

Accelerating the remote monitoring market through partnership

Partnering with the remote monitoring industry to accelerate the value of technology for patients

A report by the Health Innovation Network for NHS England, London Region, Digital Transformation

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1. Introduction

In 2022, on behalf of NHS England, London Region, the Health Innovation Network captured insights from early adopters in London and undertook a market review to better understand barriers and opportunities surrounding remote monitoring. This found the market in a growth phase, with adopters at an early stage of articulating patient and clinical needs for remote monitoring technologies. A key recommendation was to improve partnership working between the healthcare system and the remote monitoring industry, to ensure that the digital enablement of clinical pathways is shaped by patient and clinical needs rather than technology.

Considering those findings, there is a need to move from a reactive approach (responding only when the market fails to meet patient needs) to 'market-shaping' (organising public and private activity in service of a shared purpose). This cannot be achieved by procurement teams alone. The healthcare system needs a process to drive the work of both public and private partners towards a core purpose: improved care for patients with the option of remote monitoring where possible. This must be a continuous process, bringing together different perspectives and developing solutions in partnership with industry. These partnerships require capability and capacity in teams not traditionally involved with procurement and commercial management.

This report was commissioned by NHS England, London Region, to outline what success would look like when setting up developmental partnerships with industry, as well as highlighting areas in need of further research.

Thirty stakeholders from operational and clinical teams as well as commercial and procurement experts and industry were interviewed. The HIN hosted two roundtables, bringing together procurement, commercial and legal experts to discuss potential approaches and solutions to real-world challenges in partnership working, as presented by senior NHS stakeholders. Insights from the interviews and roundtables, supplemented by desktop research, were analysed to produce the recommendations within the report. The report is organised into four sections: set up for success; engage the market through pre procurement activities; use existing procurement mechanisms and procure a relationship.

This introduction provides a summary of the high-level findings of the report, according to three dimensions of procuring developmental partnerships: when to partner, who to involve and how.

The full report provides further detail on 'who to involve' (recommendation 1) and 'how to build developmental partnerships' (recommendations 2, 3 and 4).

When to seek developmental partnerships to procure remote monitoring technologies

There are three main drivers for using a developmental partnership approach when procuring remote monitoring technology:

1. **A need for supported care outside the clinical environment:** A growing and ageing population combined with workforce constraints require urgent solutions to address the demand for hospital beds in the NHS. Admission to hospital carries risks including infection, deconditioning and mental health decline, particularly among patients with frailty. In addition, evidence is emerging that patients prefer to be cared for in the comfort of their own home. Policy is directing the NHS to urgently develop solutions to meet the rising demand, and remote monitoring has emerged as a key part of this new model of care. Partnerships with remote monitoring technology suppliers would enable the co-development of these solutions.

2. **Pathways are evolving:** As a system, we are learning what works for virtual wards and other remote monitoring pathways. Patient needs and clinician requirements are not yet clearly defined, and the system is learning as different models of care are tried and tested. The evidence-base for these new care models is still emerging and the diverse range of approaches are hard to compare. In addition, the data eco-system and integration needs are themselves emerging. Other factors impacting the evolution of these pathways include the emergent ICB landscape integrating health and care providers, the drive for increased preventative care, digital maturity of systems, and the parity of esteem between mental and physical health. Partnership working would enable a more agile development of solutions in response to the evolving pathways and greater clarity on patient needs.
3. **The market is growing:** The remote monitoring market is in a growth phase, with over 27 suppliers identified by a HIN landscape review in mid-2022. No single solution has emerged as able to meet all the needs of the patients, clinicians and the system. Platforms and devices continue to evolve as technology advances and new digitally enabled care pathways emerge. In the absence of comprehensive off-the-shelf solutions ready for purchase, partnership working would help accelerate the development of needs-driven solutions.

The remote monitoring market is growing, and pathways are evolving; at present there is no off-the-shelf solutions which meets all needs. At the same time, there are immediate challenges the healthcare system faces that could be met in part by existing remote monitoring technology. Developmental partnerships can help to address this through the co-design of solutions to meet multiple needs, and to accelerate the evolution of clinical pathways in tandem with the growth of the market.

Who to involve in the procurement process:

1. **Patients:** Patient preference has emerged as a major benefit of virtual wards. Co-developing with patients will ensure that the technology matures in line with population needs and the evolution of the pathways, where this has previously too often been either supplier or provider led. Patient input is particularly valuable around safety, experience, outcomes and defining the appropriate place for care.
2. **Clinicians:** Clinical input is crucial to guiding the development of technology partnerships, particularly with respect to outcomes, efficiencies, workforce, safety and having access to actionable and timely data. Short-term funding mandates and pressures related to COVID-19 have meant that, too often, remote monitoring pathways have been shaped by available technology.
3. **Technical specialists:** Crucial to developing successful partnerships is the NHS's capacity and capability to operate as an intelligent customer. This requires digital and data expertise, commercial relationship management, contracting, procurement and legal expertise. This capacity can be provided internally (within provider organisations or ICBs) or by drawing on regional (eg London Procurement Partnership) and/or national infrastructure (eg NHSE National Commercial and Procurement Hub; Crown Commercial Service).
4. **Integrated Care Boards:** Acting as system conveners, ICBs can ensure procurement considers the coordination of diverse population needs, reducing the risk of duplication and seeking opportunities for economies of scale in investment decisions. Joint procurements offer additional options for partnering with industry at scale across ICBs.
5. **Industry:** From defining the principles of a partnership through to delivering the results, industry should be closely involved to build a shared culture so that the remote monitoring pathways and enabling technologies can evolve and mature together. Involving industry in co-defining the terms of the partnership and the problem allows the NHS to become a more effective customer and support more co-ordinated efforts around key issues such as integration and data sharing. Organisations such as AHSNs can provide expert support in engaging with and setting up developmental partnerships with industry.

How to build developmental partnerships with remote monitoring suppliers:

1. **Invest in pre-procurement market engagement:** Engaging with the market prior to formal procurement offers the greatest opportunity for establishing effective developmental partnerships. This can help to mobilise collective insights, identify opportunities for technological solutions and build relationships. Co-defining the problem with industry provides an opportunity to bring together health and care system insights (patient and clinical need, operational and commissioning constraints) with industry expertise (technical expertise, business models, learning from elsewhere). Success factors for effective pre-procurement include building in adequate timelines for open dialogue, working at an appropriate scale for the ambition (provider collaborative, ICS or regional), collaborating regionally to avoid duplication in market engagement activities, and engaging multiple industry stakeholders to avoid unfair advantage to or excess demands on a small number of suppliers.
2. **Use existing procurement mechanisms:** Existing mechanisms, such as Dynamic Purchasing Systems, extended discovery phases, pilots and outcomes-based procurements can be used to form developmental partnerships with industry. This report can be used to identify those mechanisms for building partnerships, and bespoke regional and national expertise can be sought to tailor it to meet local needs. Further research could support a more comprehensive understanding of why these mechanisms are not in widespread use, and what is needed to increase their adoption.
3. **Procure a relationship:** The cultural fit between healthcare organisations and technology suppliers should steer procurement, as the terms of the partnership (including roles, responsibilities, investment, risk and reward sharing) are critical in working flexibly together as pathways and technologies evolve. It is important to include detail in the procurement specification on the partnership requirements, including flexibility and responsiveness; resources, readiness and capabilities and key cultural characteristics.

The purpose of the report is to provide high-level guidance on using procurement to establish partnerships for developing needs-driven technologies. The structure of the report follows the chronological order of a typical procurement process; from setting up for success, through to engaging the market and going out to procurement.

2. Set up for success

"We need people who have a broad understanding of how the system works, both from a technical standpoint and from a practical perspective of how different staff members within a service actually use the technology." - Programme Manager, Remote Monitoring

Before starting any transformational programme, certain activities need to be carried out in the 'set up' phase. These include mapping the individuals who needs to be involved, defining the problem to be solved, understanding the current state, and agreeing on the aims. Drawing on insights gathered from interviewees and case studies, this chapter provides a summary of recommendations and insights on how to begin the journey of establishing agile, developmental partnerships with remote monitoring suppliers.

Recommendations

Most stakeholders indicated that the following factors are crucial when setting up a transformational programme involving remote monitoring technology:

Be guided by users: Interviewees from the NHS and industry shared their experiences of problems or risks related to the lack of early and ongoing clinical engagement in procurement activities. Examples included having to rewrite procurement specifications (produced by technical experts) because clinicians highlighted superfluous digital features, and the need for suppliers to pivot solutions because clinical insights were sought too late by NHS customers. The recommendation was to incorporate clinicians in the procurement team from the outset to define the problem the procurement is addressing and any opportunities it provides, rather than seeking their input solely for testing and validation purposes. In addition, interviewees highlighted that positive patient experiences heavily influenced the legitimacy and clinical buy-in of remote monitoring technology. While best-practice examples in this area are limited, a common theme raised was the need to capture and consider the perspectives of patients throughout the procurement process to ensure that user experience is at the core of decision making and solution development, rather than being restricted to reactive patient feedback exercises.

Form a multi-disciplinary team that can advise on people, process and product: Stakeholders highlighted that digital transformation requires not just the availability of great tech, but also changes in 'people' and 'processes'. As such, it was recommended that a range of experts be brought together to direct and oversee the procurement of the partnership. Members of the team might include users (for example, patients, clinicians, operational managers), commissioners, experts in information governance and interoperability, and experts in contracting with industry from legal, commercial, procurement and contract management backgrounds. However, these are people who do not regularly work together, who tend to use different language and acronyms, and who often operate according to different working practices and cultures. To enable effective working within the MDT it was recommended that technical jargon (be it legal, commercial, clinical, or digital) be minimised and simplified. The involvement of technical experts in procurement, digital and legal at the onset of the procurement process was deemed crucial by stakeholders. It was also highlighted that clinical leaders and executive sponsors play a critical role in influencing transformation, operating as credible champions. With regards to executive sponsors, one hospital director highlighted their role as providing assurance to the hospital board and seeking 'notional signatures' from colleagues in finance, workforce, IT infrastructure and estates.

Case study: multi-disciplinary involvement

A successful pan-London procurement utilised a multidisciplinary project team, supported by a Clinical Council composed of nominated consultants and nurses with previous involvement in the clinical network. Members of the Clinical Council made key decisions after meetings with the project team, achieving buy-in from clinicians at each decision point. The project team collaboratively developed the service needs specification using the MOSCOW method, with specific clinical and patient engagement sections agreed by the Clinical Council. A regional technology expert outlined technology-specific requirements such as technical functionality, DTAC, and integration, ensuring that only suitable companies could apply for the tender.

Bring in specialist procurement expertise and build commercial understanding in operational and clinical teams: Engaging in partnerships with industry in an agile, developmental way is not commonplace within the NHS, and stakeholders highlighted concerns about breaching procurement law. Stakeholders agreed that enhancing commercial capabilities of all MDT members is imperative. To promote development based on frontline experience and commercial acumen, it may be necessary to seek guidance from procurement, commercial and legal experts while also providing training and resources for clinical and operational leads to directly engage with suppliers. One supplier reported that "after having discussions with non-clinicians, those conversations would not be translated back internally in the right way, leading to a lack of understanding about the purpose of the project." Direct engagement with clinicians during procurement and development, along with effective supplier engagement, could have minimized the need for repeated pivots and reduced partnership tensions.

To mitigate the risk of challenge associated with novel ways of working, it is recommended that teams seek multiple procurement and legal perspectives beyond their MDT to explore and validate the optimal approach to partnership. In particular, advice should be sought from experts with credentials in using DPSs and managing pre-procurement (such as London Procurement Partnership or the National Procurement and Commercial Hub), and from experts in the market (such as AHSNs). One CTO highlighted the importance of seeking expert advice, saying:

“When you’re engaging with the market, sometimes it’s easy to have conversations that can lead to dead ends if you’re not doing it in a structured way. You have to use professionals with this, you can’t do it on your own.”

Define the challenge and articulate the desired outcome: The evolving and diverse nature of remote monitoring pathways and technologies has meant that aligning NHS and industry activity around a common aim has proved challenging. Suppliers are keen to meet NHS needs, but one market-leader reported that “no one comes to a meeting and says: ‘these are the outcomes and challenges we have, how can you help us overcome them?’, they come and say ‘we’ve got this money, can we do some transformation work.’” One NHS hospital director concurred with this, recommending to “always start with the problem you are trying to solve not the product or partner. From this will flow (1) the right clinical leadership (2) the right director or manager for accountability and (3) any enablers that need to be in place.” Clearly defining the challenge, the policy context and the outcome envisioned can also help create a sense of urgency, excitement, and commitment amongst stakeholders. This, in turn, can drive innovation, creativity, and collaboration to achieve the common goal of improving care for people.

*“Always start with the problem you are trying to solve not the product or partner” -
Hospital Director*

Define what is fixed and what is flexible: Although services may not yet be able to define their future needs in detail, they may be able to specify the core parameters required to establish developmental partnerships: starting points, what they are looking for in a supplier, the financial envelope, the outcomes they are aiming for and stating that all needs are iterative and subject to change. The system can then work with suppliers to co-develop and articulate a longer-term vision in an iterative and agile way. As a senior government procurement expert put it, “we need to have a static position of what we might want at a particular point in time and start with that as the initial point of discussion with suppliers.” This involves communicating the present state of existing pathways and any technologies in use, alongside any well-defined priorities in a clear and concise manner. For example, the London Guide Specification for virtual wards includes must-have requirements such as a clinical dashboard for sorting patients by acuity and support for two-way messaging between clinicians and patients. In addition, there may be other requirements that will need development through the partnership – these can also be stated up-front, such as integrating specific data points into existing clinical systems.

“We need to have a static position of what we might want at a particular point in time and start with that as the initial point of discussion with suppliers.” - Senior Procurement Expert, Central Government

Additional insights and future research

Further suggestions made by some interviewees included:

- Make connections with interested organisations early on that can help with:
 - o analysing the market (for instance, AHSNs)
 - o articulating the industry voice (such as industry Trade Associations including TechUK and ABHI)
 - o highlighting technological innovation (including innovation accelerators like DigitalHealth.London)
 - o indicating possible collaborations beyond the NHS (such as local government).
- Seek senior leadership support for teams who pursue innovative partnership approaches, given the additional investment of time and resources involved.

Although involving patients and clinicians in the procurement of developmental partnerships was identified as important, there was limited advice on how to do this effectively. As such it is suggested that further research be undertaken on how best to support meaningful patient and clinical involvement in the procurement and development of digital products with industry.

3. Invest in pre-procurement market engagement

*"A partnership is not something that you enter into 'on a first date.' You must have a level of courting, a period of time to get that trust on both sides before you commit." -
Procurement Director*

To succeed in collaborative development, dialogue must begin before formal procurement. By engaging with the market early on, healthcare providers can not only tap into the innovative expertise of industry leaders but also guide and shape the efforts of innovators towards maximising benefits for patients. This section details insights from interviews and roundtables on key activities during pre-procurement, including where to focus time and resource, how to approach industry engagement and what to discuss. It also highlights opportunities around bringing together suppliers to provide a comprehensive solution, connecting NHS organisations for more efficient partnerships and testing solutions at the earliest stages.

Recommendations

Most stakeholders emphasised the significance of the following factors when engaging with the market prior to procurement:

Invest time and resource in pre-procurement market engagement: There was strong consensus that pre-procurement engagement is the area of maximum opportunity for building developmental partnerships. In the words of one Deputy Director in government procurement, "we have to do a lot of pre-market engagement. We don't necessarily need to define how we do it, but the more we do, the better it is." As the remote monitoring market grows and pathways evolve, dialogue between industry and the NHS is important to ensure that development is mutually beneficial. Senior procurement staff advised that pre-procurement engagement offers the best environment for open discussion to: 1) co-define the challenge driving digital transformation, 2) co-create potentially contentious contract terms and 3) build

organic and trusting relationships. While there was no consensus on the optimal timeframe for this, participants reported engagement periods running from one to nine months. Similarly, activities varied, ranging from a structured engagement via email to a series of workshops with interested stakeholders.

By listening to industry, the NHS can become a more effective partner, and by understanding NHS priorities, industry can become more responsive to patient, clinical and NHS needs. One procurement director emphasised this by saying “it’s important not to rush into a partnership, as it is quite an intensive relationship that requires a lot of dedicated time at multiple levels of an organisation, so it does require a lot of commitment. It is not something that you enter into ‘on a first date.’ You must have a level of courting, a period of time to get that trust on both sides before you commit.”

Co-define the challenge, goals and terms of partnership: Interviewees emphasised that partnerships often fail due to inadequate clarification of expectations, roles, and responsibilities, which can create risk, incidents and disputes over incentives and intellectual property. The meaning of the partnership should be clearly defined up-front from both perspectives. According to one procurement director, mutual clarity is important as “partnership is an overused term that means a lot of different things to a lot of different people, so the starting point is to establish what you mean and outlining the principles of a partnership at the earliest possible stage.” This involves co-defining the following early on:

- *Goals and meaning of partnership:* It is essential to clearly outline project goals and explicitly articulate what partnership will mean to all parties, ideally in writing.
- *Outcomes and challenges:* Pre-procurement discussions are the most suitable forum to discuss potential challenges and outcomes, and to explore how partnerships can offer solutions to these challenges.
- *Ways of working:* The discussion can also cover how the outcomes can be achieved through co-development processes, sharing an understanding of how to resolve disputes and form a collaborative culture.
- *Roles and responsibilities:* Defining what each party will contribute helps avoid tensions and build clarity on the resources required for a successful relationship.
- *Principles:* The ways of working should be underpinned by a set of agreed principles, such as, collaboration, openness, transparency, and flexibility.
- *Rewards and Incentives:* The next section includes more detail on negotiating rewards and incentives.

One particularly important topic for early discussion is integration. Suppliers requested clarity on system integration and data collection requirements to allow them to target their resources in response to NHS priorities. Similarly, a leading Chief Technology Officer felt that “one of the things that the procurement ecosystem needs to do is make it more apparent or better articulate requirements when it comes to interoperability, so that solutions, when they do enter the market, actually can plug and play.”

The agreements made around outcomes, ways of working and principles can inform the direction of formal procurement and later, the contents of contractual documents, as well as outcome metrics and key data points that will be collected and used to evaluate the partnership.

Case studies: pre-market engagement

Pre-market engagement was useful when one ICB was procuring a digital health product in a way that allowed them to pilot the product before scaling. A procurement partner carried out engagement with suppliers to prepare them for the procurement approach, allaying potential market concerns about this less common approach and mitigating the risk of challenge. In another case, the clinical pathway for a virtual ward was shared with suppliers prior to formal procurement, so that they could provide suggestions about how technology could support clinicians. This was then used to help clinicians build consensus around the most effective and safe use of technology, which would contribute to future procurement rounds.

Initiate a dialogue on the risks and rewards for the NHS and industry: NHS data, real-world testing and clinical expertise add significant value to the development of remote monitoring solutions and require NHS resources (such as staff inputting data, data curation and storage). For suppliers, partnering with an NHS organisation enables market access and helps build reputation. Reflecting on this, one CCIO commented: “we never value the worth of the clinical expertise and data properly.” It is important to determine how this value can be recognised. Although it can be challenging to accurately value these assets, [there are criteria](#) to guide discussion. Pre-market engagement is the optimal environment to have those discussions.

Reward sharing mechanisms

- Free or discounted access to products developed
- One-off payment in exchange for data access
- Royalty payment or share of the revenue from the products developed
- Leveraging shared ownership of intellectual property generated in connection with data mining
- Share of profits or equity raised through commercialisation
- ‘Golden share’, which in specific predetermined circumstances can out-vote all other shares

In general, suppliers are willing to explore reward sharing opportunities and can see the benefits of developing products in partnership with the NHS, as an enabler to investment and future domestic and international sales. Early conversations are important so that the terms of engagement can be co-defined. Suppliers may seek longer-term commitment and sustainability, while healthcare providers may prioritise innovation and flexibility. Engaging with the market before going out to procurement is an ideal time for having bold discussions about, for example, rewards associated with reduced licensing fees, development support, and shared equity or intellectual property.

There are several factors to consider when negotiating on reward sharing, including the stage of product development, what each partner is investing (including money, time, knowledge, clinical expertise and data) and the level of risk they are each carrying. Although there are no templates for this, principles exist and legal advisors can draw on previous examples of partnerships. If the NHS organisation is paying for development costs, there should be a discussion (before contracts are signed) on reward sharing for the new IP to be developed through the partnership. Costing up the amount of resource being invested in the partnership will help inform the reward sharing mechanism - ensuring the benefits to both parties are commensurate with the resources and expertise each have invested.

There are risks for the NHS around the additional time and resources that might be invested in co-developing a solution that may not deliver the expected benefits. Similarly, for suppliers, developing functionality that is applicable for a local system may not result in a scalable product and the flexibility required of a partnership may demand the investment of significant resources. Risks should be articulated clearly so that conversations can be transparent, and mitigations can be agreed.

Bring suppliers together to provide a comprehensive solution through a single partner: The diversity and size of the remote monitoring market poses challenges around variation, integration and continuity. In response to this challenge, some suppliers are forming collaborations. For example, one multinational company has formed a consortium of suppliers operating through a single command centre able to deliver remote monitoring solutions across a range of care pathways and acuity levels. This approach was recommended by NHS interviewees, with one NHS CIO suggesting encouraging suppliers to join together to develop a single central platform hosting multiple apps that could offer bespoke support for specific patient cohorts. Commissioners can aid the development of collaborations through clearer signalling in the pre-procurement stage on strategic direction, clinical priorities, appetite for innovation and openness to supplier collaborations.

Seek collaboration across the NHS to achieve efficiency in procurement and risk sharing: As well as supply-side partnerships, joint procurements can enable partnerships that involve several NHS organisations, and this was suggested for larger, nationally mandated pathways (frailty and respiratory). In the words of one CCIO, “healthcare organisations need to be thinking about solutions beyond individual Trusts and more about acute provider collaboratives or ICB-level approaches.” This could allow for more efficient commercial management of the partnership, and in addition offer more opportunities for sharing best practice as the partnership develops, reducing variation and benefitting from economies of scale.

Test integration and user experience: Interviewees highlighted the need to test interoperability and user experience more thoroughly before awarding contracts. As one NHS CIO explained, “there is a sense that the system runs procurements as a paper-based, trust-based exercise rather than testing the detail before joining a partnership.” The CIO continued: “we need to test the technical detail of delivery capability and development capability as part of this process, so that we have more confidence in the procurement process.” Testing core functionality or capabilities during pre-procurement enables all interested suppliers to engage and also helps to develop a clearer understanding of the resources and capability required to deliver against procurement specifications.

There was no consensus on the preferred approach for testing. Below are some of the activities mentioned that might assist in assessing specific functionality or capabilities prior to procurement:

- *Environments:* Stakeholders expressed interest in a physical hub to host cross-functional interaction with remote monitoring solutions and help define local needs and aspirations. This could also support user testing and data testing, as well as building buy-in and co-ordinating collaboration and sandbox activities. It might validate vendor responses to procurement tenders, whilst also supporting new entrants to test and demonstrate the capabilities of their product in a ‘living lab’ environment. A smaller-scale version would be a “simulation lab.” Another variation of this type of ‘live’ testing mechanism would focus on the technical aspects, like a “sandbox” environment. A testing environment could be implemented at a regional or ICB level. A testing facility endorsed or owned by NHS England was recommended, to support teams procuring technology testing whether data could be sent between supplier systems and NHS clinical environments. This would drive standardisation and support a move towards a plug and play environment.
- *Events:* Hackathons could provide more dedicated time for teams to collaborate intensively on solving specific issues, such as digital product integration, in a sandbox-type environment. Experts in areas such as API development or data management can be involved to provide guidance and support, and in that process of collaboration new networks and longer-term partnerships are given the opportunity to form.
- *Demonstrations:* Demonstrations of solutions can be used during pre-procurement to hone discussions about future development possibilities. Virtual site visits allow for feedback from users about integration and implementation challenges. Live user testing of products allows for validation of functionality and usability.

“There is a need for nationally enforced standards so that we can provide a roadmap that suppliers can work towards when co-developing solutions with the NHS” - CNIO

Define and communicate needs around standards and integration: Successful partnerships require NHS organisations to define and effectively communicate expectations and standards to their suppliers. They are also responsible for monitoring and ensuring compliance with those standards. For example, it is now an expectation that remote monitoring suppliers use the NHS number as a unique patient identifier; however, until recently most suppliers built their systems around patients registering using their email addresses.

Many of the innovative solutions on the market are being developed by small and medium sized companies who do not always have the resources to invest in integration with major EPRs, and therefore require clear guidance from the NHS about which integrations to prioritise. This reinforces the need for agreed and well communicated standards so that suppliers can plan against a well-defined roadmap.

Reaching a consensus on such standards can form the foundations for break clauses when negotiating pilots and contracts and provide the NHS and industry with greater clarity when navigating new partnerships. In scenarios where existing suppliers no longer meet the specified standards or do not have the flexibility to adapt, NHS contractors can explore other suppliers to ensure the best value for patients and organisations.

Additional insights and future research

“Partnership approaches develop over time, which means doing lots of premarket engagement is important. This has two key dimensions: understanding what a supplier can deliver for you technically and whether they are the right fit culturally” - Deputy Director, Procurement

Some stakeholders described the benefits of running workshops to bring health and social care leaders together with large and small suppliers to discuss shared challenges and the opportunities for innovation and partnership in remote monitoring. In addition, it was recommended that systems develop and publish a ‘statement of innovation needs and challenges’ around remote monitoring to guide and direct the development of innovation within the market. Finally, one clinician felt it would be beneficial to have an arbitrating agent or third party who could work with both the suppliers and the NHS, who understood both parties and could therefore facilitate relationship building.

In the absence of guidance on how to undertake effective pre-procurement market engagement, it is recommended that further research be undertaken to co-develop and test the most effective approach and also the level at which to organise pre-procurement activities be that national, regional, ICB and/or provider level.

4. Use existing procurement mechanisms

“Where the market is developing and evolving it is important to keep options open. The key suppliers that you want to work with today may not be the best suppliers tomorrow. The importance here lies in flexibility and not shutting down options until you know the market and your requirements mature” - Procurement Director, Central Government Department

Although procurement mechanisms exist to form developmental partnerships, they are not typically used to do so. This section outlines the procurement approaches identified by interviewees as effective in facilitating partnership working, such as utilising Dynamic Purchasing Systems, procuring pilots, using outcomes and milestones for added flexibility, and considering different pricing approaches to support partnership in a growing market.

Recommendations

Most stakeholders emphasised the importance of the following factors when using existing procurement mechanisms to establish partnerships:

Remain open to evolving platforms and new functionality: As services crystallise their needs and the market continues to mature, it is important to remain open to innovative functionality as it emerges. As one CNIO put it: “we've got a massive range [of suppliers] because nobody does everything. And the challenge I've got is that as people invent new toys and new ways of doing remote monitoring, all of a sudden we can do so much more in patient's homes.” We need procurement and contracting processes which allow services to harness innovation safely, limiting the risk of getting locked-in to outdated technology while also reducing the inefficiencies associated with repeat procurement exercises. Rather than traditional routes of tendering or frameworks, using a Dynamic Purchasing System (such as Spark DPS, the preferred route for NHS England) makes going back out to market easier because, as criteria change, suppliers can be on-or-offboarded. Individual customers are not tied to a rigid procurement structure and can map out their own mini competitions to update requirements or bring on new suppliers as technology and pathways evolve. The structured use of a DPS also makes it easier to pivot when an implementation is no longer meeting system needs and allows the system to harness innovation. At the same time, it is important to be aware of how changing the remote monitoring platform can cause disruption to the integration that has been achieved with the data infrastructure. Service delivery can also be impacted, with a new interface for patients and clinicians and additional change management expertise required.

Divide the work up into packages along a roadmap: Creating work packages within procurement and contracting helps to define the work needed to meet known requirements and the work needed to undertake iterative developments in the future. Those work packages can be specified based on outputs and tested through piloting or evaluation. By using these methods, suppliers can be incentivised to stay ahead of the curve as system needs and the market evolve. Long-term roadmap management is important to ensure that as this evolution happens, the needs of the system are rearticulated and there is transparent dialogue between NHS staff and industry.

Case studies: using a DPS

An NHS procurement team used a Dynamic Purchasing System (DPS) for a Health & Social Care Apps sub-category purchase, providing guidance on specifications, timetables, weightings, price schedules, and technical questions. The team sent an Invitation to Tender (ITT) via an e-tendering portal to all suppliers deemed relevant following pre-procurement engagement. A mini competition was run with bespoke requirements that received two bids, and after evaluation and moderation, a contract was awarded to the highest scoring bidder for a primary period of one year with an optional extension of one year up to a maximum term of 10 years. The project resulted in a £9,000 saving from the original budget of £280,000.

Link pilots to procurement: Pilots can be a useful mechanism to test a technology and partnership before committing to a full contract and recurrent funding. Where an existing platform is being procured, known clinical or patient outcomes from the supplier can be used to outline expected deliverables and tolerance levels.

In practice, many remote monitoring technologies have failed to scale following the pilot phase. When deciding to pilot a solution, especially if the technology is offered for free or discounted, insufficient consideration can sometimes be given to the contractual agreements including scope for influence over the evolution of the tech and future reward sharing arrangements. As one CIO put it: "When we do pilots using patient data and we're linking patient data across different domains, there is increased anxiety in the system that a pilot doesn't give the right cover in terms of risk. We put IG in place but nevertheless, without a contract it feels a little bit too loose sometimes and that's a real barrier." Often pilots can be undertaken without a formal procurement and contracting process, where clinical teams are enthusiastic about piloting a solution locally but the procurement process and/or value of following it is unclear to them.

When considering the right approach to testing a technology, it is important to decide the purpose of this test phase and what you want to happen post-pilot. Three approaches were raised by stakeholders:

- 1. Are you piloting to scale?** If there is clarity on the local needs and what the solution needs to look like but uncertainty about the appropriate supplier, procure a pilot. Procuring a pilot with clear criteria on what outcomes need to be delivered by when will enable a smoother transition to roll out. The solution can be tested with a smaller subset of patients and then scaled if it delivers against requirements specified in the tender.
- 2. Are you piloting to define your specification?** If the specification is unclear, contracting for a discovery phase or proof of concept will enable you to define the requirements through testing and to better understand the potential costs and benefits. At the end of the discovery phase, you can tender out for a solution based on what has been discovered, and it should be noted in the original tender that you may transition to another solution following the conclusion of the pilot.
- 3. Are you considering going straight into full procurement without a pilot?** One CCIO raised the possibility that, by default, every procurement should consider building in a pilot phase, to test the partnership and validate the vendor.

In any case, a developmental contract should be agreed with the requirement for iteration clearly stated. Contracts with multiple suppliers or a consortium of suppliers may be required to cover the range of patient needs across an ICS, from long term condition management to high-acuity virtual wards.

Case studies: piloting to scale

One expert described including a six-month pilot phase as part of a multi-year contract depending on successful delivery during the pilot:

1. The first step involved pre-market engagement to familiarise suppliers with the approach, including the outputs and contracting process.
2. Within the procurement, the pilot was valued between 0.1% - 1% of the potential total value of the contract.
3. The supplier that delivered successfully against the requirements at the pilot phase was selected and the ICS awarded a three-year contract with a possible one-year extension (3+1 contract).

Gather outcomes data to prepare for future value-based procurement: Several stakeholders highlighted that outcomes-based procurement offers an opportunity for flexible co-development, because procurement is based around an outcome (eg reducing hospital admissions or length of stay) thereby avoiding the need for specifications that limit procurement to a solution with specific functionality. The buyer can also change the requirements as the software is iterated upon and it becomes more feature rich. The NHS buyer must be clear from the outset on the outcome and the developmental elements of the procurement. While some requirements are needed to satisfy procurement rules, procuring against overarching outcomes is sufficient to remain within the procurement legislation.

However, even those who expressed enthusiasm for outcomes-based procurement noted that it has proved challenging in the NHS, especially with evolving pathways and technology such as in the remote monitoring space. One hospital director suggested that outcomes-based procurement is more likely to be possible with larger companies, as small companies are looking for quick progress, for example, developing a minimum viable product. He also highlighted, as did others, that “the NHS isn’t very good at using an outcomes model or measuring outcomes.” The director provided an example of using a type of outcomes contract where 75% of the contract was based on activity (for instance, number of clicks) and 25% was based on outcomes (which was the actual usage).

For outcomes-based procurement to work effectively, the process needs to begin with a sustained exercise across several months to drive the market to co-create the outcomes framework as industry will typically have a different view, from the NHS, of how they can evidence their performance. Given the immaturity of the remote monitoring market and the need to grow the evidence base for these technologies, one expert suggested it is too early for outcomes-based procurement to be effective. Most specialists agreed on the importance of including data collection and evaluation requirements within tenders and contracts to enable outcomes-based procurement to take place more effectively in the future.

Consider the partnership implications of various pricing models: The diversity of remote monitoring solutions and the rapidly evolving market can make it challenging to determine the right pricing model and to assess value for money. There was no consensus amongst interviewees on the optimal approach, however the pros and cons of different pricing models were elicited for different approaches, including:

- With fixed annual pricing, as opposed to variable activity-based pricing, the supplier can guarantee an income, which can be particularly important for small to medium sized enterprises in terms of investing in development and integration capabilities.
- Using an enterprise-level pricing model (eg 10p per population), as opposed to a per-user licence model, provides a financial incentive to engage patients and staff to increase usage. This, in turn, can help drive the development of the product because of the volume of user feedback.
- The financial risk associated with fixed, population-level pricing rests with the commissioner unless this is mitigated by, for example, setting a minimum utilisation rate.

Value-based pricing - linking pricing to patient outcome measures - was raised by one supplier as a possibility. This pricing model would incentivise developments to meet patient and clinician needs, however it is rarely used because it requires consensus on, and the ability to measure, outcomes and value for money.

Discounts for large-scale deployments and research and development were highlighted by the majority of respondents. It was noted that costs associated with co-development need to be factored into pricing, which should be defined clearly. Finally, the cost of the devices and who bears these costs also impacts on pricing, for example, if the patient has their own phone or wearables.

Additional insights and future research

Interviewees reported that, instead of defining a series of technical requirements, requirements can be included in tenders that are more 'strategic,' reflecting the challenge and outcomes agreed at the pre-procurement stage. For example, one team described a requirement that "patients should have easy access to their clinical data through a single platform." By not dictating exactly how that would be achieved, the requirement worked as a strategic driver without limiting the types of solution or ability to trial and develop different options.

Participants highlighted several existing procurement mechanisms that facilitate developmental partnerships. However as these are not in widespread use, it is recommended that additional research be undertaken to understand why the current procurement processes are not deployed to facilitate collaborative ways of working and what might enable their wider adoption.

5. Procure a relationship

"Trust is hard won and easily lost. Any effective partnership needs to have a high level of trust, this means that partners must be willing to work together to solve problems collaboratively, agreeing to work in the best interests of the partnership goals" - CIO

Developing a digital product in partnership with a supplier requires trust and cultural alignment. This section highlights the criteria that interviewees recommended as important for assessing cultural fit with a supplier, finding an appropriately agile partner to adapt to evolving pathways and ensuring that agreements around ways of working together are well documented.

Recommendations

Most stakeholders emphasised the importance of the following factors when procuring a relationship:

Prioritise cultural fit, agility and relationship building: The cultural fit between organisations is key to an agile partnership. This contrasts with a traditional supplier-customer relationship, which can be characterised by demands and penalties with limited, transactional dialogue. Developmental partnerships take time, resources, core capabilities and commitment from both parties at all organisational levels, along with an alignment of values. The commitment begins during pre-procurement, by engaging with the market in a thoughtful way. Stakeholders highlighted the style of engagement, the behaviours, and attitudes of NHS staff as central to building a mutually supportive and collaborative working environment with a supplier.

One clinical lead for an ICB remote monitoring programme commented: "Agility is important as this is all

very unknown: we don't know what we're going to need." For example, there is potential for remote monitoring within the hepatology pathway, however their requirements (e.g.: step count) are not yet clear. The consensus among stakeholders was to frame the procurement approach in terms of working with an agile partner rather than buying a specific technology. The first step in finding that agile partnership is establishing whether any prospective partner will be comfortable with going on a developmental journey, in which clinicians do not know exactly how pathways will evolve. Another consideration was raised around how the size of a supplier will impact the partnership. Smaller suppliers may offer increased agility and flexibility, while larger suppliers may have greater capacity to scale, invest and deliver integration at pace. For established high volume pathways, suppliers with evidence-based solutions and the ability to scale may be more attractive, whereas emerging pathways might benefit from the agility of a smaller, more innovative supplier.

Include criteria in tender documents to evaluate cultural fit and agility: Selecting a supplier for partnership behaviours can be incorporated formally into the procurement process, by evaluating the cultural fit and setting a high weighting for cultural factors in the tender. As one CIO put it, "I'm not sure we can define the detail in the way that a traditional procurement mechanism would ask of us. Instead, we could define a relationship as a starting point." Cultural meshing requires careful selection, effective facilitation and an intelligent client function. The evaluation criteria can be shared and refined with industry during pre-procurement engagement to test feasibility and mutual benefits. Some key considerations highlighted through this research when assessing a partner include:

- *Flexibility:* Has the supplier: shown a willingness to adapt and learn; refined their products to meet NHS need; deepened internal understanding of the health system; developed their business model in relation to NHS needs; and considered their position within the market?
- *Engagement:* Has the supplier: incorporated patient/clinician feedback into the design and iteration of their digital solution; provided evidence of excellent user and customer feedback; and articulated the problem they are seeking to solve in a way that is engaging to patients, clinicians and commissioners? A good partner will have invested in resources, skills and processes to effectively engage with the NHS.

Include agreements about culture and ways of working in documentation: Participants emphasised the need to articulate, and contract for, how the relationship will work including formal (governance, relationship managers) and informal mechanisms. In the words of one procurement expert, "partnership has to be done within the confines of a well-defined contract that does not leave room for conflict over ambiguity." A well written contract supports smooth partnership working, mutual understanding and security for both parties. Several stakeholders suggested contracting in the way you would for a service, rather than for a product. For example, using milestones to measure the partnership at agreed timepoints. This can incentivise partnership working, by ensuring that both parties engage with development work to achieve the agreed goals. One CTO emphasised the importance of "making sure that you've written things down, both hard requirements ('this is what I want') and soft requirements around culture, the ways of working and outcomes. If you haven't written things down, you can end up in a bit of a sticky situation at the end."

Additional insights and future research

While there is a considerable tacit knowledge on procuring a relationship and consensus on its importance, there are few examples in widespread use to support delivering this effectively and consistently. As such, further research is recommended on developing effective criteria for measuring cultural fit and supplier agility, and to determine the ideal approach to procuring a relationship.

6. Conclusions

As remote monitoring pathways and technology are evolving, meeting the needs of patients over the coming years will require effective developmental partnerships. Among the expert stakeholders engaged, there was a consensus around the following recommendations for establishing developmental partnerships:

Set up for success

- Be guided by users, ensuring patient and clinician involvement from the outset.
- Form a multi-disciplinary team that can advise on people, process and product.
- Bring in specialist procurement expertise and validate the intended approach with external experts.
- Build commercial understanding in operational and clinical teams.
- Define the challenge and articulate the desired outcome.
- Define what is fixed and what is flexible.

Invest in pre-procurement market engagement

- Invest time and resource in pre-procurement market engagement.
- Co-define the challenge, goals and terms of the intended partnership.
- Initiate a dialogue on the risks and rewards for the NHS and industry.
- Bring suppliers together to explore the potential of supplier collaboration through a single partner.
- Seek collaboration across the NHS to achieve efficiency in procurement and risk sharing.
- Test integration and user experience.
- Define and communicate needs around standards and integration.

Use existing procurement mechanisms

- Remain open to evolving platforms and new functionality.
- Divide the activities for the supplier/s into work packages along a roadmap.
- Link pilots to procurement.
- Gather outcomes data to prepare for future value-based procurement.
- Consider the partnership implications of various pricing models.

Procure a relationship

- Prioritise cultural fit, agility and relationship building.
- Develop and refine criteria through pre-procurement market engagement.
- Include criteria in tender documents to evaluate cultural fit and agility.
- Include expected ways of working and measures to track this within contracts.

As this is a novel way of working with few cases of best practice, further research is recommended in the following areas:

- Supporting meaningful patient and clinical involvement in the procurement and development of digital products working in partnership with industry.
- Undertaking effective pre-procurement market engagement by co-developing and testing the most effective approach.
- Deploying current procurement processes to facilitate collaborative ways of working and what might enable their wider adoption.
- Procuring a relationship and developing effective criteria for measuring cultural fit and supplier agility.

7. Appendices

Appendix 1: Contributing Stakeholders

The authors would like to thank all health and care stakeholders and suppliers who contributed to the report.

Roundtable attendees

Adrian Gibson	Category Director, Clinical Digital Solutions, London Procurement Partnership
Anna King	Commercial Director, Health Innovation Network
Anna White	Head of Commercial Legal Services, Guy's and St Thomas' NHS Foundation Trust
David Lawson	Director of Medical Technology, Department of Health and Social Care
Garry Mitchell	Associate Director of Commercial and Procurement, National Commercial and Procurement Hub
Gary McAllister	CTO, NHS England, London Region
James Bird	CNIO and Deputy Director of Nursing, Imperial College Healthcare NHS Trust
Jamie Foster	Partner, Hill Dickinson LLP
Janet Keyede	Category Manager, London Procurement Partnership
Leontina Postelnicu	Health and Care Programme Lead, TechUK
Luke Readman	Regional Director of Digital Transformation, NHSE London
Manisha Misri	Deputy Director, Complex Transactions Team, Cabinet Office
Mark Fox	Assistant Director, Clinical Digital Solutions, London Procurement Partnership
Rishi Das-Gupta	Chief Executive, Health Innovation Network
Robert Walker	Programme Manager for Health and Emergency Services, TechUK
Sanjay Gautama	CCIO and Consultant Anaesthetist at Imperial College Healthcare NHS
Sara Nelson	Director, DigitalHealth.London
Taj Sallamuddin	Legal Expert, Information Governance Services
Tim Cullinan	Deputy Director, Digital Health, Digital Care Models Team, NHSE

Industry and system expert stakeholders

Dominic Conlin	CW Innovation Partnerships & Hospital Director
Liz Capp-Gray	NHS Commercial Directorate, NHS England
Alice Ward	Cardiovascular Network Manager, GSTT
Peter Almond	Programme Manager for Remote Monitoring, Mersey Care
Rosie Kaur	Clinical Lead for Remote Monitoring, Mersey Care
Jenni West	Associate Director of Digital Change, Innovation Agency (AHSN)
Bhavi Trivedi	London Clinical Networks Lead, NHS England London
Catherine Sendall	Remote Monitoring Co-Lead, Head of Frailty, NWL ICB
Chris Chaney	CEO, CW+ and Co-Lead for CW Innovation
Sarah Behmedi	Senior Business Manager, My MHealth
Steve Bens	BT, Healthcare Division, Business Development
Fred Walker	Managing Partner at Verizon Business
Andrew Davies	Digital Health Lead ABHI
Mike Ringe	Commercial Policy Manager, ABPI
Chris Laing	Managing Director, UCLPartners
Konrad Dobschuetz	Chief Enterprise Officer UCLPartners and National Director of the NHS Innovation Accelerator
Raj Purewal	UKI Strategic Development Director, Tunstall UK
Louise Hough	Director, UK Customer Operations, Current Health
Francesca Demain	Clinical Operations Manager, Current Health
Chris Jobson	CEO, living.with
Ashley Bishop	Head of Business Development, living.with
Nabeel Khan	Director of Economy Lambeth Council
Maurice Cohen	Clinical Lead, London Frailty Clinical Network
Stephen Edmondson	Clinical lead, London Cardiac Clinical Network
Jane Scarborough	Programme Manager, Public Facing Digital Services, Connected Notts ICB
Rob Simister	Clinical Co-Lead, London Stroke Clinical Network

Appendix 2: Further reading

Resources on procuring partnerships from the public, private and policy sectors.

NHS England: Putting partnership at the heart of our supplier relationships	Blog outlining direction of travel for NHSE
Central Government: Digital, Data and Technology Playbook	Cabinet Office guide to setting projects and programmes up for success including partnerships
Local Government: Driving Public-Private Partnerships	Insights from local government on driving partnerships with industry
Public Service Mutuels: Partnerships between Mutuels and other organisations	Government guide to partnerships aimed at Public Service Mutuels
Public Policy: Mission-Oriented Innovation Policy	Key research on using public procurement to shape markets
Industry: TechUK Ten Point Plan for Healthtech	Industry recommendations for public sector stakeholders to help ensure that digital technology is at the forefront of improving outcomes for citizens
Legislative context: The Procurement Bill	The Procurement Bill, which will reform the existing Procurement Rules and is now going through Parliament

Authors:

Joe Barker, Project Manager, Health Innovation Network
Amanda Begley, Director of Digital Transformation, Health Innovation Network
Zara Hannigan, Project Support Officer, Health Innovation Network

Contact:

Joe Barker, Project Manager, Health Innovation Network
hin.technology@nhs.net