

BIGMOTIVE



DHCNI

Technology Enabled Care (TEC) Discovery



Long-Term Conditions

May 2024

This report details **Long-Term Conditions** (LTCs) 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

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 Long-Term Conditions

Exploration Approach



Long Term Conditions

LTCs Focus

For each exploration, DHCNI proposed a specific application of TEC.

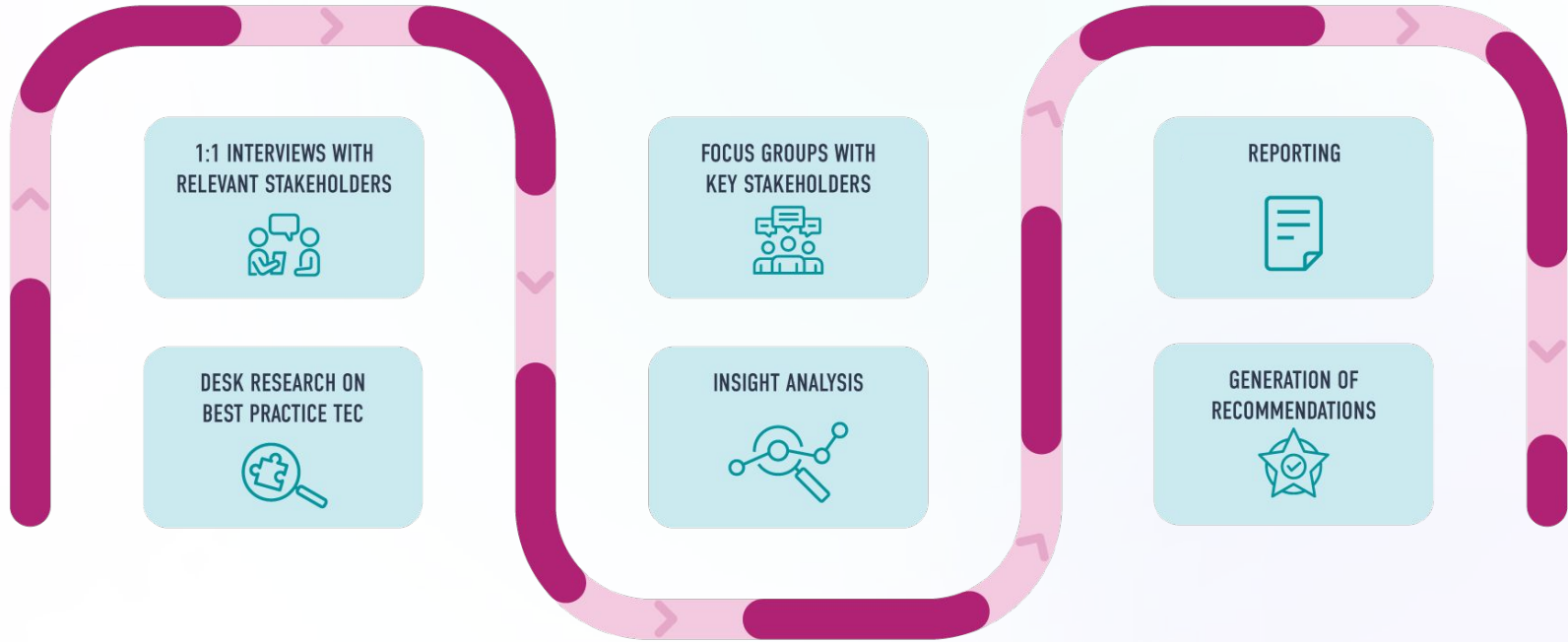
This was used to stimulate conversation during research and determine TEC opportunities and potential challenges with implementation.



Enable people and care teams to leverage data to better **monitor and manage trends** in disease and to **respond to exacerbations**.

Exploration Process

The process of exploring LTCs 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.



Research Engagement for LTCs

47

Participants
contacted

32%

Response
rate

15

Total
engaged

3

1:1
interviews

12

Participants at
focus groups



- PHA
- Community Respiratory Team
- Nurse Consultant



- Diabetes Nurse
- Respiratory Clinical Lead Nurse
- SET ANP/RNS
- Diabetes Specialist Nurse



- Charity and Voluntary
- Occupational Therapist
- Community Respiratory team



Storyboards

To facilitate TEC focused conversations, storyboards were created describing current and future state scenarios.

These were used in focus groups to facilitate reflection and debate, and to gain insights into 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 Technology Enabled Care.

Current State Storyboard

The Current State storyboard illustrates a representative example of the management of a LTC without the use of TEC. This was used in the LTC workshop to understand the existing care pathway and its limitations.



James, a widower with COPD, lives alone since his wife's death 6 months ago. His condition has worsened, requiring three recent hospital admissions.



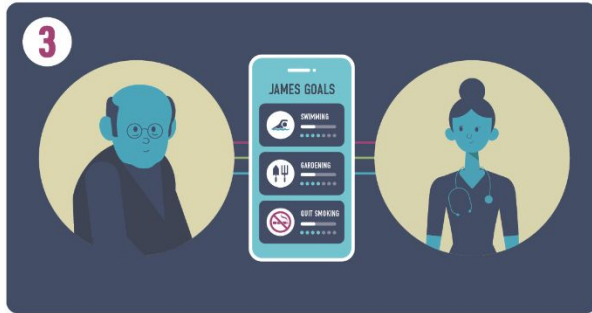
It has been 6 months since his last COPD review. James was advised to quit smoking and prescribed nicotine replacement, but relapsed and missed his follow-up. He attends annually for a flu vaccination.



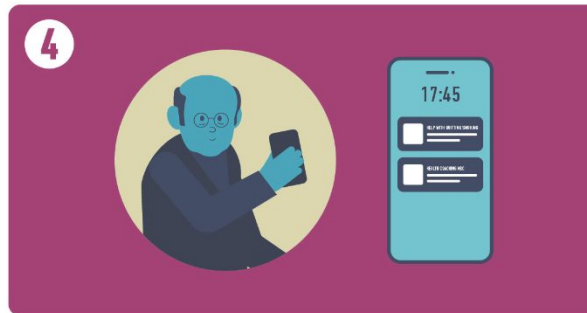
James' GP Practice send him regular letters and text messages to remind him to attend for appointments.

Future State Storyboard

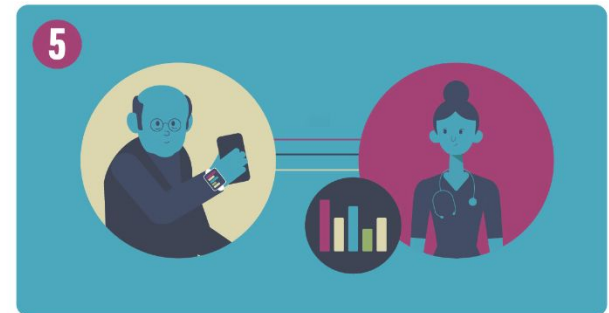
The Future State storyboard shows a potential new application of TEC for the management of a LTC. This was used in the Telecare workshop to facilitate discussion about the potential impact of TEC.



James discusses self-monitoring and TEC with the COPD team. He seeks motivation to improve self-care. James joins a gardening and swimming club through an online social prescribing platform. He sets personal goals while the healthcare team tracks his progress.



The team have recorded James' Patient Activation Measure as low, they advise him to download a health coaching app and receives support through a smoking cessation text service.



The healthcare team initiates remote monitoring for James, who monitors his vitals daily and can identify changes in readings. With proactive management, he learns to recognise and address symptoms early, reducing hospital admissions.

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 provided explain how insights may be actioned / addressed to move towards the goal of TEC adoption and achieve positive outcomes for stakeholders.

 Long-Term Conditions

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 LTCs 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 LTCs?*

Research Questions

1

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

Research participants were positive and enthusiastic about the use of TEC for LTCs, and offered examples of positive impact within existing services.

In particular, they highlighted the ability for TEC to promote and facilitate patient empowerment and self-management, where appropriate, in addition to providing continuity of care following acute admissions.

Despite this positivity, participants highlighted several challenges for the adoption and impact of TEC, including challenges in coordination across care services.

Research Questions

2

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

Several opportunities were identified to better support and encourage individuals involved in LTC care to engage in TEC innovation.

These included the mapping of LTC pathways to ensure TEC integration with Encompass, in addition to the documenting and sharing of evidence of TEC impact to help build business cases for application of TEC with other LTCs.

Research Questions

3

What opportunities are available for TEC innovation in LTCs?

Participants described several key opportunities for the impactful TEC innovation within LTCs.

These included the exploration of TEC interventions at a variety of stages of an individual's LTC journey, in addition to the greater application of TEC following acute admissions to ensure sustainable continuity of care.



Long-Term Conditions

Insights & Challenges

INSIGHT 1

TEC has the ability to empower patients in the self-management of their LTC.

TEC is viewed as a way for patients to take ownership of their LTC.

Research participants agreed that data produced from TEC can enhance patients' understanding of their health and wellbeing, and encourage meaningful conversations about their care pathway.

INSIGHT 1

TEC has the ability to empower patients in the self-management of their LTC

The people who do the best are the people who are well informed.

TEC can enable a culture of change - a move to education and self-management.

People want to take part in their own healthcare.

INSIGHT 2

LTC management is disconnected, making it difficult to seamlessly coordinate a patient's care.

Due to the complex nature of LTCs, a patient's journey often involves multiple services of care.

Research participants believe that the use of technology (e.g. Encompass) can facilitate better sharing and understanding of a patient's LTC management, making it possible to tailor treatment plans more accurately, anticipate needs, and avoid unnecessary duplication of services.

INSIGHT 2

LTC management is disconnected, making it difficult to seamlessly coordinate a patient's care.

*There's a lack of connectivity/
communication between services.*

*Utilise data better and
improve service.*

*[There is] inefficient method of
communications [...] working
in silos.*

*Lacking of generalists - people
are specialist so no-one takes
ownership.*

INSIGHT 3

TEC has the ability to provide continuity of care following acute admissions.

Current pathways & pressures mean there may be some disparity in care for LTCs after discharge - following acute hospital admissions and between acute episodes.

Research participants expressed a desire for sustained support and monitoring between admissions/ episodes. They viewed TEC as a potential solution to bridge potential care disparity, by enabling a continuum of care once a patient is discharged.

INSIGHT 3

TEC has the ability to provide continuity of care following acute admissions.

TEC might help patients to live healthier and avoid recurrent acute episodes.

[TEC may be able to] fill in gap between full care and nothing.

Patients are sicker and the workload is more acute.

We need to engage the patients a lot earlier to say this is the way to do it.

TEC is being used successfully in the monitoring and management of some LTCs.

Research participants praised the impact and implementation of TEC for some LTCs (e.g. diabetes and respiratory conditions), but commented that evidence and strategy for other LTCs is lacking.

Participants described the use of TEC in diabetes as an example of the transformative influence that TEC can create for both LTC management and self-management [3].

Participants described the need for increased evidence of successful application to build business cases for application in other LTCs.

INSIGHT 4

TEC is being used successfully in the monitoring and management of some LTCs

“Diabetic care has some TEC involved, video meetings and the like. That means you can do them more regularly, with more people and make them available on demand.”

“A business case is needed, it comes down to finance.”

“Patients are given TEC (i.e. continuous respiratory monitor) if criteria is met.”

“Theres a business case for funding this to prolong and enrich people's lives.”

Challenges

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

Process Challenges:

- Lack of funding and recurrent funding
- Responsibility of health data (monitoring)
- Provider criteria for tech
- Central contact for patient
- Lack of regional policies and procedures for implementing TEC
- Protocols regarding malfunctioning equipment
- Protocols for return of tech

Technology Challenges:

- Fear of using tech
- Lack of basic connectivity (i.e. Wi-Fi infrastructure)
- Lack of connected health and care (primary, secondary and community)

People Challenges:

- Patient confidence/ culture to self-manage using TEC
- Patient motivate to use TEC for self-management can decline when support withdraws
- Patient health literacy
- Patient digital literacy
- Greater patient complexities



Long-Term Conditions

Opportunities

OPPORTUNITY 1

Provide TEC following acute admission to support LTC management - helping to maximise patient outcomes.

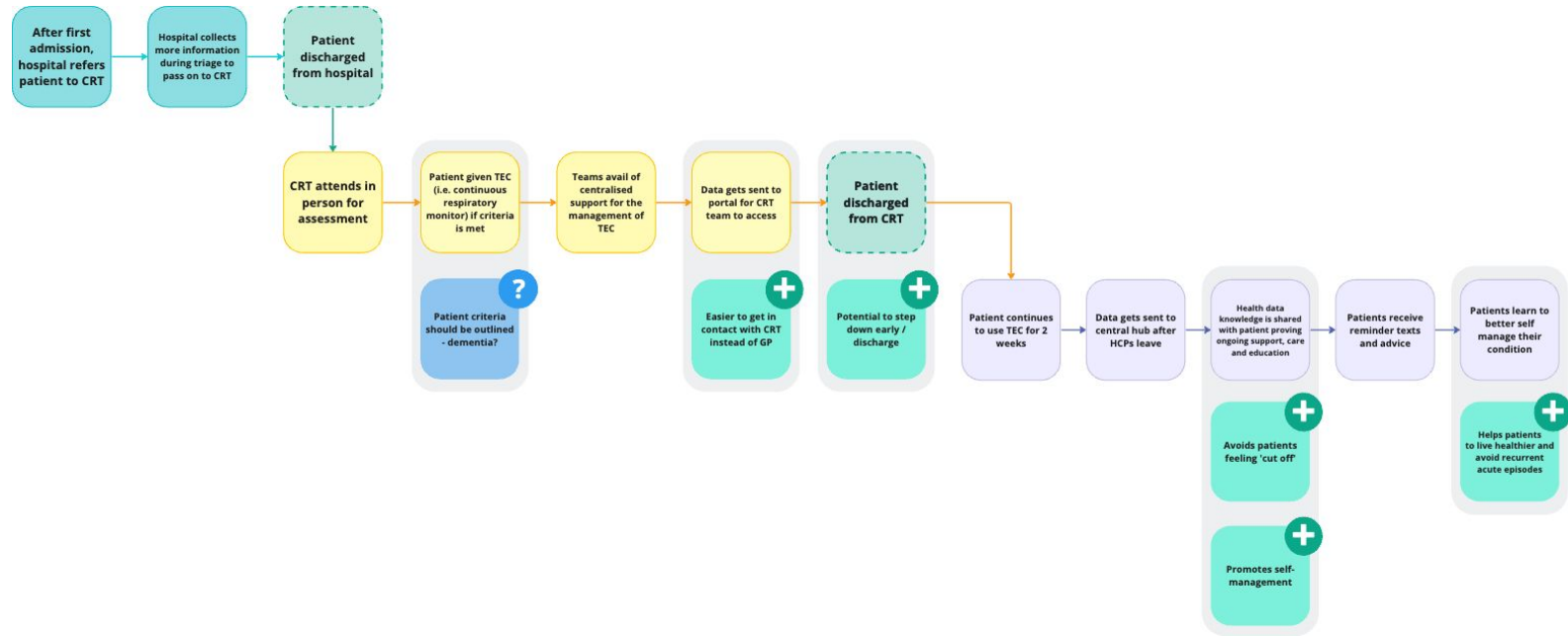
- Timely adjustments in treatment plans and interventions based on real-time health data can produce better patient outcomes, which can help to reduce service pressures [2].
- Participants believed there is an opportunity to broaden the **Hospital at Home referral criteria to include other exacerbations in LTCs** and patients at risk of health decline.

GPs don't have time or capacity to do follow through tests.

- Focus Group Participant

OPPORTUNITY 1

Research participants outlined a future state journey demonstrating TEC post-acute admission:



OPPORTUNITY 2

Explore TEC interventions for additional stages of a service user's LTC journey.

- Participants praise the use of TEC in LTCs as a way to both empower and educate patients. Evidence shows that earlier intervention with TEC in LTC can lead to better health outcomes [1].
- Through mapping LTC service user journeys, inefficiencies can be identified and areas of opportunities for the use of TEC highlighted.
- There is an opportunity to document and share evidence of TEC impact to build a business case for other LTCs.
- Sharing learnings, evidencing benefits and applying best practice can support and inform the acquirement and roll out of other LTC TEC.

OPPORTUNITY 3

Explore opportunities for TEC integration with Encompass.

- By enabling access to appropriate health data, health services can benefit from a more complete picture of the patient and their self-management, which can help to provide more informed care plans and interventions.
- There is an opportunity to use Encompass to enable better access to LTC TEC data, across different LTC pathways.

OPPORTUNITY 4

Patient reminders and charity signposting to maintain self-management.

- In some TEC for LTCs, research participants expressed that patients can lose momentum for TEC for their LTC self-management following receipt of technology.
- Enabling text reminders for TEC usage in some LTCs has the potential to improve engagement and patient empowerment.
- There is a lack of awareness of voluntary and community services for LTCs. Better signposting to these services has the potential to improve patient engagement with their LTC self-management and consequently their utilisation of TEC.

The patient stops using it when help leaves.

– Focus Group Participant

Further Opportunities

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

- TEC for prevention (e.g. pre-COPD diagnosis)
- Voice controlled TEC (e.g. Google speaker, Alexa ETC.)
- Monitoring health data for LTC patient education
- Instant C-reactive protein (CRP) results
- Remote monitoring between acute episodes
- Connected and more informed health and care through shared patient data (this can be achieved through encompass)
- Real-time health data
- Sensors to measure respiratory rate
- Continuous respiratory monitor
- Virtual support groups
- Collection of population health data to identify trends and inform future services

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

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Long-Term Conditions

Appendix

Appendix A

DESK RESEARCH

- Desk research was conducted to understand the use of TEC in LTCs, surfacing case studies and models of TEC care.
- Several examples of TEC technologies used in LTCs 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.

The lightning posters are arranged in a grid. The top row features 'Connect Me' and 'FreeStyle Libre'. The middle row shows 'How it works' for each. The bottom row shows 'How it supports care' for each. The 'FreeStyle Libre' poster includes an image of the sensor and a small image of the reader device.

Connect Me

Remote Blood Pressure Monitoring

- Patient monitors and uploads BP
- Variety of upload and communication channels for inclusivity
- Saves time and resources

How it works

- Blood pressure monitor or pulse oximeter provided depending on need
- Connect Me remote monitoring service contacts patient at remote intervals to ask 'health question'/clinical readings when required
- An alert is sent to home screen to repeat readings if results are out of range
- 'Signposting' to NHS resources if required

How it supports care

- Older population mean more conditions that need BP monitoring
- Saves time and resource for GP surgery
- Series of BP reports provides a better picture of the patient and helps with care decisions etc.
- Clearer patient picture helps diagnosis and patient management
- Provides convenience for the patient in avoiding travel for appointments
- Eliminating BP reduces on average 3 mins necessary for the patient for each visit and saves costs
- Clinician receives patient report when needed (1 monthly, 5 monthly etc)

FreeStyle Libre

Continuous Glucose Monitoring

- Real-time glucose reading on smartphone
- Direction of glucose reading
- Real-time reports easily shared on smartphone and upload

How it works

- Uses a thin, flexible filament inserted just under the skin to measure glucose levels constantly
- Small and discreet sensor

How it supports care

- Increases time in range in T1
- Optional alarms for low glucose readings to prevent extreme hypoglycaemia

How it works

- Provides a variety of ways to input results - apps, phone call, etc, secure online platform
- Potential to integrate with other systems so other HCF can access results
- Different protocols for different ranges depending on the need e.g. long term monitoring, diagnosis needed etc.
- Clear remote that makes it obvious if a person is well controlled or not helping to indicate medication needs

TEC Technology Examples

There are several examples of TEC technologies being used for LTCs. Many of the examples make use of technologies like sensors, wearables, smartphone applications and AI and data collection platforms to monitor and inform LTC management.

- Continuous Glucose Monitor (CGM): Biosensors that intermittently collect blood glucose readings [4].
- Insulin Pumps: Medical device used to administer insulin [5].
- Remote Blood Pressure (BP) Monitoring: Service user-led BP cuff and online platform to upload results [6].
- Remote ECG Device: Service-user led ECG monitoring and online platform for healthcare professional access [7].
- Respiration Analysis System: Wearable device designed to monitor and analyse respiratory patterns [8].
- COPD Wearable: Collects and analyses pulmonary functions, diagnostic biomarkers and predictors of exacerbation [9].

[4] Abbott. (n.d). *The Freestyle Libre 2 system* [Online]. Available: Libre 2 System | Continuous Glucose Monitoring | Abbott

[5] Medtronic. (n.d). *Insulin Pump Systems* [Online]. Available: Insulin Pump Systems | Medtronic Diabetes for Healthcare Professionals (medtronic-diabetes.com)

[6] Inveresk Medical Practice. (n.d). *Connect Me — Blood Pressure Patient Guide* [Online]. Available: Connect Me — Blood Pressure Patient Guide – Inveresk Medical Practice

[7] Nordic Semiconductor. (2020). *Wearable ECG monitor enables remote care of cardiac patients* [Online]. Available: Wearable ECG monitor enables remote care of cardiac patients - nordicsemi.com

[8] Indiegogo. (n.d). *RUAH : Wearable Respiration Analysis System* [Online]. Available: RUAH : Wearable Respiration Analysis System | Indiegogo

[9] Deswal, P. (2023, Nov. 2). *Samay reports positive results for AI-assisted wearable device for COPD* [Online]. Available: Samay reports positive results for AI-assisted wearable device for COPD - Clinical Trials Arena

TEC Impact Summary

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

- **Freestyle Libre**, a flash glucose monitoring system, measures interstitial fluid glucose levels in people living with Diabetes, significantly improving glycaemic control [10] and is shown to reduce hospital admissions by up to 66% [11]. Healthcare Improvement Scotland found that Freestyle Libre is likely to be cost effective under a wide range of scenarios and cost saving against self-monitoring blood glucose (SMBG) when a mean number of eight blood glucose tests per day was considered [12].
- **AliveCor mobile ECG**, a portable ECG heart rate and rhythm monitor used to detect atrial fibrillation (AF). It is provided and funded by NHS England to those who present with symptoms such as palpitations. In undiagnosed palpitations, it is cost saving (£13.22 per patient over 2 years) [13]. In recurrence situations, it is modestly cost incurring (£85.91 per patient over 10 years, saving 212.8 strokes/100,000 patients tested and 115 deaths/100,000 tested). In detecting AF recurrence, Kardia Mobile was modestly cost incurring over 10 years, but led to a large reduction in number of strokes and deaths.

[10] Deshmukh, H., et al. (2020, Sept.) "Effect of Flash Glucose Monitoring on Glycemic Control, Hypoglycemia, Diabetes-Related Distress, and Resource Utilization in the Association of British Clinical Diabetologists (ABCD) Nationwide Audit". *Diabetes Care* [Online]. Vol. 43, issue 9. Available: Effect of Flash Glucose Monitoring on Glycemic Control, Hypoglycemia, Diabetes-Related Distress, and Resource Utilization in the Association of British Clinical Diabetologists (ABCD) Nationwide Audit | Diabetes Care | American Diabetes Association (diabetesjournals.org)

[11] Abbott. (n.d). *Real-World Data* [Online]. Available: Real-World Data | Healthcare Professionals | Abbott (freestyle.abbott)

[12] Health Improvement Scotland. (2018, Jul.). *In response to an enquiry from the Scottish Diabetes Group: What is the clinical and cost effectiveness of Freestyle Libre flash glucose monitoring for patients with diabetes mellitus treated with intensive insulin therapy?* [Online]. Available: <https://shtg.scot/media/1799/freestyle-libre-flash-glucose-monitoring-shtg-evidence-note-81-endocrinology-and-diab.pdf>

[13] National Institute for Health and Care Excellence. (2023, Jul. 25). *KardiaMobile for detecting atrial fibrillation* [Online]. Available: <https://www.nice.org.uk/guidance/mtg64/chapter/3-Evidence#:~:text=The%20base%20case%20results%20of,AF%20recurrence%20detect on%20in%20a>

TEC Models Summary

TEC in LTCs is largely either self-funded or NHS funded, within the UK. Trust contracts with external companies, as well as internal Trust programmes, aim to make TEC for LTCs more accessible through innovative pathways:

Trust Contract (Connect Me Programme): NHS Scotland - Inhealthcare [14]

A variety of digital health services provided through Connect Me programme (23 pathways) to monitor/ interact with service users.

- Blood pressure monitor/ pulse oximeter etc. used for conditions like COPD, asthma, hypertension etc.
- Provides a holistic view of LTCs, which may not be exposed within traditional clinical appointments.
- Service user records and sends health data via digital health platform. Reviewed data initiates a 'traffic light' system, which states any required actions by the service user.
- Over 87, 500 patients have used this programme, helping reduce primary service pressures in avoiding more than 300, 000 in-person appointments.

Trust long-term Conditions Programme: Edinburgh Health and Social Care Partnership [15]

Aims to improve care for people living with LTCs and who are at risk of falls.

- Multi-agency approach, initial focus on people registered with a Deep End GP practice, who frequently attend ED and people who live with frailty.
- LTC team supporting implementation of remote blood pressure monitoring for use in GP surgery's. This is supported by National Services Scotland, Technology Enabled Care (NSS TEC).

[14] Digital Health. (2023, May 23). *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/>

[15] Edinburgh Health and Social Care Partnership. (n.d). *Long term conditions* [Online]. Available: <https://www.edinburghhsc.scot/longtermconditions/>