

# Innovation collaborative

Rapid review of current remote monitoring in care homes across the UK

Katya Masconi-Yule , Programme Manager

# Introduction

In partnership with the seven regions of the NHS in England, NHSX is pioneering a new National Innovation Collaborative to (i) build on the digital health gains achieved during the pandemic, (ii) accelerate the scale of those digital innovations that enable a redesigned outpatient and remote care service, and (iii) help save staff time. Many areas of London have deployed remote monitoring technologies within certain areas of their localities, and the five individual ICS/STPs across London have committed to work collaboratively to support the increased use of remote monitoring across various pathways under the London regional Innovation Collaborative. As part of a commissioned programme of work through the London Digital First Programme, this rapid review of the current remote monitoring in care homes across the UK has been produced by the Health Innovation Network, who will be undertaking the evaluation of the regional scale of remote monitoring. The aim of this review is to:

- Identify previous evaluations and available evidence for remote monitoring in care homes in the UK
- Summarise desktop and market research comparison of available solutions
- Detail the uptake of remote monitoring solutions used in care homes across the UK

## Rapid review approach

### Online search of evidence for remote monitoring in care homes in a UK setting

The lack of uniformity of reporting and publishing of evidence and evaluations on the use of remote monitoring digital technologies in the UK requires this rapid review to undertake two separate search strategies. These cover the two domains of literature: published articles, and gray literature (including reports, case studies and policy documents). PubMed, a freely available online database, was used to source published articles. PubMed Advanced Search Builder was used to construct a precise search strategy. Search sources for gray literature included the Nuffield Trust, the Kings fund, NICE, AHSN publications, CCG and STP publications, GDE site publications and desktop search for industry-created reports.

### Market comparison of available solutions and provider spread across the UK

Desktop and network research were undertaken to identify available solutions and summarise the spread of providers across care homes in the UK. The search was restricted to solutions that either included the kit for the observations or risk assessments designed for a number of settings, or a communication tool that would allow for the reporting of vitals or risk assessment scores to a clinician with a care home focus.

### Inclusion and exclusion criteria

|                              | Inclusion   | Exclusion  |
|------------------------------|---|--|
| <b>Setting</b>               | Public / private care home setting  | Hospice / care at home settings  |
| <b>Location</b>              | United Kingdom  | Countries other than the UK  |
| <b>Publication objective</b> | Full text available for an evaluation / assessment / pilot review / case study which included outcomes following implementation and/or care home staff, patient, relative and wider stakeholder attitude and experiences. | Practice guidelines, news articles / opinion pieces / editorials / statements with a description of the pilot and no inclusion of outcomes following implementation. |
| <b>Product type</b>          | Any platforms used to monitor care home residents' basic vital signs to help with care decisions  | Any other product, including remote monitoring platforms where care is not focused on the patient or the platform is focussed on remote consultations.               |

# Review results

## Evidence for remote monitoring in care homes in the UK

A total of 1 published study and 8 case studies or evaluations were included in this rapid review. Thirty published studies were identified, and following screening based on the inclusion and exclusion criteria the following were excluded. An exhaustive search for gray literature that matched the inclusion criteria identified the case studies / evaluations listed below.

| Ref | Study type        | Setting   | Aim  | Solution / condition  | Results   |
|-----|-------------------|---|--|---|---|
| [1] | Feasibility study | 11 nursing home residents, Dublin                               | Explore the feasibility of remote monitoring data collection and transfer and the associated burden on participants  | Fall prevention programme   | Extensive burden to both staff and patients   |
| [2] | Case study        | 76 care homes, Wirral   | Implement innovation to reduce ambulance calls, conveyances, A&E attendances and admissions, improve patient experience, provide quicker access to clinical assessment than via NHS 111 and provide care in the patient's place of residence | 24/7 clinical tele-triage service, HD iPads, secure nhs.net email addresses, and staff trained to take basic observations and equipped with blood pressure monitors, thermometers, urine dipsticks and oximeters. | Receives around 300 calls a month from care homes, and only 12% of patients require hospital treatment.<br>Over a 6-month period, 66% reduction in NHS 111 calls and a 7% reduction in ambulance conveyances to A&E from care homes   |
| [3] | Case study        | 7,687 nursing and care home residents, Lancashire and Yorkshire | Introduce staff to new technology to improve patient care and support their work   | 24-hour clinical support to care home residents via a video link to the Airedale digital care hub, monitoring equipment, and virtual training of care home staff  | Reduction in care home referrals to GPs by 40% and ambulance calls by 30% over a 12-month period.<br>40% of existing care home resident healthcare needs/callouts are assessed and treated in their place of residence avoiding unnecessary journeys to hospital.<br>Potential savings for 2016/17 approximately £3 million. This includes £332,800 in GP visits, £1m through fewer ambulance callouts, £1.5m through reduced non elective admissions and £200,000 through reduced A&E attendances. |

|     |            |  |   |   |   |
|-----|------------|--|---|---|---|
| [4] | Evaluation | 8 nursing and residential homes, West Sussex | Introduce a telehealth to assist in the early detection of signs and symptoms to prevent unnecessary admissions to hospital.                                | Android tablets and the provider's software (Docobo) were provided  | 75% reduction in admissions and 49% had no admissions at all throughout the period compared to the previous year.<br>The financial benefits based on the costs and savings for the pilot and projected for 100 patients in each locality are year 1 £198,709 and year 2 £212,229. |
| [5] | Case study | 34 care homes, Bolton                        | Introduce technology to proactively support the health and wellbeing of care home residents, and care home staff and Clinicians during the covid-19 crisis. | myKiosk systems, thermometers, pulse oximeters, blood pressure monitors and staff training on both the system and on how to take vital signs observations.  | Reduction of clinical staff entering care homes, reducing the risk of cross infection, and improvement of the prioritising of residents' care.  |
| [6] | Case study | Manor Care Centre care home, Lincolnshire    | Implement a solution that provided care that was safe for residents, carers and clinicians during the covid-19 crisis.                                      | CliniTouch Vie solution. This includes a digital health platform and associated peripheral devices. The solution allows real-time biometric and wellbeing data to be collected and entered the digital platform for its residents | Increased efficiency with which infections were addressed, medication was accessed and continuity of care for patients with long-term conditions was ensured.<br>Reduced the paper administrative burden and improved communication between carers and GPs.                       |
| [7] | Evaluation | 3 residential care homes, Sutton             | Enhance early identification and proactive management of any deterioration.   | Tablet, or POD, able to collect vital signs and condition specific questionnaires.  | No impact on the frequency of calling 999 or on being admitted to hospital urgently over a 9-month period, and therefore no financial savings realised.   |
| [8] | Case study | 250 care home residents, Stockport           | Reduce non-elective admissions, improve resident's health care and empower residents and community staff to better manage patient care.                     | Dignio portal, blood pressure monitors, thermometers, oximeters, scales and spirometers.  | Reduction of hospital admissions by 34%, £164,556.6 cost saving over 7-month period.  |
| [9] | Case study | 14 care homes, Sunderland                    | Enhance the quality of care for residents and improve the communication between care homes and the external health environment.                             | Tablet, blood pressure monitors and pulse oximeters   | Total cost saving of £756,144 in one year for eight care homes due to reduced A&E attendances and non-elective admissions.  |

## Summary of market comparison of available solutions

| Company                | Description  | Condition  | Supporting evidence   | Enabled connections<br><small>Bluetooth enabled products unless otherwise indicated</small>   |
|------------------------|--|--|---|---|
| <b>Current Health*</b> | Platform for continuous vital sign monitoring, smart alerts, 24/7 nursing triage team and in-built telemedicine.<br><br><b>Website:</b> <a href="https://currenthealth.com/">https://currenthealth.com/</a>  | Patient post-discharge<br><br><b>Provider spread:</b> Imperial College London NHS FT, Croyden Health Services NHS Trust, Brighton and Sussex University Hospital NHS Trust, Sussex Community NHS FT, NHS Larkshire, Dartford and Gravesham NHS Trust | Informal case study showing use at NHS Lanarkshire, reducing readmissions and unnecessary home visits and improving patient experience [10]<br><br>22% reduction in home visits, 92% patient adherence and a decrease in length of stay and readmissions at Dartford & Gravesham NHS Trust through the Hospital at Home team [11, 12]<br><br>Imperial College Healthcare NHS Trust's Frailty Team showed a decrease in overall care by 1.5 days, saving 144 potential bed days due to avoided A&E admission. This resulted in a cost saving of £62,500 in 3 months [13] | Pulse oximeter<br>Thermometer<br>Pedometer  |
| <b>Dignio*</b>         | Dignio is a daily remote patient monitoring and telemedicine platform, with the addition of a home lab.<br><br><b>Website:</b> <a href="https://dignio.com/en/">https://dignio.com/en/</a>                   | No specific focus<br><br><b>Provider spread:</b> University Hospitals Birmingham, Stockport City Council and Dudley CCG  | Published evaluation across a number of care settings [8]<br><br>Informal case studies outside of the UK, and recent partnership with NHS Dudley Clinical Commissioning Group [14]  | Blood pressure monitor<br>Glucometer<br>Scale<br>Thermometer<br>Pulse oximeter<br>Spirometer  |
| <b>Doccla*</b>         | Platform to monitor patients remotely, following a hospital discharge.<br><br><b>Website:</b> <a href="https://www.doccla.com/">https://www.doccla.com/</a>  | Patient post-discharge<br><br><b>Provider spread:</b> Nene CCG, Northampton General Hospital NHS Trust   | Partnered with Northampton General Hospital NHS trust to provide virtual wards [15]   | Thermometer<br>Pulse oximeter<br>Blood pressure monitor   |
| <b>Docobo*</b>         | DOC@HOME is a digital remote monitoring and case management solution for patients under care at home or care homes.<br><br><b>Website:</b> <a href="https://www.docobo.co.uk/">https://www.docobo.co.uk/</a> | Frail/elderly and patients with long term conditions<br><br><b>Provider spread:</b> Bexley, Newham, West Yorkshire, Liverpool, Kent, Lancashire, Tameside and Warwickshire, Mersey Care NHS Foundation Trust.  | 8-month pilot at Sussex Community Trust showing a 75% reduction in admissions compared to the same period the year previously. 4.9% had no admissions at all through the period compared to the previous year [4, 16]<br><br>NHS Social Care Pathfinder funded project in Bexley showing a 65% reduction in GP visits, 35% less A&E attendances and less 999 conveyances to care homes in Bexley [17]   | Tablet for the manual input of data from:<br>Blood pressure monitor<br>Pulse oximeter<br>Thermometer<br>ECG<br>Patient questionnaires |

|                              |  |  |   |   |
|------------------------------|--|--|---|---|
| <b>Feebris*</b>              | <p>Feebris is a mobile-based software platform used to detect and monitor complex health conditions.</p> <p><b>Website:</b> <a href="http://feebris.com/">http://feebris.com/</a></p>  | <p>Acute and chronic conditions in the elderly, and paediatric pneumonia</p> <p><b>Provider spread:</b> Barking, Havering and Redbridge, Northants, Hampshire and additional care home across East London. Retirement Villages in Cheshire and in community settings in India</p>  | <p>Awarded funding under the Techforce19 challenge to spread across 10 care homes in East London</p> <p>Additional work in community care for children under 5 in India, showing a reduction in hospitalisations and cost reduction across the diagnostic pathway at scale.</p>   | <p>Mobile phone<br/>Stethoscope<br/>Pulse oximeter<br/>Thermometer<br/>Blood pressure monitor</p>         |
| <b>Healthcall*</b>           | <p>The Digital Care Home service allows care home staff to refer patients details to clinical teams using a secure portal</p> <p><b>Website:</b> <a href="https://www.nhshealthcall.co.uk/">https://www.nhshealthcall.co.uk/</a></p>                               | <p>Care home residents and patients avoiding hospital admissions</p> <p><b>Provider spread:</b> Norfolk Community Health and Care Trust and all care homes in County Durham &amp; Darlington</p>   | <p>Monitoring of a group of high-dependency patients at home showed a reduction in bed days by 88%, A&amp;E admissions by 89% and GP visits by 65% at Norfolk Community Health and Care Trust [18]</p>  | <p>Manual input of data from:<br/>Pulse oximeter<br/>Thermometer<br/>Blood pressure monitor</p>           |
| <b>Huma*</b>                 | <p>Remote patient monitoring app, Medopad, that tracks symptoms and vital signs, flags deterioration and incorporates telemedicine functionality</p> <p><b>Website:</b> <a href="https://huma.com/">https://huma.com/</a></p>                                      | <p>Care home residents and patients avoid hospital admissions</p> <p><b>Provider spread:</b> 20 NHS Trusts including Royal Free, Guy's and St. Thomas', Chelsea &amp; Westminster, Royal Brompton, Watford General Hospital and North West London primary care teams</p>   | <p>Partnered with NHSX to trial 6 virtual ward sites for patients with mild-to-moderate Covid-19 symptoms – both those discharged from hospital and those for whom admission might otherwise have been required.</p>  | <p>Manual input of data from:<br/>Pulse oximeter<br/>Thermometer<br/>Blood pressure monitor</p>           |
| <b>InTechnology*</b>         | <p>Inhealthcare digital care home service that coordinates the monitoring of vital signs and acts as an early warning system.</p> <p><b>Website:</b> <a href="https://www.intechnologyplc.com/inhealthcare/">https://www.intechnologyplc.com/inhealthcare/</a></p> | <p>Care homes residents, high risk patients at home, post-op patients and pregnant women</p> <p><b>Provider spread:</b> More than 50 different NHS organisations and approximately 500 care homes across the UK including Durham, North Manchester, NWL CCG, Weldmar hospice care, City Health Care Partnership, Southern Health and Social Care trust, North Tees and Hartlepool NHS FT, Norfolk Community Health and Care NHS Trust, Northumberland Tyne and Wear NHS FT, Newcastle upon Tyne Hospitals NHS FT and Pennine Acute Hospital HST Trust</p>              | <p>Remote monitoring in Norfolk Community Health and Care NHS Trust of heart and lung disease patients at home showed a reduction in bed days by 88%, A&amp;E admissions by 89%, GP visits by 65% and out-of-hours appointments by 65% [19]</p> <p>Additional informal case studies available on their website [20]</p>   | <p>Manual input of data from:<br/>Pulse oximeter<br/>Thermometer<br/>Blood pressure monitor<br/>Scale</p> |
| <b>Medicspot<sup>‡</sup></b> | <p>Pod in pharmacies/care homes with equipment to measure vital signs and remote consultations.</p> <p><b>Website:</b> <a href="https://www.medicspot.co.uk/">https://www.medicspot.co.uk/</a></p>   | <p>Non-specific (GP surgeries), Care homes (frail/elderly), COVID in community, urgent care</p> <p><b>Provider spread:</b> In many pharmacies across the country (<a href="https://www.medicspot.co.uk/pharmacies">https://www.medicspot.co.uk/pharmacies</a>), an arc partner with GP surgeries, PCNs and GP federations including The Goldborne Medical Centre in Kensington; South Downs Health and Care in Eastbourne; Willows Health Centre in Leicester and St Andrews Health Centre in Tower Hamlets and in 11 care homes in Leicester and Nottinghamshire.</p> | <p>Informal case study showing, through the installation of MedicSpot across 4 care homes by a GP surgery in Leicester, a reduction in the time of one care home visit from up to an hour to just 15–20 minutes [21]</p> <p>Partnered with ASDA to offer in-store GP services [22]</p> <p>Awarded InnovateUK funding to develop first digital healthcare assistant [23]</p> | <p>Pulse oximeter<br/>Thermometer<br/>Blood pressure monitor<br/>Stethoscope<br/>Otoscope / endoscope</p> |

|  |  |  |  |   |
|--|--|--|--|---|
| <p><b>My mhealth*</b></p>  | <p>A solution for comprehensive monitoring of patients to identify changes in observations, including a text chat function and rehabilitation / education resources.</p>                               | <p>COPD, asthma, diabetes and heart disease patients</p>   | <p>The myCOPD app has been tested in a randomised control trial, showing that a 6-week online support pulmonary rehabilitation was non-inferior to conventional face-to-face session [24], and an economic evaluation has estimated the net benefit from avoided hospital admissions in a CCG with 250,000 patients is £143,820 per year [25, 26].</p>   | <p>Blood pressure monitor<br/>Scale<br/>Glucometer<br/>Pulse oximeter<br/>Thermometer<br/>Sputum colour checker</p>   |
| <p><b>Website:</b> <a href="https://mymhealth.com/">https://mymhealth.com/</a></p>                                 |  | <p><b>Provider spread:</b> Southend University Hospital, NELFT Diabetes Service, Mid and South Essex STP and Waterside PCN</p>   |  |   |
| <p><b>PatientMpower*</b></p>   | <p>Remote monitoring platform to reduce hospital admissions by acting as an early warning system for patient deterioration.</p>  | <p>Chronic kidney and lung diseases patients</p>   | <p>A small study of patients using home spirometry for 4 months showed no significant change in baseline readings and scores [27]</p> <p>Two randomised controlled trials have been completed in Ireland but no yet published focussing on self-monitoring of patients with idiopathic pulmonary fibrosis and patients in hemodialysis. An observational study is underway in Ireland assess the utility of the app helping patients and care givers manage their idiopathic pulmonary fibrosis.</p> | <p>Spirometer<br/>Pulse oximeter<br/>Blood pressure monitor<br/>Scale</p>   |
| <p><b>Website:</b> <a href="https://info.patientmpower.com/">https://info.patientmpower.com/</a></p>               |  | <p><b>Provider spread:</b> Nottingham University Hospitals and Beaumont Hospital Dublin</p>  |  |   |
| <p><b>Safe Steps<sup>§</sup></b></p>   | <p>Safe Steps is a falls prevention app, using multifactorial personalised action plan for falls, with the addition of the CV-19 Core Data Tracker tracking for outbreak of covid-19 in care homes</p> | <p>Frail/elderly in care homes</p>   | <p>Early evidence indicates the app has reduced the number of falls in 100 care home by 28%, with initial cost modelling suggests a 5:1 return on investment, based on cost savings through reduced A&amp;E conveyances [28]</p> <p>Feedback from an early adopter of the CV-19 Tracker in care homes in Tameside and Glossop (700 residents across 25 care homes) show it has been positively received.</p>   | <p>Computer dashboard<br/>Multifactorial risk assessment and personalised action plans</p>                            |
| <p><b>Website:</b> <a href="http://www.safesteps.tech/">http://www.safesteps.tech/</a></p>                         |  | <p><b>Provider spread:</b> 137 care homes across NW England, 1 hospital setting in Greater Manchester and Southwark. The CV Tracker is in 30 care, including Wirral and Southwark, and rolling out across 500+ homes in Greater Manchester, including Tameside &amp; Glossop, Bolton and Salford</p> |  |   |
| <p><b>Sensium Healthcare*</b></p>  | <p>Wearable, wireless system for monitoring vital signs of patients, acting as an early warning system for patient deterioration.</p>  | <p>Patients at risk of deterioration</p>   | <p>A cost utility analysis of intermittent monitoring vs continuous with Sensium showed a cost saving of £700,000 per year for a 30-bed ward expecting to treat 1500 patients. The cost savings are driven by reduced costs of hospital readmissions and length of stays [29]</p>  | <p>Senor that reports heart rate, respiration rate and temperature</p>  |
| <p><b>Website:</b> <a href="https://www.sensium.co.uk/">https://www.sensium.co.uk/</a></p>                         |  | <p><b>Provider spread:</b> West Middlessex University Hospital, Royal Liverpool and Broadgreen University Hospital, Leeds Teaching Hospital NHS Trust, Montefiore Hospital Brighton, Chelsea and Westminster Hospital NHS Foundation Trust and UCL Hospitals</p>                                     |  |   |
| <p><b>Smartmed</b></p>   | <p>A remote monitoring platform allowing patient to take their vital signs, symptoms and general wellbeing.</p>  | <p>Patients at home and care home residents</p>  | <p>-</p>   | <p>Blood pressure monitor<br/>Scale<br/>Glucometer<br/>Pulse oximeter<br/>Thermometer<br/>Peak Flow Meter<br/>ECG</p> |
| <p><b>Website:</b> <a href="http://www.mhealthcaresolutions.co.uk/">http://www.mhealthcaresolutions.co.uk/</a></p> |  | <p><b>Provider spread:</b> London North West Healthcare NHS Trust and Waterloo Health</p>  |  |   |

|                                    |   |  |  |  |
|------------------------------------|---|--|--|--|
| <p><b>Spirit Digital*</b></p>      | <p>The CliniTouch Vie connects clinical teams and patients, collecting vitals and tailored health questionnaire via an app.</p> <p><b>Website:</b> <a href="https://www.spirit-digital.co.uk/">https://www.spirit-digital.co.uk/</a></p>        | <p>Patients with long term conditions, vulnerable patients, patients avoid hospital admissions and patients post-discharge</p> <p><b>Provider spread:</b> Department of Surgery and Cancer at St Mark’s Hospital and Academic Institute, Department of Cancer and Surgery at Imperial College, Health and Life Sciences Department at De Montfort University, University Hospitals of Leicester NHS Trust, care home in Lincolnshire and in all CCGs offering the Cardiopulmonary Rehabilitation service</p> | <p>A return on investment of £4.84, with every £1 spent returning £4.84 in savings net of all costs [30]</p> <p>67.5% reduction in unscheduled COPD hospital admissions, £2,304.24 absolute saving per patient and a total saving of £117 550 over a 12-month period for LC CCG [31]</p>   | <p>Blood pressure monitor<br/>Pulse oximeter<br/>Thermometer<br/>Patient questionnaire</p>   |
| <p><b>Telehealth Solutions</b></p> | <p>The HomePod / CareHomePod is a telehealth solution which enables patients or carers to take and record vital signs.</p> <p><b>Website:</b> <a href="https://www.thsl.co.uk/products/homepod">https://www.thsl.co.uk/products/homepod</a></p> | <p>Patients with long term conditions, patients avoiding hospital admissions and patients post-discharge</p> <p><b>Provider spread:</b> Southend CCG, NHS Tayside, Portsdown Group Medical Practice, NHS Ayrshire and Arran, Drayton Medical Practice in Shropshire, Carnoustie Medical Group in Scotland, Yeovil District Hospital NHS Foundation Trust, North Leeds CCG, Slough Borough Council and NHS Slough CCG</p>   | <p>A pilot at NHS Ayrshire and Arran to enable COPD patients to be better support at home has been evaluated and shown a 40% savings compared to usual care, 26% reduction in GP appointments, 70% reduction in emergency admission and 86% reduction to local out of hours services [32]</p> <p>An interim evaluation of a three-phase care home pilot with the Royal Marsden Community Services did not show a reduction in 999 calls, A&amp;E attendances or non-elective hospital admissions [7]</p> | <p>Pre-configured tablet for manual input of data from:<br/>Scale<br/>Blood pressure monitor<br/>Pulse oximeter<br/>Thermometer<br/>Glucometer<br/>Cholesterol check<br/>INR monitor</p> |
| <p><b>Whzan*</b></p>               | <p>Telehealth system for care homes to send vitals, photos and questionnaire data to clinicians via an app.</p> <p><b>Website:</b> <a href="https://www.whzan.uk/">https://www.whzan.uk/</a></p>  | <p>Frail/elderly and patients with long term conditions, post hospital discharge and post-op patients, pregnant women</p> <p><b>Provider spread:</b> 1,500 NHS care homes across the UK, London specific boroughs include Greenwich, Wandsworth, Merton and 14 care homes across UCLP</p>  | <p>A report on the pilot in care homes in Gateshead and Newcastle detailed implementation learnings of the Whzan digital health NEWS monitoring [33]</p> <p>An evaluation of the use across 8 care homes in Sunderland showed an estimated saving of £756,144 due to reductions of A&amp;E attendances and ambulance services over 1 year [34]</p>   | <p>Tablet<br/>Blood pressure monitor<br/>Pulse oximeter<br/>Thermometer</p>  |
| <p><b>XIM*</b></p>                 | <p>Lifelight Contactless is an app that can take vitals via a camera</p> <p><b>Website:</b> <a href="https://lifelight.ai/">https://lifelight.ai/</a></p>   | <p>Patients at home, care home residents and in hospital settings</p> <p><b>Provider spread:</b> North East London NHSFT, NHS Essex Partnership University NHSFT, Portsmouth Hospitals Trust, and East Devon Health Limited</p>  | <p>A NICE MedTech innovation briefing was published detailing the evidence and considerations [35]</p>   | <p>App for smartphone or tablet</p>  |
| <p><b>121Sync*</b></p>             | <p>vPad is a medical hub to allow for data to be inputted directly into EMIS Web or SystmOne.</p> <p><b>Website:</b> <a href="https://www.121sync.com/">https://www.121sync.com/</a></p>  | <p>Patients at home and care home residents</p> <p><b>Provider spread:</b> Avondale Mnetal Healthcare Centre and Knowsley CCG</p>  | <p>-</p>   | <p>Pre-configured tablet<br/>ECG<br/>Pulse oximeter<br/>Thermometer<br/>Blood pressure monitor<br/>Glucometer and spirometer</p>   |

\* Included in the Spark Dynamic Purchasing System for remote monitoring  
φ Available via ARC on the Spark Dynamic Purchasing System  
§ Available via multiple partners on the Spark Dynamic Purchasing System

# References

- [1] Donnelly, A. et al. The Burden of a Remote Trial in a Nursing Home Setting: Qualitative Study. *Journal of Medical Internet Research*. 2018; 20(6): e220.
- [2] AHSN Network., (2019). Care home tele-triage reduces A&E attendances. [online]. *AHSN Network*. [Viewed on 5 October 2020]. Available from: <https://www.ahsnnetwork.com/case-study/care-home-tele-triage-reduces-ae-attendances>
- [3] Airedale NHS Foundation Trust., (2017). Vanguard Care Homes Evaluation summary. [online]. *Airedale Digital Care Hub*. [Viewed on 5 October 2020]. Available from: <http://www.airedaledigitalcare.nhs.uk/resources/evaluation-reports/>
- [4] Sussex Community NHS Foundation Trust., (2014). DocoboWeb pilot evaluation report. [online]. *Sussex Community NHS Foundation Trust*. [Viewed on 5 October 2020]. Available from: <https://www.sussexcommunity.nhs.uk/Downloads/news/docoboweb-pilot-evaluation-report.pdf>
- [5] Tunstall., (2020). Using remote health monitoring to safeguard care home residents and professionals. [online]. *Tunstall*. [Viewed on 5 October 2020]. Available from: [https://www.tunstall.co.uk/siteassets/uk/case-studies/bolton-case-study\\_v2.pdf](https://www.tunstall.co.uk/siteassets/uk/case-studies/bolton-case-study_v2.pdf)
- [6] Manor Care Centre., (2020). Case Study: How remote monitoring is improving access to primary care for care home residents. [online]. *Lifescience Industry*. [Viewed on 5 October 2020]. Available from: <https://www.lifescienceindustrynews.com/clinical-need/case-study-how-remote-monitoring-is-improving-access-to-primary-care-for-care-home-residents-in-lincolnshire/>
- [7] Sutton Homes of Care Vanguard., (2018). Evaluation Report of a Pilot in Sutton Residential Care Homes for the Elderly to Test Remote Clinical Monitoring of Residents. *Sutton CCG*. [Viewed on 5 October 2020]. Available from: <https://www.suttonccg.nhs.uk/vanguard/plans/PublishingImages/Pages/Telehealth-Pods/Evaluation%20of%20Telehealth%20Pilot%20in%20Residential%20Homes%20at%209%20months%20-%20Final%20March%202018.pdf>
- [8] [file:///C:/Users/k1891378/Dropbox%20\(HIN\)/HIN%20-%20Dementia/Project%2026%20-%20remote%20monitoring%20\(NHSX\)/Innovation%20collaborative/1.%20Rapid%20review/Gray%20literature%20search/TEL%20Presentation\\_Aug2020\[3\].pdf](file:///C:/Users/k1891378/Dropbox%20(HIN)/HIN%20-%20Dementia/Project%2026%20-%20remote%20monitoring%20(NHSX)/Innovation%20collaborative/1.%20Rapid%20review/Gray%20literature%20search/TEL%20Presentation_Aug2020[3].pdf)
- [9] AHSN Network., (2019). Well Connected Care Homes. [online]. *AHSN Network*. [Viewed on 5 October 2020]. Available from: <https://www.ahsnnetwork.com/case-study/well-connected-care-homes>
- [10] Current Health., (2020). Our work with NHS Lanarkshire. [online]. *Current Health*. [Viewed on 5 October 2020]. Available from: <https://currenthealth.com/our-work-with-nhs-lanarkshire>
- [11] Current Health., (2020). Dartford & Gravesham NHS Trust's experience with Current Health: a clinical team perspective. [online]. *Current Health*. [Viewed on 5 October 2020]. Available from: <https://currenthealth.com/dartford-gravesham-nhs-trusts-experience-with-current-health-a-clinical-team-perspective>
- [12] Current Health., (2019). Dartford & Gravesham NHS. [online]. *Current Health*. [Viewed on 5 October 2020]. Available from: <https://currenthealth.com/dartford-gravesham-nhs>
- [13] Current Health., (2020). Imperial College Healthcare NHS Trust: Supporting Care Homes During a Pandemic. [online]. *Current Health*. [Viewed on 5 October 2020]. Available from: <https://currenthealth.com/imperial-college-healthcare-nhs-trust-supporting-care-homes-during-a-pandemic>
- [14] Dignio., (2020). Our work. [online]. *Dignio*. [Viewed on 5 October 2020]. Available from: <https://dignio.com/en/our-work/>
- [15] Health Tech News., (2020). Northampton partners with Doccla for virtual wards. [online]. *HTN*. [Viewed on 5 October 2020]. Available from: <https://www.thehtn.co.uk/2020/09/04/northampton-partners-with-doccla-for-virtual-wards/>
- [16] Docobo., (2020). Use of low intensity Telehealth in Adult Social Care to prevent avoidable admissions. [online]. *Docobo*. [Viewed on 5 October 2020]. Available from: [https://www.docobo.co.uk/case-studies/cs-111\\_sussex-cht\\_en-44\\_a42\\_2014-07\\_web\\_v3.pdf](https://www.docobo.co.uk/case-studies/cs-111_sussex-cht_en-44_a42_2014-07_web_v3.pdf)
- [17] Docobo., (2020). London Borough of Bexley and Docobo use telehealth remote monitoring in care homes to reduce GP visits, ambulance conveyance and hospital attendance. [online]. *Docobo*. [Viewed on 5 October 2020]. Available from:

<http://www.docobo.co.uk/news-and-events/docobo-news-20200111A.html>

- [18] Inhealthcare., (2020). A new heart failure and lung disease service reduces A&E admissions and bed days at Norfolk Community Health and Care Trust. [online]. *NHS Health Call*. [Viewed on 5 October 2020]. Available from: <https://www.nhshealthcall.co.uk/wp-content/uploads/2020/03/Norfolk-care-case-study-A4.pdf>
- [19] TSA., (2020). Inhealthcare and Norfolk Community Health and Care NHS Trust. [online]. *TSA*. [Viewed on 5 October 2020]. Available from: [https://www.tsa-voice.org.uk/downloads/pdfs/case\\_studies/inhealthcare\\_norfolk\\_-\\_tsa\\_member\\_case\\_study.pdf](https://www.tsa-voice.org.uk/downloads/pdfs/case_studies/inhealthcare_norfolk_-_tsa_member_case_study.pdf)
- [20] Inhealthcare., (2020). The latest case studies from Inhealthcare. [online]. *Inhealthcare*. [Viewed on 5 October 2020]. Available from: <https://www.inhealthcare.co.uk/category/case-studies/>
- [21] Care Home Professional., (2020). Remote diagnosis hub offers care homes GP lifeline during pandemic. [online]. *Care Home Professional*. [Viewed on 5 October 2020]. Available from: <https://www.carehomeprofessional.com/remote-diagnosis-hub-offers-care-homes-gp-lifeline-during-pandemic/>
- [22] DigitalHealth., (2020). Doc and shop: Medicspot launches online GP consultations at Asda. [online]. *DigitalHealth*. [Viewed on 5 October 2020]. Available from: <https://www.digitalhealth.net/2020/07/doc-and-shop-medicspot-launches-online-gp-consultations-at-asda/>
- [23] Medium., (2020). Medicspot awarded £445k grant by Innovate UK. [online]. *Medium*. [Viewed on 5 October 2020]. Available from: <https://medium.com/medicspot/medicspot-awarded-445k-grant-by-innovate-uk-21bae32f6db3>
- [24] Bourne, S, et al. Online versus face-to-face pulmonary rehabilitation for patients with chronic obstructive pulmonary disease: randomised controlled trial. *BMJ Open*. 2017; 7: e014580
- [25] York Health Economics Consortium., (2018). Economic Impact Evaluation Case Study: Health Unlocked. [online]. *NHS Accelerator*. [Viewed on 5 October 2020]. Available from: <https://nhsaccelerator.com/wp-content/uploads/2018/03/HealthUnlocked-Economic-Case-Study.pdf>
- [26] SBRI Healthcare., (2017). SBRI HEALTHCARE CASE STUDY: my mhealth Limited. [online]. *SBRI Healthcare*. [Viewed on 5 October 2020]. Available from: <https://sbrihealthcare.co.uk/wp-content/uploads/2018/11/MYmhealth-FINAL-MASTER-3-Sept.pdf>
- [27] Fox, L, et al. An Observational Study of Self-Monitoring of Spirometry and Symptoms via a Mobile Electronic Health Journal in Usual Care of Patients with Idiopathic Pulmonary Fibrosis. *American Journal of Respiratory and Critical Care Medicine*. 2020; 201:A3394
- [28] AHSN Network., (2019). Improving safety in care homes. [online]. *AHSN Network*. [Viewed on 5 October 2020]. Available from: [https://www.ahsnnetwork.com/wp-content/uploads/2019/09/Care\\_Homes\\_Report\\_WEB.pdf](https://www.ahsnnetwork.com/wp-content/uploads/2019/09/Care_Homes_Report_WEB.pdf)
- [29] Sensium., (2020). Cost utility analysis of continuous and intermittent versus intermittent vital signs monitoring in patients admitted to surgical wards. [online]. *Sensium*. [Viewed on 5 October 2020]. Available from: <https://www.sensium.co.uk/publications/2020-cost-utility-analysis-of-continuous-and-intermittent-versus-intermittent-vital-signs-monitoring-in-patients-admitted-to-surgical-wards/>
- [30] Ghosh, S. et al. A cost saving intervention for patients with severe breathlessness. *British Journal of Healthcare Management*. 2018; 24:2-4
- [31] Ghosh S. et al. Combined interventions for COPD admissions within an urban setting. *BJHCM*. 2016; 3:122–131.
- [32] NHS England., (2014). NHS England – TECS CASE STUDY 006. [online]. *NHS England*. [Viewed on 5 October 2020]. Available from: <https://www.england.nhs.uk/wp-content/uploads/2014/12/tecs-arran-ayr.pdf>
- [33] Northumbria University., (2017). Assessment and clinical decision making of the acutely ill older care home resident: Implementation of NEWS in Gateshead Care Homes. [online]. *Northumbria University*. [Viewed on 5 October 2020]. Available from: [https://static1.squarespace.com/static/5893239037c581b39142e013/t/59dddecc2b8572ff2c11bd5/1507712721712/NEWS+REPO+RT+FINAL\\_2.pdf](https://static1.squarespace.com/static/5893239037c581b39142e013/t/59dddecc2b8572ff2c11bd5/1507712721712/NEWS+REPO+RT+FINAL_2.pdf)
- [34] AHSN Network., (2019). Well Connected Care Homes. [online]. *AHSN Network*. [Viewed on 5 October 2020]. Available from: <https://www.ahsnnetwork.com/case-study/well-connected-care-homes>

[35] NICE., (2020). Lifelight First for monitoring vital signs Medtech innovation briefing. [online]. *NICE*. [Viewed on 5 October 2020]. Available from: <https://www.nice.org.uk/advice/mib213/chapter/Clinical-and-technical-evidence>