



Evaluation of a national programme to roll-out mobile ECG devices

7 lessons for digital roll-out in primary care

Executive summary

In March 2020 Wessex AHSN completed its evaluation of the national roll-out of 6,300 mobile-ECG devices to a wide range of primary care and community settings across England. The roll-out was managed locally by each of the fifteen regional Academic Health Science Networks (AHSNs). The evaluation found wide variation in the success of local programmes in supporting a wide range of staff groups to adopt and maintain their use of this innovative technology – to improve the detection of AF.

The challenges of **Covid-19** have brought an even greater focus to the need for the NHS to successfully adopt digital innovation in primary and community care. This paper has been prepared to describe the findings from the evaluation in the form of 7 lessons for digital roll-out in primary care. They are:

- 1 Identify implementation issues and risks early and plan to mitigate them.** Practical considerations play a large part in the roll-out's success.
- 2 Minimise ambiguity about the use of digital innovation.** Staff struggle to commit to the change and disengage when there is any confusion about how it should be used.
- 3 Hands-on active management of implementation is most effective.** Whilst being resource intensive, it is much more effective than 'at-distance roll-out' approaches.
- 4 Design and implement accurate and transparent systems for data collection and engage suppliers in sharing responsibility for supporting this.** Whenever possible collect utilisation data through the device/ innovation, because manual collection can't be relied upon.
- 5 Support and encourage staff to keep using the digital innovation.** Early abandonment is a large risk that can be reduced by providing good support when users need it.
- 6 Decide which staff groups are best suited to use the digital innovation.** Assess the options for the different staff groups to ensure they are the right match with the innovation.
- 7 Involve the procurement team at the outset.** They can stimulate the market, understand differences between products and help manage long lead in times.

The paper illustrates each of these lessons with the findings from our evaluation.

Implementing new innovation is not easy and any one or a combination of the issues described above can have a significant effect on its success. We believe that if the NHS were to learn from the experience of the mobile-ECG programme and take these lessons into account when rolling-out digital technology, then we will achieve greater and faster adoption of innovation that improves care and contributes to our collective response to the **continuing challenges of Covid-19**.

Evaluation of a national programme to roll-out mobile ECG devices

7 lessons for digital roll-out in primary care

Background to the roll-out programme and its evaluation

The AHSN Network led the delivery of a national roll-out of 6,300 mobile-ECG devices to a wide range of primary care and community settings across England during 2018 and 2020, with £500,000 funding for the devices from NHS England. The aim of this programme was to improve the detection of people with Atrial Fibrillation (AF) in order to reduce the incidence of strokes. It also aimed to build national understanding of a novel approach to spreading innovative technology across the NHS. 71% of the registered device users worked in General Practice, 7% in community pharmacy and 17% in community services. The roll-out programme was designed and overseen by the AHSN Network's AF team and delivered locally in each of the 15 regional AHSNs.

Wessex AHSN undertook an independent evaluation of the impact of the programme on the adoption of digital technology in the NHS. The focus was understanding the roll-out programme, not evaluating the effectiveness of the devices. Qualitative fieldwork took place in each of the 15 regional AHSNs and interviews and focus groups were held with 157 AHSN roll-out staff and 125 mobile ECG device users. 622 users completed R-Outcomes on-line surveys*^{1 2} measuring four domains relating to digital innovation. Quantitative data was collected automatically and manually to record the utilisation of the devices and the number of possible AF cases detected.

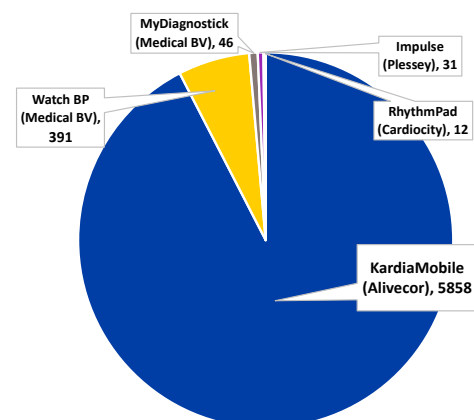
Detection of Atrial Fibrillation using mobile ECG devices

The traditional way of detecting AF is by identifying an irregular pulse rhythm using manual pulse-palpitation. AF is then either confirmed or excluded using a 12-lead ECG in primary or secondary care, interpreted by a trained health care professional.

A range of devices have been developed that are able to replace manual pulse-palpitation as a means of detecting possible AF. This programme purchased more than 6,000 devices to be used in a range of settings to opportunistically screen for undiagnosed AF. Five different devices were selected for central procurement and each of the fifteen AHSNs were asked to select the ones that they wanted to roll-out.

Of the following five devices, the **vast majority (92%)** were the **KardiaMobile** devices supplied by Alivecor Inc:

- KardiaMobile (Alivecor Inc)
- Watch BP (Medical BV)
- RhythmPad (Cardiocity Ltd)
- Watch BP Home A (Microlife Health Mgmt Ltd)
- Impulse (Plessey Semi-conductors Ltd)



* R-Outcomes are a suite of self-reported outcome measures used to evaluate service change – more information at www.r-outcomes.com



Wide variation in the utilisation of the devices across the AHSNs

A key finding from the evaluation of the roll-out of these devices was a large variation in their utilisation across the fifteen AHSNs.

The table opposite shows that the:

- Percentage of purchased devices distributed to users ranged from 54% to 100%
- Average readings per device ranged from 7 to 72.
- Percentage of KardiaMobile devices registered to have their utilisation automatically quantified ranged from 31% to 100%.

AHSN	Devices procured	% of procured devices distributed	Average readings per registered device	% of Kardia distributed devices registered
A	535	54%	12	76%
B	503	100%	28	50%
C	340	100%	19	31%
D	413	100%	39	86%
E	275	80%	26	47%
F	382	74%	7	73%
G	556	100%	30	46%
H	370	100%	54	100%
I	222	91%	13	51%
J	248	100%	72	53%
K	670	80%	12	64%
L	350	89%	23	42%
M	589	99%	26	24%
N	285	78%	16	34%
O	600	86%	23	74%
TOTAL	6,338	88%	26	

Each AHSN organised and led their local roll-out programme, with the support of written guidance and regular meetings and events with the national AF team. A focus for the evaluation was to understand the reasons for this regional variation. Its findings provide **7 lessons** from this programme that can inform the design of future programmes to roll-out digital innovation across the NHS.

7 Lessons for Digital Adoption in Primary Care

1 Identify implementation issues and risks early and plan to mitigate them. Practical considerations played a large part in the roll-out's success.

The evaluation found strong evidence that a range of implementation themes impacted on the AHSNs roll-outs, in particular the following three:

- **Pace of roll-out.** There was a long timeframe between AHSNs seeking local expressions of interest in trialling devices in Spring 2017 and their arrival in early 2018. This was primarily due to supplier negotiations and resolving concerns raised about data protection issues. AHSNs reported some loss of interest and motivation from potential users during this period.
- **Management resource.** There was a widespread view from AHSNs that the management of the roll-out was under resourced for its size and complexity. The NHS England funding only covered the cost of the devices and AHSNs were asked to incorporate the management of their roll-out programme within existing resource. This varied by AHSN, but typically there was a single part time person managing a programme involving 3-400 users from a range of professions and settings who may be using different devices. A theme from the field work was that more roll-out management resource would have resulted in more device utilisation.
- **Assumption that staff would use their own personal device.** The KardiaMobile device requires the use of an associated app. There was an assumption that staff would be prepared to use their own personal device (smart phone or tablet) to participate in the trial. To do this they would need to set up an NHS email account on their personal device to meet information governance requirements. In practice AHSNs reported that large numbers of staff were put off by this additional complication and did not participate in the trial.



2 Minimise ambiguity about the use of digital innovation. Staff struggle to commit to the change and disengage.

The qualitative fieldwork identified a lot of ambiguity amongst the local AHSN roll-out leads and their device users, including:

- Uncertainty about where the devices should be trialled
- Mixed views on the clinical application and advantages of the device over manual-palpitation
- Uncertainty over whether these devices were a replacement for 12-lead assessments and how additional demand for these could be met

The AHSN Network AF team issued a 37-page central guidance document in January 2018 but AHSN roll-out staff reported that it didn't do enough to resolve ambiguity and answer people's key questions.

It appears that one key issue driving this ambiguity on the ground was a **more complex external context than anticipated**. In 2014 the National Screening Committee conclusion about the case for a national AF screening programme was that "...it is not clear that those identified as at risk through screening would benefit from early diagnosis".³ Other studies have highlighted the need for more high-quality evidence of the cost effectiveness of screening for AF, how best to confirm AF in screen-positive cases and the impact of the workload in general practice.⁴ NICE reviewed the role of lead-I ECG devices during this roll-out programme and concluded that there is not enough evidence to recommend their routine adoption to detect AF.⁵

This complexity was carried into the local roll-out programmes and the experience of staff trialling the devices on the ground generated ambiguity that national guidance wasn't able to overcome.

3 Hands-on active management of implementation is most effective. Whilst being resource intensive, it is much more effective than 'at-distance rollout' approaches.

The 15 AHSNs took different approaches to their local roll-out programmes and the evaluation sought to understand these and their effectiveness. We found that the programmes that took what we termed an "Active Management" approach had higher utilisation of their devices (more distributed, more registered and more readings taken).

The AHSNs with an active management roll-out programme typically provided flexible training opportunities, including face to face training and remained actively in touch with device users. They didn't issue devices until users had been trained and would track their use, redistributing devices that weren't being used. At the opposite end, some AHSNs with time and resource pressures posted the devices to the CCGs for them to distribute to users.

4 Design and implement accurate and transparent systems for data collection and engage suppliers in sharing responsibility for supporting this. Whenever possible collect utilisation data through the device/ innovation, because manual collection can't be relied upon.

The programme suffered from difficulties with collecting information on the use of the devices, which meant that users didn't get feedback about the benefits of the programme. It also affected the evaluation of the programme. An automatic data collection system was employed for the KardiaMobile devices (92% of the total devices purchased) and manual collection for the other four devices. Both approaches had significant issues.



One of the attractions of KardiaMobile was that it included automatic data collection. In practice, only half of the users registered their devices online, meaning only half of the devices had their usage recorded. There were additional issues with devices registered to multiple users (not the intention) and widespread confusion about where to find the serial number on the device, despite there being guidance about this.

The other devices relied on manual data collection by users, employing a range of methods, including paper diaries and on-line surveys. This didn't work, it was usually incomplete and late.

National roll-out programmes rely on accurate utilisation data collection and the design and implementation of this should be considered a 'must do'. The suppliers benefit from roll-out programmes and are often best placed to do this.

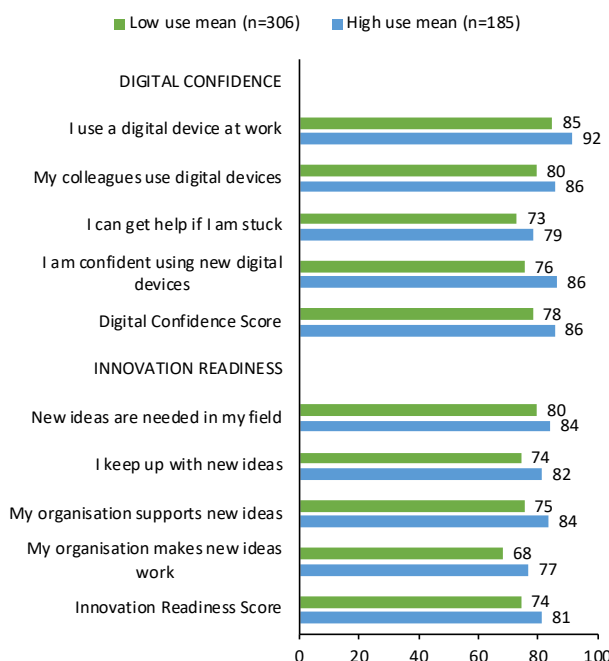
5 Support and encourage staff to keep using the digital innovation. Early abandonment is a large risk that can be reduced by providing good support when users need it.

38% of the device users were 'high users', recording 25 or more readings with their device. These users accounted for 80% of all of the readings taken as part of this programme. The remaining 62% were 'low users', recording 25 or less readings. 43% of users recorded 10 or less readings.

Age or gender were not associated with low usage. There were differences between occupation groups – Doctors were the most likely to abandon early (77%) and Healthcare Assistants were the least likely (55%).

The R-Outcomes innovation measures provide more evidence of the difference between these two groups and the following chart compares the scores for the 'low users' and 'high users'.

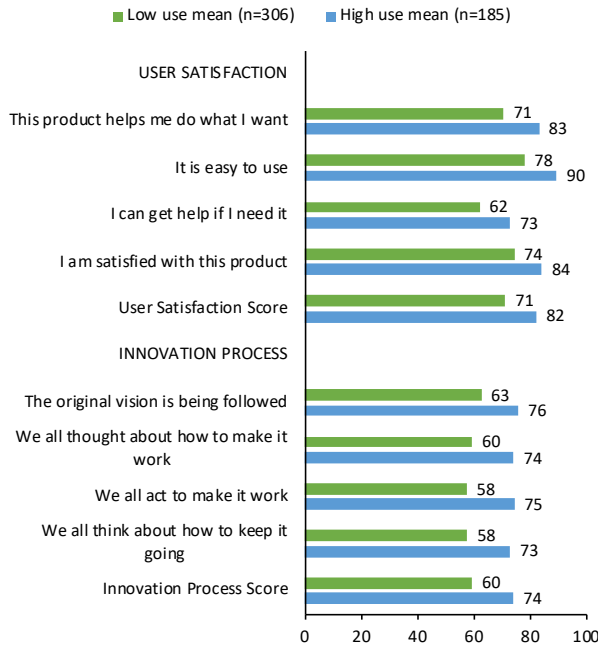
Each measure is made up of four individual questions and is scored out of 100 – the higher the score the more positive the response.



All of the differences in responses between the high and low users are statistically significant at the 95% confidence level.

The low use group have a slightly lower digital confidence – though their score is still relatively good

And slightly lower scores for their organisation's readiness to innovate



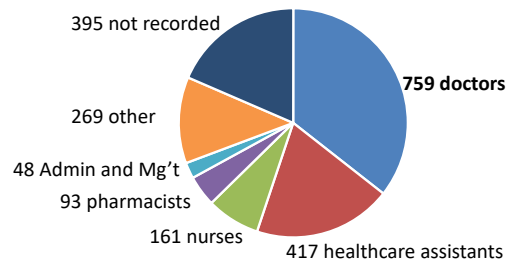
Low users gave their device a lower rating. We aren't sure of the cause and effect here – did they stop using it because they didn't like it; or didn't like it because they didn't use it enough?

The largest difference between the two groups was how they reported their experience of the adoption process. This could be the key issue determining whether people sustain an innovation.

This suggests that the people's experience of the implementation process for an innovation could be the most important factor in whether people sustain their use of digital innovation or abandon it early. Supporting and encouraging people to keep using the innovation is the key to successful roll-out.

6 Decide which staff groups are best suited to use the digital innovation. Assess the options for the different staff groups to ensure they are the right match with the innovation.

A wide range of staff trialled the devices and they had different experiences and achieved different results. The largest group were doctors (GPs) (35%) and the second largest were healthcare assistants (19%).



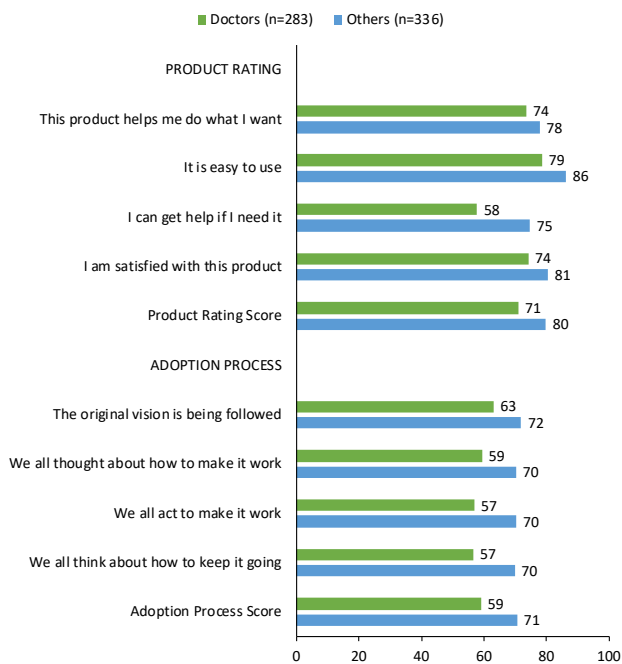
The qualitative fieldwork identified mixed views from GPs on the clinical application and advantages of the devices. Some raised concerns about the impact of the device use on an already stretched workload, such as checking traces and organising confirmatory 12-lead testing. Other doctors reported that the devices had workload advantages, including the potential to avoid 12-lead testing. These ambiguities and concerns were less evident from the other staff groups. There was a theme from some GPs that the supporting roles such as healthcare assistants and pharmacy assistants were best placed to use these devices.

There were important quantitative differences between staff groups:

- Doctors used their device least and pharmacists the most.
- Nurses had the highest detection rate.
- Doctors were the most likely to abandon using their device early (77%); healthcare assistants were the least likely (55%).

	Avg readings per user	Possible AF detection
Doctors	36	6.8%
HCA's	42	5.9%
Nurses	38	9.9%
Pharmacist	57	6.1%
Admin & M'gt	57	6.5%

The R-Outcomes innovation scores for doctors were similar to other staff groups for their digital confidence and innovation readiness. However, they reported significantly lower experience of the adoption process in their local AHSN:



All of the differences in these scores between doctors and other staff groups are statistically significant at the 95% confidence level – apart from the first question in Product Rating.

Doctors gave **significantly lower scores** for all of the adoption process questions.

They were also less positive about the devices – in particular their ability to get help if they need it.

This suggests that the utilisation of the devices and possible AF detection could have been higher if a greater proportion of the users weren't GPs, but people in the wider primary care team such as health care assistants. Also, that roll-out programmes that support doctors to adopt digital technology need to consider how their needs differ from other staff groups.

A strength of primary and community care is the wide range of staff groups, working as part of wider multi-professional teams. Making sure that the opportunity to engage all staff groups (clinical and non-clinical) is important.

7 Involve the procurement team at the outset. They can stimulate the market, understand differences between products and help manage long lead in times.

The view from the team that procured the devices was that their involvement should have started earlier and before the devices to be trialed in the programme had been selected. By the time they began their support to the programme in May 2017, the 5 devices had been selected and their role was focused on identifying supply options.

There was a view from the three companies that supplied the least number of devices that the AHSNs did not fully understand the differences between their device and KardiaMobile when they were choosing which ones to trial. Their devices were designed for multiple use by staff in health and care settings whereas KardiaMobile is designed for personal use by individuals. This accounted in part for the difference in price.

The procurement team believed that if they had been involved earlier they could have done more to stimulate the market, including bringing suppliers and users together to understand the differences between the devices. They would have also been better prepared to avoid some of the delays they experienced with negotiating and procuring the KardiaMobile devices.



For General Practice this means accessing the support of PCNs, CCGs and AHSNs at the outset.

Conclusion

The successful spread and adoption of digital innovation in primary and community care settings has never been so important as where we find ourselves in 2020.

The mobile-ECG programme was a large digital roll-out programme that concluded in early 2020, with an aim of building the NHS understanding of how to spread digital innovation. Our evaluation has identified 7 lessons for digital roll-out in primary and community care that can support the NHS to achieve greater and faster adoption of innovation that improves care and contributes to our collective response to the challenges of Covid-19.

We can be optimistic about our potential to succeed and make great strides in the spread of digital innovation in 2020/21. While we've written this paper in the form of the lessons from the mobile ECG roll-out – it is important that we end by recognising its many achievements and benefits. Thousands of new users in primary and community care, identifying 5,600 potential cases of AF and helping avoid a large number of strokes. Evidence of successful adoption by a wide range of staff groups using the devices in a wide range of settings. Evidence of and learning from a number of particularly successful local AHSN roll-out programmes. All contributing to the lessons set out in this paper to help us build on this programme and make good progress this year.

April 2020

For more information, contact the authors:

Andrew Liles, Director, R-Outcomes, andrew.liles@r-outcomes.com

Philippa Darnton, Associate Director Insight, Wessex AHSN philippa.darnton@wessexahsn.net

Dr Andrew Sibley, Evaluation Programme Manager, Wessex AHSN andrew.sibley@wessexahsn.net

References

- ¹ Benson T. Digital innovation evaluation: user perceptions of innovation readiness, digital confidence, innovation adoption, user experience and behaviour change. *BMJ Health Care Inform* 2019
- ² Benson T. Measure what we want: a taxonomy of short generic person-reported outcome and experience measures (PROMs and PREMs). *BMJ Open Quality* 2020
- ³ National Screening Committee. The UK NSC recommendation on atrial fibrillation screening in adults. NSC 2014
- ⁴ Hobbs FDR, Fitzmaurice DA, Mant J, *et al.* A randomised controlled trial and cost effectiveness study of systematic screening (targeted and total population screening) versus routine practice for detection of atrial fibrillation in people aged over 65 years and over: the SAFE study. *Health Technology Assessment* 2005; 9: 1-74.
- ⁵ NICE. Lead-I ECG devices for detecting symptomatic atrial fibrillation using single point testing in primary care. May 2019.