White Paper

From Innovation to Integration: The Route Towards Realising the Potential of Wearable Technology to Prevent Cardiovascular Disease

ROBERT BALLANTINE, Leader, Global Digital Health Centre of Excellence, IQVIA
PHIL CHOWIENCZYK, Vice President, BIHS
JESSICA EKEY, Director, Connected Devices Strategic Solutions Lead, IQVIA
JULIA LEVY, CEO, Promomenta
LYNN MACKAY-THOMAS, Strategic Lead, BIHS
MEIKE MADELUNG, Engagement Manager, Thought Leadership, IQVIA

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Executive summary

Cardiovascular Disease (CVD) is the UK's leading cause of premature death, with hypertension (chronically raised blood pressure) as the most significant modifiable risk factor. Despite awareness campaigns, the majority of people with hypertension are undiagnosed or have blood pressure that is inadequately controlled. Socioeconomic status is a significant factor in determining outcomes.

Traditional cuff-based blood pressure monitors impose barriers due to convenience and engagement issues, as well as providing only point-in-time data.

Wearable devices with advanced cardiovascular sensors promise continuous, unobtrusive monitoring, facilitating earlier diagnosis, empowering patients in their own care, enhancing treatment adherence, and enabling collaborative self-management. Continuous data from wearables can provide clinicians with deeper insights for timely interventions, improving detection and long-term disease management.

Wearables thereby support the goals of the NHS 10-Year Health Plan which prioritises a shift to community-based, preventive, and digitally enabled care. The EU Safe Hearts Plan also recognises the potential for wearables in personalised prevention and risk management, while identifying persistent challenges such as device reliability and integration into mainstream services.

Wearables are being increasingly used, although less well adopted by those at higher risk groups. To unlock the full potential of wearables, it is essential to ensure device reliability and clinical validity, seamless data integration with NHS infrastructure, and equitable access to avoid worsening health inequalities.

Wearable blood pressure technologies should not be adopted device by device or app by app; they need a proportionate national framework for evaluation, integration and real-world performance oversight.

This paper proposes a roadmap to achieve this, transforming hypertension detection and management, and supporting the NHS's vision for digital transformation — ultimately aiming to deliver improved health outcomes for patients nationwide.

Introduction: The potential of wearables in hypertension management in the context of the NHS transformation

Cardiovascular Disease (CVD) is the leading cause of premature death in the UK with hypertension the most significant modifiable risk factor. Despite broad awareness campaigns, control rates remain low, and millions of people — particularly those in working-age groups, underserved communities, or with limited access to healthcare — are either undiagnosed or poorly managed. Hypertension affects a third of adults in the UK and remains undiagnosed in an estimated 29% or 4.2 million of those.[1]

Effective blood pressure monitoring is therefore crucial. Innovative wearable technology, equipped with advanced cardiovascular sensors, offers the promise of overcoming the limitations of traditional cuff-based devices. Although cuff-based devices are clinically robust, they impose barriers due to issues of convenience, accessibility, and patient engagement. They also provide a limited snapshot of blood pressure under specific circumstances rather than continuous monitoring.

Wearables enable continuous, unobtrusive home monitoring, but their potential goes beyond convenience. These devices can empower patients to take ownership of their health, support treatment adherence, and enable collaborative self-management alongside healthcare professionals. Unlike point-in-time clinic readings, continuous data from wearables can provide clinicians with deeper, predictive, and actionable insights for timely intervention. This not only closes the detection gap but also supports more effective long-term disease management.

Wearables align directly with NHS priorities, facilitating improved detection and control, shifting care into the community, and enhancing digital integration across the care pathway. They are also already used by significant parts of the population, albeit often those who are least at risk.

The NHS 10-Year Health Plan for England sets out a bold vision for the next decade, prioritising a shift from hospital-centric to community-based care, from reactive treatment to proactive prevention, and from analogue processes to digital innovation.[2] Within this framework, remote monitoring for cardiovascular disease is expected to become the standard of care by 2028, with wearables integrated routinely by 2035.

In November 2025, IQVIA and the British & Irish Hypertension Society (BIHS) co-hosted a High Level Summit on 'Realising the Potential of Wearable BP Technology to Prevent Cardiovascular Disease'. The event brought together NHS England, DHSE, NICE, MHRA, industry, academia, EHR providers and patient voices to shape a safe and effective future for wearable BP monitoring in the UK.

This white paper lays out the outcomes of the summit.

A full report on the summit can be found here: https://bihs.org.uk/blood_pressure_technology/summit_2025.aspx

Yet, realising this potential requires addressing critical challenges. Ensuring the reliability and clinical validity of wearable devices, integrating their data seamlessly into NHS digital infrastructure, and making the technology accessible to all — without exacerbating health inequalities — are essential steps.

The NHS is not the only healthcare service to recognise the potential of wearables for managing cardiovascular disease. The EU Safe Hearts Plan launched in December 2025 calls out the role of digital technologies and within these of consumer digital monitors in moving towards personalised prevention and risk management while also recognising the currently existing barriers.[3] Similarly, the OECD report on cardiovascular health in the EU highlights the potential for wearables in self-management and early detection while cautioning that there are issues around device reliability, uneven uptake, and integration into mainstream services which must be resolved.[4]

This paper sets out to create a roadmap towards integrating the use of wearables into standard NHS care and realising the potential of wearables to truly transform hypertension detection and management, and thereby CVD prevention, fulfil the ambitions of the NHS, and deliver better outcomes for patients nationwide.

Addressing the challenges

The integration of wearables into hypertension management within the NHS faces several key challenges. Ensuring the clinical reliability and validity of these devices is crucial, as is the seamless incorporation of wearable data into NHS digital systems. Accessibility and affordability present significant barriers, potentially exacerbating existing health inequalities, particularly for underserved and lower-income groups. Furthermore, there is a need for robust evidence to justify investment, and the risk of fragmented data ecosystems and unvalidated consumer use could hinder safe and effective clinical decision-making.

Access and affordability: Wearable data for hypertension management in the UK

The potential of wearables for hypertension management is enormous, but access and affordability remain two major barriers to reaping the full benefits of this innovation.

THE COST CONUNDRUM

The economic case for improved detection and management is compelling. A BMJ Open analysis estimated that improving the detection of CVD risk and aligning cardiovascular care with NICE guidelines could save £61 billion, gain 8.1 million QUALYs and prevent 5.2 million CVD cases over 25 years.[6] Wearables could accelerate this by improving detection and adherence. But the evidence base remains limited, and Treasury officials are unlikely to fund significant investment without robust modelling. In the meantime, the cost burden falls on individuals, raising uncomfortable questions about equity.

Wearable blood pressure monitors remain relatively expensive. Cuffless devices currently retail from £100 at the lowest end, with many devices at £300 and above. Often, a smartphone is also needed since most devices come with an app. Low-cost devices at a price point affordable to all are currently missing from the market. This is particularly concerning since hypertension disproportionately affects people on the lower end of the socio-economic scale. Commissioners must weigh upfront investment against uncertain long-term savings, a calculation complicated by the fact that prevention rarely delivers immediate returns.

TYPES OF BLOOD PRESSURE MEASURING DEVICES

Most cuff-based blood pressure measuring devices used in hospitals, doctors' practices, and in home settings use the oscillometric method, which relies on recording the pressure differences between the inflatable cuff and the artery to calculate systolic and diastolic blood pressure.

Most cuffless devices, on the other hand, use optical photoplethysmography (PPG) to derive pulse waveforms based on light absorption by red blood cells passing through skin capillaries. Machine learning algorithms then estimate BP from waveform features. These wearable devices come in the form of wristbands, smartwatches, or rings.

In principle, smartphone cameras can also be used for BP estimation and apps for this purpose are in development.

The traditional auscultatory method using an inflatable cuff and a stethoscope, although still considered the "gold standard", is used much more rarely now. It does however still constitute the basis for validating oscillometric devices.[5]

COST OF DELAY

Delaying the integration of wearables also comes with a cost — offering a further incentive to take action now:

- Market adoption of wearables continues to accelerate, independent of NHS integration
- Use by consumers without proper validation poses a risk for unsafe clinical decision-making
- Fragmented data ecosystems will entrench vendor biases and increase procurement dependencies
- If access and usage is shaped solely by commercial players, health inequalities are likely to be exacerbated

DIGITAL DIVIDE AND SOCIAL GRADIENT

Affordability is not the only barrier. Adoption of wearables is currently skewed heavily towards the "worried well": younger, affluent, tech-literate consumers who already enjoy better health outcomes. Left unchecked, this trend risks widening the gap in cardiovascular disease, which disproportionately affects older, poorer, and ethnically diverse populations. These groups are less likely to own smart devices, less confident with digital tools, and more vulnerable to the consequences of untreated hypertension.

Language and literacy compound the problem. Terms like "hypertension" are poorly understood by the general public, and device instructions often assume a level of health literacy that many do not possess.

Connectivity is another hurdle. Rural areas and low-income households may lack reliable internet access, making cloud-based data flows impractical. Even when the technology works, trust does not come easily. Patients want reassurance that their data is accurate, secure, and acted upon — a demand that consumer platforms alone would find challenging to satisfy.

Consumer adoption is already outpacing system readiness. The task for the NHS is not to ignore this reality, but to shape it safely, equitably and proportionately. By leaning into the NHS encouragement for patients to purchase their own Blood Pressure Monitoring (BPM) devices, the healthcare system can pivot from a "provider-centric" model to an "empowered-user" model. While this approach does carry a risk of health inequity, it could facilitate the initial stage of the evolution towards a prevention-focussed healthcare system.

MAKING CO-DESIGN MEANINGFUL RATHER THAN SYMBOLIC

There is strong consensus that lived experience contributors should be full partners throughout the product development and pathway design processes. That means involving users in framing the problem, defining what "good" looks like from their perspective, and shaping onboarding flows, alerts and feedback. Lived experience advocates frequently hold dual roles: They contribute firsthand insight grounded in personal experience of a condition, service, or system, ensuring that decisions reflect realworld needs rather than abstract assumptions. At the same time, many lived-experience advocates also act as skilled contributors within professional and institutional settings, e.g. on advisory boards or patient councils. Moving towards genuine co-governance requires inviting these contributors into steering groups, registry governance and validation workstreams. If a more consumer-driven approach towards embedding wearables in care pathways is taken, co-design taking user experience into account becomes even more essential.

Addressing the language barrier discussed above should also draw on the expertise of lived experience users. Clearer wording that links raised blood pressure to cardiovascular disease as a modifiable risk can make the issue more relatable without resorting to fear. Community narratives also matter. Hypertension should not be presented as an abstract risk factor but as something that affects everyday life and wellbeing.

Practical steps help build trust. Offering patients free trials of devices reduces hesitation and provides developers with feedback grounded in lived experience. Engagement can be heightened during the "window of receptivity" that often follows a personal or family health event, when individuals are most open to taking action.

EQUITY AND INCLUSION: DESIGNING FOR ALL

Digital health risks deepening inequalities. Current wearable users skew towards the affluent and tech-savvy — the very groups least at risk of CVD. To avoid widening the gap, equity must be designed in, for example:

- **Subsidised or loan devices** for low-income users
- **Community-based onboarding** in pharmacies, workplaces, and everyday venues — not just GP surgeries
- **Multilingual support and low-friction User Experience (UX)**, with clear instructions and simple feedback to accommodate low literacy and limited digital confidence (think red-amber-green, not cryptic graphs)
- **Alternative routes** for the digitally excluded, such as phone support or paper summaries

WHAT IS CORE20PLUS5?

Core20PLUS5 is a targeted population-and-clinical focus framework designed to support accelerated improvement in health outcomes for groups experiencing the worst inequalities in England.

The three components of Core20PLUS5 are:

1. CORE20: refers to the most deprived 20% of the population in England based on the Index of Multiple Deprivation (IMD), which reflects income, employment, health, education, housing, crime and environment. These populations consistently experience poorer access to care and worse health outcomes.
2. PLUS — locally defined inclusion groups who experience additional barriers to care, even if they are not in the most deprived 20%.
3. The '5' priority clinical areas: These are clinical areas where inequalities are largest, and focused, evidence based action can make a significant difference. Hypertension case finding and optimal management is one of these priority areas for adults.

Equity is not charity; it is a performance metric. Uptake and outcomes should be monitored by level of deprivation, ethnicity, and geography, aligned with Core20PLUS5[7] priorities.

SCIENTIFIC AND TECHNICAL CHALLENGES

Unlike traditional cuff-based monitors, cuffless wearables estimate BP indirectly, often using optical PPG technology combined with machine-learning algorithms. These signals are influenced by factors unrelated to blood pressure, such as skin tone, ambient temperature, arterial stiffness, and medication use. Physiological states like pregnancy or heart failure add further variability. The AI models used to interpret these signals therefore have to be trained on a sufficiently diverse population to ensure accuracy. Calibration drift over time and firmware updates complicate matters, raising questions about long-term reliability of readings.

For these reasons, the well-established validation protocols for cuff-based devices are not readily transferable to cuffless devices, and pragmatic adaptations that account for real-world conditions without sacrificing scientific rigour are needed. An evaluation architecture that links wearable BP data to conventional BP data and clinical endpoints will allow robust evaluation of the technology and inform how it should be used in clinical pathways to best effect. This will pave the way for wearables to move from adjunct to replacement.

CLINICAL INTEGRATION: AUGMENT FIRST, THEN REPLACE

For clinicians, wearables offer promise but also peril. The current gold standard for diagnosis — 24-hour Ambulatory Blood Pressure Monitoring (ABPM) — is cumbersome and resource-intensive. Cuffless devices could ease this burden, but few are validated to the level required for clinical decision-making. Most still require calibration with a conventional cuff, limiting their role to monitoring and diagnosis, rather than screening. As a result, at this point, wearables are best positioned as an adjunct: surfacing risk, supporting adherence, and providing trend data that complements structured home readings. However, with the appropriate evaluation, they offer scalable population monitoring, replacement of resource-limited ABPM and improvement of treatment titration. The National Evaluation Architecture proposed below can pave the way for wearables to become the standard of care in blood pressure management.

Integration into NHS workflows is critical. General practitioners do not have time to interpret hundreds of raw data points from consumer apps. What they need is a single, clinically meaningful metric — such as a seven-day average — delivered through familiar channels like the NHS App. Secure data environments can enable this, but only if standards for provenance, summarisation, and consent are enforced. Without such guardrails, wearable data risks becoming "noise in the void," eroding clinician trust and adding to workload rather than reducing it.

Creating a national evaluation architecture for wearable blood pressure devices

THE PROPORTIONATE CLAIMS FRAMEWORK FOR WEARABLE BP TECHNOLOGIES

This paper proposes an evaluation claims ladder as a structured framework for classifying wearable blood pressure technologies according to their intended use and evidence requirements. It recognises that not all devices serve the same purpose and therefore should not be held to identical standards. The ladder consists of five rungs, each representing a progressively higher level of clinical responsibility and regulatory scrutiny. This ladder anchors what can be said, the minimum evidence to say it, and the plain-English limits that must accompany each tier. It is a means of balancing innovation with patient safety.

This framework could form the basis of MHRA/NICE guidance.

Proposed validation claims ladder:

CLAIMS LEVEL	NATURE OF CLAIM	EVIDENCE REQUIREMENTS
Wellness/ lifestyle	General wellbeing, rough "heart health" indicators	Basic bench testing; not positioned as medical measurement
Risk alert	Alerts to possible high BP; prompts confirmatory testing	Sensitivity/specificity versus standard-of-care in realistic conditions; prospective studies needed but limited evidence burden
Measurement	Provides BP values accurate enough for clinical decision-making	Formal validation against reference standards; performance across key subgroups (age, sex, ethnicity, pregnancy, CKD, frailty)
Diagnosis support	Supports or substitutes for ABPM or structured home BP in diagnosing hypertension	Prospective comparative studies against accepted diagnostic pathways; adherence and failure rates; robust handling of artefacts
Treatment guidance	Safe to use readings to initiate, titrate or stop therapy	Longitudinal studies demonstrating impact on time to control, time in target and cardiovascular outcomes; safety endpoints

PRACTICAL CONSIDERATIONS FOR VALIDATING BP WEARABLES

Validation should follow a pragmatic pathway with ongoing surveillance. A two-phase protocol is the minimum: (1) Controlled technical validation against appropriate reference standards to establish baseline performance; then (2) Real-world evaluation to quantify artefact handling, calibration drift, adherence, and trend fidelity in routine use. Continuous devices require metrics beyond point accuracy, including time-weighted averages, variability measures, and failure/ uncertainty rates. Because algorithms and firmware change, validation cannot be "once and done": post-market monitoring should be a condition of making higher-risk claims.

Avoiding misleading comparisons with gold-standard ambulatory monitoring is critical. The goal is not to replicate every feature of existing devices but to demonstrate real-world benefit. A shared validation registry or platform trial, funded jointly by manufacturers, academia, and the NHS, could reduce duplication and accelerate evidence generation. Such a model would also enable ongoing post-market surveillance, ensuring devices remain accurate as algorithms evolve.

Equity is a validation requirement, not an implementation add-on. Studies must be powered and reported across groups where performance is known to vary or where clinical risk is high: older adults, different skin tones and ethnicities, pregnancy, frailty, CKD, and common cardiovascular comorbidities. Results should be published in a consistent format, including subgroup performance and uncertainty ranges, to support commissioner and clinician confidence.

Communication and consent must reflect the limits of the claim. Devices should present plain-English statements that match their validated tier (for example: "This device can flag possible high blood pressure; confirm with a cuff test"). Clinicians and pharmacists need standardised guidance on what outputs are

clinically usable, what is not, what the validated tier of that output is, and how to message escalation routes. Patients should be able to see, in simple terms, what data is shared, who can access it, how long it is retained, and how to withdraw consent. Without these safeguards, adoption will remain patchy, and trust will fail at scale.

Driving performance and innovation by linking next generation BP devices to clinical event data

PERFORMANCE METRICS: BEYOND ACCURACY

Accuracy alone is insufficient if the potential of wearables is to be leveraged in full. Devices must demonstrate that their data improves prediction, engagement, and outcomes in real world NHS populations. A prerequisite for this is integrating cuffless BP data into EHRs and linking them to clinical outcomes in both primary and secondary care settings. In addition to large-scale validation, this would also allow for monitoring user engagement and technology performance across diverse populations.

Relevant real-world metrics include:

- **Time-in-target range**: Analogous to diabetes care, this predicts cardiovascular benefit better than single readings
- **Adherence and engagement**: Sustained use over months, not just initial enthusiasm
- **Clinical outcomes**: Reductions in myocardial infarction, stroke, and heart failure
- **System-level metrics**: GP appointments avoided, hospital admissions reduced, and cost savings achieved

INNOVATION DRIVERS: DATA, AI, AND INFRASTRUCTURE

Innovation in wearables is not just about sensors; it is about systems. Four enablers stand out:

- **Integration with NHS App and EHRs**: The NHS App should act as a consent and access gateway and as a channel to provide feedback and support to users as part of the proposed NHS Health Coach. Data must flow securely from device to app, then into shared care records and Secure Data Environments (SDEs) for analysis
- **NHS Health coach**: The NHS is developing a health coach[8] as part of its 10-year health plan. This system will integrate health data, including data from wearables, to provide recommendations and flag potential issues to patients, primarily supporting lifestyle changes. Infrastructure like this will help patients make informed decisions
- **AI and Large Language Models (LLMs)**: Artificial intelligence can summarise complex data, detect patterns, and personalise feedback. LLMs could translate raw readings into actionable insights for clinicians and patients. But AI must operate in auditable environments, not opaque consumer apps
- **National Performance Registry**: A neutral, SDE-linked registry could monitor device performance, detect accuracy drift, and benchmark outcomes. It would also provide manufacturers with anonymised feedback, fostering iterative improvement
- **Strategic Data-for-Innovation Exchange**: A path not yet fully explored is the creation of an "Innovation Sandbox" where commercial wearable providers gain controlled, anonymised access to NHS longitudinal data. In exchange, these companies provide the NHS with early access to cutting-edge hardware and proprietary algorithms at a subsidised rate. This reciprocal relationship accelerates the validation of new BPM technologies while ensuring that the "consumer-led" market is built on a foundation of clinical rigor. To ensure trust in NHS data privacy is maintained, clear governance, independent oversight, and defined reciprocity and anonymisation principles are a prerequisite

From wrist to record: The challenges of integrating wearable data into NHS hypertension care

NHS England's ambition is clear: By 2028, remote monitoring for cardiovascular disease using wearables should be standard of care. By 2035, the use of wearables should be routine.[9] This is an ambitious

timeframe, and there are numerous challenges to integrating data from wearables into clinical workflows — technical, policy, governance, and cultural.

Integrating outputs from next-generation BP monitors into Electronic Health Records (EHRs) in a standardised manner is essential to support clinical decision-making, enable performance monitoring of BP systems, and foster ongoing technological innovation.

An ideal system would enable standardised BP data from devices to be summarised for patients on their personal devices (e.g., phone, tablet) and securely transferred — subject to patient consent — into EHRs. Within the EHR, this data could then be integrated with treatment plans and presented to clinicians in ways that best support shared decision-making. A feedback loop to patients must be incorporated in order to foster understanding and confidence in the system and empower patients to take control of their care.

Furthermore, linking EHRs with real-world clinical outcome data would enable performance monitoring at local and national levels, while supporting continuous improvement and innovation. Incorporating a more granular dataset should also be considered to enhance real-world studies.

ADDRESSING DATA FRAGMENTATION IN WEARABLE BLOOD PRESSURE MONITORING

The initial challenge in integrating wearable blood pressure data into NHS hypertension care is the fragmentation of information. Wearable devices produce large volumes of data in a variety of formats, with much of this information confined to proprietary applications. Some wearables record isolated readings, while others track ongoing trends. Additionally, crucial metadata — such as device model, firmware version, and measurement context — is captured inconsistently. In the absence of standardisation, clinicians are confronted with extensive sets of raw figures that offer limited clinical value.

At present, most wearable BP monitors supply patients with personal summaries of their measurements. However, there is no uniform approach for transferring these data to healthcare professionals or healthcare systems. Furthermore, there is minimal integration with information on current antihypertensive treatments or direct linkage to EHRs. Consequently, the management of hypertension remains suboptimal, and promising opportunities for digital innovation and system-wide performance monitoring are missed.

To mitigate this situation, two measures are needed:

- A **minimum standard output pack** should be defined to ensure a uniform and consistent set of data to be integrated into EHR. Provisionally, this output pack should include BP value(s) and unit, date/time stamp, device ID/model, measurement context (resting, active, sleep, unknown), and signal quality/confidence indicator. In addition, averaged summaries over appropriate windows (e.g. daytime/night-time, 24-hour average) and outlier flags and handling rules should be included for continuous devices
- The NHS is moving towards FHIR (Fast Healthcare Interoperability Resources) and SNOMED (Systematised Nomenclature of Medicine) coding, but these standards are not yet universally applied to wearable devices. A "**BP data translator layer**" must therefore be implemented to convert consumer-grade outputs into clinically usable data and align data formats for integration into the NHS data pool

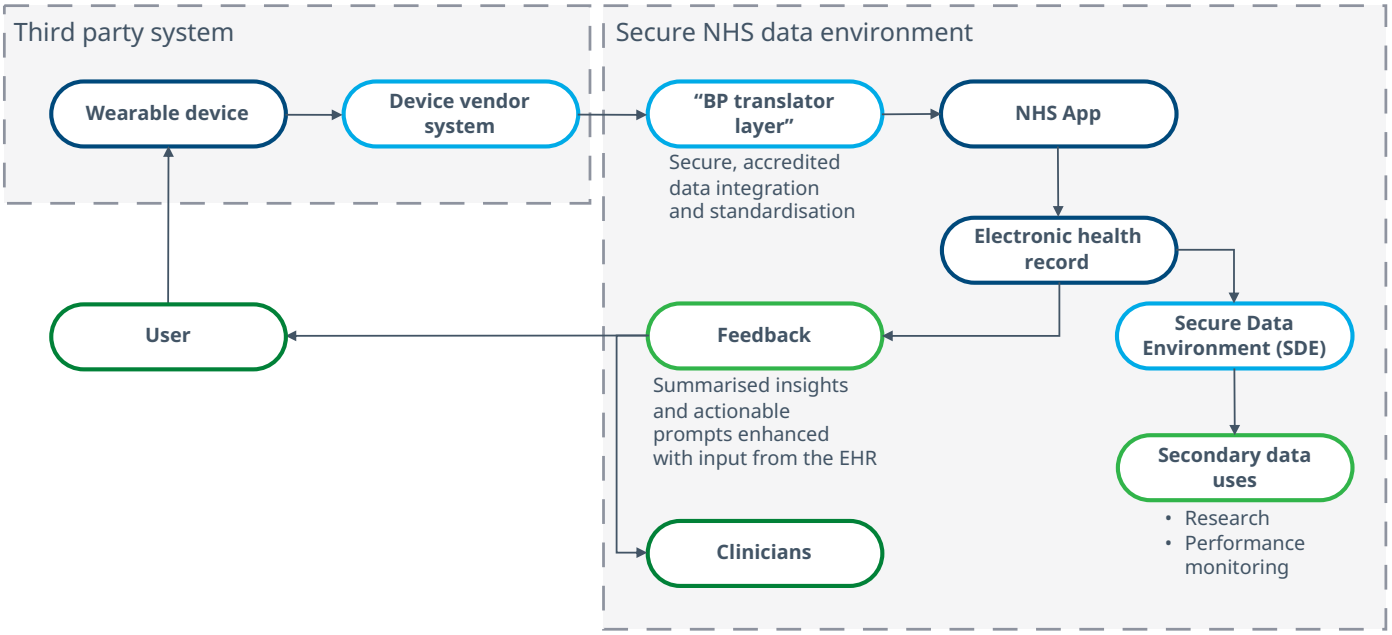
PROPOSED DATA WORKFLOW

A data workflow must accommodate a range of different requirements and use cases. GPs already operate under severe time pressure and need concise summaries — weekly averages, trend alerts — not raw streams. Patients, on the other hand, may want to see more detail, depending on their overall health status and health literacy. At any rate, a feedback loop must be incorporated. Lastly, using data from wearables to evaluate overall NHS performance or enable secondary research is likely to require more granular data as well as a wider range of data points than that required by HCPs.

From a technical point of view, the NHS App is a logical access and content gateway for data to enter the NHS data ecosystem.

A sample generic workflow could look like this:

Sample schematic workflow



DATA GOVERNANCE, DATA PRIVACY, AND CONSENT

Data governance is not a technical footnote; it is the foundation of trust. Clinicians need assurance that readings are accurate, summarised, and legally defensible. Patients need clarity on what is collected, who sees it, and how long it persists. They also need to understand how data sharing might benefit them beyond their immediate care. Emerging consensus points to a number of principles:

- **Validation and quality assurance**: Manufacturer plus independent oversight (e.g., BIHS registry)
- **Data transformation for clinical use**: Managed by neutral, governed services outside of vendor apps to ensure transparency
- **Interpretation and action**: Remains the responsibility of clinicians within agreed pathways
- **Interoperability thrives on conformity**: The NHS should resist bespoke formats that require custom integration at every site, instead opting for existing standards like SNOMED and FHIR

Informed consent is the cornerstone of user acceptance. The NHS App lends itself to being established as a consent gateway, but transparency for the user is key. Hence, two further recommendations emerge:

- **Clear consent statements** should be embedded in the NHS App, explaining what is collected, who sees it, and why
- **Transparent signalling** when users are moving from the NHS App into a third-party system

Economics, policy and operationalisation: Making wearable BP monitoring work for the NHS

There is consensus that timely diagnosis and management of hypertension is one of the levers for lowering the incidence of CVD and the integration of wearables into care pathways is recognised as one building block in that strategy. However, as yet there is no clear road map towards achieving this. For the NHS, adoption hinges on two unforgiving realities: economics and policy. Without a credible return on investment and a clear regulatory roadmap, even the most sophisticated technology will remain stuck in the pilot stage.

THE ECONOMIC IMPERATIVE: MEASURING IMPACT

Wearable technologies have the potential to accelerate progress in managing cardiovascular risk but establishing a robust business case remains essential. Assessing the impact of prevention within the NHS presents challenges due to limited available evidence and the necessity for long-term studies that account for lifestyle variables. This makes it hard to prove cost-effectiveness and assess whether initial investment leads to future savings, which is crucial for demonstrating return on investment. Initially, the costs of not managing hypertension properly should be quantified in a modelling exercise comparing standard of care to a wearable-enabled pathway.

Relevant measures could include:

- **Incremental detection**: How many additional cases will wearables uncover compared to standard care?
- **Therapy optimisation**: Will continuous monitoring shorten time-to-control and reduce complications?
- **Avoided events**: What is the projected reduction in strokes, myocardial infarctions, and hospital admissions?
- **System savings**: How do these translate into fewer GP visits, shorter hospital stays, and lower social care costs?
- **Productivity gains**: What is the projected increase in productivity and reduction of time out of the workforce for patients?

As a second step, a national "hypertension audit," modelled on the National Cancer Audit, could crystallise the economic case for stakeholders and decision makers.

POLICY LEVERS: ADAPT, DON'T INVENT

At present, the NHS has no clear wearables strategy although there is a commitment in the 10-year plan to implement wearables as standard in hypertension management by 2035. What is needed now is definitive guidance on how much of the technology should be adopted, what indicators should be set, or what best practice guidelines should be provided to local trusts. The 10-year plan also identifies hypertension and CVD as one of the indications where care pathways should be redesigned.

Against this background, a pragmatic and relatively straightforward approach is to adapt existing levers rather than create a parallel universe of regulation:

- **Quality and Outcomes Framework (QOF)**: Use and adapt existing QOF/GP contract measures around BP measurement and control
- **CVD National Framework**: Embed wearables into prevention and monitoring pathways
- **MHRA and NICE Guidance**: Clarify acceptable claims at each level of the "claims ladder" and provide templates for evidence submission
- **Digital Technology Assessment Criteria (DTAC) and NICE Early Value Assessment (EVA)**: Extend these to cover continuous BP monitoring devices

This approach avoids duplication and ensures the integration of wearables is aligned both with existing frameworks and the 10-Year Plan.

OPERATIONALISATION: START SMALL, THINK BIG

Grand visions of algorithm-driven hypertension services are alluring, but near-term success depends on pragmatism. Instead of attempting to redesign the entire pathway overnight:

- **Summarise, don't swamp:** Deliver one clinically meaningful number (e.g., seven-day average) to GPs, not hundreds of raw data points
- **Leverage existing infrastructure**: Use NHS App as a consent and access layer, pharmacies as onboarding hubs, and Primary Care Networks for integration pilots
- **Plan for scale**: Longer term, explore a National Hypertension Service model combining nurse-led titration, pharmacist follow-up, and wearables as an enabling technology

POLITICS AND NARRATIVE: A LEGACY OPPORTUNITY

Hypertension is the silent infrastructure of cardiovascular disease. Although it is only one half of the modifiable risk factors contributing to cardiovascular disease, the introduction of validated digital BP monitoring — alongside strategies addressing other modifiable causes — holds significant promise for transforming prevention, much as cancer screening revolutionised oncology.

Implementing wearable BP monitoring as a flagship prevention initiative could give ministers a legacy: shifting the NHS from a “national sickness service” to a proactive health system. The timing is propitious. Digital transformation and community-based care are policy priorities. What is needed now is a bold, coherent roadmap — one that marries economic credibility with political courage.

Conclusion: Moving from vision to reality

To realise this vision and fully leverage the potential of wearables in hypertension management, two logical next steps offer themselves:

1. **Set up dedicated workstreams** to ensure a coordinated and methodical approach to integrating wearables into the NHS care pathway. These workstreams should draw on the expertise of healthcare professionals, patient experts, developers, and technical experts and cover the areas of validation, data integration, and performance and innovation.

2. **Implement a pilot** to pressure-test and fine-tune the concept developed in the workstreams under real-world conditions.

Set up data integration, performance and innovation, and validation workstreams

These proposed national workstreams mirror the three structural pillars already being developed within the BIHS BP Technology Programme. Dedicated workstreams segmented to focus on data integration, performance and innovation, and validation will enable stakeholders to address the complex challenges around the integration of wearables systematically, promote accountability, and accelerate progress.

- **Validation and clinical use**
  Define use-case tiers, interim evidence standards, and a UK claims framework
- **Data integration**
  Define the minimum output pack, consent model, and NHS App/EHR integration pathway
- **Performance, research and innovation**
  Design the real-world evaluation model, registry logic, and evidence plan for outcomes and economics

Creating a pilot

Initiating a Wearable BP Pilot should be considered as a logical next step, developed with BIHS, patient experts, manufacturers, NHS partners and relevant regulators, with clear independent oversight. Ideally, this pilot should incorporate Key Performance Indicators (KPIs) covering clinical outcomes, equity, technological performance, user experience, and economic impact.

Additionally, an equity dashboard should be included to systematically track the initiative's reach across various demographic groups and areas of deprivation, thereby supporting the assessment of health equity.

The pilot should include a mid-point evaluation to provide interim analysis and enable potential modifications. On completion, a final report should be submitted to the Department of Health and Social Care (DHSC), offering evidence-based insights and recommendations for future, broader implementations.

Next steps: Turning insight into action

Integrating BP data from wearables into the NHS care pathway is not just possible — it is imperative for the advancement of hypertension care and cardiovascular risk management. This paper outlines not only the potential and challenges but also lays out a roadmap for making this vison a reality. However, immediate sponsorship and crosss-system collaboration are essential to move wearable blood pressure monitoring from local innovation to national impact.

To create momentum, the NHS should:

1. **Endorse** a national UK appropriate validation framework.
2. **Support** a small number of defined pilots.
3. **Commission** an economic and data infrastructure needed for scale.

Wearable blood pressure technologies should not be adopted device by device or app by app; they need a proportionate national framework for evaluation, integration and real-world performance oversight.

To meet its ambitious goals and establish remote monitoring as the standard of care for cardiovascular disease by 2028, the NHS should implement these actions within a twelve-month timeframe.

We urge policymakers, healthcare providers, and technology developers to act decisively: invest in collaborative pilot initiatives, embed equity at the heart of design and evaluation, and rapidly translate findings into clinical practice. The time to transform cardiovascular care through digital innovation is now — let us seize this opportunity to deliver safer, smarter, and more inclusive health outcomes for all.

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About the authors

ROBERT BALLANTINE
Leader, Global Digital Health Centre of Excellence, IQVIA

Robert Ballantine leads IQVIA's global Digital Health Centre of Excellence, driving the strategy and integration of digital health solutions across pharmaceutical, medtech, and healthcare ecosystems. He brings more than 27 years' experience in innovation and human-centred design, with deep expertise in translating emerging technologies into clinically meaningful, operationally scalable solutions.

His recent research and consulting interests centre on the role of digital innovation in neurology and cardiometabolic disease — spanning wearable technologies, digital biomarkers, and data-driven care models that support prevention, earlier intervention, and improved patient outcomes.

PHIL CHOWIENCZYK
Vice President, BIHS

Phil Chowienczyk is Professor of Cardiovascular Clinical Pharmacology in the British Heart Foundation Centre and School of Cardiovascular and Metabolic Medicine and Sciences at King's College London. He is Vice President of the British and Irish Hypertension Society and is leading the Societies' initiative on the evaluation of cuffless blood pressure technology.

JESSICA EKEY
Director, Connected Devices Strategic Solutions Lead, IQVIA

Jessica Ekey is Director of Connected Devices Strategic Solutions at IQVIA, leading the selection, validation, and integration of digital health technologies for global clinical trials. With 20 years of experience, she specialises in deploying wearable and remote monitoring solutions across clinic-based, hybrid, and decentralised studies. Her work focuses on ensuring devices meet defined clinical use requirements, align with regulatory and evidence standards, and integrate seamlessly into care pathways to support digitally enabled, prevention-focused healthcare systems.

JULIA LEVY
CEO, Promomenta

Julia Levy is CEO of Promomenta, a consulting firm providing strategic advice to a number of life science and early stage healthcare businesses. She was previously a Principal in Real World Evidence in oncology at IQVIA UK where she also worked on a range of policy initiatives including the All-Ireland Cancer Data Strategy. Julia is a Strategic Advisory to Women's Health Horizons and a Trustee of the Picker Institute which promotes person-centred care.

LYNN MACKAY-THOMAS
Strategic Lead, BIHS

Lynn Mackay-Thomas is an experienced health strategy and cross-sector engagement professional who helps organisations clarify their purpose, open up new horizons and turn ambition into practical, future-facing programmes. As an adviser to the British and Irish Hypertension Society, she has supported the development of the Society's wearable blood pressure technology programme, including its stakeholder summit, strategic narrative and workstream structure.

MEIKE MADELUNG
Engagement Manager, EMEA Thought Leadership, IQVIA

Meike has over 20 years of experience in life sciences and develops, publishes, and speaks on insights and analyses of strategic relevance on a range of key topics and latest industry trends. She takes a special interest in topics relating to health system viability, therapeutic innovation, and patient engagement and support and has published a number of articles and white papers in this area. Meike holds an MBA in International Management from the University of London and an MA from the University of Bonn, Germany.

CONTACT US

iqvia.com

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