6 practical lessons for implementing technology in domiciliary care

Learning for commissioners and policy makers

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Overview

In recent years, digital technology and innovation has become a strategic focus for health and social care policy in the UK (Department of Health & Social Care, 2018). The vision sets out to drive the system to increasingly use digital solutions, with the ultimate aim of providing better quality care and improving outcomes for patients and service users.

The social care sector stands to benefit from the use of digital technologies to enhance the delivery of care. However, relative to the NHS, social care is often on the backfoot when it comes to adopting innovative solutions because of decades of structural underfunding, alongside a fragile and complex provider market. The government's recent announcement of a health and social care levy made no dedicated additional investments into expanding the use of digital technologies in social care, or into improving existing social care quality.

The social care sector is inhibited from widespread adoption of digital technologies. This can be attributed to a lack of standardised care records held by a centralised data system; variations between care providers and their capacity to drive and implement change; and downward pressures on local authority funding, leaving little scope for innovation (Curry and Oung, 2021). This is the case for both residential care (a form of social care that offers permanent accommodation and on-site personal care for the service user) and domiciliary care (centred around providing support services within the home of the service user). Limited contact time and short appointments can mean that, even relative to residential care, domiciliary care has greater time constraints that act as a barrier to testing and scaling up digital solutions.

Huge financial pressures, a lack of robust, centralised data and significant staff shortages were even more amplified than before in the social care sector when the Covid-19 pandemic hit, making a national coordinated response to the virus challenging (Hodgson and others, 2020). However, when lockdowns were imposed in the UK, the pandemic highlighted the value of remote monitoring technologies, and rapid roll-out of these innovations during this period has been particularly notable in care homes. There are examples of tablets being piloted in care homes to help residents keep in touch with families, as well as the use of tablets for monitoring residents' health

(NHSX, 2020, Department of Health & Social Care, 2020, Local Government Association, 2020). Pulse oximeters were also trialled in care homes as a way to monitor older people's oxygen levels, who may require urgent treatment if their oxygen levels fall too low (Bousfield and others, 2021). But roll-out of similar technologies is few and far between in domiciliary care settings.

This briefing is based on findings from the evaluation of the Care City site as part of the national test bed programme funded by NHS England (Sherlaw-Johnson and others, 2021). This is an initiative that brings health and social care organisations and digital health entrepreneurs together to test combinations of digital technologies as a means to provide an alternative way to deliver care. The Care City test bed involved testing six market-ready innovations in health care settings in East London.

This summary focusses specifically on how digital technologies were implemented in domiciliary care settings, and the findings provide an important contribution to the existing evidence base – particularly in light of the growing use of remote monitoring in social care settings since the Covid-19 pandemic. This summary sits alongside our other research summary on the benefits and challenges of upskilling care staff through digital innovations, and how to maximise the potential of digital tools to aid skill development in the domiciliary care workforce (Oung and others, 2021).

Here, we set out six key lessons for policy makers and commissioners to inform future projects in this area, raise potential barriers and navigate towards successful implementation of digital innovations in domiciliary care:

1   Ensure all partners across the health and care system are engaged, not just those involved in direct care delivery

2   Consider the delivery challenges unique to domiciliary care when transferring technologies from other care settings

3   Recognise that variation exists across domiciliary care agencies and adapt implementation plans accordingly

4   Consider how appropriate the innovation is to different cohorts of service users

5   Consider the resources needed to implement and sustain implementation when designing the care pathway

6   Collect good quality individual-level data to best demonstrate the impact of the innovations

About the innovations

Two digital innovations were tested in four domiciliary care agencies. The intention behind the innovations was to help domiciliary care users (particularly those who frequently attended hospital) to manage chronic health conditions through regular testing.

The main innovation measured the vital signs of service users using instruments connected to a tablet via Bluetooth (heart rate, systolic blood pressure, oxygen saturation, respiration rate, temperature and level of consciousness). Based on these results, it generated an aggregated score, known as the National Early Warning Score (NEWS) – a standardised scoring system originally designed to identify clinical deterioration for patients in acute care settings. Testing was carried out either: (a) at regular monitoring checks conducted weekly or monthly specifically for the purpose of collecting NEWS; or (b) when a care worker had cause for concern during a normal visit.
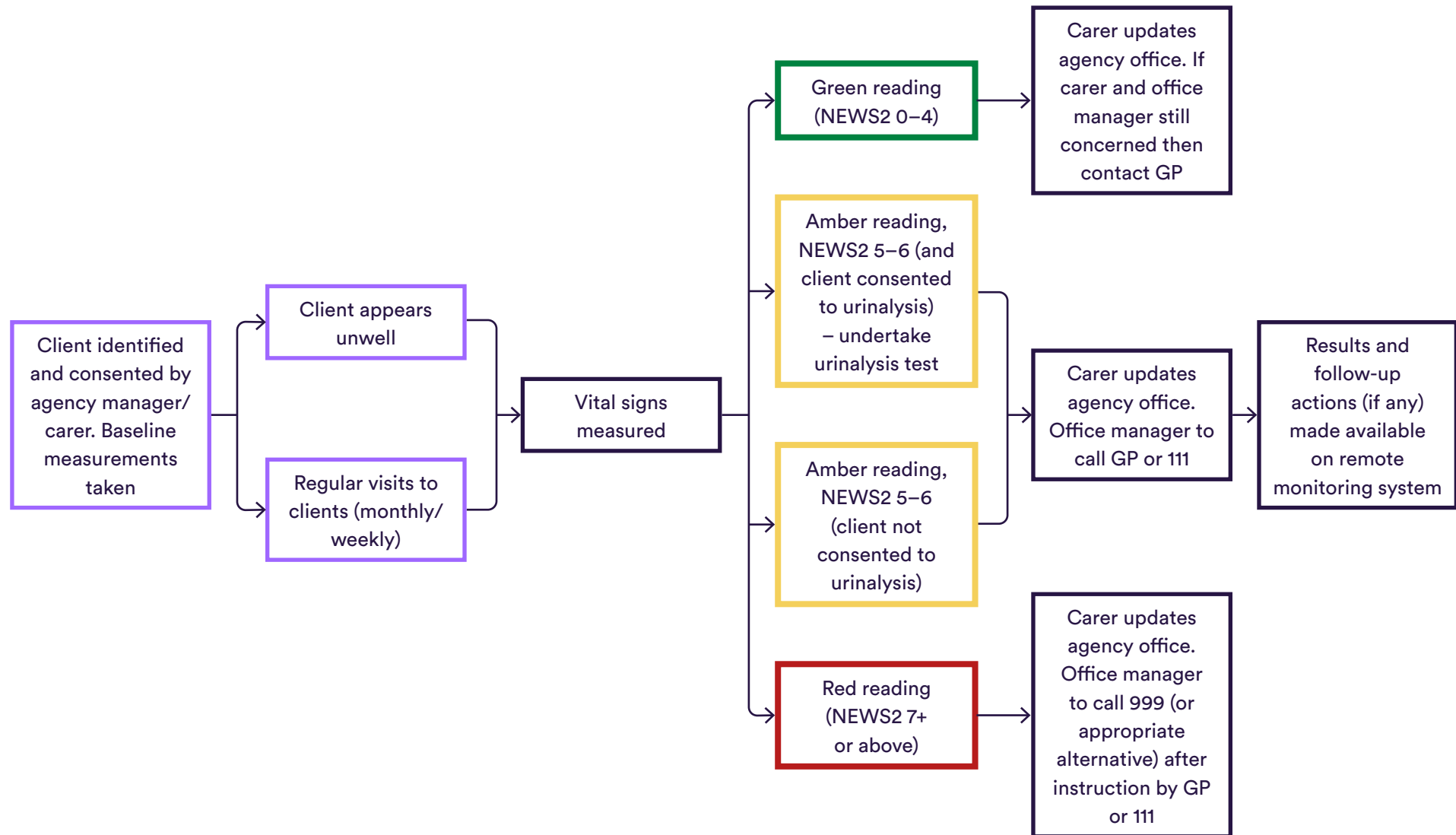
The aggregate score indicated the clinical risk and the response level that was required for the service users. A normal score for someone depended on their health status and age, which meant that a 'normal' score for a 90 year old with COPD and a 70 year old with diabetes could have been different. For most participants in the test bed, an aggregate score between 0 and 4 (a 'green rated' reading) indicated low clinical risk which required no additional monitoring unless care workers and agency staff remained worried. A score between 5 and 6 (an 'amber rated' reading) showed that the patient was at medium risk and the care worker should contact primary and community base services (e.g. registered GP practice or 111). A score of 7 and above (a 'red rated' reading) meant service users were at high risk and care workers should contact emergency services if recommended by GP or 111 (see Figure 1). There is some prior evidence of the effectiveness of this innovation in residential care (Sherlaw-Johnson and others, 2021).

When the score was 5 or 6 (i.e. an 'amber rated' reading), care workers used a second digital innovation to undertake urine sample tests at home using a cup and dipstick kit and an accompanying smartphone app, which made use of computer vision technology to enable clinical-grade interpretation of the dipstick results. Care workers logged results and included results in any escalations of care. To date, there is no evidence of the effectiveness of this innovation in domiciliary care, and significantly fewer service users

were eligible for urinalysis, due to many of them being either incontinent or having to use a catheter; therefore, fewer of them were offered and fewer took up the offer. However, in other health care settings the digital innovation has been used to increase proteinuria screening rates among patients with suspected hypertension (Sherlaw-Johnson and others, 2021).

Figure 1: Care pathway, including embedded innovations

Flowchart:

Client identified and consented by agency manager/carer. Baseline measurements taken →

- **Client appears unwell**
- **Regular visits to clients (monthly/weekly)**

→ **Vital signs measured** →

- **Green reading (NEWS2 0–4)** → **Carer updates agency office. If carer and office manager still concerned then contact GP**
- **Amber reading, NEWS2 5–6 (and client consented to urinalysis) – undertake urinalysis test** → **Carer updates agency office. Office manager to call GP or 111** → **Results and follow-up actions (if any) made available on remote monitoring system**
- **Amber reading, NEWS2 5–6 (client not consented to urinalysis)** → **Carer updates agency office. Office manager to call GP or 111**
- **Red reading (NEWS2 7+ or above)** → **Carer updates agency office. Office manager to call 999 (or appropriate alternative) after instruction by GP or 111**

Key lessons

The recommendations below draw on some of the key lessons we identified from the findings of implementing digital innovations in domiciliary care settings as part of the Care City test bed project. These recommendations will inform policy makers, commissioners, care providers and innovators who are interested in embedding technologies into care pathways.

1.   Ensure all partners across the health and care system are engaged, not just those involved in direct care delivery

It is important to engage with those who play a significant role in the implementation pathway and to ensure that all those involved in service delivery are engaged with the intervention process (see Figure 2). Integration of care planning, care delivery and patient information across health and social care services is essential if remote monitoring tools are to be used effectively in social care settings. Care staff reported having trouble relaying the results from the health and wellbeing checks quickly due to long waits on the telephone to speak with GPs. They also reported having to repeatedly describe the digital innovation to the various parts of the health sector.

Figure 2: Stakeholders involved in the implementation pathway and service delivery
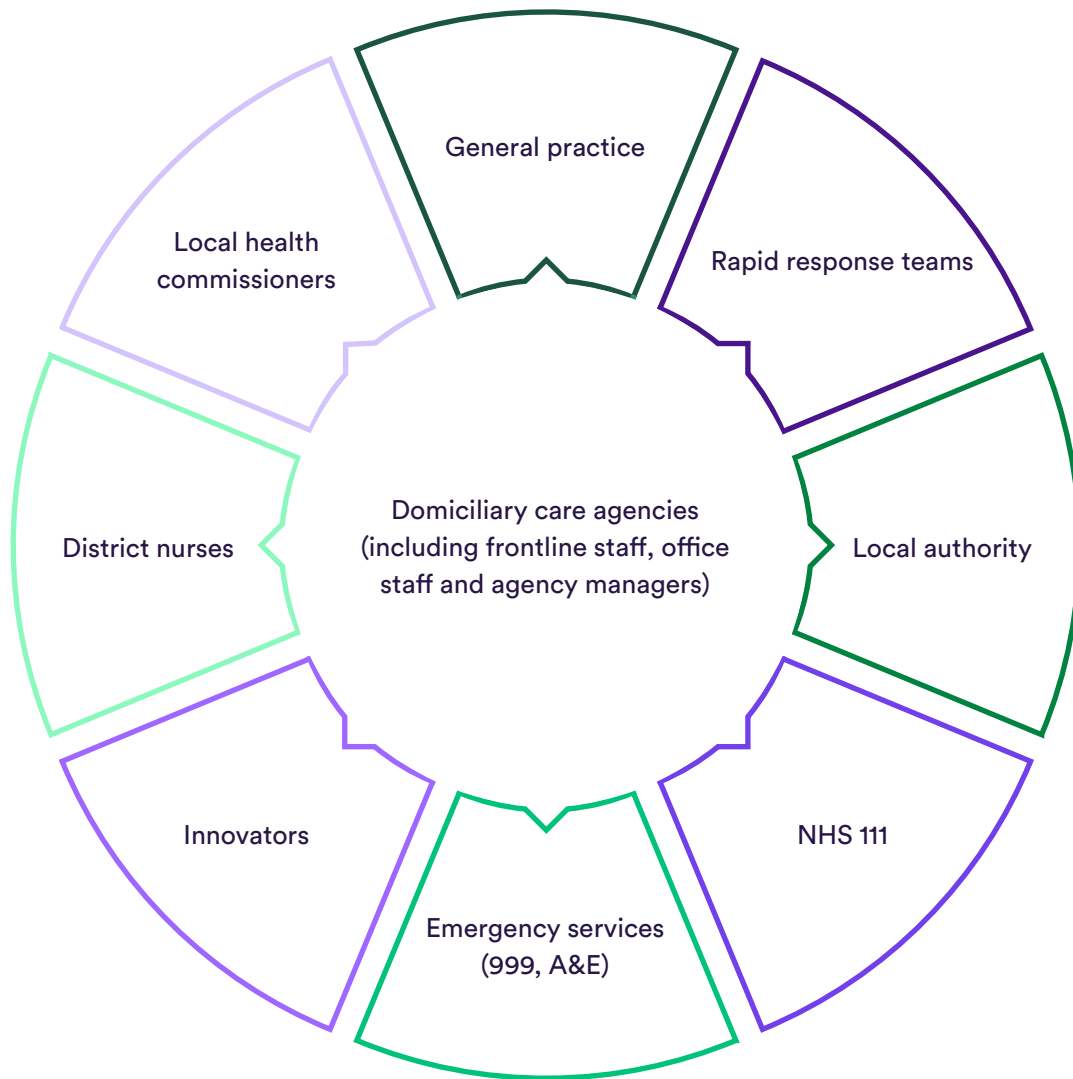
Staff implementing the technology reported that it would have been beneficial for local health care services (including GPs, rapid response teams and matrons) to have a better understanding of the intervention process from the outset. GP engagement was particularly challenging because service users being cared for by a single domiciliary care agency were often registered with one of many local GP practices – unlike in care homes where residents usually have a single designated GP practice. Piggybacking on meetings of local systems or education sessions may be one approach to engaging partners.

The challenges described above took place before the Covid-19 pandemic hit. Since then, there has been a shift in priorities for health care delivery, with rapid adoption of digital solutions for remote monitoring during lockdown being one example. Evolving better relationships between partners across the health and social care sector is fundamental to the success of implementing

digital innovations. The move to delivering services through Integrated Care Systems will foster these relationships and help to align digital priorities across local health and care organisations.

2. Consider the delivery challenges unique to domiciliary care when transferring technologies from other care settings

Although the innovation monitoring vital signs had been previously tested and widely adopted in residential care, embedding digital innovations in a care home vastly differs to implementing technology in domiciliary care, as was shown to be the case in the Care City test bed. Additionally, when GP practices were closed and alerts were raised for service users with a medium risk NEWS reading, care workers were left no choice but to escalate results to 111 or A&E, even if they felt that there was little cause for concern. Lack of readily available clinical input (other than 111 or A&E) can lead to inappropriate trips to A&E (or equivalent).

Domiciliary carers had to carry the kit to and from multiple service users' homes while on their shift. Feedback from carers, particularly those who travelled by foot or via public transport, described the kits as bulky and heavy to carry around to multiple appointments. Additionally, some expressed concern that the cases containing the kits were very noticeable and they were worried about their safety, where people in the local area may have perceived them to be health care professionals carrying medication or medical equipment.

A single appointment in domiciliary care typically lasts around 30 minutes, with care agency staff reporting that health and wellbeing checks took 15–20 minutes (and longer still when including urinalysis). The limited timeframe in which to carry out these checks meant there was a greater risk of them taking time away from delivering other activities, such as personal care. In addition, if there was a cause for concern, the schedule for home visits did not easily allow time for carers to respond to higher NEWS readings, which required escalation or follow-up checks. In these instances, they may have caused delays for other service users who had an appointment with the same carer later that day.

Digital technologies have huge potential to improve working conditions for domiciliary carers and the experience of those who use services. However, implementation will need to be designed around the specificities of the domiciliary care sector. The innovations need to be easily transportable to consider carers who may be travelling to service users' homes on foot or via public transport, and having a sufficient supply of antibacterial products in the kits to clean equipment before and after use is also essential to minimise the risk of infection.

Furthermore, the time of week or day when clinical advice is available (for instance, from GPs or out-of-hours teams) should be considered when planning to fit the health and wellbeing checks into a typical carer's schedule. The ability to monitor residents over time with multiple scores has been shown to work effectively in residential care (Hodgson and others, 2017). If delivery challenges are recognised and resolved by all stakeholders prior to implementation, this could contribute to long-term sustained use of innovative solutions in domiciliary care.

3. Recognise that variation exists across domiciliary care agencies and adapt implementation plans accordingly

Within the test bed, the context of the four domiciliary care agencies varied, so the initial implementation and evaluation plans were adapted across agencies. For example, the medical records of local authority funded service users were more comprehensive than for self-funded users, which provided the three agencies that delivered services to mostly publicly-funded service users a head start on understanding the baseline. Other areas of variation between agencies included:

- whether checks were included as part of routine care or as a supplement – when included in routine visits, care workers had less time to complete checks alongside their other care duties

- the frequency with which checks were undertaken (weekly, fortnightly or monthly) – less frequent checks may have meant that carers in particular agencies did not have as much practice using the innovations

- the numbers of carers trained, which impacted on the number of service users that were offered the innovations

- the types of service users recruited into the test bed and decisions as to who would be eligible for urine testing

- escalation procedures, with one agency making use of local rapid response teams, which can be onsite within a short timeframe and avoid hospital admissions. This meant that clinical input was more readily available and escalations were much easier for this care agency. Other providers relied on local GPs, out-of-hours services and 111

- whether office staff or care workers escalated high NEWS scores to the appropriate health service, which impacted on the care worker's visiting schedule.

The variation described above may not apply to all settings, but points to aspects of the implementation pathway that need to be considered during planning phases. Care provider staff should be involved in designing the care pathway to best suit the needs of the individual agency. In particular, the size of the agency, the funding arrangements of the service users, the disruption to the usual care pathway, and whether there are any pre-existing escalation procedures to local health care partners already in place should be discussed and necessary adaptations made.

4. Consider how appropriate the innovation is to different cohorts of service users

Working closely with care agency staff during the planning phase will help to determine the group of service users that could benefit from the innovations, as well as understanding which innovations are most appropriate in meeting service users' needs. In the Care City test bed, the eligibility criteria varied between providers. Some agencies approached their most vulnerable service users with the highest level of need (such as frequent attenders to hospital), while others offered the innovations to a group of service users with higher or lower-level needs.

One of the main reasons that service users (or their family members) declined to receive one (or both) of the innovations was because they were not appropriate for the service user. For example, many service users who were offered the innovations were elderly, bedbound or incontinent, and therefore were unable to agree to urinalysis. There was low uptake even among those who were eligible, with very few cases of it being used in practice due to the low number of amber readings from using the health and wellbeing kits (which prompted further investigation using urinalysis).

Carers also expressed concern that it would have been too challenging to carry out health and wellbeing checks on service users with advanced dementia. Agency staff expressed that it was difficult to articulate the purpose of the checks to service users with dementia, and could cause distress when trying to undertake the readings.

Domiciliary care agency staff and potential service users could have been more involved in the early design and development of the care pathway prior to implementation. Identifying agencies to work with before cementing the implementation plan could have improved uptake. For instance, challenges regarding the clinical appropriateness of the service user cohort receiving the innovation would have been identified earlier in the process, and a more standardised eligibility criteria could have been established across the agencies. Given the limited opportunities for innovation in social care, it is essential that resources are directed to those who will benefit the most from technology. These groups of service users are likely to vary depending on the innovation, so users' needs and motivations must be better understood in order to maximise the benefits of health technology in domiciliary care.

As well as driving implementation decisions based on service user need, it is also important to consider what the service user actually wants from a consumer perspective – particularly for self-funders of care who may have certain expectations of what they would like from care services. Innovations should be adapted appropriately to align with what works best for service users.

5. Consider the resources needed to implement and sustain implementation when designing the care pathway

Implementation plans must take account of the resource and costs needed to set-up and sustain the use of the innovations. This includes gathering baseline measures of service users' health status (to enable detection of worrying change), supporting carers through training and other activities, and communicating results to health care professionals. Yet domiciliary care agencies are under significant financial pressure and constraints on both budgets and time can often inhibit the potential for more innovative models of care provision in users' homes under normal circumstances (Curry and Oung, 2021). In the Care City test bed pilot, Care City provided constant support to implementation sites, which was seen as a significant advantage.

Despite this, implementation teams committed a significant amount of resources – both in terms of time and financially – to ensure successful set-up of the innovations. Many teams reported that the time spent on the project was greater than they had originally anticipated. The domiciliary care sector also experiences a high turnover of staff, which affected most participating agencies that lost some of their carers who were originally trained to use the technologies. This meant that additional training had to be delivered to ensure there were more carers trained to use the innovations to replace the staff that had left.

Costs must be considered within the context of how the innovation impacts the overall care pathway, and the potential system-wide benefits that digital innovations can bring. For instance, monitoring vital signs could, at least in the short-term, increase contact made with GPs, 111, ambulance services, and A&E, although the findings from the pilot were not able to conclude whether more escalations occurred when the innovations were in place compared to usual care. However, sustained use of remote monitoring could lead to identifying health concerns earlier on before individuals deteriorate to the point of requiring a hospital admission or specialised care.

6. Collect good quality individual-level data to best demonstrate the impact of the innovations

Initial plans for quantitative analysis for the Care City pilot included linking data held by the care agencies to health records, to understand the potential impact of the use of remote monitoring on service users' primary and secondary care use. However, the absence of national routine data collections on domiciliary care service users and patchy data held by agencies made it challenging to measure these outcomes. Those who were funded by the local authority or the local clinical commissioning group (CCG) typically had more background information on their records, whereas data on self-funders was much more limited.

In the end, the analysis relied solely on the data collected and submitted by the care agencies. However, the consistency in recording data between different agencies also varied, with ambiguity regarding the categorisation of ethnicity and comorbidities. Care agencies were also asked to record the test results from the innovations and any subsequent escalation to health services, but the completeness of these fields varied by site, with one agency having no escalation outcomes recorded in their data. There were also instances of invalid test results being recorded (such as a heart rate of 0 beats per minute) because some care staff were skipping some of the tests by entering the value '0'. This highlights the importance of acquiring data for monitoring purposes, where the invalid test results and the underlying issues can be identified and appropriately mitigated against.

Future evaluations should ensure that there is a comprehensive understanding of the data that domiciliary care agencies hold from the outset, and plan an approach for measuring outcomes that is both feasible for all implementation partners and contributes meaningful results to the evidence base. That being said, the lack of data on domiciliary care users at a national level and the barriers to integrating health and care records has wider implications to be able to effectively drive change in domiciliary care provision, and makes it challenging to contribute conclusive evidence of the impact of innovations on outcomes for service users (Curry and Oung, 2021).

As well as this, a sufficient amount of time must be earmarked for acquiring approvals for information governance requirements, so that data items being collected and the processes for secure data transfer have been agreed upon and put in place. Support in navigating the information governance landscape must be available for all stakeholders, as well as providing clarity on the amount of time and resource required to obtain these approvals. This is crucial to monitor the impact of the technologies.

Concluding remarks

As the health and social care system slowly starts to recover from the repercussions of Covid-19, we must take note of the changing landscape of health care delivery, including the positive evolving relationships between health and social care services. These relationships can be harnessed by taking advantage of the opportunities that digital innovations can bring to the social care sector. Based on the findings from the Care City test bed, domiciliary care staff perceived the benefits of technology as a tool that helped with early detection of health problems; improved communication with health professionals; increased confidence of carers; and crucially, provided wider system benefits due to growing demand of the number of people in receipt of domiciliary care.

Future interventions in this area would benefit from adapting implementation to the individuality of domiciliary care agencies and the key differences in service delivery relative to residential care, as well as understanding the resource implications for implementing and sustaining the use of technologies in care pathways.

While the lessons set out in this report contribute to the scarce evidence base that exists on the impact of technology in domiciliary care, there are perhaps some more fundamental barriers that will continue to exist and will be difficult to overcome without comprehensive reform of the social care system. Social care is lacking the basic data infrastructure that is taken for granted in the NHS, and without this, challenges will remain when trying to determine real, measurable impact of digital innovations.

Digitising an entire sector that, at present, has had very little exposure to digital technologies should not be underestimated. We must understand and mitigate against the unique challenges posed by this sector if we are to implement technology in domiciliary care with maximum chance of success – else it will fail to be adopted and the anticipated benefits will not be realised.

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