



Meeting of East Renfrewshire Health and Social Care Partnership	Integration Joint Board
Held on	14 August 2019
Agenda Item	9
Title	Home and Mobile Health Monitoring
<p>Summary</p> <p>This report provides the Integration Joint Board with an update on the progress of Home and Mobile Health Monitoring (HMHM) across East Renfrewshire as part of our strategy to use digital solutions to support the health and wellbeing of East Renfrewshire residents. It reports on evaluation of the local test of change funded by Scottish Government including outcomes achieved and progress towards scale-up, spread and sustainability.</p>	
Presented by	Candy Millard Head of Adult Health and Social Care Localities
<p>Action Required</p> <p>The Integration Joint Board is asked to:-</p> <ul style="list-style-type: none"> ▪ note and comment on the progress and evaluation of Home and Mobile Health Monitoring ▪ ask the HSCP to work with primary care and acute colleagues to explore options for the continued expansion and long term sustainability of this approach 	
<p>Implications checklist – check box if applicable and include detail in report</p> <p> <input checked="" type="checkbox"/> Finance <input type="checkbox"/> Policy <input type="checkbox"/> Legal <input type="checkbox"/> Equalities <input type="checkbox"/> Risk <input type="checkbox"/> Staffing <input type="checkbox"/> Directions <input type="checkbox"/> Infrastructure </p>	

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EAST RENFREWSHIRE INTEGRATION JOINT BOARD

14 AUGUST 2019

Report by Chief Officer

HOME AND MOBILE HEALTH MONITORING

PURPOSE OF REPORT

1. This report provides the Integration Joint Board with an overview of Home and Mobile Health Monitoring (HMHM), and reports an evaluation of the test of change including outcomes achieved and progress towards scale-up, spread and sustainability.

RECOMMENDATION

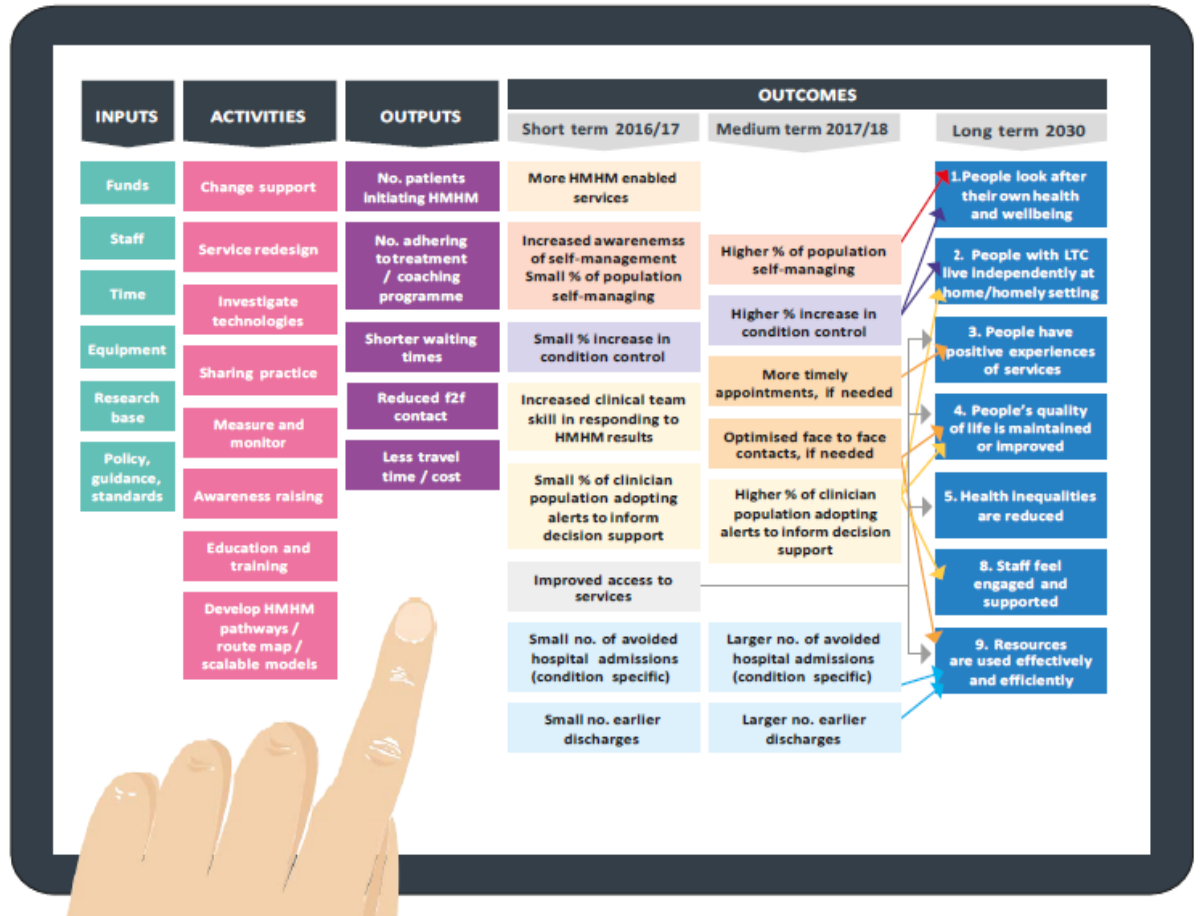
2. The Integration Joint Board is asked to:-
 - note and comment on the progress and evaluation of Home and Mobile Health Monitoring
 - ask the HSCP to work with primary care and acute colleagues to explore options for the continued expansion and long term sustainability of this approach

BACKGROUND

3. The National Service Model (Scottish Government 2017) states Home and Mobile Health Monitoring (remote monitoring), describes those activities that enable patients outside of healthcare settings to acquire, record and relay clinically relevant information about their current condition to an electronic storage system where it can be used to inform or guide self-management decisions by the patient and/or to support diagnosis, treatment and care decisions by professionals’.
4. East Renfrewshire HSCP has a longstanding commitment to the use of technology and digital solutions to support health and care. As part of this work the Technology Enabled Care team
 - Procured a license and package to operate the Florence (FLO) simple Telehealth text messaging system
 - Identified Hypertension as the initial long term condition which would benefit from HMHM (to cover diagnosis, titration of medication and long term management)
 - Created a model which would fit into GP practices’ current hypertension pathways with no additional costs to GP practices, as license, text bundles and equipment costs were all met from Scottish Government funding

5. The following logic model shows illustrates how Scottish Government expected that home and mobile health monitoring would to contribute to the national health and wellbeing outcomes

Figure 1 – Logic model for national HMHM 2016 to 2018



REPORT

6. East Renfrewshire HMHM service launched in September 2017 with 9 GP practices opting in use Florence (FLO) to manage Hypertension. In April 2018 the HSCP was successful in securing additional funding from Scottish Government for 2 further tests of change
- Up-scaling Flo in the management of Hypertension and,
 - Implementing Flo in the management of COPD.

Upscaling Flo in the Management of Hypertension

7. Between June 2018 and December 2018 the team secured an agreement from the remaining 6 GP practices who had not implemented HMHM to implement Flo as part of their hypertension pathways. By the end of April 2019 thirteen out of fifteen East Renfrewshire GP surgeries were actively recruiting patients to the Flo hypertension protocol.

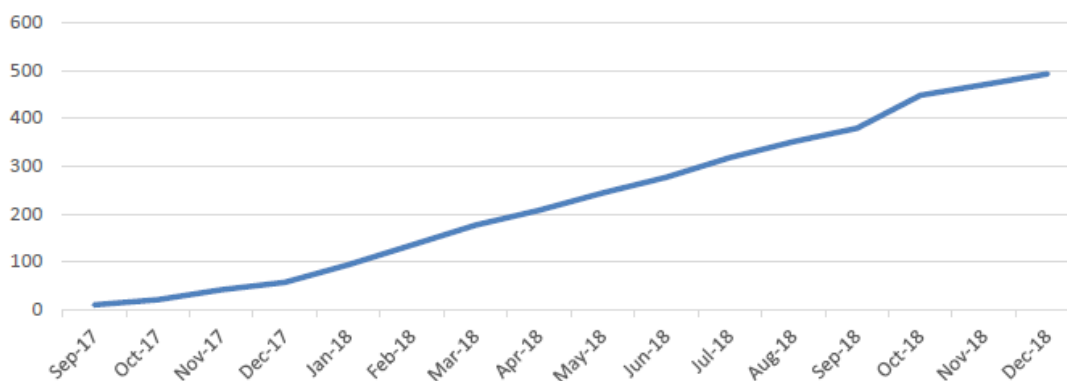
Chronic Obstructive Pulmonary Disease (COPD)

8. Between September 2018 and December 2018 a test of change was carried out with the aim of reducing the number of GP home visits and hospitalisations due to exacerbations of COPD. This proved difficult to roll out. Despite a financial incentive it was very difficult to get opt in from surgeries. Although this would suggest an unsuccessful test of change, evaluation feedback from staff and patients who used the protocol was extremely positive, with many of the patients remaining on the protocol long term with hospital admissions being prevented.

Independent Evaluation of Home and Mobile Health Monitoring

9. Dr Helen Alexander (Evaluation Manager, NHS Lanarkshire) undertook a national evaluation of HMHM, which included an evaluation of HMHM in East Renfrewshire. A full copy of the report is attached as an appendix to this report.
10. The national service model framework (Scottish Government, 2017) defined scale-up as having 1,000-5,000 active patients/service users by 2018/19. By this definition, and allowing for some having relatively small populations, six of the 12 HMHM partnerships funded nationally achieved this by the end of Year 3. East Renfrewshire achieved almost 500 people using HMHM for hypertension, which equates to 3.7% of the population estimated to have this condition. This is as high a proportion as anyone during the three year programme, so the partnership can be said to have achieved the first stage of scale-up.

Figure 2 – Cumulative total of HMHM users over time



11. In terms of impact, a local patient survey found that 80% of people said that HMHM had helped them recognise when their condition was getting worse. Feedback indicated that patients were prompted to take action *“I was glad of the text messages as they reminded me to take my blood pressure, otherwise I would have forgotten”* Everyone surveyed said Flo helped them to comply with health advice and 73% that it had supported them making lifestyle changes. Additional comments included, *“I liked being able to [monitor] without taking up the nurse’s time”*, *“It was excellent”* and *“It really reassured me because of my family history of high blood pressure”*.
12. HMHM was found to positively contribute to the optimisation of face to face contacts with services. Appointments were avoided because clinicians had blood pressure readings available to them from remote monitoring and used these to inform decision making without the patient needing to be present. *“Easier to review readings without patient there ... I either text or phone them ... easier to manage time for myself and the patient”* This meant that these appointments could be used for others who

needed to see the clinician face to face. Patient feedback demonstrated the advantage of this to people in work who were happy to free up the appointment they would otherwise have had to attend.

13. The report concludes that there is evidence of from East Renfrewshire of the contribution of HMHM towards achieving:
 - a higher proportion of the population self-managing
 - increased condition control
 - optimised face-to-face contacts
 - improved access to services
14. It also reports there was 'good evidence submitted of the contributions to resources being used more effectively and efficiently and positive patient/service user experience.' However the author indicates that without continued policy and implementation focus there is unlikely to be sufficient scale-up or spread and impact on systems and services to realise the benefits that remain possible.

Moving towards greater use of HMHM

15. Earlier this year, a bid to upscale HMHM was submitted to Scottish Government, but due to oversubscription was unsuccessful. A further 9 month test of change was approved providing £50k with the HSCP committing to a further £26k to allow a 12 month period. Disappointingly, Scottish Government has since advised they will only support a 6 month test of change.
16. Other digital solutions are being explored as part of Primary Care transformation and in support of the new GP Contract:
 - Attend Anywhere (Near Me) video conferencing is being enabled in 2 large practices within East Renfrewshire, with a further 7 being enabled this year. This is especially beneficial for our working population and those with difficulties travelling to appointments not requiring face to face examination.
 - Potential use of Woundsense technology alongside FLO to support safe and timely wound management. This can reduce unnecessary lengthy appointments for wound dressings. Analysis from the primary care demand to inform the development of Treatment Rooms as part of the Primary Care Improvement Plan found this was the area with this highest demand and longest length of appointment time.

CONSULTATION AND PARTNERSHIP WORKING

17. The Technology Enabled Care Team worked in consultation with the National HMHM Network and with guidance from the Clinical Director to create and deliver an HMHM service which would fit into current primary care hypertension and COPD pathways, and one that would be easily adoptable by a range of professionals within primary care teams.
18. Recently there has been a greater interest from wider NHSGG&C including HSCPs and the e Health team. A forum has been established to share knowledge and experience among areas, to assist in the scale up of HMHM in the management of Hypertension at Board level and to learn of other long term conditions being supported by HMHM such as Diabetes.
19. The HSCP will continue to work in partnership as part of the National HMHM Network with the overarching aim of developing a "Once for Scotland" HMHM service.

IMPLICATIONS OF THE PROPOSALS

Finance

20. Funding is required to support ongoing FLO support. Staff, licence and text bundles.
21. Earlier this year, a bid to upscale HMHM was submitted to Scottish Government, but due to oversubscription was unsuccessful. A further 9 month test of change was approved providing £50k with the HSCP committing to a further £26k to allow a 12 month period, d Disappointingly Scottish Government has since advised they will only support a 6 month test of change.

CONCLUSIONS

22. Currently over 600 patients in East Renfrewshire have benefitted from using Flo to assist them in managing their blood pressure. However it is not yet sufficiently scaled-up or spread to realise the level of health and wellbeing benefit modelled by Scottish Government. The independent evaluation concluded that more time is needed to reach a tipping point where HMHM becomes business as usual.
23. Further work is required to explore opportunities to embed the use of digital solutions to support self management of long term conditions, prevent hospital admission and support people at home safely in partnership with our technology enabled care solutions. These solutions can also reduce demand for house visits and appointments with GPs and other clinicians.

RECOMMENDATIONS

24. The Integration Joint Board is asked to:-
 - note and comment on the progress and evaluation of Home and Mobile Health Monitoring
 - ask the HSCP to work with primary care and acute colleagues to explore options for the continued expansion and long term sustainability of this approach

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BACKGROUND PAPERS

A National Service Model for Home and Mobile Health Monitoring
<https://sctt.org.uk/wp-content/uploads/2017/05/A-National-Service-Model-for-HMHM-v1.1.pdf>

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Towards Scaling Up Home and Mobile Health Monitoring *in East Renfrewshire*

An evaluation of the outcomes achieved and progress towards scale-up, spread and sustainability **April, 2019**

Dr Helen Alexander

ACKNOWLEDGEMENTS

This report would not have been possible without the commitment of those working in HMHM who built evaluation into their challenging workloads and responded to requests to submit it for this evaluation with enthusiasm and grace. Special thanks go to David Walker, Joanne McKeeve and Ann Steele.

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AT A GLANCE

HMHM IN EAST RENFREWSHIRE



493 people used Home and Mobile Health Monitoring (HMHM)

(also known as remote digital monitoring or telehealth)

in East Renfrewshire from September 2017 to December 2018



East Renfrewshire was **new to the use and adoption** of HMHM within local services

The people using HMHM were hugely positive about it, reporting positive health care experiences

“Very positive experience”

“It really re-assured me”

“Excellent not having to miss work to attend the nurse”

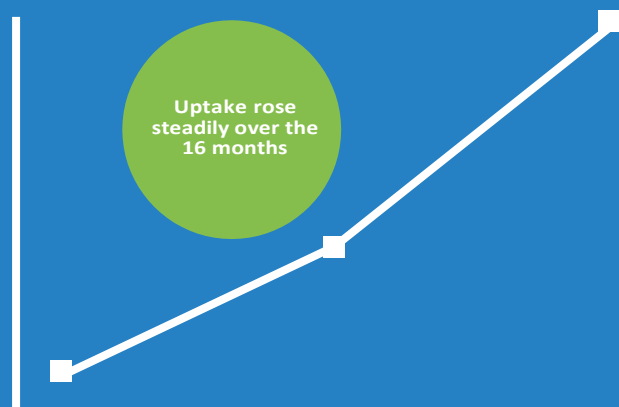
“Text messages reminded me to take my blood pressure”

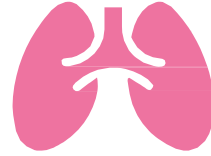
There has been significant growth in the adoption and use of HMHM

In just 16 months East Renfrewshire moved from zero to having all of their GP surgeries signed up to use HMHM

Much was expected of HMHM, and East Renfrewshire made considerable progress with two years of funding

Uptake rose steadily over time from the first **10** in September 2017 to **493** by December 2018





East Renfrewshire used HMHM for **hypertension** and did some early testing of it with **Chronic Obstructive Pulmonary Disease (COPD)**



There is good evidence of NHS resources being used **more effectively** and **efficiently**, avoiding the need for some GP & Practice Nurse appointments through the use of HMHM

This evaluation presents robust evidence that, when supported by HMHM:



More people self-manage their health and care



Condition-control improves



Face to face contacts (appointments) are optimised



Access to services increases



East Renfrewshire's participation in the National HMHM Programme has provided a firm foundation for future developments and much has been learned about accelerating scale up.

We need to remain pragmatic and realistic about how long it might take to move towards scale up and achieve sustainability.

This evaluation identified some aspects that would enable future scale up efforts to support implementing HMHM within a complex, dynamic health and care system.

Further scale up of HMHM is required to reach population level gain. East Renfrewshire would benefit from creating an action plan for HMHM scale-up that could lever the kind of radical change needed.

The inherent level of complexity with HMHM, and the results of this evaluation have shown that the benefits at a population level cannot be realised quickly. Success would be increased if some of the complication and complexity were reduced.

1 INTRODUCTION AND BACKGROUND

1.1 TECHNOLOGY ENABLED CARE IN SCOTLAND

1.1.1 THE EVOLVING STRATEGIC CONTEXT

Technology Enabled Care (TEC) has increasingly been gaining attention in recent years. When the TEC fund was launched in 2014, the focus was specifically on embedding and expanding the application of technology, because its potential was not widely understood at that time. Home health monitoring was one of the five priority areas identified for investment, with the aim of moving beyond small to medium scale initiatives to create substantial transformational programmes across Scotland. The intention was for TEC to progress from being an adjunct to care to become a core part of health and care delivery. This would require identifying which conditions and citizens could benefit most and which services should be scaled-up beyond the three years of funding available. Sustainability was not expected to be achieved within this timescale, but areas that merited further investment would be identified. Scotland was on a journey to support scale-up and spread, and home health monitoring was a priority.

Progress in the intervening years is captured eloquently in three seminal 2018 publications, which also set a clear strategic vision to ensure that Scottish citizens benefit from TEC's full potential. The first of these was our Parliament's Health and Sport Committee report from its inquiry into *Technology and Innovation in Health and Social Care* (Scottish Parliament, 2018). In their conclusions they noted that the health and social care sector was culturally reluctant to adapt to new ways of working, there were multiple incompatible systems in use, and the uptake of technology was slow. However, the Home and Mobile Health Monitoring workstream was commended as an exemplar that others could learn from.

The second and third core publications were our *Digital Health and Care Strategy* (Scottish Government, 2018a) and *Report of the External Expert Panel* (Scottish Government, 2018b) that created an ambitious vision to improve outcomes, based on the 'world leading' nature of our TEC programme. That vision would be realised by empowering citizens 'to better manage their health and wellbeing, support independent living and gain access to services through digital means' and by scaling the use of technologies, putting in place 'the underpinning architectural and information governance building blocks for the effective flow of information across the whole care system'. There was also a reaffirmation of the Christie Commission (Public Services Commission, 2011) comment that 'radical change in the design and delivery of public services [was] necessary' and that this needed 'to be driven by how best services [could] achieve positive outcomes'. The new strategy noted how critical it was for spread and adoption at scale of proven digital technologies, including the need for scale-up of home and mobile health monitoring (HMHM), the development of digital skills across the workforce, and creation of a national digital platform.

1.1.2 WHAT IS HOME AND MOBILE HEALTH MONITORING (HMHM)?

Home and Mobile Health Monitoring (HMHM) was defined in our National Service Model (Scottish Government, 2017) as:

'Home and mobile health monitoring (remote monitoring) describes those activities that enable patients outside of healthcare settings to acquire, record and relay clinically relevant information about their current condition to an electronic storage system where it can be used to inform or guide self- management decisions by the patient and/or to support diagnosis, treatment and care decisions by professionals'

HMHM was the agreed descriptor within the TEC programme, but different terms are increasingly being used such as 'Remote Digital Monitoring' or simply 'Remote Monitoring'.

1.1.3 EAST RENFREWSHIRE'S PARTICIPATION IN SCOTLAND'S HMHM PROGRAMME

East Renfrewshire was one of 12 partners that successfully secured an award from HMHM Programme funding. Their Year 1 implementation plan was based on an anticipated staffing resource that was subsequently redirected to support major service change. This meant they really began to make progress in Year 2 with recruitment of their HMHM nurse in April 2017. She had the capacity to engage directly with General Practices and facilitated the first one going live within five months. As word spread about the benefits of remote blood pressure monitoring, momentum built for the next five months, when the 100th patient was recruited. The East Renfrewshire team feel that buy-in from their Clinical Director was also critical to their success, and they ensured his positive attitude had a solid foundation in regular updates on progress.

In reflecting on their key learning, East Renfrewshire noted how accessing an existing network of HMHM contacts smoothed progress with their equipment procurement. They also found that respecting each practices' responsibility for record-keeping ensured data protection compliance. Spreading positivity across their General Practices meant that more patients could benefit from HMHM.

Although they were very frustrated by thwarted early plans, East Renfrewshire invested a lot of time and effort in their revised approach, challenging procurement obstacles, and minimising the time commitment required of practice staff. Their success was rewarded at the end of Year 3 with additional test of change funding to support further progress.

At a national level, HMHM activity was supported across the programme in a number of ways, including a dedicated central team and a learning collaborative to enable experiences to be shared and problems explored. Newer partners benefited from those who had more experience to share.

1.2 EVIDENCE ABOUT HMHM

A review of the available evidence about HMHM implementation and positive outcomes from remote monitoring across a number of conditions can be found in the national evaluation report (Alexander, 2018).

1.3 HMHM SCALE-UP, SPREAD AND SUSTAINABILITY

Despite policy directives to focus on scale, Imison et al (2016) caution that focusing on the technology itself does not lead to radical change. Rather 'transformation comes from new ways of working', so we need to look elsewhere to understand scale.

Greenhalgh et al (2017) point out that uptake is often low and explained by a rash of barriers and facilitators. They go on to say that 'it is not individual factors that make or break a technology implementation effort but the dynamic interaction between them. The more complex an innovation or the setting in which it is introduced, the less likely it is to be successfully adopted, scaled up, spread, and sustained'. Using a wealth of available literature and empirical data from technology implementation case studies, they created a framework to evaluate scale, spread and sustainability. Greenhalgh et al (2017) define these terms as:

- Scale-up – moving from a local project to one that is 'business as usual'
- Spread – transfer to new settings
- Sustainability – being maintained long- term, adapting as required

Sustainability was not part of the original aims of HMHM in Scotland, but some of the evaluation learning may be useful. This report comprises two main parts:

- Chapter 2. Evidence of East Renfrewshire's contributions to key HMHM outcomes
- Chapter 3. Consideration of HMHM scale- up, spread and sustainability in East Renfrewshire

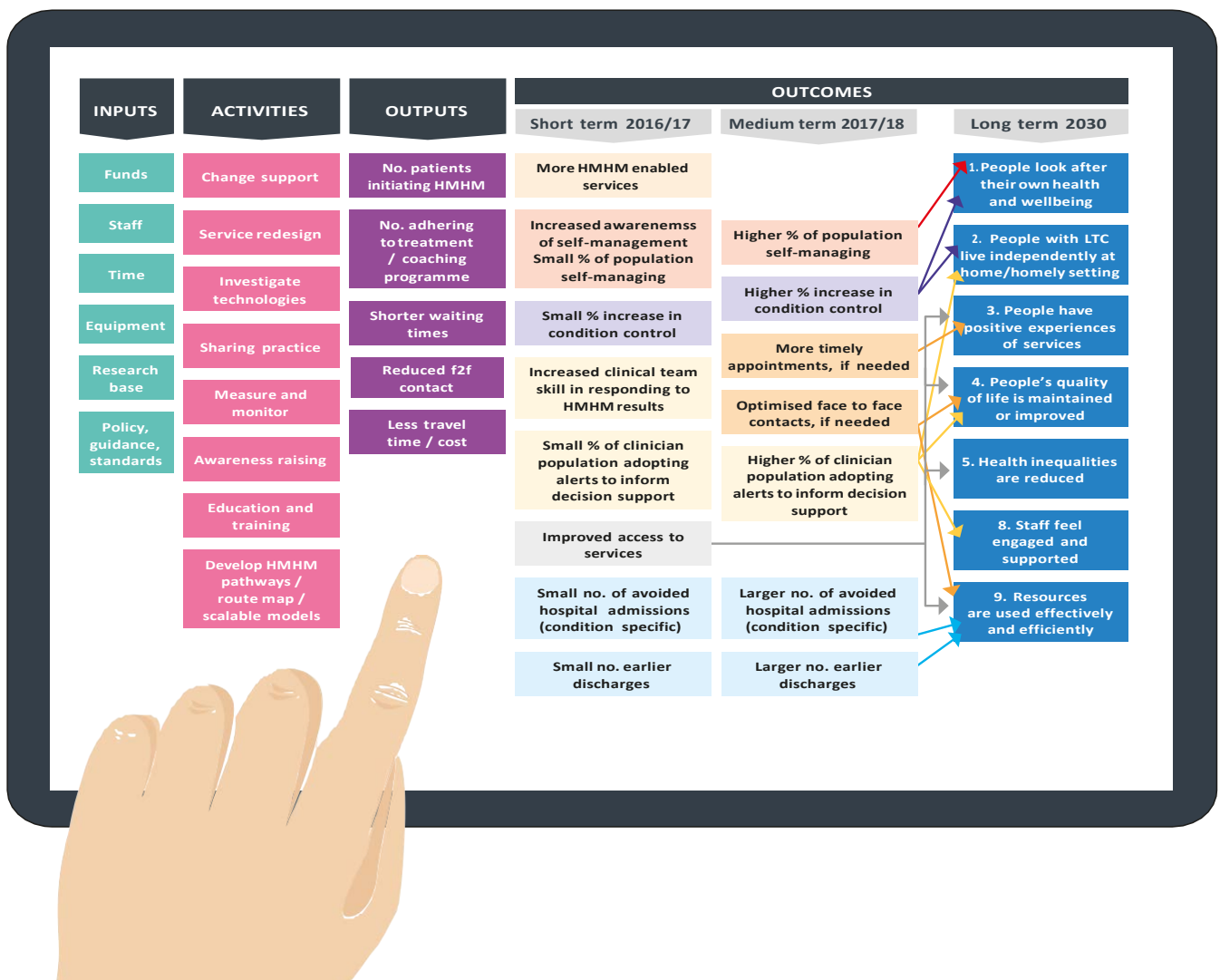
2 CONTRIBUTIONS TO HMHM OUTCOME ACHIEVEMENT

2.1 OUTCOMES TO BE ACHIEVED BY HMHM IN SCOTLAND

Recognising the policy directive to focus on outcomes, the Home & Mobile Health Monitoring (HMHM) workstream developed its logic model at an early stage. Although the aim was to map out what was to be achieved, the process of creating it was helpful for clarifying what was in or out of scope and communicating this across the partners. The agreed outcomes are shown in Figure 1.

Figure 1 sets out how it was envisaged that the HMHM workstream would link all the inputs and related activities to seven of the national health and wellbeing outcomes (not that the outcomes around carers and safety weren't relevant, just not so obviously influenced by the activities planned). The logic model made explicit the key outcomes to be achieved in shorter- and medium-term. They relate mainly to self-management, condition control, the effect on appointments/face to face contacts where these were needed, and access to services. The conversation then progressed to how the HMHM programme would demonstrate outcome achievement.

Figure 1 – Logic model for national HMHM 2016 to 2018



2.2 BRIEF OVERVIEW OF CONTRIBUTION ANALYSIS

In the real world it is rare for a single action to be solely responsible for causing an effect. It is therefore unlikely that East Renfrewshire can attribute changes in relation to remote blood pressure monitoring simply to the new technology (given the different patients/GP practices and ongoing changes in technology use), so its evaluation requires a method that acknowledges this attribution problem. Contribution Analysis (CA) can encompass this kind of complexity, gathering evidence to support an agreed theory of change (or logic model) that can be refined over time, and generating credible claims that link activities to observed results. There are six steps involved in CA (Mayne, 2012):

First	Describe what is being claimed about the link from inputs to observed results	Fourth	Assemble an initial contribution story
Second	Make explicit the theory about how change will be achieved	Fifth	Gather additional evidence, including alternative explanations for the results
Third	Gather evidence around the theory of change	Sixth	Revise / strengthen the credible contribution story

The first four CA steps were covered in the Year 2 HMHM evaluation report (Alexander, 2017):

1. We claimed that the HMHM programme would enable many more people to realise the range of benefits it offered
2. The logic model in Figure 1 represents the theory of how the HMHM inputs and activities were expected to lead to the short & medium-term outcomes, and contribute to the national health and wellbeing outcomes
3. Evidence was gathered from all 12 HMHM partners in a stepwise process, firstly agreeing which of the logic model outcomes they would contribute to, then what evidence they could gather that would demonstrate this, and finally if they would like any assistance with their evidence. Once received, the quality of the evidence was rated and only that deemed to be a robust demonstration of outcome achievement used in step 4. Robust meant it met generally accepted standards relevant to each type of evidence
4. The robust evidence was assembled into an initial contribution story which showed that the partners had contributed to Scotland having more HMHM enabled services. HMHM had also prompted an increased awareness of self-management and a small increase in condition control, in line with the key outcomes that had been envisaged for Year 2

This evaluation report concentrates on CA steps 5 & 6 i.e. the additional evidence required around the theory of change, including alternative explanations for the results (step 5), and the collation of evidence into a stronger, more credible contribution story (step 6).

2.3 EVIDENCE OF OUTCOME ACHIEVEMENT

This evaluation focuses mainly on the outcomes that were to be achieved in the medium-term:

- Higher % of the population self- managing
- Higher % increase in condition control
- Optimised face to face contacts, if needed
- Improved access to services


In addition, there is some evidence around resource use and an overview of patient experience.

2.3.1 ABOUT THE EVIDENCE

The East Renfrewshire team gathered all of their own evidence for this evaluation and they are to be commended for building this into their work plans. It was agreed that a mix of numbers and words would give a richer overview of progress. Where qualitative data is included it should not be viewed as any less robust than quantitative alternatives; the strengths of both approaches are acknowledged.

2.3.2 HMHM OUTCOME – A HIGHER % OF THE POPULATION SELF-MANAGING

Table 1 – Evidence for ‘Higher percentage of the population self-managing, supported by HMHM’
Outcome definition – People/patients actively doing something, not just submitting readings to Flo/pod

Measure	Data source	What the evidence shows
No. using HMHM as a % of whole population	Local Florence database 	Total using HMHM at 31.12.18 = 493 Mid 2017 population estimate * = 94,760 Estimated hypertension prevalence † = 13,172 3.7% of those with hypertension are using HMHM
Views on HMHM prompting self-management	Local patient survey	80% of people said HMHM helped them to recognize when their condition was getting worse and they needed to take action
	Patient feedback	“I was glad of the text messages as they reminded me to take my blood pressure, otherwise I would have forgotten”

* Population estimates by administrative area, National Records of Scotland (NRS, 2018)

† Prevalence estimates from Quality and Outcomes Framework (QOF) data for 2015/16 (ISD, 2016)

Table 1 shows that East Renfrewshire made good progress in increasing the use of HMHM by the end of 2018. In just 16 months they had not only introduced blood pressure remote monitoring support via Florence text messaging, but scaled it to 3.7% of those in their population with, or being tested for, high blood pressure. In addition, most patients felt HMHM had helped them identify when they needed to take action for their condition and feedback showed that HMHM acted as a prompt to comply with the self-management instructions. Figure 2 shows East Renfrewshire’s monthly HMHM progress.

Figure 2 – Cumulative total of HMHM users over time

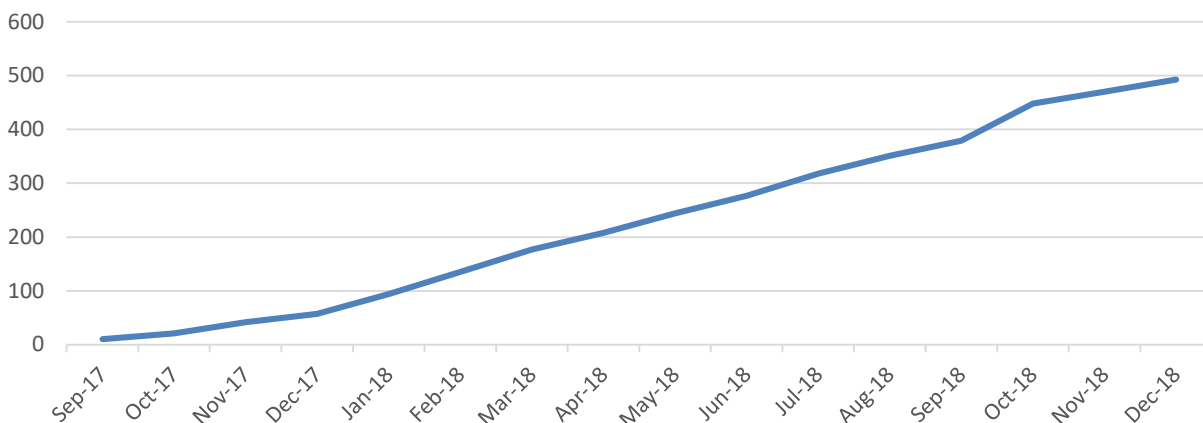


Figure 2 shows the steady rise in number of people who had used HMHM over time, starting from zero before September 2017 and rising to 493 in just 16 months. The rate of increase was slightly slower in the first four months, as you might expect with the introduction of a new technology, but as recruitment within the first few practices increased, and more practices came on board, the number rose steadily during 2018. When the level of recruitment per month is calculated, it was 14 in the first four months and rose to 36 per month during 2018. By January 2019, all 15 practices in East Renfrewshire had signed up to use Florence text messaging with remote blood pressure monitoring.

The data above shows that East Renfrewshire has robust evidence that patients were actively doing something in response to text messages, not just passively submitting readings. Examples include that it helped them recognize when they needed to do something about a worsening condition and it reminded them to take their blood pressure when they might otherwise have forgotten. It is concluded that the adoption of HMHM for hypertension in East Renfrewshire has contributed to increased self-management.

2.3.3 HMHM OUTCOME – A HIGHER % INCREASE IN CONDITION CONTROL

Table 2 – Evidence submitted for 'Higher percentage increase in condition control, supported by HMHM'
Outcome definition – a 'control' metric, or an action known to improve condition control

Measure	Data source	What the evidence shows
Hypertension – no. diagnosed/monitored for medication titration to stabilise blood pressure (BP)	Local data	186/493 (38%) still remotely monitoring therefore assume they have had hypertension diagnosed and stabilized (<i>this is likely to be an underestimate as some will have been stabilized before stopping remote monitoring</i>)
	Case study	A 56 year old man with poor medication compliance was able to accept he had high BP after starting on Flo. His medication is now taken as prescribed, and his BP is at a safer level



Table 2 illustrates robust evidence of HMHM's contribution towards increased condition control (treatment adherence). This was mainly demonstrated by the number of people who continued remotely monitoring their blood pressure, presumably because they had been diagnosed with hypertension and HMHM helped them maintain it in line with recommendations. In the absence of blood pressure readings, this is the best estimate we have, although it is felt that 38% is an underestimate because there was variation between practices in whether or not their patients continued monitoring after diagnosis (some people will have been diagnosed and stopped monitoring). However, the case study included in Table 2 is a good illustration of how HMHM helped someone previously not complying with his medication (because his symptoms were not obvious to him) to accept his high blood pressure and take his medication as prescribed.

2.3.4 HMHM OUTCOME – 'OPTIMISED FACE TO FACE CONTACTS, SUPPORTED BY HMHM'

Table 3 – Evidence submitted for 'optimised face to face contacts, supported by HMHM'
Outcome definition – face to face (f2f) contacts improved by HMHM or contacts avoided i.e. available for others

Measure	Data source	What the evidence shows
Hypertension – no. f2f contacts/ appointments avoided by HMHM	Local data	561 appointments avoided for 241 people (incomplete data) = 2.3 per person, estimate 1,416 appointments avoided*
	Clinical staff	"Easier to review readings without patient there ... I either text or phone them ... easier to manage time for myself and the patient"
	Patient feedback	"Excellent not having to miss work to attend nurse for BP check"

* Estimate that the 292 people who finished monitoring avoided 2.3 appointments each = **672** and the 186 people still monitoring would have had on average 5 appointments for diagnosis and medication titration, so remote monitoring avoided 4 of these (they attended for an initial appointment only) = **744, Total = 1,416**



Table 3 shows that the use of HMHM has positively contributed to the optimization of face to face contacts with services. Appointments were avoided because clinicians had blood pressure readings available to them from remote monitoring and used these to inform decision making without the patient needing to be present. This meant that these appointments could be used for others who needed to see the clinician face to face. The patient feedback demonstrates the advantage of this to people in work who were happy to free up the appointment they would otherwise have had to attend.

2.3.5 HMHM OUTCOME – 'IMPROVED ACCESS TO SERVICES, SUPPORTED BY HMHM'

Table 4 – Evidence submitted for 'improved access to services, supported by HMHM'
Outcome definition – HMHM prompting increased contact with services, a faster response, or HMHM instead of contact

Measure	Data source	What the evidence shows
Hypertension – HMHM prompting a faster response	Case Study	Within 24 hours of starting Flo, a 55 year old woman's shared management plan identified dangerously high BP and the need to contact services. She was admitted to hospital and started on medication. She had previously been unsure she had high BP
Hypertension – avoidance of 24 hour monitoring	Local data	GPs advised that a referral for a 24 hour tape had been avoided for 29 of their patients remotely monitoring their blood pressure
	Staff survey	All staff acknowledged that HMHM avoided referrals for 24 hour tapes



From the evidence in Table 4, it is clear that use of HMHM improved access to services. The case study shows how having access to blood pressure readings meant that one woman knew to make contact with services when they were dangerously high. There is also data to show that clinicians felt having blood pressure remotely monitored and the readings sent in to the practice meant that some patients who would previously have been referred to hospital for 24 hour monitoring did not require this (their HMHM readings sufficed instead). Not only was this response universally agreed in the staff survey, but the practice returns highlighted that 29 of the 493 patients remotely monitoring had avoided the need for this. It may be an underestimate as not all practices completed all of the possible data fields in their returns.

2.3.6 HMHM OUTCOME – ‘RESOURCES ARE USED EFFECTIVELY AND EFFICIENTLY’

The results presented in Table 5 show how East Renfrewshire contributed to national health and wellbeing outcome number 9 i.e. resources being used effectively and efficiently.

Table 5 – Evidence for ‘resources used effectively and efficiently’

Measure	Data source	What the evidence shows
No. self-managing condition, controlling condition	Various	Evidence presented for ‘Higher % population self-managing’ and ‘Higher % increase in condition control’ shows examples of responsibility shifting away from healthcare professionals to patients/service users. This not only makes the services involved more efficient, but generally increases the effectiveness of the interventions
No. reduced referrals, clinic appointments, home visits	Various	Evidence presented for ‘Optimised face to face contacts’ and ‘Improved access to services’ shows a range of examples of avoided clinic appointments and referrals and having additional information to prompt faster access to hospital care when needed



Table 5 comprises a summary of the evidence presented in Tables 1 to 4 because many of the changes effected by HMHM also produce efficiencies or more effective interventions e.g. when patients/service users know more about why they should comply with advice offered.

2.3.7 HMHM OUTCOME – ‘PEOPLE HAVE POSITIVE EXPERIENCES OF SERVICES, SUPPORTED BY HMHM’

East Renfrewshire gathered evidence directly from their patients/service users that showed what effect HMHM had had on their experience of engaging with services (Table 6).

Table 6 – Evidence submitted for ‘people have positive experiences of services, supported by HMHM’

Measure	Data source	What the evidence shows
Patient surveys, feedback comments	Various	Feedback about HMHM from patients/service users is overwhelmingly positive
When people completed surveys about HMHM they said that they gained knowledge about their health, they felt more in control of their symptoms and that Flo helped them recognize any worsening of their condition and take action when needed. Everyone surveyed said Flo helped them to comply with health advice and 73% that it had supported them making lifestyle changes. Additional comments included, “I liked being able to [monitor] without taking up the nurse’s time”, “It was excellent” and “It really reassured me because of my family history of high blood pressure”.		

Evidence presented in Table 6 is a clear demonstration of how positively people viewed their use of HMHM. The surveys were based on fixed responses, which is why additional comments have been included in the table.

2.3.8 ALTERNATIVE EXPLANATIONS FOR THE HMHM OUTCOME RESULTS

In addition to Contribution Analysis enabling the claim that an intervention has made a difference, Mayne (2012) says that rival explanations for the results observed need to be identified and their influence either acknowledged or discounted. This is because the evidence gathered to support a theory of change is considered to be making a contribution to observed results and other factors could have greater impact. Although Mayne suggests that rival explanations should be surfaced along with the theory of change, he also says he is supportive of modifying the six CA steps. This evaluation was felt to be sufficiently complicated to delay exploring rival explanations until step 5 and they are presented in Table 7 in relation to each of the main Year 3 HMHM outcomes. Their exploration supports the claims of contributions to HMHM outcome achievement.

Table 7 – Exploration of rival explanations for observed HMHM results

Claim	Rival explanation for results	Rival explanation supported or rejected
That HMHM enables a higher percentage of the population to self- manage than would have done so without HMHM	The people participating in HMHM have self- selected because they are pre- disposed to self- manage	Rejected – local data and case studies are from people who were not previously self-managing, so pre-disposition unlikely
	The people participating in HMHM are only complying with an instruction from their clinical team, not actively self- managing	Rejected – local surveys, data and case studies describe people's increased motivation/ knowledge and better adherence to recommendations
	The people participating in HMHM may be motivated to self-manage because of something else happening in their lives unrelated to HMHM	Rejected – Flo is enabling success with issues being denied and there are no indications of any additional, unrelated catalysts for change
That HMHM enables a higher percentage increase in condition control than would have happened without HMHM	The people participating in HMHM may have experienced a spontaneous improvement in their condition, unrelated to HMHM	Rejected – hypertension does not tend to improve spontaneously but worsen over time and people report reminders/motivation arising from HMHM
	The people participating in HMHM may have had a change to their management regime e.g. medication prescribed, which would explain why their condition improved	Rejected – the evidence is of hypertension management as a result of HMHM, not prior to/at the same time
That HMHM has enabled optimised face to face contacts, if needed	The people participating in HMHM have inaccurate perceptions of any change to face to face contacts	Rejected – hypertension HMHM does result in fewer contacts
	Some of the small numbers supporting this claim may not be representative of the impact	Rejected – the numbers for hypertension are relatively large now
	Data on reduced appointments may be the result of improved condition control, not due to HMHM	Rejected – the majority of people remotely monitoring were previously unaware they had hypertension to control
That HMHM has improved access to services	The people participating in HMHM may have inaccurate perceptions of any changed access to services	Rejected – people avoiding appointments could not be mistaken in this
	The people participating in HMHM may just have demanded quicker access to services due to something unrelated to HMHM	Rejected – people describe HMHM prompting a response to text messages, not something they would normally expect
That HMHM results in a positive patient/ service user experience	The people providing feedback may be an unrepresentative sample	Rejected – if there had been major problems with HMHM you would expect more negativity to be voiced

3 TOWARDS HMHM SCALE-UP, SPREAD AND SUSTAINABILITY

3.1 SCALE-UP, SPREAD AND SUSTAINABILITY OF HMHM

The following definitions (Greenhalgh et al, 2017) are used in the remainder of this report:

- **Scale-up** – moving from a local project to one that is 'business as usual'
- **Spread** – transfer to new settings
- **Sustainability** – maintained long-term, adapting as required

3.1.1 SCALE-UP

Our national service model framework (Scottish Government, 2017) defined scale-up as having 1,000-5,000 active patients/service users by 2018/19. By this definition, and allowing for some having relatively small populations, six of the 12 HMHM partnerships funded nationally achieved this by the end of Year 3. East Renfrewshire has achieved almost 500 people using HMHM for hypertension, which equates to 3.7% of the population estimated to have this condition. This is as high a proportion as anyone during the three year programme, so the partnership can be said to have achieved the first stage of scale-up.

Scale-up success may also be judged in terms of the total number of people who have benefited. There has been a considerable increase in East Renfrewshire's numbers in the past 16 months and it is possible that some people may have remotely monitored without their details being recorded.

National work is ongoing to scale-up blood pressure monitoring across the country and this will in turn drive forward population health benefits at scale. It has taken some time to get to this point and we do not yet know how much longer it may be to reach a population-level tipping point.

3.1.2 SPREAD

The national service model also projected that by 2018/19, most partners would have spread HMHM across 2 to 8 pathways of care and used 1 to 3 different media channels i.e. text messages, tablets, web sites etc. East Renfrewshire has now completed a test of change for Chronic Obstructive Pulmonary Disease (COPD) so has begun to tackle the spread to other conditions.

3.1.3 SUSTAINABILITY

Although not an aim of the HMHM Programme at the outset, it is worth considering what we have learned thus far that could inform sustainability. There is a high risk that if suitable resourcing is not allocated to support the continued scale-up and spread of HMHM across Scotland its potential will not be realised. Efforts also need to be made to retain knowledge and HMHM expertise within the workforce developed over the course of the programme and continue to develop digital health and care leadership roles for HMHM.

In addition, more work is needed across the NHS and health and social care partnerships to embed the learning and successes to date across whole pathways of care and to spread to other conditions and new digital technologies as they become available. It is becoming increasingly important for NHS boards and Integrated Joint Boards to capitalise on the benefits of embedded digital health and care/TEC, and specifically remote monitoring, as key enablers of service transformation programmes in Scotland. A hands-off approach at this stage is a major threat to long-term maintenance and the radical new ways of working that HMHM offers.

3.2 A FRAMEWORK TO EVALUATE THE SUCCESS OF HMHM

The Non-adoption or Abandonment of technology by individuals and difficulties achieving Scale-up, Spread and Sustainability (NASSS) framework was developed to help predict and evaluate success or otherwise with health and social care technologies such as HMHM. An early version complexity assessment tool (NASSS-CAT) was made available for testing in East Renfrewshire (Table 8).

Table 8 – Complexity rating of HMHM in East Renfrewshire– applying the NASSS-CAT

NASSS domain	East Renfrewshire equivalent	Complexity ratings of different aspects of each NASSS domain
The condition or illness	Hypertension	14 simple sub-components: the condition is well-understood, follows a predictable course and has predictable implications for care 0 complicated sub-components 0 complex sub-components
The innovation (technology)	Florence text messaging	14 simple sub-components: the HMHM technology is straightforward, well-understood and will have a predictable effect 1 complicated sub-component: the technology is not easily substitutable 2 complex sub-components: data reporting/output from Florence is not accurate or reliable, a key technology needs to be installed across multiple technical systems to achieve integration
The value proposition	Increased clinical and cost-effectiveness, improved health,	14 simple sub-components: the technology generates value for different groups of people 1 complicated sub-component: procurement process shared with other areas, but everything not fully resolved for future 1 complex sub-component: those who fund the technology don't realize any direct benefits
The intended adopters	General Practice, patients and the Telehealth team working together	2 simple sub-components: no implications for those indirectly affected 3 complicated sub-components: some people may require assistance, reject the technology or be unwilling to use it 5 complex sub-components: some staff question the value, not want to work differently, claim not to have time, or not work creatively/flexibly
The organisation(s)	East Renfrewshire Health & Social Care Partnership (other organisations are involved)	12 simple sub-components: technology introduction was resourced, the organization was ready, and there is capacity to adopt it 4 complicated sub-components: some staff have poor equipment, there are no slack resources and future funding has not been identified 0 complex sub-components
The external context	National strategy, good evidence-base, digital age	18 simple sub-components: the policy, professional, patient, regulatory and commercial contexts are all conducive to HMHM 1 complicated sub-component: future funding is the only imminent threat 0 complex sub-components
Project implementation	Project supported at all levels, dedicated team to implement HMHM	31 simple sub-components: technically straightforward, few structural or operational issues, socio-political context is conducive 4 complicated sub-components: Docman reporting not ready yet, budget constraints, more work needed with dissenters, need to widen support 2 complex sub-components: may be future issue with resources (funding), may need greater co-operation across sectors

Table 8 shows that the majority of sub-components of each NASSS domain were relatively 'simple', with some elements of complication and a few rated as 'complex'. Greenhalgh et al (2018) say that programmes with mainly complicated domains were 'difficult, slow and expensive' but not impossible to implement, whilst those with considerable complexity were rarely ever mainstreamed. The main domain requiring attention in East Renfrewshire is related to the intended adopters of HMHM, where some exploration of the aspects rated as complex and any complicated components is warranted. A few of the other domains with complex or complicated sub-components should be included, but the adopters should be prioritized. Scale-up, spread and sustainability will only be achieved if conditions are in place which reduce the level of complexity for as many of the NASSS domains as possible (Greenhalgh et al, 2018).

4 DISCUSSION

4.1 DOING THINGS DIFFERENTLY WITH EVALUATION METHODOLOGY

The policy context for HMHM in Scotland is ambitious and there is a strong underlying assumption that technology has the ability to effect major system change. However, a focus on the technology itself is unlikely to lead to the kind of radical change suggested in recent policy documents (Imison et al, 2016).

Evaluation methodologies are needed that can absorb the complexity associated with system-wide change and this chimes with current evaluation practice where theory-based approaches are becoming the norm. The Contribution Analysis approach adopted in the first part of this evaluation set out the theory of how HMHM was to effect change in a logic model (Figure 1). This theory of change was then used to assemble evidence of how East Renfrewshire had contributed to achievement of the desired outcomes. Contribution Analysis does not relinquish rigour, since only evidence that is deemed to be sufficiently robust is included, but the descriptor 'good enough' covers the fact that it was not possible (nor arguably desirable) to control all the conditions under which data was gathered. East Renfrewshire collected a range of data via methods appropriate to local circumstances. They should be applauded for building evaluation into their HMHM programme and for the evidence they generated.

4.2 THE IMPACT OF HMHM ON OUTCOMES

The achievements made by East Renfrewshire are considerable, starting from zero and reaching almost 500 users in 16 months. The evidence published in this report (Tables 1 to 4) shows robust evidence from East Renfrewshire of the contribution of HMHM towards achieving:

- a higher percentage of the population self-managing
- increased condition control
- optimised face to face contacts
- improved access to services.

There was also good evidence submitted of contributions to resources being used more effectively and efficiently and positive patient/service user experience.

Contribution Analysis has proved to be a useful method for collating evaluation results. Not only do we have evidence of contributions to outcome achievement, but there is considerable detail on the experience of patients/service users who were overwhelmingly positive about HMHM. It could be argued that these are early adopters of new approaches and therefore more likely than others to be positive, but this can be countered by evidence in case studies where the people described were not technophiles.

Contribution Analysis also requires a consideration of risks to the theory of change (Mayne, 2012) i.e. that the results observed may be due to something unrelated to the programme being evaluated. For this reason alternative explanations for the outcome results were considered (Table 8) and this provided a degree of confidence that HMHM has indeed made a contribution to their achievement.

4.3 PROGRESS WITH SCALE-UP, SPREAD AND SUSTAINABILITY

East Renfrewshire has had a unique journey from start to the present day with much learning to share. Two important factors are worth highlighting. Firstly, they have displayed considerable enthusiasm and commitment in implementing HMHM, something that has been at times challenging. Secondly the collaboration between them and the National HMHM Team has worked well in sharing learning and related resources. Whilst acknowledging how much success has been achieved, the level of scale, spread and sustainability needs to be considered. The numbers in East Renfrewshire have risen steadily and they have begun to spread from hypertension monitoring to COPD.

At a population level, there is clearly more HMHM activity required. Without continued policy and implementation focus there is unlikely to be sufficient scale-up or spread and impact on systems and services to realise the benefits that remain possible.

Although not one of the original HMHM programme aims, in order to sustain the progress made to date and build on what has been learned thus far, there is a need to retain and continue to exploit the expertise developed in East Renfrewshire. Within the context of ongoing national support, there is a need to build HMHM (and other aspects of TEC) into service plans. These ongoing investments need to plan for the inherent challenges, and acknowledge how long it can take to realise the full benefits, so that HMHM can become 'business as usual' in time.

It is timely that Greenhalgh et al (2017, 2018) identified the need to go beyond the myriad lists of facilitators and barriers to successful implementation of new technologies. With a sound theoretical basis, these authors have developed a useful framework for determining a programme's complexity and have tested it in the field. Although they say it needs to be applied more, testing it in East Renfrewshire has suggested that the implementation of HMHM has raised challenges with some aspects rated as complicated or complex; these need to be addressed.

5 RECOMMENDATIONS AND NEXT STEPS

In recent years, HMHM in East Renfrewshire has scaled-up and spread from zero to almost 500 people. As previously discussed, this level of progress should be applauded, but it is also contended that they have not yet been implementing HMHM long enough for it to be considered sufficiently scaled-up or spread to realise the level of benefit that our policy documents would like to achieve. **It is recommended that East Renfrewshire continue to scale-up and spread remote monitoring** in order to realise its full potential.

More time is needed to reach a tipping point where HMHM becomes business as usual. A wealth of expertise has been created in East Renfrewshire and ongoing efforts are needed to ensure that this continues to be available for others wishing to adopt HMHM. The number of people whose outcomes have improved is not yet large enough to impact on East Renfrewshire's health profile.

Scale-up, spread and sustainability are affected by the level of complexity associated with HMHM. Testing the Non- adoption or Abandonment of technology by individuals and difficulties achieving Scale-up, Spread and Sustainability (NASSS) framework for HMHM (Table 8) showed that **East Renfrewshire had only a few aspects of complication or complexity, but they should give consideration to how to reduce these.** Developing an action plan to simplify, wherever possible, should enable identification of local solutions to some aspects and links to national work for others.

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