This report details **Hypertension** specific insights from the TEC discovery research.

For overall findings and other exploration specific reports please visit the [DHCNI website](#).

🔍 **Overall Findings**	📈 **Hypertension**
🏠 **Care Homes**	⏱ **Long-Term Conditions**
🏥 **Hospital at Home**	📱 **Telecare**

Contents

Hypertension

Exploration Approach
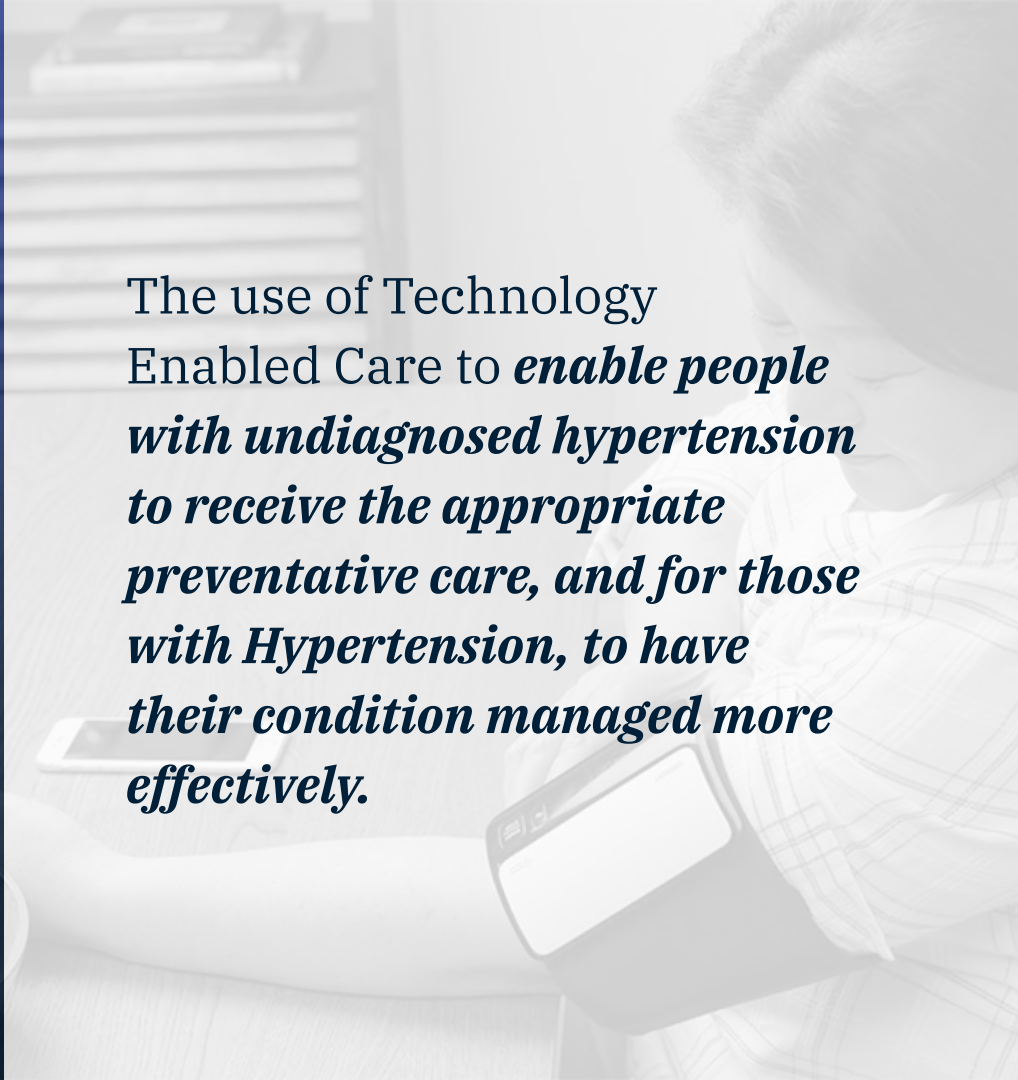
Hypertension Focus

For each exploration, DHCNI proposed a specific application of TEC.
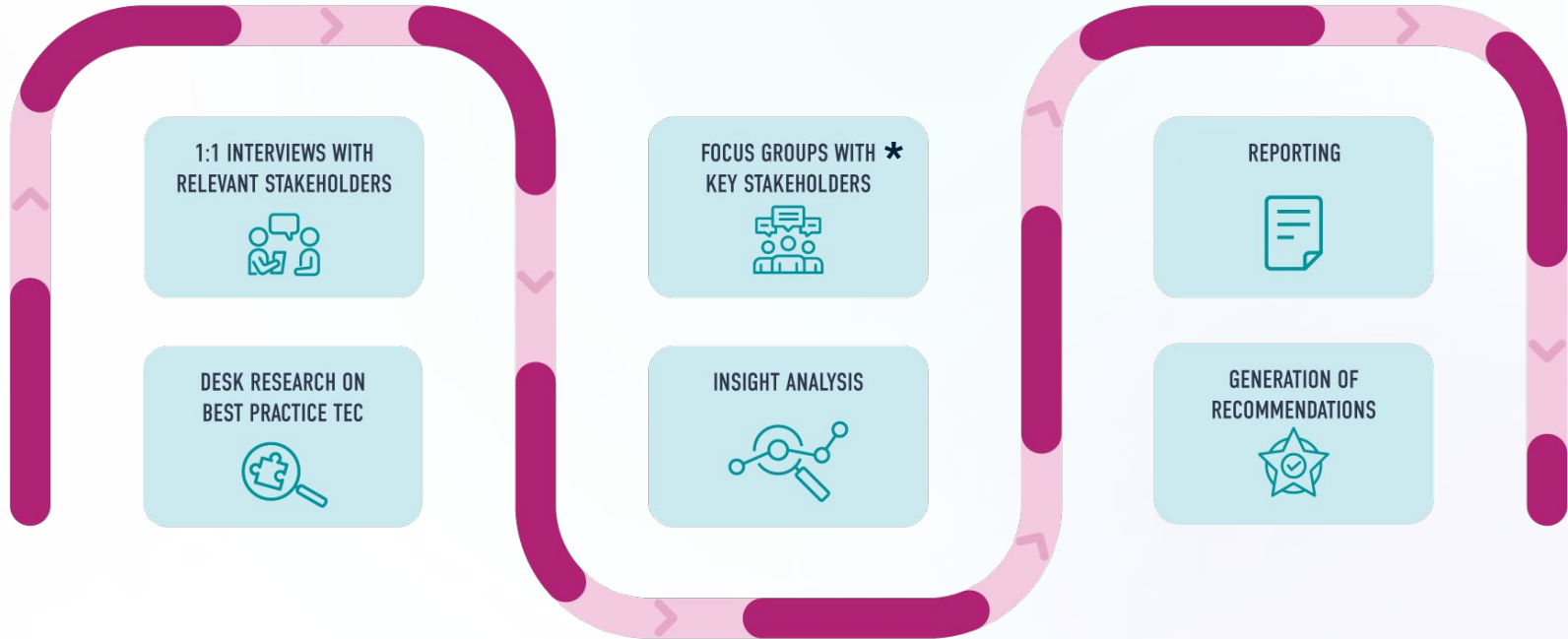
This was used to stimulate conversation during research and determine TEC opportunities and potential challenges with implementation.

The use of Technology Enabled Care to **enable people with undiagnosed hypertension to receive the appropriate preventative care, and for those with Hypertension, to have their condition managed more effectively.**

Exploration Process

The process of exploring Hypertension followed agile principles, including iterative development, flexibility to adapt to new information, and continuous collaboration with stakeholders to ensure alignment and relevance of the deliverables.

1:1 INTERVIEWS WITH RELEVANT STAKEHOLDERS

DESK RESEARCH ON BEST PRACTICE TEC

FOCUS GROUPS WITH * KEY STAKEHOLDERS

INSIGHT ANALYSIS

REPORTING

GENERATION OF RECOMMENDATIONS

*Whilst a focus group was planned for this research, it did not take place due to participant unavailability.

Research Engagement for Hypertension

37
Participants contacted

19%
Response rate

7
1:1 interviews

- Service Users
- Health & Social Care Professionals

- Policy Makers
- Housing Association Officers
- Care Home Managers

- Carers
- Charity & Voluntary sector

Storyboards

To facilitate and inspire TEC focused conversations

In each exploration, storyboards were created describing current and future state scenarios, these were used in focus groups to gain insights and to debate the role of TEC in health services

CURRENT STATE NEXT STEPS

Tell us what happens next....
Who is involved and what actions must they complete?
Map all possible routes to delivering necessary care.

FUTURE STATE NEXT STEPS

Here we imagine a scenario where health care professionals are able to provide proactive care and encourage self management with the help Techonolgy Enabled Care.

Current State Storyboard

The Current State storyboard shows the initial stages of a potential Telecare referral. This was used in the Hypertension workshop to understand the range of potential Hypertension referral pathways that currently exist.

1

Julie, 55 has been felling unwell for months, with fatigue and headaches. She attends her GP, when her blood pressure is taken it is very high.

2
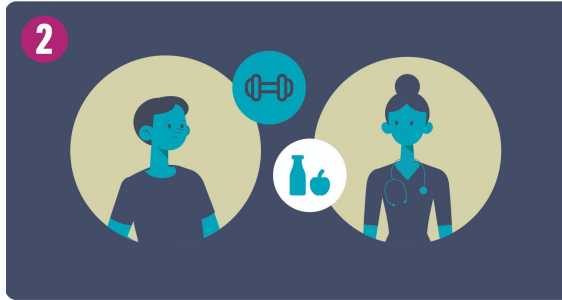
The practice nurse advises lifestyle changes including diet and exercise. Julie is scheduled to attend the treatment room for a recheck in 3 days.

3

Julie's blood pressure remains high, the nurse asks the GP to see Julie. The GP looks at the 3 recorded blood pressures and prescribes anti-hypertensive medication. Julie's blood pressure is checked at the treatment room 3 times a week for three weeks to monitor the effect of the medication.

Future State Storyboard

The Future State storyboard shows a potential Hypertension referral scenario in which TEC is available. This was used in the Hypertension workshop to facilitate discussion about the potential impact of TEC.

1 — Julie, 55 has been felling unwell for months, with fatigue and headaches. She attends her GP, when her blood pressure is taken it is very high.

1 — Clinicians can use Encompass patient records and known contributing factors to identify potential hypertension cases and reach out to them via an intelligent health messaging service for diagnosis and management.

2 — The practice nurse gives Julie a B/P monitor and assists Julie to download an app to her phone. Julie is asked to record her B/P at home in the morning and evening.

3 — Julie is able to connect the blood pressure device to her phone via Bluetooth. The readings are automatically uploaded and the practice nurse is able to visualise Julies readings in the clinical portal.

Insights & Opportunities

Through analysing research findings and trends, key insights have been identified.

A Design Insight is a clear and comprehensive understanding of a complicated problem or situation.

Opportunities detail how insights may be actioned / addressed to move towards TEC adoption and achieve positive outcomes for stakeholders.

Hypertension

Research Questions

Research Questions

Research questions were composed to define the scope of each exploration and inform the creation of discussion guides.

The same research questions were used across all five explorations, allowing for the comparative capture of insights.

1 *What are the experiences, attitudes and perspectives of individuals working with Hypertension regarding TEC?*

2 *How might individuals better be supported or encouraged to engage in TEC innovation?*

3 *What opportunities are available for TEC innovation in Hypertension?*

1

What are the experiences, attitudes and perspectives of individuals working with Hypertension regarding TEC?

Participants were aware of the existing usage of TEC to assist with the management of Hypertension, with some participants having direct experience in their practice.

Participants were generally positive about the use of TEC in this domain - seeing it as an opportunity to reduce the number of in-person visits to GP practices. Participants provided examples of good acceptance amongst patients.

However, participants expressed concerns regarding the lack of standardisation in TEC devices, and the risk of improper usage by patients, resulting in some examples of a lack of trust in patient-generated data.

Additionally, participants expressed uncertainty regarding the funding of devices, and the potential for changes in workload.

2

How might individuals better be supported or encouraged to engage in TEC innovation?

Individuals may be better encouraged to engage in TEC innovation for Hypertension management through increased awareness of benefits and impact. Case studies demonstrating the impact on patients, and clarifying the necessary changes in roles and workload, will reduce hesitation in TEC adoption.

Additionally, the implementation of a standardised, regional approach to Hypertension management with TEC should provide clarity regarding funding, acceptable devices, and best practice.

3

What opportunities are available for TEC innovation in Hypertension?

Scaling up adoption of TEC for Hypertension management has the potential to increase detection of undiagnosed Hypertension cases, facilitating earlier intervention and patient self-management.

The creation of a standardised, regional approach may result in further efficiencies, which may allow primary care to meet increased demand on resources.

Hypertension

Insights & Challenges

TEC is currently being used for some aspects of Hypertension management, and has demonstrated positive impact and acceptance.

Research participants discussed examples of TEC in Hypertension management currently implemented in Northern Ireland, within GP practices.

Participants were generally positive about the current acceptance of self-monitoring through TEC and highlighted advantages like, reducing the numbers of in-person GP visits.

Participants stated that health data currently generated from TEC could be used more efficiently for patient care and help to promote personalised care.

TEC is currently being used for some aspects of Hypertension management, and has demonstrated positive impact and acceptance

" *It needs to happen. Patients are being missed because they can't get to practices.*

" *Anything diverting patients from having to make regular calls and visits to the practice will be good.*

" *There's a role for TEC in following up and/or confirming suspected cases of Hypertension.*

" *We had a proactive response to self blood pressure monitoring, 88% uptake.*

" *Patients deal very well with their own blood pressure monitoring.*

Some clinicians are reluctant to make decisions based upon patient-generated data.

Technology for the recording of Hypertension-related data is widely available from personally acquired products. Participants highlighted increasing frequencies of patient acquired products.

However, health care professionals (HCPs) will only feel confident using hypertension data from TEC once the accuracy of devices has been confirmed, and HCPs currently confirm blood pressure readings by performing their own assessments.

There was a call for standardisation in the application of TEC-enabled self-monitoring across Trusts.

Some clinicians are reluctant to make decisions based upon patient-generated data

"

[patient-generated hypertension readings] aren't standardised so we have to retake tests to action them.

"

Accuracy of the devices might be an issue. You hear about cases of people running to GPs after their smartwatch has risen a concern.

"

[Any personal hypertension devices] needs the NHS rubber stamp. I won't base my clinical decision on an unverified reading.

"

If the Trusts could all do the same thing [going forward in technology enabled hypertension care], that would be good.

Participants were concerned that introducing TEC for Hypertension may create an unsustainable workload.

Participants reflected upon the prevalence of Hypertension, and were concerned that the introduction of TEC could result in an unmanageable influx of currently undiagnosed hypertension cases.

Participants expressed concerns that this may increase strains on already limited resources, and questioned if increased efficiencies in some areas (e.g. patients taking their own measurements at home) would be replaced with increased demand in other areas (e.g. equipment onboarding and data monitoring).

Participants were concerned that introducing TEC for Hypertension may create an unsustainable workload

> *Hypertension is very common. How will we cover this population?*

> *Staffing is a huge problem for us at the moment, have we got the resources to cover this?*

> *Assisting in IT is not a nurse's role*

> *It would be a massive resource to manage these new patients*

> *Who will monitor the data? You might free time for appointments, but you might actually end up with more patients with this technology*

Challenges

Participants also described the following challenges for the implementation of TEC in Hypertension:

Process Challenges:

➔ The mix of approaches to hypertension TEC across NI, not everybody is starting from the same stage, emphasising the need for a standardised approach
➔ Limited regional policies and procedures for implementing hypertension TEC
➔ Lack of funding
➔ Staff capacity

Technology Challenges:

➔ Lack of consistent and reliable connectivity throughout NI (i.e. Wi-Fi and mobile data infrastructure)
➔ Lack of connected health and care (primary, secondary and community)
➔ Concern about the accuracy and reliability of hypertension TEC
➔ Concern about potential accessibility for individuals with limited digital confidence

People Challenges:

➔ Concern around security, consent, data capture, use and storage
➔ Fear about TEC creating more work for overstretched services
➔ Perception of more urgent need for funding elsewhere

Hypertension

Opportunities

Process: Identify areas of best practice within TEC for Hypertension management and share regionally to build upon it.

➜ There is an opportunity to consolidate examples of the positive impacts of TEC for Hypertension management in Northern Ireland.

➜ By inviting practitioners and patients to share their experiences, there is an opportunity to evaluate and evidence the effectiveness of each project.

➜ In doing so, there is an opportunity to drive buy-in and standardisation by identifying which systems can be adopted and rolled out.

➜ Where this has been done elsewhere in the UK, benefits are being observed within primary care. For example, a reduction of 8% in overall GP appointments, with a 15% drop in face-to-face appointments [1].

[1] NHS Transformation Directorate (2024). Telemonitoring at scale for hypertension in primary care [Online]. Available:https://transform.england.nhs.uk/key-tools-and-info/digital-playbooks/cardiology-digital-playbook/telemonitoring-at-scale-for-hypertension-in-primary-care/

Confidence: Introduce guidelines for the use of TEC in Hypertension.

→ There is a range of views on using patient-generated Hypertension data, with a general acceptance that more work is needed to identify potential human error and how this can be reduced or avoided [2].

→ There is an opportunity to establish clear guidelines and policies to support the standardisation of patient-generated data across Trusts.

→ These policies and guidelines should provide clarity regarding approved devices, manufacturers or features which patients should look for in devices. Existing guidance may be referenced, such as the British and Irish Hypertension Society's list of validated monitors [3].

→ Additionally, standardised training materials for patients should be created to maximise the validity and accuracy of data generated through correct device usage.

[2] Abdolkhani, R., Borda, A. and Gray, K. (2018) "Quality management of patient generated health data in remote patient monitoring using medical wearables-a systematic review." Stud Health Technol Inform. Available: https://pubmed.ncbi.nlm.nih.gov/30040674/

[3] British and Irish Hypertension Society. (2024) For Home Use. [Online] Available at: https://bihsoc.org/bp-monitors/for-home-use/.

Adoption: Document better evidence on the long term benefits of TEC implementation.

➜ By enabling better identification of Hypertension using TEC, there is an opportunity to produce better patient health outcomes [4].

➜ To enable better HCP buy-in it is necessary to promote the benefits of TEC for Hypertension, and address concerns over the impact on already constrained resources.

➜ In addition to providing case studies demonstrating the positive impact of TEC on patient outcomes, case studies should also be provided to demonstrate and clarify the impact on resources.

[4] Iqbal, A., Johnson, G., Chambers, R. and Johnson, K. (2021) "Benefits of digital technologies in empowering patients to take control of their cardiovascular health." Primary Health Care. vol 31, issue 5, pp 19. Available: https://openurl.ebsco.com/EPDB%3Agcd%3A14%3A10634046/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Agcd%3A152789277&crl=c

Secondary use of hypertension data, or any healthcare data, could unlock better research outcomes.

➔ As more hypertension data is generated through the application of more technology, there's an opportunity to make wider use of it.

➔ Allowing secondary use of data for research purposes could expand knowledge of diseases and treatments, improve efficiency and help the health service in meeting patient needs.

"

There's huge potential. Most of Europe does that as a matter of course. There's general access to health data, anon or not, which can be used to inform research.

– Research participant

Further Opportunities

Participants also described the following opportunities for TEC (and other health tech) in Hypertension:

➔ Standardise TEC hypertension care provision across Northern Ireland

➔ Use TEC to better cope with demand on primary care

➔ Empower patients to manage their own conditions

➔ Work with other parts of the public sector to match rollout with improvements in digital infrastructure

➔ Drive public understanding of TEC through publicity and education campaigns

➔ Ensure influencers within the sector understand the potential of TEC

Moving Forward

This discovery has provided a better understanding of TEC appetite, challenges, implementation requirements and opportunities for adoption.

In the next steps of this work, DHCNI are seeking to address key challenges raised across this discovery through implementing the recommendations detailed in the 'Overall Findings' report.

If you are interested in keeping up to date with ongoing work, please visit the DHCNI website.

If you would like more information about this work please contact: Linda.McRandle@hscni.net or DHCNIContact@hscni.net

Visit bigmotive.com
Read   bigmotive.com/blog
Follow @big_motive

Appendix

Appendix A

➜ Desk research was conducted to evaluate the extent and impact of technology within Hypertension.

➜ Several examples of TEC used within Hypertension were identified. Three were selected and used to create lightning posters to stimulate conversation in interviews and focus groups.

➜ Full research findings can be accessed through DHCNI.

TEC Technology Examples

There are several examples of TEC technologies being used for Hypertension. Many of the examples make use of technologies like sensors and wearables to monitor and inform Hypertension management and self-management.

- **Remote Monitoring Devices**: These include blood pressure monitors that patients use at home. These devices can automatically send blood pressure readings to healthcare providers - if the providers are set up to receive them. These are commonplace on the market, for example: Tenovi, Aktiia and Omron Evolv.

- **Smartphone Apps**: Apps help patients track their blood pressure readings, medication schedules, and lifestyle changes. They rely on users taking their own measurements and inputting them. Apple, Samsung and Google's Health Apps, for example.

- **Wearable Technology**: Devices worn on body can capture a range of health tracking data. Many smartwatches are able to track heart rate. As technology improves more wearable devices are being developed to provide are blood pressure monitoring capabilities.

- **Communication Platforms**: Systems that prompt patients to measure and submit their own blood pressure readings, often with devices issued by HCPs. Patients can be prompted by text, email or phone call for example, NHS Scotland's Connect Me.

TEC Impact Summary

Innovation for TEC in Hypertension is developing at a rapid pace - making both management and self-management more accessible. Some examples of successfully used TEC include:

- **Aktiia,** a wrist-worn blood pressure monitor that intermittently measures the user's blood pressure, records and displays results on a cloud-based app, which can be reviewed by a HCP. On accuracy, trials suggest readings are on par with traditional cuff measurements [5].

- **Connect Me,** a remote monitoring Hypertension monitoring service that contacts the user intermittently to ask health-related questions/ blood pressure readings, via a variety of upload methods (app, phone call etc.) [8].

- **Lifelight,** uses a smartphone/ tablet camera to measure blood pressure by detecting light changes on skin, related to blood flow. Research suggests its results are on a par with traditional monitoring methods [6]. This technology was used during the pandemic and allowed for remote monitoring of vital signs [7].

[5] Almeida, T.P., Cortés, M., Perruchoud, D., Alexandre, J., Vermare, P., Sola, J., Shah, J., Marques, L. and Pellaton, C. (2023). "Aktiia cuffless blood pressure monitor yields equivalent daytime blood pressure measurements compared to a 24-h ambulatory blood pressure monitor: Preliminary results from a prospective single-center study." Hypertension Research. vol 46, issue 6, pp1456-1461. Available: https://www.nature.com/articles/s41440-023-01258-2
[6] Heiden, E., Jones, T., Brogaard Maczka, A., Kapoor, M., Chauhan, M., Wiffen, L., Barham, H., Holland, J., Saxena, M., Wegerif, S., Brown, T., Lomax, M., Massey, H., Rostami, S., Pearce, L., & Chauhan, A. (2022). "Measurement of Vital Signs Using Lifelight Remote Photoplethysmography: Results of the VISION-D and VISION-V Observational Studies." JMIR formative research. vol 6, issue 11. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9706384/
[7] NHS Transformation Directorate. (2020, 10). Remote monitoring of vital signs. [Online] Available at: https://transform.england.nhs.uk/ai-lab/explore-all-resources/understand-ai/remote-monitoring-vital-signs/.

TEC Models Summary

There are a range of technologies for TEC within Hypertension care across the UK. Many users choose to self-fund these products but there are also NHS-led programmes.

Trust Contract (Connect Me Programme):
NHS Scotland - Inhealthcare [8]

- The Connect Me program offers a range of digital health services encompassing 23 pathways to monitor and engage with service users.

- Devices such as blood pressure monitors and pulse oximeters are utilized for conditions like COPD, asthma, and hypertension, providing a comprehensive overview of health conditions that may not be fully evident during traditional clinical visits.

- Service users record and transmit their health data through a digital health platform.

- The reviewed data triggers a 'traffic light' system, indicating any necessary follow-up actions for the service user.

- To date, over 87,500 patients have benefited from this program, contributing to a reduction in primary service pressures by averting more than 300,000 in-person appointments.

[8] Digital Health. (2023, 05). Inhealthcare partners with NHS Scotland to expand remote monitoring. [Online] Available: https://www.digitalhealth.net/2023/05/inhealthcare-partners-with-nhs-scotland-to-expand-remote-monitoring/