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10 practical lessons for implementing digital innovations – learning from the Care City test bed

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Overview

Despite the huge potential of digital health innovations to transform health and social care services, the full benefits are often not being delivered for service users and staff.

Digital technology is often implemented as a 'ready-made' solution to many of the challenges facing the health and social care system with little consideration of the complexity of implementing digital health innovations. What's more, guidance on how to best approach the implementation of innovations in health settings is scarce. As a result, many innovations are not embedded into care pathways effectively or adopted successfully. Identifying how to harness the benefits of digital technology will not only increase the chance of successful adoption, but also help to deliver the best care possible for service users, as well as deliver benefits for staff.

During the Covid-19 pandemic, we've seen rapid adoption of digital technology within health and care services. This has placed even greater significance on the need to innovate well, to have a long-term transformative effect on the delivery of health care services. We must understand how best to implement digital health technologies if we are to sustain and build on the legacy of changes in delivering new ways of care brought about by the pandemic.

This summary outlines 10 key lessons for the implementation, adoption, and spread of digital innovations in health and social care services. The lessons are designed to support policy makers, commissioners, innovators and service providers keen to integrate technology into health and social care services to successfully embed innovations into care pathways. However, they will not be universally relevant to every innovation, context and stakeholder, all of the time.

The findings presented are based on a real-world evaluation of the implementation of digital technologies across several health and social care settings. More specifically, this summary draws on learning from the NHS England Test Bed programme that was designed to bring together NHS organisations and commercial providers of digital technologies in order to test

market ready innovations and new ways of delivering care, with the potential to improve service user experiences and outcomes. There were seven Test Bed programme sites in total – three funded by NHS England and four funded directly by the Department of Health and Social Care. The lessons of this summary are drawn from the Care City test bed site that was based in East London. It is hoped that our findings will support the adoption and spread of digital innovations in health care.

Our 10 key lessons to support the implementation, adoption, and spread of digital innovations in health and social care services are:

1 Dedicate sufficient time and resource to engage with end users

2 Co-design or co-production with end users is an essential tool when implementing technology

3 Identify the need and its wider impact on the system, not a need for a technology

4 Explore the motivators and barriers that might influence user uptake of an innovation

5 Ignore information governance requirements at your peril

6 Don't be afraid to tailor the innovation along the journey

7 Ensure adequate training is built in for services using the technology

8 Embedding the innovation is only half the journey – ongoing data collection and analysis is key

9 Ensure there is sufficient resource, capacity and project management support to facilitate roll-out

10 Recognise that variation across local areas exists and adapt the implementation accordingly

The Care City test bed

The Care City test bed was a pilot project which involved the implementation of six digital innovations in East London between June 2019 and August 2020. The test bed aimed to determine the extent to which the selected digital innovations engaged service users, improved their outcomes and could alleviate some of the capacity challenges of the wider health and care systems. The digital innovations were used in three settings:

- two innovations were implemented in domiciliary care, to regularly monitor and flag concerns around care users' health status (to manage long-term conditions)

- three innovations were implemented in primary care, which involved 'prescribing' digital support for the management of long-term conditions such as insomnia and diabetes

- one innovation was implemented in an acute hospital setting that provided cardiac rehabilitation to outpatients.

The innovations were considered 'market ready' and some were already operational in different settings or with different populations.

The Care City test bed programme demonstrated the complexity of implementing digital solutions in practice. It also showed what can be achieved through collaborative working between service providers and innovators, and dedicated implementation and project management support. Despite the huge potential of digital technology, the Care City test bed highlighted a wide range of considerations that must be addressed if innovation is adopted in a way that delivers benefits for staff and service users. The full Care City test bed evaluation report can be accessed here.

The digital policy context

Digital innovation has been a key focus for health and social care policy in recent years. The government's 2018 vision for digital, data and technology in health and social care[1] put forward a clear national direction and strategic focus for how this would be achieved. Digital technology is also a key feature of many of the ambitions of the 2019 NHS Long Term Plan[2], which underpin the importance of digital technology in the future NHS and outline several priority areas to support the digital transformation of services. Supporting the adoption and spread of innovation is a key part of this. There are numerous initiatives established to bring together innovators and NHS organisations, and to support the spread of new innovations such as the Accelerated Access Collaborative (AAC) and the AI award[3] funding. The AAC partnership between NHSX and the National Institute for Health Research has set up the AI award funding, which focuses on accelerating the testing of the most promising technology. The next steps on the five year forward view[4] have also focused on harnessing technology and innovation to help people manage their own health, digitising services and using technology to meet priorities of the NHS, as well as being an area of focus for improving care. NHSX[5] continues to build on the digital transformation seen during the Covid-19 pandemic – particularly its vision for scaling up its recent work, including digitisation of services, improving data flows and remote monitoring of service users.

The purpose of this summary

The purpose of this summary is to share learning from the Care City test bed. In particular, to support policy makers, commissioners, innovators and service providers keen to integrate technology into health and social care services to successfully embed innovations into care pathways. It is hoped that our findings will support the adoption and spread of digital innovations in health care to deliver benefits for both service users and staff.

Below, we outline 10 key lessons for implementing digital technologies in health and social care services, drawing on examples from the Care City test bed programme. The lessons outlined will not be universal to every innovation, context and stakeholder on every occasion. **We have indicated throughout the summary where the lessons are more relevant to particular stakeholders.*

10 key lessons for implementing digital health innovations

1. Dedicate sufficient time and resource to engage with end users

**Relevant to innovators, service managers, commissioners*

Engage early with all stakeholders involved in the implementation, including clinicians, middle management and service users. This is important for designing the implementation/care pathway. Discuss potential challenges and risks, be realistic about what can be achieved and what sort of digital solution can be provided. To develop a realistic implementation plan, it is important to not only bring together people who are supportive of the innovation, but also those who are perhaps more inclined to identify barriers. This increases the probability that decisions about implementation and whether an innovation is appropriate being driven by service needs rather than the technology. It is also crucial for developing a clear implementation/care pathway and understanding how an innovation might best fit into a particular service. In the Care City test bed, the input of health care professionals in designing pathways and identifying challenges and solutions was invaluable across all settings.

Engage early with services implementing the technology to build trust and ensure staff buy-in. This was evident across the Care City test bed. The credibility of the innovations and the relationship between the delivering services and the innovators were important factors for staff to be reassured that they were providing the best care possible.

Services implementing the innovations should test the technology to ensure that it is appropriate for end users. This was particularly beneficial

in the Care City test bed, in that services implementing the technologies were able to recommend changes to the content and delivery of the innovations and to tailor the innovation to the needs of service users. For example, one of the digital apps was translated into several other languages. However, this must be done in the early phases of implementation (ideally the set-up phase) to help secure staff engagement and identify any issues promptly. Within the Care City test bed, stakeholders were positive about developing the technology collaboratively (e.g. innovators and services implementing the technology) to ensure it was most appropriate for users and the implementation/ care pathway.

Spend time early on understanding and agreeing the operational requirements of the implementing service including roles, responsibilities and necessary resources. This should include providing clarity about the commitment and time required from innovators and services implementing the technology. It is important to be realistic about resources, and agree roles and responsibilities of services delivering the innovations early on. For example, in the Care City test bed, some service delivery staff reported that the input required was more than expected, which impacted on the level of staff engagement. The significance of resources needed to implement and sustain the innovations has also been observed in care home settings and implies plans for wider scaling up should be realistic about the input of resources required[6].

2. Co-design or co-production with end users is an essential tool when implementing technology

**Relevant to commissioners, innovators, service providers*

Not only is it important to have clinician and service user involvement early on in the planning phase, but this involvement must be continued throughout so that feedback can be provided to adapt the implementation over time. Co-design or co-production is a valuable process for gathering feedback on the implementation and identifying practical changes to help drive the implementation according to the service user need rather than the technology. This should include more 'informal' co-design, such as spending time on the ground in different settings with end users – which was

particularly valued in the Care City test bed to understand clinical pathways and differences across services.

In the Care City test bed, the involvement of clinicians and users in the co-design sessions was pivotal in identifying any implementation issues as they arose and in co-developing solutions. The test bed co-design sessions led to new insights and resulted in changes to service user cohorts, care or implementation pathways, or an adaptation to the technology itself – a continuous 'quality improvement' approach.

Time and funding for co-design or co-production activities should be allocated early on. *This is of particular relevance to commissioners*. Bringing stakeholders together is important for identifying a shared view of the problem and actions to be taken. Developing a logic model (or another type of programme theory) can provide an opportunity to do this, but their utility may be more limited when the implementation is highly complex. The purpose of co-design and commitment required from partners should be outlined early on.

What is a logic model?

A logic model[7] (or programme theory or theory of change) is a visual representation of how an intervention works or produces its outcomes. The format of logic models can vary – however most include the components; inputs/resources, implementation/outputs, outcomes, the context and relationships between components. Logic models should describe the problem and how the inputs and actions will bring about change.

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3. Identify the need and its wider impact on the system, not a need for a technology

**Relevant to implementing services, innovators, policymakers*

The implementation should be driven by the service problem or end user need. The implementation should not be driven by the digital innovation – rather the specific problem(s) or need should be identified first (in

collaboration with end users including service users and clinicians) and innovations sought out to address the particular problem(s) or need.

Consider whether a digital health innovation is providing an alternative service or is acting as an adjunct to an existing service. When designing the implementation, local priorities and service aims should be considered. Clinician input is also vital and can be important for both service user and staff engagement. For example, within the Care City test bed, in the primary care and cardiac rehabilitation setting, the digital apps were prescribed in addition to the services usually received (rather than a replacement). Service users therefore received the same level of care and support from the services, and clinicians valued having an additional treatment option to offer service users.

When embedding innovations within the wider care pathway, the need for support should be recognised. Whether the innovation will provide an additional service or substitute a particular service, the support and infrastructure required to deliver the innovation is crucial. Without this support the innovation will not be embedded into the care pathway effectively or deliver the full benefits for end users. For example, in the Care City test bed, face to face interaction in the cardiac rehabilitation setting was considered important for reasons such as monitoring clinical issues and for social interaction.

Consider how the innovation might disrupt or impact wider care pathways (and workforce capacity) or whether system-wide change might be required in order to achieve the full benefits of an innovation. For example, with the Care City test bed, the health checks implemented in the domiciliary care setting had knock-on effects for primary care services when escalations were required.

Prepare for an extended length of time to embed innovations. Embedding new innovations within services can take time to see the full potential of an innovation and for it to be properly integrated into existing services. The time scale imposed by the Care City test bed programme wasn't necessarily long enough for the innovation to be embedded and for services to be evaluated (for several of the innovations the implementation within services only lasted several months). It is important to be realistic about the time required so that innovations can be properly integrated into a care pathway.

4. Explore the motivators and barriers that might influence user uptake of an innovation

**Relevant to service providers, innovators, policymakers*

The method of referral or onboarding to the technology can affect service user uptake, motivation and engagement with a digital innovation. In the Care City test bed, within primary care services, face to face referral (rather than phone contact) was seen as key to service user uptake, and endorsement of the innovation by a trusted healthcare professional seemed to be an important motivating factor for service user engagement.

The role of friends and family in supporting the use of technology. The Care City test bed illustrated that support of non-health care professionals in accessing and using digital innovations was crucial, particularly for those service users who were less confident with digital technology – for example for supporting the downloading and accessing of digital apps.

Innovations seeking to augment service pathways should consider the motivations to use a particular service. Within the Care City test bed, identifying what motivated people to take up or use the cardiac rehabilitation innovation helped to explain whether people were more likely to use the technology. The users who opted for the traditional face-to-face programme valued the opportunity to share their journey with people with the same lived experience.

Consider the service user cohort likely to benefit from an innovation, taking account of local demographics and service configuration. Potential barriers to engagement with digital health technology include:

- Language – many innovations are available in English only, as was the case for several of the innovations within the Care City test bed.
- Cultural barriers can exist for service users around sharing diagnoses or innovations being tailored to certain preferences.
- Digital literacy – such as smart phone familiarity among users and also the workforce implementing the innovation. Within the Care City test bed,

some users required support from health professionals or family members/ friends in downloading and accessing the apps.

- Digital exclusion[8]- the access that individuals might have to technology or the internet, and availability of data to use the innovations. For example, within the Care City test bed those service users without access to a smartphone or computer were not able to use the innovations, which can be a particular challenge amongst certain groups. Within the test bed, older adults were found to be less likely to engage with several of the technologies.

Failure to address the above issues when implementing digital technology will only act to increase inequality in access to health care. The Covid-19 pandemic has shone a spotlight on health inequalities – however there is a risk that the rapid expansion of digital services facilitated by the pandemic will only accentuate barriers and promote further inequalities. Where digital exclusion is more pronounced, particularly among older adults, it is important to maintain access to traditional modes of delivery. A more nuanced understanding of digital exclusion may be required to fully understand the willingness of people to engage with digital solutions. For example, the Care City test bed highlighted that while an individual may have access to a smartphone, their willingness to use it for their health care may be limited, or they may have limited access to the internet or available space to accommodate the apps.

5. Ignore information governance requirements at your peril

**Relevant to service providers, innovators, commissioners*

Gaining information governance approvals is a critical component of implementing digital technologies. Sufficient time and expertise should be allocated prior to innovations being implemented, as well as throughout the implementation process to manage the information governance (IG) requirements. For example, within the Care City test bed, IG requirements caused delays at the start of the project and ensuring the necessary data transfer processes were in place was, at times, challenging.

It is important to gain all necessary approvals and to make sure that the digital innovation aligns with organisational plans (including that of service providers and innovators). The IG landscape can be challenging to navigate, particularly where there may be multiple information governance approvals that are required – ensuring support for stakeholders to go through this process and being clear about expectations including the time required is important. Navigating the IG landscape can also have significant implications for monitoring the implementation – getting the necessary approvals in place in the domiciliary care and primary care services within the Care City test bed was, at times, difficult and time consuming.

6. Don't be afraid to tailor the innovation along the journey

**Relevant to innovators, service providers*

Be flexible and open to adaptations to the innovation. The process of implementing and spreading innovations often requires innovators to make changes or adaptations to their product or process in order to respond to users' needs or adapt to new settings, pathways or situations. Being flexible and open to adaptations can enable innovators to spread to new markets or users, improve their innovation or maximise the benefit for service staff and service users.

The Care City test bed highlighted the value that can arise from tailoring innovations for the process of implementation to better support service users and staff, or respond to new situations. Two of the innovations were adapted with the support of services implementing the innovations; one innovation was translated into other languages to better meet the needs of the local population, and one innovation was amended to better fit the domiciliary care setting. Understanding what the barriers are for different groups of service users (and therefore what the most appropriate solutions are) is essential for determining where digital technology can be most effective.

Tailoring innovations may require trade-offs. Particularly to maintain fidelity to the model or pathway (as defined by the innovator or for service providers). In addition, tailoring innovations can impact on the capacity of the innovation team and the timeframe for the innovation team to respond to requests (which may be more challenging for a smaller company).

7. Ensure adequate training is built in for services using the technology

**Relevant to innovators, service managers*

Adequate training is crucial for services implementing the technology to feel confident in using or referring to digital health innovations – a lack of confidence can act as a barrier to staff engagement. In particular, innovators and service managers should look to:

- Deliver parts of the standard training for digital technologies within the context of the care pathway in which it is being implemented – this was particularly important in the Care City test bed for health professionals and service staff to understand the pathway.

- Include refresher sessions in which staff can familiarise themselves with the innovations and their required responsibilities, as well as reinforce learning. This is of particular value when there is a time delay between training and the implementation starting within a service.

- Provide a clear understanding of how the technology functions. Staff implementing the technology should understand the technology, its functionality, capabilities and limitations. Allowing staff to use and test the innovations themselves can help with understanding and confidence, and was reported as particularly beneficial in the Care City test bed.

- Consider staff experience and confidence with using technology. For many service staff in the Care City test bed, it was their first time using or prescribing digital health innovations.

- Include all staff involved in the pathway – for example, in the domiciliary care setting in the Care City test bed, it was important to train non-frontline staff, namely office staff, who were responsible for the escalation of service users with worrying health scores.

- Recognise the enhanced skills developed by staff. For example, sign-off procedures and certificates of achievement were used at some implementation sites within the Care City test bed to make sure staff felt valued and that their knowledge/skill development was recognised.

- Provide service staff with guidance relating to the best way to communicate the digital innovation to service users. Within the Care City test bed, some staff members were provided with a script to support them when explaining the innovation to service users.

8. Embedding the innovation is only half the journey – ongoing data collection and analysis is key

**Relevant to service providers, innovators, policymakers*

When embedding a new innovation, data should be collected to enable you to monitor how well it is meeting its original aims, whether there are problems with access and to identify reasons why it might not be used. Data on outcomes should be collected to see whether the technology within the local setting is meeting its intended advantages and that serious unintended consequences are not being missed. This can then lead to changes in the process or schemes to improve uptake within target populations. It is therefore important to address the relevant information governance issues early, particularly if needing to link data gathered by the technology with that collected by the service. The linking of data particularly in some settings can be challenging and data often isn't readily available. Therefore, both time and resource may need to be invested into collecting new data where necessary.

Evaluate the implementation of the service to measure its impact on end users (service users and/or staff) and assess whether it is working. This can include comparing the service against an intended goal, another group of people or time period to determine the value of the service. However, this may need investing resources into the right analytical capacity to enable analysis of the required standard. Monitoring the implementation using ongoing data collection allows feedback to be provided in real time and can determine whether plans and procedures are being followed. When designing these activities, it is important to minimise their impact on the time of staff implementing the service. In the Care City test bed, some staff members reported that the evaluation activities were more time consuming than expected, which often hindered staff engagement.

Regular data flows between innovators and implementing services can help to facilitate engagement and problem solving. In the Care City test bed, the recruitment data was regularly sent to services implementing the technology, which proved beneficial for keeping health professionals informed and engaged. Data sharing between innovators and services is also important to allow the implementation to be as efficient as possible and for care to be aligned. Maintaining communication between innovators and services delivering the technology is also important to ensure that technological issues that arise during implementation can be resolved with minimal impact on the services or pathway. For example, in the Care City test bed, services implementing the technology valued the responsiveness of the innovator and how it enabled them to adapt the digital innovation so it was more appropriate for their service user population.

9. Ensure there is sufficient resource, capacity and project management support to facilitate roll-out

**Relevant to innovators, commissioners, policymakers*

Consider the funding and resource input required to implement innovations in order to ensure sustainability within services. Across the innovations within the Care City test bed, there were significant implementation costs, in terms of time required to develop the pathway, as well as to recruit service users and deliver the intervention. It is important for commissioners of innovations (and others) to understand that digital solutions rarely stand alone but need infrastructure and support to be effective, whether this is provided as part of a package by the digital provider, or whether this needs to be provided by health services. This was evident in the Care City test bed, given how under resourced domiciliary care is and the necessity to implement the checks as an 'add-on' rather than as part of routine service. This was also the case in primary care – GP practices did not often have the workforce capacity to implement the digital innovations.

Dedicated project support and management. The value of project management and support (from within or outside the service implementing the innovation) to drive the innovation should not be underestimated. Project support is likely to be needed for roll-out, even if the innovations have been tested.

Across the settings of the Care City test bed, services implementing the digital technology recognised the value of having a dedicated project management team to support them with the set-up and the implementation, to drive the process, provide feedback, reassurance, practical support, facilitative communication between stakeholders and monitor progress. The Care City team were particularly valued for their project management expertise, bringing together partners (including innovators and health professionals) and managing relationships to help the implementation progress more smoothly. In the absence of a dedicated project support and management team, consideration should be given to who would be best placed to take on the role of linking organisations and facilitating engagement. Project support should also include 'a critical friend' feeding back to support the implementation.

10. Recognise that variation across local areas exists and adapt the innovation accordingly

**Relevant to innovators and service providers*

Effort should be made to understand the variation in organisational and workforce structure and capacity across local services – even if implementing the same digital innovation. The implementation process of the same digital innovation will not be identical across all services and will therefore need to be adapted according to the different organisational structures to be successful (e.g. workforce structure, capacity and staff roles). Services implementing innovations require flexibility in order to adapt operating procedures to the specificities of their service. As was the case in the Care City test bed – the size, service user base, and staff makeup among the care agencies in the domiciliary care setting led to variations in implementation across service providers. Care agencies implemented the same innovation but each did it differently.

Within the Care City test bed, workforce capacity had a notable impact on implementation across services and settings. Health services face significant financial and staffing pressure, and staff engagement within the test bed seemed to be dependent on time and ability to fit the implementation into

their work schedule. Consideration should be given to how services can best be supported to implement digital innovations.

Services implementing the technology should be involved in adapting the implementation and resolving issues to the specificity of their own setting. In the Care City test bed, when implementing digital technology in the domiciliary care setting, implementation proved most successful where care agencies demonstrated strong organisational leadership, adapted innovations and developed care pathways unique to the specificity of their own setting and existing care delivery routines.

Understand the priorities of local services implementing the technology. This can be seen with the often-varied priorities of primary care services and how resources tend to be geared up towards achieving particular targets. For example, within the Care City test bed, GP practice staff engagement was high for the innovations relating to diabetes care processes due to the Quality and Outcomes Framework (QOF) targets and local incentive schemes in delivering diabetes care.

Concluding remarks

Implementing digital innovations in health and social care services is rarely simple – many health innovations are not embedded effectively into services or fail to be adopted[9]. It is therefore crucial that we understand how best to implement and scale digital health innovations to increase the probability of successful adoption and to improve the way that care is delivered.

This summary draws on a real-world evaluation of a set of digital health innovations to identify lessons for implementing technology in health and social care services. The learning from the Care City test bed demonstrated the complexity of implementing digital technologies in health services, as well as how stakeholders can work together to increase the chance of successfully embedding innovations into care pathways.

The lessons outlined in this summary should be considered by innovators, commissioners, policy makers and service providers if digital health innovations are to be successfully embedded into services in a way that delivers maximum benefits for service users and staff. Although not all of these lessons will be universally relevant across all contexts and innovations, they represent useful guidance for planning the implementation of digital health innovations. It is hoped that the findings will help to bridge the evidence gap relating to how best to approach innovation and its implementation within the health and care system to harness the maximum benefits and allow services to deliver the best quality care. This learning is of particular significance as we emerge from the Covid-19 pandemic, if we are to sustain and build on the transformation of services that has taken place.

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