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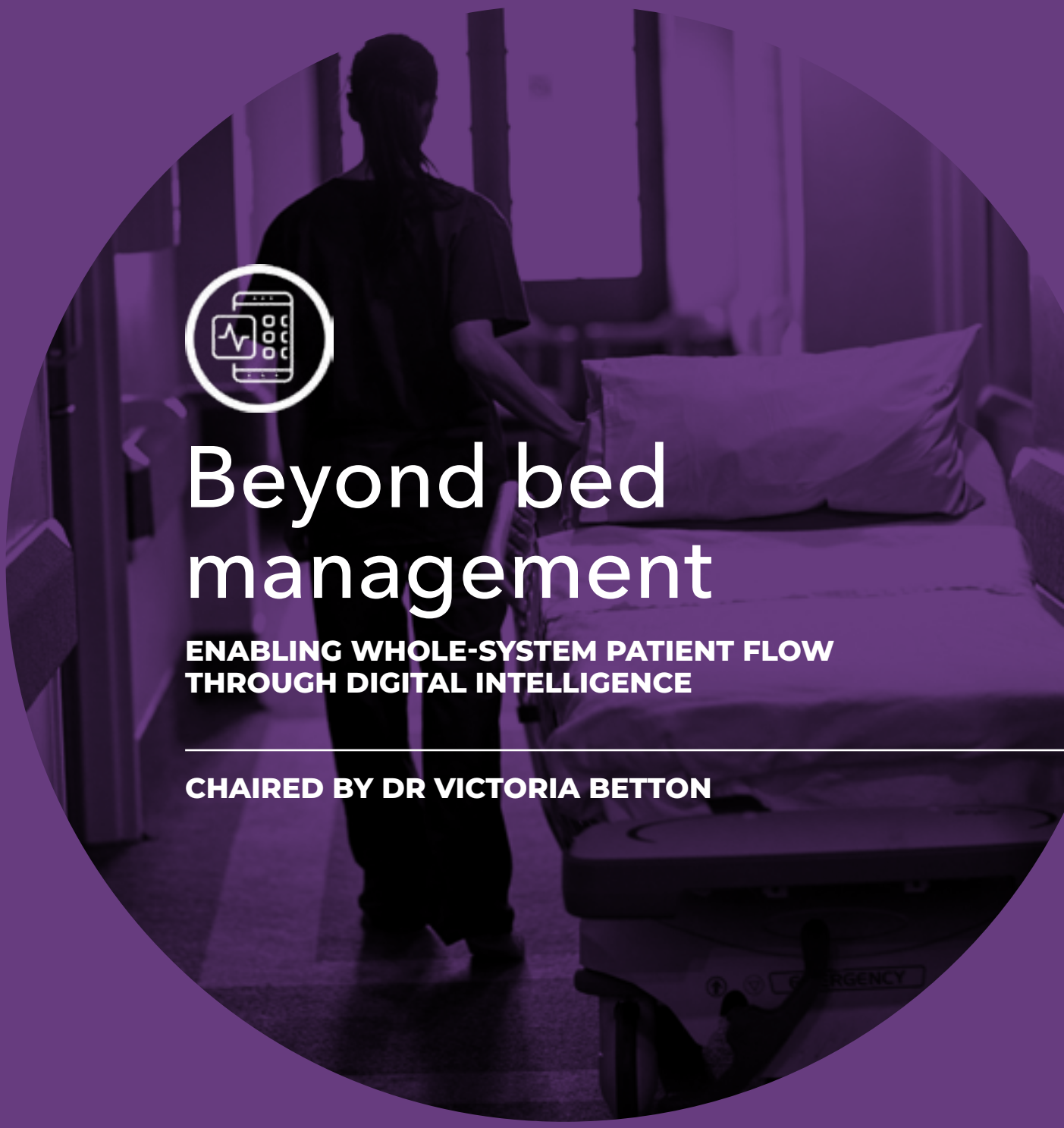

Beyond bed management

ENABLING WHOLE-SYSTEM PATIENT FLOW THROUGH DIGITAL INTELLIGENCE

CHAIRED BY DR VICTORIA BETTON

ALCIDION

Contents

ABBREVIATIONS

10YHP	10 Year Health Plan for England	**INT**	Integrated neighbourhood team
EPR	Electronic patient record	**NHSE**	NHS England
FHIR	Fast Healthcare Interoperability Resources	**PPP**	Public Policy Projects

Key Information

ABOUT PPP

Public Policy Projects (PPP) is an organisation operating at the heart of health and life sciences policy delivery. We bring together senior leaders and practitioners in the public and private health and life sciences sectors to find realistic solutions to the most pressing issues relating to health and care delivery.

ABOUT THE DDT PROGRAMME

PPP is convening a coalition of senior stakeholders to advance practical recommendations for transforming health and care services. The coalition brings together leaders from the NHS, integrated care systems, social care, local government, and industry.

The Digital and Data Transformation (DDT) Programme explores how digital and data can drive integration, improve productivity, and enable long-term sustainability in health and care. Through a series of targeted roundtables, PPP generates actionable insights and recommendations that support the government's long-term health policy goals and ensure that digital technology is at the core of future service delivery.

ACKNOWLEDGEMENTS

This report, authored by Fredrik Matre (Programme Executive at PPP), summarises the insights from a roundtable organised by PPP on 18 March 2026, supplemented with supporting and contextual evidence. The roundtable was chaired by Dr Victoria Betton, Director for Digital, Data and AI at Health Innovation Kent Surrey Sussex, and held under the Chatham House rule. A full list of roundtable attendees is included at the end of this report.

Alcidion has provided sponsorship for this report and the roundtable from which it draws. Representatives of Alcidion – namely Tracy McClelland and Dr Paul Deffley – participated at the roundtable to share clinical and subject matter expertise as prompted, with Darren Ransley attending as an observer. PPP has retained full editorial control over the roundtable agenda and report contents. The views and opinions expressed in this report do not necessarily reflect those of PPP nor Alcidion, nor should it be presumed that any view or opinion is necessarily reflective of any individual participant of the roundtable.

PPP expresses thanks to Ishan Khalsa and Diarmaid Crean for reviewing earlier drafts of this report, providing feedback and further supplementary research. Neither reviewer bear any responsibility for errors or omissions in this report.

NEXT STEPS

The roundtables and their related insight reports from PPP's DDT programme can be found on PPP's website. Insights from the DDT programme inform deliberations in the Data and Digital Innovation Theatre at PPP's twice-annual Integrated Care Delivery Forum.

Stakeholders interested in contributing to these discussions can contact David Duffy, PPP's Head of Content and Policy, at David.Duffy@PPPInsight.com

Foreword

DR VICTORIA BETTON
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Healthcare systems today face an enduring challenge: ensuring smooth and effective patient flow across the entire care ecosystem. Patient flow is not simply a logistical issue. It reflects how well we are able to coordinate care, anticipate needs, enable professionals to do their jobs and support patients.

It was my privilege to chair this roundtable discussion, convening experts from the NHS, industry and academia all with well-informed and nuanced understandings of how digital intelligence can help operationalise the 10-Year Health Plan for England's three major shifts. What emerged was a rich and thoughtful dialogue that went far beyond the technicalities of digital tools, touching on governance, human-centred design, and the very culture of healthcare delivery.

One of the most compelling sentiments shared by participants is that patient flow is fundamentally a governance challenge. Technology alone cannot solve systemic issues. It must be embedded within redesigned workflows and governance structures that clarify accountability and enable teams to apply actionable intelligence. Without this alignment, even the most advanced digital tools risk becoming underutilised or misapplied.

Too often, digital tools are implemented without sufficient engagement, onboarding or training for the people asked to use them. Participants emphasised user-centric design and continuous patient engagement as essential to uncovering pain points and designing and implementing solutions that truly meet the needs of end users. If we are to foster a culture of innovation and trust within the NHS, we need to ensure that technical tools function as enablers rather than blockers.

While there is much work to be done to address hurdles to digital transformation, roundtable participants highlighted exciting opportunities to leverage digital intelligence for proactive care and population health management. From cohort segmentation to two-way communication systems, digital tools can enable integrated neighbourhood teams to anticipate demand, reduce acute pressures, and enable patients to manage their health. However, as several participants pointed out, these opportunities hinge on interoperability. If systems cannot share data seamlessly, the insights they generate will remain siloed, fragmented and underutilised.

As the NHS continues its journey of digital transformation, we must keep in mind what one roundtable participant emphasised: *"Digital enablement must place the patient at the centre of change rather than digitise existing analogue workflows that are unfit for digitisation."*

I am grateful to all participants for their thoughtful contributions, and I hope this report provides actionable insights to guide your next steps in operationalising whole-system patient flow.

Key Insights

- Patient flow challenges arise from governance failures, requiring aligned decision rights and accountability across pathways rather than solely technical fixes.
- Interoperability of digital tools is foundational for them to move beyond visibility to empower teams with actionable intelligence, coupled with operational decision-making authority.
- Integrated neighbourhood teams need decentralised authority and actionable data to effectively redesign services and manage patient flow locally.
- Proactive cohort segmentation and preventative management in community settings reduces acute pressures by enabling healthcare teams to anticipate demand and activate patients.
- User-centric design and continuous, direct engagement with clinicians and patients ensures digital tools address real-world needs.
- Cultural change, training, and leadership buy-in are essential to overcoming implementation barriers and fostering workforce alignment for digital transformation.

Recommendations

1. NHS organisations should ensure that flexible governance structures empower local integrated neighbourhood teams with decision-making authority, clarifying accountability for cohorts at every step of their care journey.

2. Commissioners and procurement teams must ensure that tenders for any electronic patient record or other digital tool include explicit, testable interoperability use cases, aligned to national standards (e.g. UK Core FHIR), with pre-defined acceptance criteria, open APIs, and financial/contractual penalties for failure to deliver functional interoperability in real-world workflows.

3. Ensure that NHS England funding earmarked for digital transformation in community settings is properly allocated to equip neighbourhoods with digital tools that support cohort segmentation, risk stratification, and preventative management, enabling healthcare teams to anticipate demand and proactively advance population health improvements.

4. Any NHS digital transformation project must be overseen by a multidisciplinary change management team. This team must ensure that tool implementation is driven by continuous engagement with clinicians, technical staff, and patients to align digital solutions with real-world workflows, localised workforce strategies, and targeted training through a sustained user-feedback loop.

Roundtable findings

INTRODUCTION: PERSISTENT BLOCKAGES OF FLOW

> *Poor flow isn't just an administrative inconvenience – it's a matter of life and death*
> **Nick White and Dr Paul Deffley (2025)**[1]

The issue of insufficient patient flow both within acute settings, as well as discharges from acute to primary, community or domiciliary care settings, is persistent. It is a wicked problem, in the sense that it can never be completely resolved. But that does not mean that flow cannot be improved. Rather, it is possible for reorganisation of procedures, pathways and interorganisational responsibilities to simplify patient flow, increase care efficiency and effectiveness, and provide greater value for clinicians, patients and the taxpayer.

> **Patient flow** is defined by the NHS as the movement of patients between departments, staff groups or organisations as part of their care pathway. The NHS furthermore defines continuous flow as patients moving from one step in their care to the next without delay.[2]

Mahnaz Samadbeik and colleagues categorise patient flow problems into three distinct domains: "population (patients and providers), capacity, and process."[3] The management of these domains is what patient flow management refers to, encompassing – but not exclusively defined by – bed management. Poor patient flow management "lead[s] to disruptions within the healthcare system, affecting the overall quality and effectiveness of care delivery" with effects such as overcrowding and delays to care that can cause patient deterioration.[4]

The different interventions to address these patient flow challenges are categorised by Samadbeik and colleagues as: "human factors, management-organisation interventions, and infrastructure."[5] Each one of these are naturally co-dependent on each other to function optimally. Furthermore, interventions can be (and usually are) composed of a combination of these domains.

Much of the literature focuses on within-hospital or within-emergency department blockages, though scholarship is increasingly examining whole-system flow — as illustrated by Nguyen and colleagues' finding that only nine per cent of eligible studies on health information systems examined network-wide interventions.[6]

To ensure better patient flow, focus needs to be on the entire patient journey, rather than narrowly focusing on incremental improvements to intra-hospital or intra-departmental transitions. Whole-system flow, not just bed management, is key to operationalising the 10-Year Health Plan (10YHP) for England's three major shifts: hospital to community; analogue to digital; sickness to prevention.

DIGITAL INTELLIGENCE: TOOLS FOR ACTIONABLE INSIGHTS

System-wide visibility and accountability across pathways – including primary and secondary as well as community (including domiciliary and virtual) care settings – is crucial to improving the effectiveness of care provision. But the enormous complexity of healthcare, both in the heterogeneity of clinical challenges as well as the tools employed, makes this a particularly difficult challenge. Digitalisation requires, as PPP has previously noted, *"more than new tools and software."*[7]

> *We need to understand how systems actually behave in order to facilitate those systems [through] design.*
> **NHS data specialist**

Roundtable attendees shared consensus on the stance that digital tools have great potential in improving patient flow. But the challenge is less technical than it is organisational, as articulated by one NHS clinical information leader: *"Flow is a governance problem rather than a bed management problem. Flow failures persist because decision rights, accountability, and ownership are misaligned across pathways, not because we lack dashboards."* There isn't necessarily a lack of tools already employed. Rather, there is a lack of ability to use them most effectively.

NHS England (NHSE) first began large-scale digital transformation efforts in 2002 with the National Programme for Information Technology, focusing initially on equipping systems with electronic patient records (EPRs) to facilitate information sharing across NHS organisations. Today, 94 per cent of NHS acute trusts in England have an EPR, marking the near-completion of NHSE's Frontline Digitisation programme.[8] Reflecting this, the forthcoming Frontline Productivity programme will shift *"with added focus on infrastructure, cyber security and change."*[9]

While EPRs have been widely adopted, their impact remains mixed. A 2024 Health Foundation survey found that 57 per cent of clinicians who use EPRs identified EPRs as their most time-saving technology.[10] This is much needed time-saving: a recent study observing 137 resident doctors for four hour periods across multiple NHS hospitals found that 73 per cent of their time is spent on non-patient-facing tasks with only 17.9 per cent spent on direct patient care.[11] However, the same study revealed that EPR users spent more time on administrative tasks than paper users (44.1 vs. 37.3 per cent of total time).

The universality of EPR deployment is – as noted by the Health Foundation – necessary, as *"without the infrastructure provided by these systems, the NHS will not be able to capitalise on innovations such as AI tools for prevention or risk identification."*[12] But near-universal EPR use is only the first step. As one roundtable attendee pointed out, and as was confirmed by the NHSE-commissioned Digital Maturity Assessment programme, only ten to thirty per cent of deployed EPRs provide advanced functionality such as record sharing between hospitals.[13]

NHSE and the Department of Health and Social Care's joint 'NHS tech, digital & data delivery plan' (unpublished but purportedly leaked to Future Health Intelligence) seems to back this up: *"NHSE's focus is no longer EPR acquisition, but on workflow automation, productivity tools and EPR optimisation."*[14] The planned £7.4 billion being invested into NHS technology, data and digital capacity up until 2030 is projected to deliver 49 per cent of the 10YHP's productivity targets, with at least half of those investments being made in community settings.[15]

'Left shifting' care to the community is not simply a matter of discharge processes, but of pathway design, shared ownership, and coordinated decision-making across services. Too often, digital investment has prioritised documentation and retrospective reporting rather than real-time operational intelligence. This has left leaders without a clear, system-wide view of demand, capacity and risk. Bed management, while important, represents only one component of a much wider flow architecture.

Optimising hospital throughput does not necessarily equate to stabilising system-wide cohorts or managing risk across neighbourhood pathways. Flow intelligence must support ownership of patients and risk beyond the hospital setting.

Patient flow is not simply about bed management, but requires action on interdependencies:

- **Anticipating demand** through proactive cohort segmentation and preventative management, rather than responding solely to acute pressure.

- **Clarifying accountability** at the level of the individual patient; understanding who holds responsibility at each stage of the pathway, and how that responsibility is transferred.
- **Identifying and addressing delays** at transition points, particularly at the acute–neighbourhood interface where operational insight can be limited.
- **Coordinating activity** across clinical teams, neighbourhood services, social care and virtual provision, including alignment of workforce capacity with system demand.
- **Aligning operational decisions** with patient outcomes and experience, supported by appropriate clinical risk management and clear decision rights.
- Ensuring that digital insight confers not only visibility but **meaningful decision rights**, enabling neighbourhood teams to act on intelligence rather than simply observe it.

Digital tools can provide the feedback loop needed to support continuous improvement. While hospitals depend on safe and timely movement between wards and specialties, whole-system flow depends equally on the effectiveness of neighbourhood services, workforce coordination and shared situational awareness across partners.

CASE STUDY: DIGITAL INTELLIGENCE USING EPR DATA TO IMPROVE FLOW

Background

Herefordshire and Worcestershire Health and Care NHS Trust provides community nursing, therapy, mental health, and learning disability services across the two counties. Within this remit, it operates seven community hospitals in Worcestershire, each reliant on manual processes, including phone calls and emails, to manage bed capacity and patient flow. The Trust identified this administrative burden as a significant inefficiency and sought a digital solution to modernise its approach.

Intervention

The Trust implemented Alcidion's Miya Precision platform – a modular intelligent care platform that overlays existing systems to deliver clinical and operational applications – deploying it initially to provide real-time visibility of bed capacity, pending discharges, and discharge activity across its community hospital wards. The platform integrates clinical and patient data with the Trust's existing patient administration system using the Fast Healthcare Interoperability Resources (FHIR) standard, creating a trust-wide orchestration layer without requiring wholesale replacement of existing infrastructure.

The rollout followed a phased approach. The first phase centred on establishing a new bed management workflow across community hospital wards. Miya Flow digital journey boards were configured to reflect the trust's community care pathways, consolidating discharge-relevant information, including transport arrangements, social care provision, take-home

medications, and destination details, into a single view for ward staff. This enables teams to identify potential delays in the discharge process earlier and coordinate care more effectively.

Outcomes

During the first phase of the programme, average patient length of stay fell by approximately five days, a reduction of more than 15 per cent. This was accompanied by improvements in discharge planning and a reduction in estimated discharge date breaches. Staff reported that having clear, accessible information in a single view supports more proactive planning, including earlier identification of outstanding arrangements around medication, transport, and onward care. Operational leaders also noted improved visibility of patient flow across wards, supporting more effective coordination and earlier intervention when delays arise.

Current status and next steps

The Trust has now entered the second phase of the programme, deploying Miya Command, which provides a live view of bed capacity, discharge activity, and patient flow across services. This is particularly relevant during periods of heightened demand, such as winter pressures, when bed availability across the system becomes critical to the trust's ability to support neighbouring acute organisations.

Looking ahead, the Trust plans to extend the Miya Precision platform into mental health services in 2026, and is pursuing interoperability with its EPR to support alignment with *wider* integrated care system priorities.

INTEROPERABILITY: A MUST, NOT A NICE-TO-HAVE

Interoperability is a core precondition for getting real value out of EPRs and digital health tools. Yet NHS organisations still struggle with multiple systems and databases that neither co-function nor share information, necessitating time-consuming and potentially inaccurate manual duplication. Interoperability solutions are, as Amir Torab-Miandoab and colleagues term it, *"the key to overcoming some of the industry's most difficult challenges, and they promise to drastically cut healthcare costs."*[16]

Technical interoperability between systems employed by health and care providers is set out in standards. These standards underpin the mechanisms for interoperability that commissioned systems must conform to.

Interoperability in health and social care is defined by NHSE as *"the capability for people involved in the provision and receipt of care to interact and complete a task across software and organisational boundaries; and use equipment, systems, or products from different vendors, which operate together in a coordinated fashion, with minimal to no human intervention."*[17] It can be further defined in granular detail, with differences between technical, structural and functional interoperability, among others.[18]

Apart from mandatory compliance – as set out in the Health and Social Care Act 2012 – with the DCB0129 and DCB0160 standards for health IT systems application of clinical risk management in manufacture and deployment (respectively), there is international industry agreement on adherence to the FHIR standard. NHSE's Interoperability Toolkit provides the set of national standards, frameworks and implementation guides that support interoperability within local organisations and across local health communities, with FHIR as key.

Roundtable participants agreed that in most cases, sufficient standards already exist, but compliance and implementation may still need further work: *"the knowledge is there, the standards are there, everything's available, it just needs adoption."*

Interoperability is not an unachievable dream. The roundtable firmly agreed that industry has already prioritised interoperability as key to product offerings considered for commissioning. The onus should not fall on individual trusts to engineer workarounds: *"we shouldn't be fiddling and creating new things to make things interoperable, we should just buy that infrastructure."*

The effectiveness of technical solutions to address interoperability challenges depends on coordinated policy mandates and vendor cooperation, user-centred design processes involving both clinicians and patients at all stages of system development, deployment and training, and robust governance frameworks.

DIGITAL OPERATIONALISATION OF NEIGHBOURHOOD-BASED CARE

Digital tools can enable integrated neighbourhood teams (INTs) to operationalise the shift from hospital to community at scale. Doing so necessarily involves decentralising decision-making, providing INTs with actionable data, and fostering trusting relationships between specialists and the neighbourhoods they serve.

Integrated care boards must be confident, according to one NHS leader attending the roundtable, to *"push all the authority down towards the neighbourhood teams".* Entrusting local stakeholders with the resources and decision-making power to redesign services based on local needs is key to ensuring that INTs can act on the intelligence digital tools provide.

Using digital tools as catalysts for service redesign is *"massively empowering"* for INTs and enables innovative, citizen-centric solutions tailored to local needs. But such empowerment is contingent on appropriate governance structures.

Roundtable participants identified misaligned governance as one of the root causes of poor patient flow. Actionable intelligence is only actionable if INTs have both authority to act and clear accountability. Misaligned decision rights and accountability create bottlenecks across acute and neighbourhood settings.

Governance structures should clarify who holds responsibility at each stage of the patient pathway, ensuring smooth transitions between acute and neighbourhood settings. There is already evidence for this need; Andrey Elizondo's review of governance structures for regional shared care records emphasises *"the necessity of continuous adaptation and negotiation among stakeholders in establishing effective governance of integrated care infrastructures."*[19] Accountability frameworks must include actionable decision rights for neighbourhood teams, enabling them to act on intelligence rather than passively observe data.

Such structural empowerment of INTs allows for informed, proactive decision-making. With a

real-time view of patient cohorts, coupled with intelligence tools providing actionable insights, INTs can anticipate patient needs, coordinate care, and reduce delays at transition points.

Digital tools can also support patients directly to care for themselves before they become acutely unwell, with self-management acting as secondary prevention relieving demand on acute care.

WORKFORCE CAPACITY, USER-CENTRICITY AND DIGITAL OPPORTUNITIES

The most crucial component of ensuring sustained improvement from digital transformation is the people delivering that transformation. That does not mean assigning complete responsibility to the estimated 13,025 data professionals employed in the health and care sector in the UK.[20] Equally important are the capabilities of leadership and non-technical staff, as emphasised in Recommendation 21 of the 2022 Goldacre Review: *"Train senior non-analysts and leaders in how to be good customers of data teams."*[21]

> *Fear is so often the thing that stands in the way of change, so we need to use the evidence to combat it and support staff to become champions.*
> **NHS clinical information leader**

To achieve success when implementing digital tools, there aren't just technical and governance hurdles to overcome; evidence shows time and again that *"psychological barriers and workload-related concerns are relevant barriers to comprehensively and holistically adopting digital health technologies."*[22] To overcome such barriers, experts emphasise the need to "provide adequate training to familiarise healthcare professionals with the technology, adapting the technology to the patient preferences and addressing technical issues."[23]

Adequate training ensures that staff are familiar with the technology and confident in its utility, while change management processes help align clinical workflows with digital solutions. An industry representative noted that the most successful projects share a common feature: *"A really strong business change team within the project management. You need a business change lead, and you need clinicians from across the whole – the clinicians, the nurses, the doctors – to be brought in."*

The need for multi-stakeholder consultation speaks to the prioritisation of end-users in digital transformation, be they clinicians, technical staff, or patients. Too often, digital tools are designed without sufficient input from those who will use them daily. This can easily cause reticence or even resistance to implementation. Insufficient consultation and inadequate training results in users being handed systems they may not fully understand, causing inefficiencies, errors in deployment, and potentially, patient harm.

Ethnographic methods – observing and engaging with users in their real-world contexts – can uncover pain points and inform solutions that truly meet the needs of both clinicians and patients. As a golden rule, the roundtable concurred, one should *"always start with the patient journey first".* Several senior NHS attendees suggested that asking patients more frequently for feedback could uncover valuable insights for service improvement.

Integrating patient-generated data into decision-making processes should not be relegated to a tick-box exercise of automated Y/N forms, but facilitating service users to give their feedback whenever and in whatever manner they wish to convey it. By involving users in the design process, digital tools can become enablers of better care, rather than barriers to it.

While there are human and organisational factors that need to be considered when deploying digital intelligence tools, there is also great potential for digital tools to mitigate workforce shortages and improve capacity planning. Two-way communication systems, for example, can reduce operational burdens by replacing phone calls and unnecessary appointments with streamlined digital interactions. A Chief Clinical Information Officer at a trust that recently introduced two-way messaging found that – contrary to initial fears of being inundated with communications – it *"actually saves a lot of time in the end."* These tools not only improve efficiency but also foster trust and engagement between clinicians and patients.

Conclusion

The roundtable discussions reaffirmed the critical importance of addressing patient flow as a system-wide challenge rather than a narrow logistical problem, emphasising the need for governance reform, considered application of digital intelligence, and user-centric approaches.

Central to this transformation is the empowerment of INTs with actionable intelligence and decision rights. Governance structures must align accountability and authority across pathways, ensuring that teams can act on insights rather than passively observing data. Proactive cohort management, supported by real-time digital tools, enables INTs to anticipate demand, segment populations, and implement preventative interventions that reduce acute pressures and improve outcomes.

Digital intelligence is pivotal to delivering this vision. While the NHS has made significant strides in deploying EPRs, the focus must shift from reactive documentation to proactive optimisation. Interoperability is essential to creating unified views of patient journeys, enabling seamless coordination across organisational boundaries. Modular and interoperable digital platforms can deliver measurable improvements in patient flow, reduce inefficiencies, and support population health management.

However, technology alone cannot drive change. Roundtable participants highlighted the human factors at play: addressing barriers requires investment in training, change management, and leadership buy-in. User-centric design, which prioritises the needs of clinicians, technical staff, and patients, is key to ensuring that digital tools are embraced as enablers of better care.

Ultimately, improving patient flow demands a multi-faceted approach that integrates governance, digital intelligence, workforce capacity, and user-centricity. By aligning these elements, the NHS can build a resilient system that delivers value for clinicians, patients, and the taxpayer, delivering the 10YHP's three major shifts.

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