paper. This dispersion presents a major obstacle to AI, which depends on unified, longitudinal records to detect patterns and support decision-making.

A Clinical Data Repository (CDR) provides a structured layer that aggregates disparate data sources into a single, clinically indexed environment. Using standard protocols like HL7 FHIR, a CDR can make this consolidated view accessible within or alongside the EPR, enriching clinical context and enabling downstream AI applications. As one Trust described, it has become “the second most important strategic investment after our EPR” — not just a data store, but an enabler of system-wide intelligence.

30%

of global data is
generated in healthcare

97%

of data is
not utilised

70%

of patient data resides
outside of EPRs

Interoperability and modular design: building systems that evolve

[SI-Squared](#) expands this view by emphasising interoperability as the critical infrastructure of AI readiness. They argue for a dual model of integration: vertical, linking AI tools directly with EPRs via open standards (e.g. FHIR, openEHR), and horizontal, enabling real-time communication between AI agents embedded across workflows — such as scheduling, coding, or triage assistants.

This modular approach enables Trusts to introduce AI capabilities incrementally, avoiding vendor lock-in and future-proofing their systems.

Real-time data flows, consistent entry standards, and flexible data models are not just technical ideals — they are practical requirements for safely deploying AI in clinical environments.

Legal frameworks and procurement pathways

From a legal and regulatory perspective, [Hill Dickinson](#) identifies a pressing need to align infrastructure with forthcoming national reforms. As the NHS moves toward a Single Patient Record by 2028, and prepares for new AI-focused legislation and value-based procurement models, organisations must ensure their systems — and

contracts — are ready.

How these reforms develop will hinge on patient access, vendor obligations, and system interoperability. Legal infrastructure must keep pace with technological advancement, safeguarding compliance while enabling innovation. Procurement must shift from one-off solutions to flexible, modular platforms that can accommodate AI evolution without starting over.

Shared care records: broadening the foundation beyond the hospital

[Orion Health](#) brings attention to the importance of shared care records as an extension of the EPR ecosystem. While EPRs capture detailed data within Trusts, they argue, shared care records link these insights across primary, secondary, community, and social care — forming the broader foundation needed for population-level AI tools.

Drawing from experience in Project Endeavour, Orion emphasises the value of embedding AI pilots within existing shared platforms, enabling evaluation and scale without duplicating infrastructure. This approach reduces costs and fragmentation, but also supports equitable access across providers and regions.

Across all contributions, the message is clear: AI-readiness begins with data — not just its presence, but its structure, flow, legal clarity, and clinical relevance. The next section explores how these foundations apply in practice: embedding AI into real clinical workflows with safety, trust, and usability at their core.

Clinically embedded AI: safety, workflow, and trust

Digital foundations alone do not make a health system AI-ready. Safe and meaningful implementation depends on how AI is introduced into clinical practice — not as a standalone tool, but as part of the care workflow. For AI to support decisions, reduce burden, and improve outcomes, it must be aligned with the realities of clinical work: intuitive, explainable, context-aware, and trusted.

From augmentation to automation: embedding intelligence into care pathways

[Altera Digital Health](#) underscores the principle that AI should be built into, not bolted onto, clinical systems. They worked with Gloucestershire Hospitals NHS Foundation Trust to integrate the AI model — the Long Stay Score — directly into the EPR to flag patients at risk of becoming long-stay early in their admission. By surfacing predictions within the patient record, clinicians can act on them during routine care, rather than in isolated dashboards or disconnected tools.

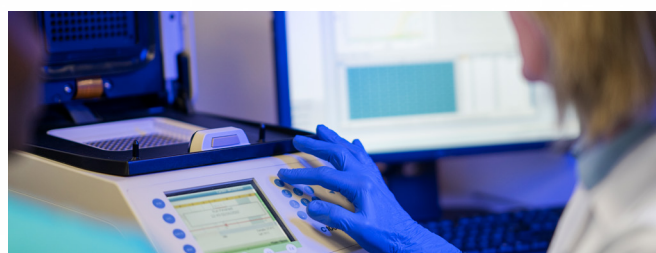
This embedded approach shifts AI from abstract potential to practical utility. Tools like ambient AI for passive documentation, task summarisation, and early warning indicators are only valuable if clinicians can understand and act on them without leaving their workflow.

As Altera Digital Health stresses, explainability and user-centred design are not optional. If outputs are not interpretable, they are not safe.

Feedback loops and alert design: learning from real-world use

[Dedalus](#) provides a case study from Vivantes Hospital Group in Berlin, where AI was deployed to detect early signs of sepsis and delirium. Alerts were integrated into the patient header in the EPR, with a direct link to detailed context and recommended interventions. Clinicians could also rate each alert for relevance and timing, feeding those evaluations back into the system to improve future performance.

This continuous feedback mechanism is essential. Over-alerting, false positives, or opaque decision logic erode trust and increase risk. AI systems must be adaptive — learning not just from data, but from the clinicians who use them. User feedback



becomes part of the model lifecycle, improving accuracy and maintaining alignment with clinical needs.

Validating AI, step by step

From pilot to scale, AI adoption must be phased, evaluated, and clinically led. Orion Health emphasises this staged approach through its work on Project Endeavour. Algorithms are first tested on de-identified data, with clinicians reviewing outputs before deploying them into live workflows. Only when they demonstrate value— and assure safety — does the Trust move the system toward production.

This methodical progression allows Trusts to maintain control, build confidence, and avoid the pitfalls of premature rollout. It ensures that AI supports — rather than disrupts — system priorities and operational pressures.

Clinician-centred design: building trust by design

SI-Squared draws attention to the broader human factors that shape AI success. Technical accuracy alone is insufficient. Trust depends on transparency, early clinician involvement, and active review and feedback mechanisms. Their practical guidance includes embedding validation checks in workflows, simplifying interfaces, and ensuring every automated recommendation is traceable and explainable.

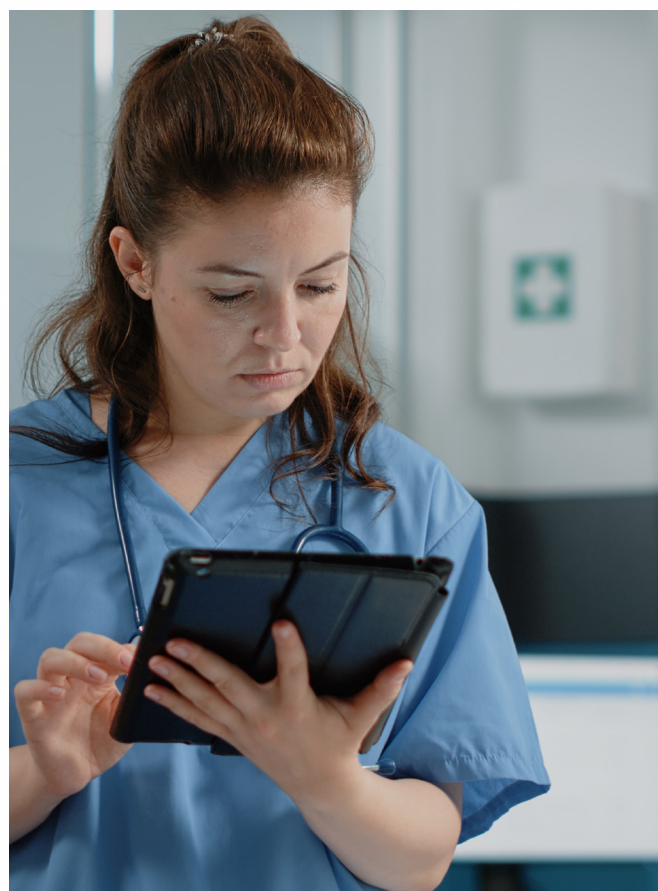
They also stress the importance of starting with small, high-impact use cases — such as clinical

documentation, appointment scheduling, or coding — where AI can reduce burden without high risk. These early wins help build familiarity and demonstrate value before expanding into more complex domains.

Together, these contributions reinforce a core principle:

AI must serve clinicians, not the other way around.

Safety, workflow alignment, and trust are not soft considerations — they are prerequisites for impact. The next section turns to the strategic enablers that underpin this alignment: governance, collaboration, and scalable design.



Strategic enablement: governance, collaboration, and scaling

As AI moves from concept to application, its success will not be determined solely by technology. Governance, policy alignment, and the ability to scale across diverse environments are equally critical. Without these enabling structures, even the most sophisticated tools risk becoming isolated pilots rather than embedded solutions.

Governance as a foundation, not a formality

SI-Squared makes clear that:

Governance is not a box-ticking exercise.

Governance ensures systems define accountability, assess risk, and deploy AI safely and responsibly. Clear frameworks are needed at both local and national levels — defining who is responsible for model validation, how decisions are monitored, and what happens when outputs conflict with clinical judgement.

These frameworks must also encompass compliance with data protection, ethical use, and clinical safety standards. Real-time AI applications often involve sensitive patient data and high-stakes decisions. Without robust oversight, the potential for harm — to patients,

clinicians, and trust in the system — increases.

Equally, governance must remain adaptive. As AI systems evolve through continuous learning or are repurposed for new contexts, oversight structures must evolve with them. Risk is not static. Regulation should evolve accordingly.

Aligning with national strategy: legislation, procurement, and readiness

Hill Dickinson highlights the shifting policy environment around AI and digital infrastructure. The NHS's commitment to a Single Patient Record (SPR) by 2028, combined with proposals for new legislation to support AI integration, will have significant implications for providers, vendors, and regulators alike.

Legislative clarity will be crucial. For example, what rights will patients have over AI-generated decisions in their records? What standards will ensure transparency and auditability? How will SPR legislation interface with procurement frameworks that historically prioritise lowest cost rather than long-term interoperability?

Equally, procurement models must evolve. One-off, siloed purchases of AI functionality will not suffice. As Hill

Dickinson notes, NHS England's shift toward value-based procurement and internal marketplaces suggests a move toward modular, standards-aligned platforms. Organisations must ensure their contracts and supply chains are structured to accommodate this future — so they can safely and scalably introduce innovation without restarting from scratch.

Scaling AI through connected infrastructure

Finally, Orion Health reinforces that scaling AI is not simply a matter of replicating pilots. System-wide adoption depends on interoperability, shared standards, and platforms that can support multiple organisations with consistency. Their work on Project Endeavour demonstrates how embedding pilots into shared care records enables coordinated, cross-provider innovation.

Such approaches reduce duplication, lower costs, and help ensure that AI does not become yet another source of digital inequality. As more Trusts become AI-capable, the risk is that progress becomes patchy — reinforcing variation rather than resolving it. Nationally aligned platforms offer a way to counter this, providing a common technical and governance layer that equitably distributes innovation.

**Strategic enablement
is where operational
readiness meets long-term
sustainability.**

Governance frameworks, legal scaffolding, and shared infrastructure are not ancillary to AI — they are what make scale and safety possible. In the next section, we examine how real-world case studies from across the EPR ecosystem already apply these principles in practice.



Case study snapshots

Real-world examples illustrate how NHS organisations and their partners are laying the groundwork for AI through embedded, clinically focused and governance-aware implementations. The following case studies demonstrate how NHS teams and their partners are translating the principles of AI readiness into practice. Despite differences in context, each example reflects a consistent pattern:

- **AI should be embedded, not bolted on** — teams must integrate tools directly into clinical systems and workflows, not layer them as standalone platforms.
- **Data quality and access are non-negotiable** — clean, structured, and real-time information remains the bedrock of safe AI use.
- **Clinician trust is actively earned** — success depends on explainable outputs, intuitive design, and continuous user feedback.
- **Progress should be phased and controlled** — deployments begin with de-identified data and pilot testing before scaling safely.
- **Collaboration multiplies value** — shared infrastructure, such as care records, enables equitable access and reduces duplication.

Together, these examples show that safe, scalable AI is not just a technology challenge — it's a systems challenge. And it starts with getting the foundations right.

Case Study 1: Predicting Long Stays with AI — Gloucestershire Hospitals NHS Foundation Trust & Altera Digital Health

Context

Hospital flow is a persistent operational challenge. Identifying patients at risk of extended length of stay early in their admission can improve discharge planning, resource allocation and overall efficiency. However, such predictions are often underutilised due to lack of integration into routine care workflows.

Solution

Gloucestershire Hospitals NHS Foundation Trust partnered with Altera Digital Health to introduce the Long Stay Score — an AI model that identifies patients at risk of becoming long-stay admissions. Crucially, the model is embedded directly into the Trust's Sunrise EPR, surfacing insights within the existing clinical interface and supporting decision-making in real time.

Impact

- The system alerts clinicians early to potential long-stay patients
- It delivers alerts directly into normal workflows, not as separate dashboards
- Earlier planning enables more proactive resource use and discharge coordination
- The model generates outputs that are passive, interpretable, and actionable, avoiding additional user burden

AI Readiness Themes

- Embedded intelligence within the EPR
- Workflow-aligned design
- Explainability and clinical usability
- Real-time data capture and use



Case Study 2: Early Risk Detection at Scale — Clinalytix at Vivantes Hospital Group with Dedalus

Context

Vivantes Hospital Group, Germany's largest municipal hospital

network, identified early detection of high-risk conditions such as sepsis and delirium as a clinical priority. To address this, the organisation needed a solution that was both data-rich and clinically trusted.

Solution

Working with Dedalus, Vivantes deployed the Clinalytix AI platform within the ORBIS EPR. The system continuously analyses structured patient data — including labs, observations and documentation — to flag potential deterioration. It displays alerts in the EPR header alongside the patient's name, with one-click access to detailed insights and recommendations.

Clinicians can also rate each alert, contributing to continuous system learning and refinement.

Impact

- The system generates alerts in real time within the EPR, avoiding any disruption to clinician workflows
- Clinicians assess and improve the quality of alerts through built-in feedback tools
- User-led model refinement reduces alert fatigue and increases relevance
- The Vivantes Hospital Group is extending the approach to other risks, including AKI, hypertensive crisis, pressure ulcers

AI Readiness Themes

- Real-time data monitoring within the EPR
- User feedback loop for continuous improvement
- Clinician oversight and transparency
- Adaptive deployment across multiple conditions



Dedalus

Case Study 3: Scaling Safely and Equitably — Project Endeavour by Orion Health

Context

Many AI initiatives within healthcare fail to move beyond proof of concept. Orion Health recognised that Trusts needed a repeatable, safe, and scalable framework for adopting AI — one that would build on existing infrastructure and avoid duplication or digital inequality.

Solution

Project Endeavour is a national-scale initiative led by Orion Health in partnership with HEALWELL AI. It embeds AI pilots within existing shared care records, allowing organisations to test algorithms on de-identified data, validate outputs with clinicians, and scale only when clinicians confirm the value and the system demonstrates operational readiness.

Impact

- They can test AI tools in a controlled, safe environment
- Shared care record infrastructure reduces fragmentation and supports multi-site adoption
- Clinical validation is built in from the start, helping build trust and relevance
- Teams build pilots as templates, not isolated experiments, making scaling more efficient and repeatable

AI Readiness Themes

- Phased, risk-managed implementation
- Use of existing shared care infrastructure
- Alignment with national interoperability goals
- Cross-organisational equity and scalability



Conclusion: building an AI-ready NHS, together

Artificial Intelligence offers the NHS an opportunity to deliver care that is more proactive, personalised, and efficient. But algorithms alone cannot deliver this future. It requires a system-wide commitment to strengthening the digital foundations that AI depends on — particularly the quality, interoperability, and usability of Electronic Patient Records.

This whitepaper has shown that while progress is being made, the journey is far from complete. Data remains fragmented, infrastructure varies, clinician engagement is uneven. National ambitions for AI and the Single Patient Record require a level of digital readiness that many providers have not yet reached. The path forward is not disruption, but evolution. It lies in optimising and connecting what already exists — embedding AI into workflows, not layering it on top; building shared infrastructure, not standalone solutions; and enabling safe, scalable innovation through governance, transparency, and trust.

No single organisation can deliver this alone. Real progress demands collaboration: between vendors and Trusts, policymakers and frontline teams, technologists and clinicians. The UK EPR Network brings these stakeholders together through a neutral, non-commercial platform that enables shared learning, coordinated

action, and collective influence.

By working together, we can ensure that the AI tools of tomorrow are built on systems that are ready, trusted, and centred on patient care. The opportunity is real — but it starts with foundations.



Current EPR Network members (Aug, 2025)

Acknowledgements

This whitepaper reflects the collective priorities and shared insights of the UK EPR Network. While only a subset of members contributed insights and case studies to this edition, the perspectives and discussions across the full membership have shaped its themes and direction.

We would like to acknowledge the contributions of the following companies to this report:

- Altera Digital Health
- BridgeHead Software
- Dedalus
- Hill Dickinson
- Orion Health
- SI-Squared

Current members of the UK EPR Network include:

- Aire Innovate
- Altera Digital Health
- BridgeHead Software
- CLEO Systems
- Dedalus
- DigiSafe
- Harris Healthcare Alliance
- Hill Dickinson
- IGEL Technology
- Integrella
- InterSystems
- Orion Health
- Ready Computing
- SI-Squared
- System C

Participation in the Network does not imply endorsement of any specific content in this publication.

Summary of key recommendations

To safely scale AI across the NHS, organisations must focus on the following:

Strengthen the foundations

- Optimise EPRs for structured, real-time data capture.
- Consolidate fragmented data through tools like Clinical Data Repositories.
- Prioritise interoperability using open standards (e.g. FHIR, openEHR).
- Align infrastructure with national goals, including the Single Patient Record by 2028.

Embed AI into clinical workflows

- Integrate AI tools directly into the EPR, not as standalone systems.
- Design for usability, explainability and clinician trust — outputs must be actionable.
- Start with low-risk, high-impact use cases like coding, documentation, or scheduling.
- Use feedback loops to continuously refine AI models in real-world settings

Ensure safe, scalable deployment

- Phase adoption: test on de-identified data, validate clinically, scale only when ready.
- Maintain robust governance across safety, ethics, compliance, and oversight.
- Support clinician leadership in AI implementation and evaluation.

Position for national readiness

- **Track and align with evolving policy** on AI legislation, procurement, and digital maturity.
- **Prepare legal and contract frameworks** to support data sharing, compliance, and patient rights.
- **Engage with the UK EPR Network** to stay connected, informed, and aligned with best practice.

Prepare for Legal and Regulatory Change

- **Anticipate legislation** related to the Single Patient Record (SPR) and AI governance. NHS organisations should monitor emerging laws defining patient rights, provider responsibilities, and system requirements.
- **Review contracts now** to ensure they support modular, interoperable, and AI-compatible systems. Avoid lock-in and allow for safe integration of future innovations.
- **Align procurement with future models** such as value-based purchasing and internal NHS marketplaces. Procurement strategies must evolve to support flexible, multi-vendor digital ecosystems.
- **Engage legal advisors early** to ensure governance, data sharing, and procurement frameworks are compliant and future-ready.



About Healthcare Innovation Consortium (HIC)

HIC is a leading independent digital health consultancy that helps organisations design, implement, and scale healthtech solutions that improve patient outcomes and system efficiency. With a mission to put people at the heart of digital transformation, HIC works across the public and private sector to drive meaningful innovation.

To learn more about HIC's EPR consultancy services, visit:
www.hicdigital.co.uk/nhs-epr-transformation/



About Capgemini

Capgemini is a global consulting and digital transformation leader, serving as the Strategic Technology Partner and Founding Sponsor of HIC's EPR Network. Together, they will provide strategic expertise and help drive EPR adoption, interoperability, and digital maturity across NHS Trusts through collaboration and Specialist Interest Groups.



About the Electronic Patient Record Network

This whitepaper is brought to you by the Electronic Patient Record (EPR) Network, an industry-funded community founded by Hadleigh Stollar, Chief Executive at Healthcare Innovation Consortium (HIC). Recognising the need for a unified platform, Hadleigh launched the EPR Network to bring together EPR vendors, suppliers, and health innovators

— building stronger partnerships with each other and with the NHS to accelerate progress in digital healthcare. The network's mission is to shape and influence policy around EPRs, while fostering meaningful collaboration that improves patient care through better use and integration of digital systems across the health ecosystem.

If you're interested in learning more or joining the network, visit:
www.hicdigital.co.uk/epr-network/