Digital innovation in primary care

Findings from the Care City Wave Two Test Bed project

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Key findings

Consider factors that influence patient engagement such as when and how the innovation is prescribed.

- The timing of the referral and how patients were referred to the apps were important factors in patient engagement (e.g. face-to-face contact was important)

Training for implementation staff should include the functionality of the technology and its capabilities.

- Staff reported the value of understanding how the technology functions (such as how to navigate the app in order to explain it to patients and answer any queries).

Consider how the innovation embeds or fits into existing services.

- Such as existing priorities or pathways and any knock-on effects further along the pathway (e.g. for staff time/workload).

There is no 'one size fits all' approach to implementation.

- There was considerable variation in workforce structures and organisational set-up across practices. The presence of specialised staff stationed within the practices was particularly beneficial to help facilitate the implementation and provide leadership.

Be open and flexible to adaptations to the innovation and implementation pathway.

- E.g. One of the innovators made changes to the way that the data was transferred from the app to the patient records.

The innovation team should provide regular feedback to implementation teams.

- Implementation teams reported the benefit of receiving the regular 'dashboard' from the innovation team relating to the number of patients contacted and uptake.

Care City and the Test Bed

- The NHS Test Beds programme has been designed to bring together NHS organisations and commercial providers of digital technologies. These partnerships test new ways of delivering care with the potential of improving patient experience and outcomes.
- Care City is a Community Interest Company based in Barking and a Test Bed site for Wave 2 of the programme.
- Nuffield Trust were invited as evaluation partners.

Aims of the Test Bed

- The real-world testing of innovations, sometimes in combination.
- The upskilling of care support staff
- Evaluation of the test bed would provide learning about the extent to which they:
  - engage service users
  - improve their outcomes and
  - alleviate some of the capacity challenges of the wider health and care systems.

Evaluation methodology

Project set up	• Reviewing evidence • Choosing metrics
Feasibility and piloting	• Collaborative development of logic models • Understanding how each innovation can be successful
Process evaluation	• Staged interviews with users, staff and non-adopters • Monitoring process metrics including uptake • Successful scaling up
Outcomes evaluation	• Staff and patient experience • Clinical outcomes • Cost

Primary care - project aims

- To embed digital innovations in care pathways in primary care
- To promote digital prescribing for the self-management of diabetes and insomnia, and to understand the barriers and enablers

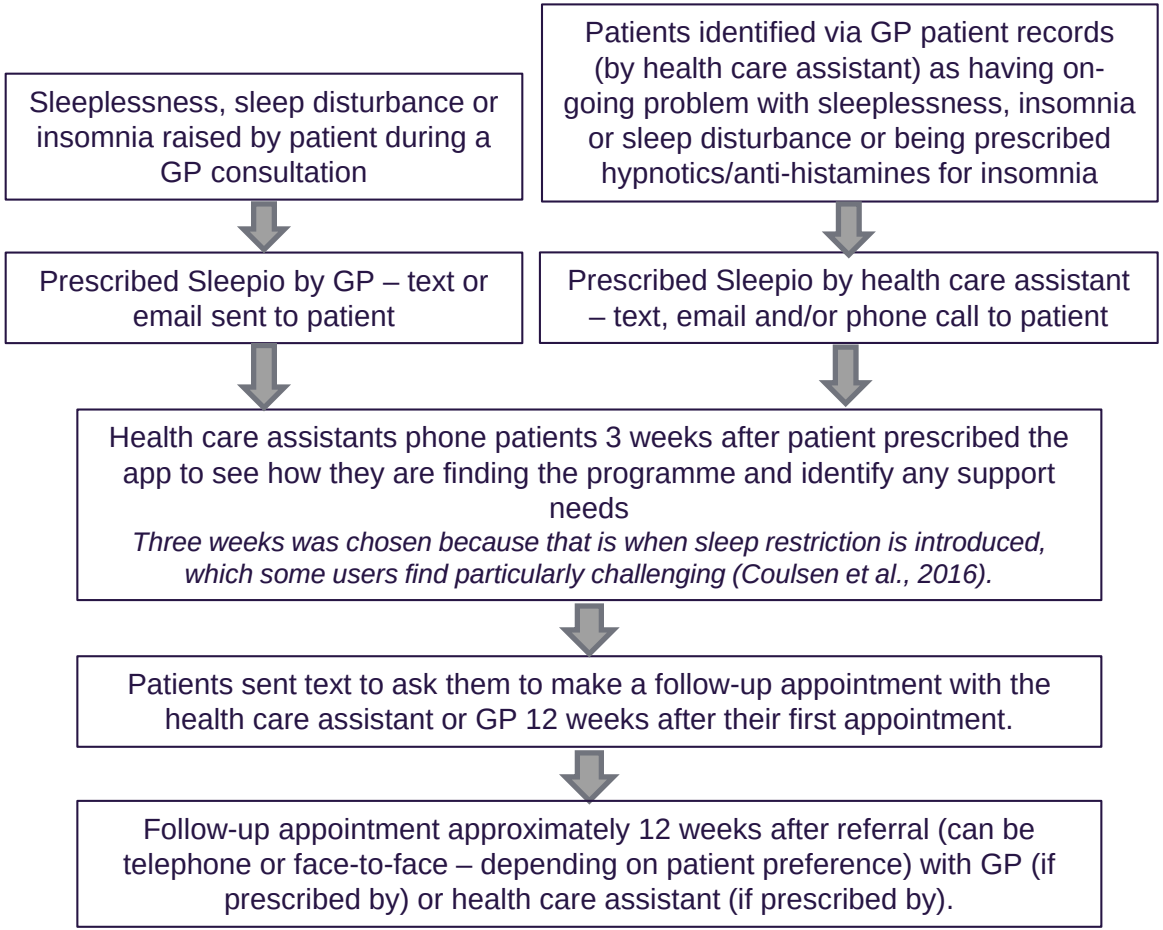
Four innovations were selected:

1. Sleepio
2. LIVA Healthcare
3. Healthy.io Albumin to Creatinine Ratio (ACR) test (now called Minuteful kidney)
4. Our Mobile Health (did not proceed to testing)

1. Sleepio

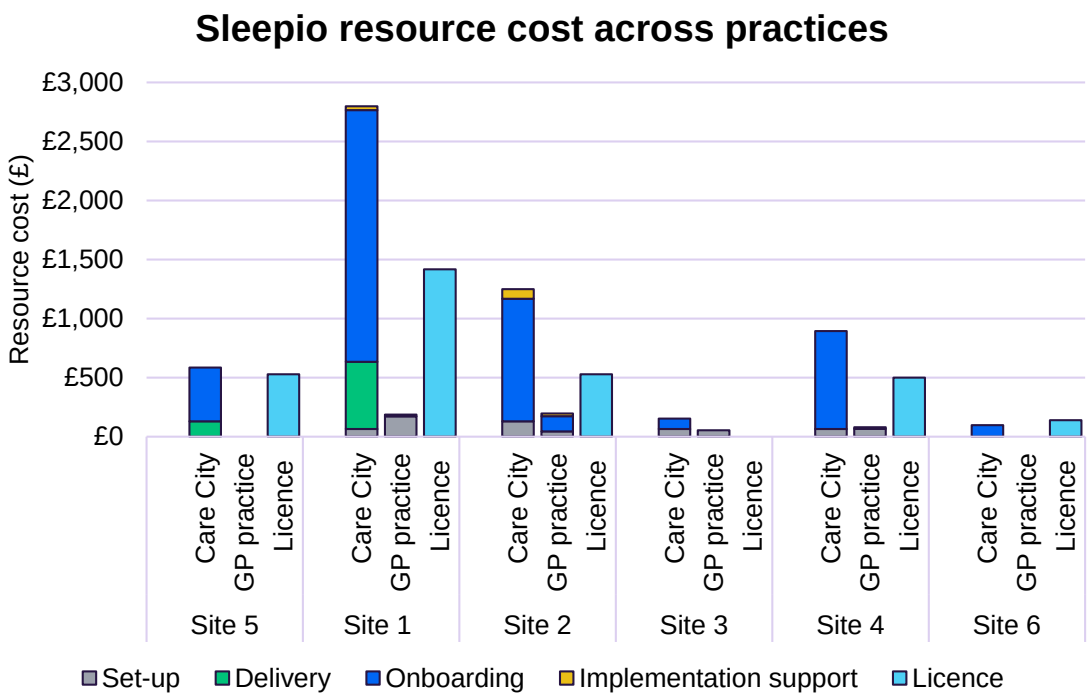
Digital programme for insomnia	
Background	• National Institute for Health and Clinical Excellence (NICE) recommends cognitive behavioural therapy (CBT) for insomnia as the first line of treatment.
Aim and benefits	• An automated digital programme delivering CBT for insomnia. • Provides an opportunity to complement or substitute face to face therapy. • Provides an alternative option (to medication) or sleep hygiene.
Description of technology	• Sleepio is an evidence-based digital programme that delivers fully automated CBT for insomnia.
Prior use	• Sleepio is in use in several pilots across the NHS and has been evaluated in numerous trials and real-world evaluations – it has been found to be safe and effective in improving insomnia symptoms and mental health.[1, 2, 3]

Implementation pathway



- Patients required to have access to a smartphone, tablet or computer, and the internet.
- Usual care pathway: patients who raise issues with insomnia or sleep disturbance during a consultation might be prescribed sleep hygiene or sedatives.

Sleepio costs



Innovation	Sleepio
Implementation cost range across practices	£96 - £2,984
Factors affecting cost variability	• Engagement and patient pool size (i.e. site 1) • Referring patients accounted for the majority of the cost and was relatively time intensive

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Cost to scale up Sleepio

	Estimate	Notes
Eligible patients	People with insomnia	In the Test Bed patients were identified through GP consultations and also patients were contacted proactively if they had a history of sleep disorder
Unit cost of innovation	£84	Unit costs include implementation costs and cost of Sleepio licence (from test bed).
Estimate of eligible patients per 1,000 population	78/1,000 population	Estimated from prevalence of insomnia and proportion of the population who are adults.
Estimate of cost to implement across population of 1,000	£655	Estimate assumes uptake is 10% among patients with insomnia. This is based on previous studies of Sleepio.
Estimate of cost to implement across population of 50,000	£32,753	
Estimate of cost to implement across population of 300,000	£196,457	

Factors affecting the cost of scale up:

- Integration into initial patient consultation
- Uptake – digital engagement/smartphone access
- Staff variation and approach

How could the innovation impact the overall care pathway in terms of cost?

- Use of Sleepio could impact on GP contacts and medication costs in primary care.

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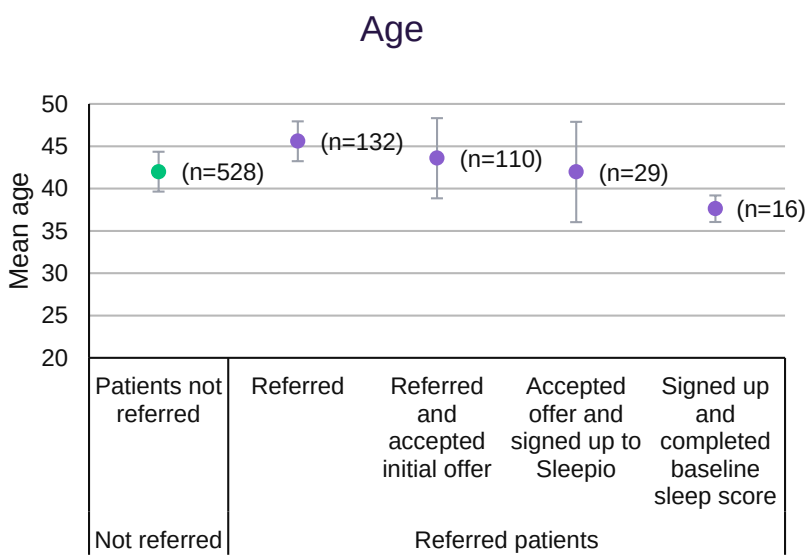
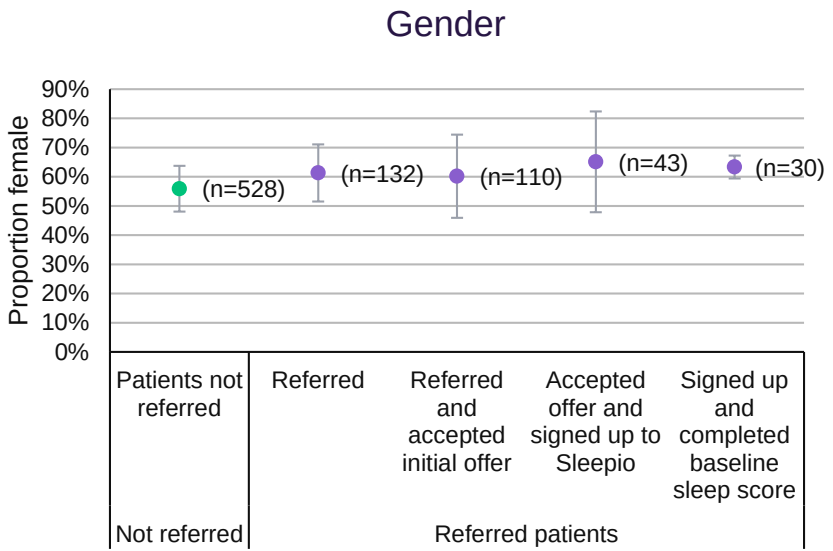
Sleepio uptake: age and gender



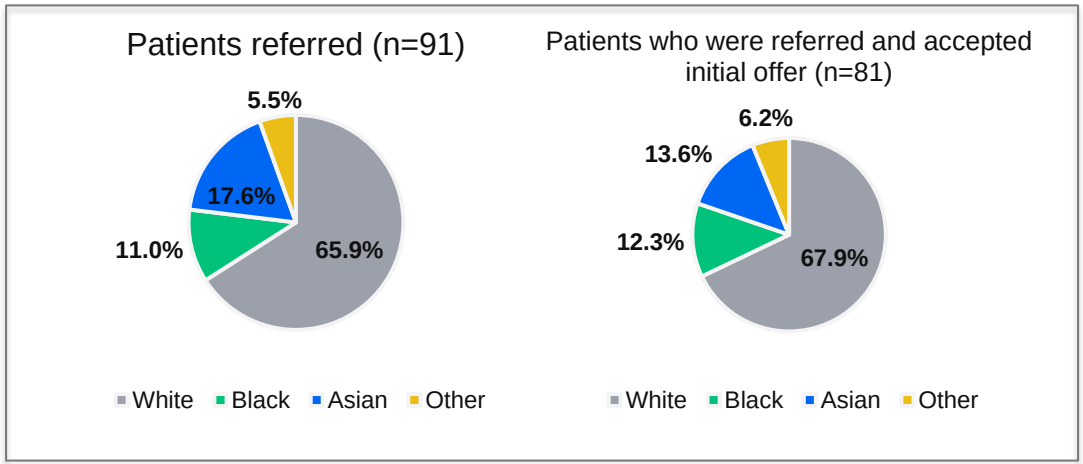


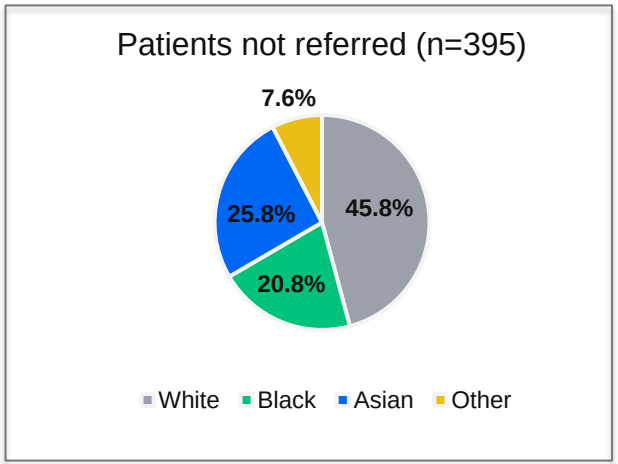
No significant difference in mean age between groups of referred patients and those who weren't referred

No significant difference in proportion of males and females between the group of referred patients and those who weren't referred

Referrals to Sleepio: ethnicity

Disproportionately more individuals from the white population are referred





Patient outcomes: engagement and satisfaction

Recruitment

- Patient engagement was lower than expected.
- Barriers to uptake included digital access, digital literacy, aspects of the programme being too challenging, language barriers, a preference for face to face, and technological barriers such as the app not being available on android phones and issues with accessing or losing the link.
- It is difficult to determine the extent to which the Covid-19 pandemic impacted on level of patient engagement.

Patient experience

- Those patients who were using the programme reported positive outcomes, such as improved sleep.

Key implementation findings

Consider when and how the programme is prescribed.

- The timing of the referral and how patients were referred were important factors in patient engagement.
- Referral by a clinician and face-to-face contact seemed to be important for engagement - this might be related to the timing of referral or the importance of clinical endorsement.

Understand ‘drop-off points’ in the implementation pathway.

- There were many drop-off points (i.e. points where patients stopped engaging with the innovation) in the pathway, including the referral, clicking the link, initial engagement with the programme, the sleep test and the use of the programme over time.
- The lack of fixed timing parameters within the programme and the fact that patients do not generally progress through it in a linear manner meant it was difficult to determine at which point support from the practice might be most beneficial.

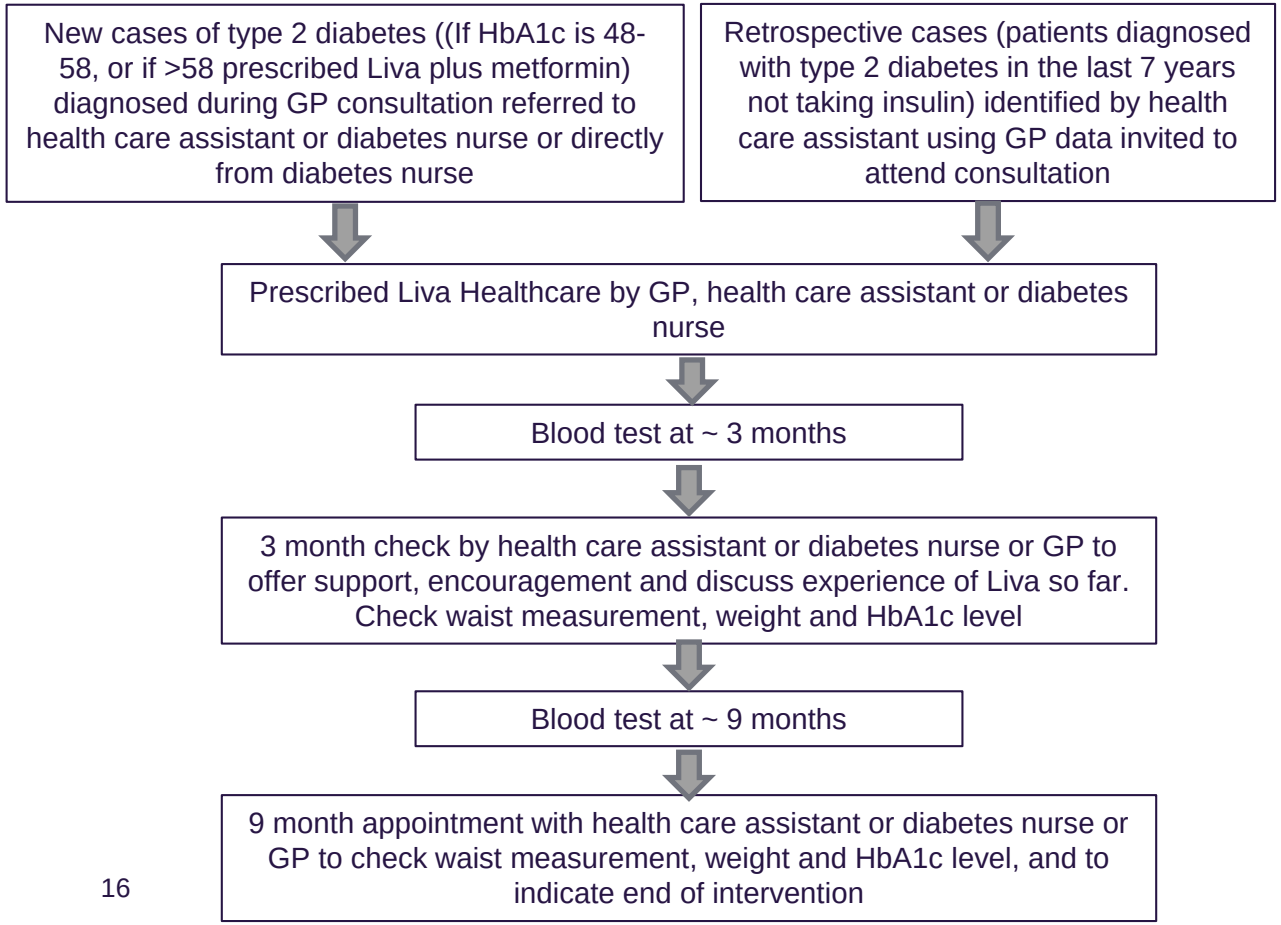
Consider how the innovation embeds or fits into existing services.

- The diagnosis and treatment of insomnia in primary care is often opportunistic. As a result, there seems to be a lack of knowledge and awareness of insomnia treatment options.
- This partly explained the low staff engagement - that implementing the innovation felt like providing an additional service or was not viewed as a priority.

2. Liva Healthcare

Digital behaviour change programme for diabetes	
Aim and benefits	• Digital prescribing for the self-management of diabetes. • The anticipated clinical benefits included reducing HbA1c levels, weight loss, improving physical activity levels and mood. • The remote accessibility – the programme can be accessed at any time or place. • Comparison with existing programmes - a 9 month programme rather than one day therefore keeping patients engaged over a longer period of time. • Supporting, educating and motivating patients to be more engaged with their own care. • The availability of the health coach to provide support that healthcare professionals do not have the capacity/time to provide. • More timely access to educational resources.
Description of technology	• A digital behaviour change programme consisting of one-to-one personal coaching, group-based interventions, tailored health plans, goal tracking and self-monitoring.
Prior use	• Already in use preventatively as part of the National Diabetes Prevention Programme. • Not previously been used with type 2 diabetic patients in the UK.

Implementation pathway



- Liva healthcare was prescribed in addition to treatment as usual as an additional service or ‘treatment option’.
- To meet the Quality Outcomes Framework (QOF) requirements, practices were required to provide structured education.

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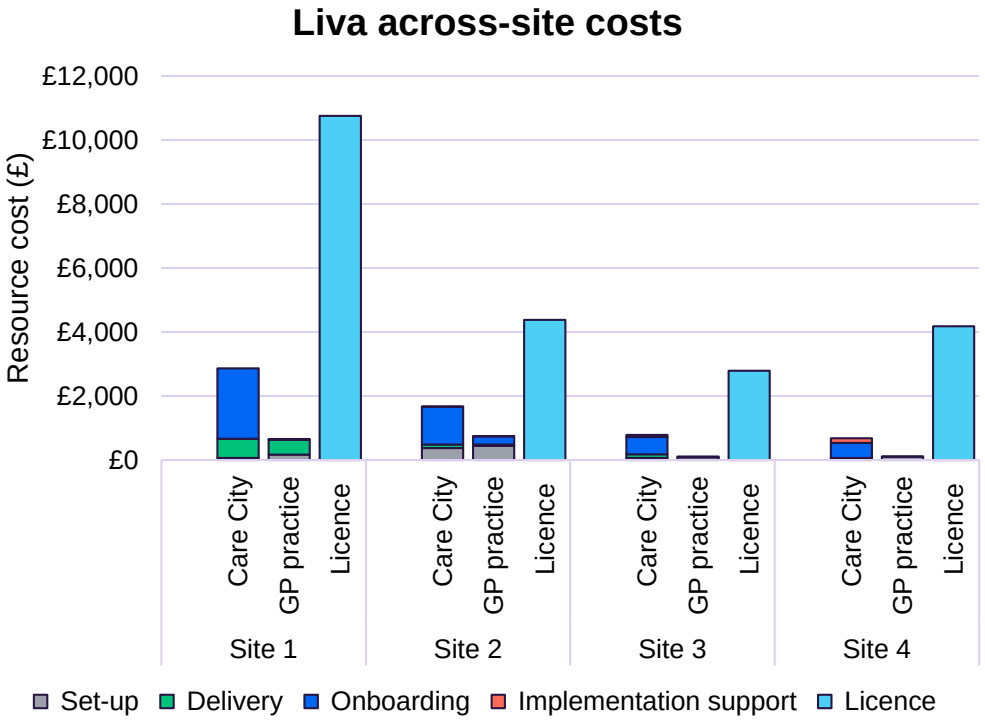
Liva implementation costs



Innovation	Liva
Implementation cost range across practices	£795 - £3,520
Factors affecting cost variability	• Engagement and patient pool size (i.e. site 1) • Different workforce structure and capacity across practices • Additional support needed from Care City in onboarding process

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Liva costs scenario 2

	Estimate	Notes
Eligible patients	Newly diagnosed diabetics	In the Test Bed patients were identified through GP consultations and also patients were contacted proactively if they had been diagnosed in the last 7 years.
Unit cost of Liva per patient onboarded	£268	Unit costs include implementation costs and cost of Liva and coaching (from test bed).
Estimate of eligible patients per 1,000 population	5.3/1000 population	Estimated from prevalence of diabetes, proportion of population who are adults, and proportion of diabetic patients who were diagnosed in the last year.
Estimate of cost to implement across population of 1,000	£377	Uptake in the Test Bed was estimated to be 27% of patients contacted. These cost estimates assume uptake is 27% among newly diagnosed diabetics.
Estimate of cost to implement across population of 50,000	£18,848	
Estimate of cost to implement across population of 300,000	£113,088	

Factors affecting the cost of scale up:

- Integration of the innovation into usual care
- Digital engagement/smartphone access
- Workforce structures
    - An implementation model including the presence of specialised staff (e.g. a diabetes nurse) was particularly beneficial to help facilitate the implementation.

How could the innovation impact the overall care pathway in terms of cost?

- Short term: Liva engagement could impact on numbers of contact with the patients GP, practice or diabetes nurse, and use of medication.
- Longer term: the costs of complications of diabetes and increased risk from other illnesses would reduce if progression of patients diabetes was slowed/reversed though Liva.

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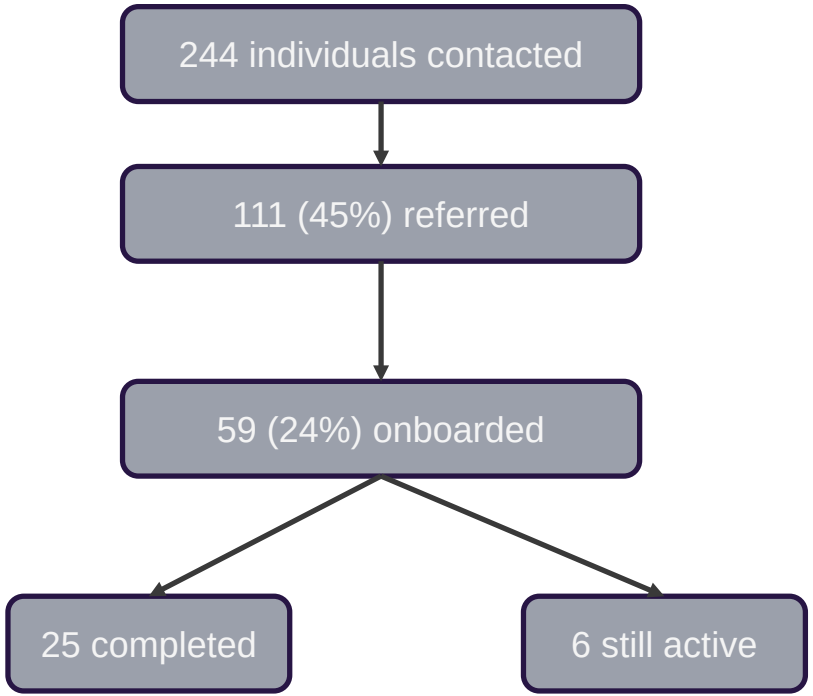
Liva uptake



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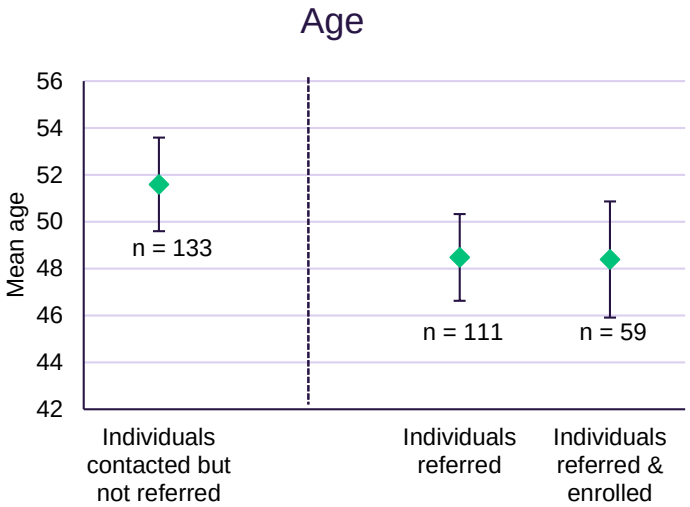
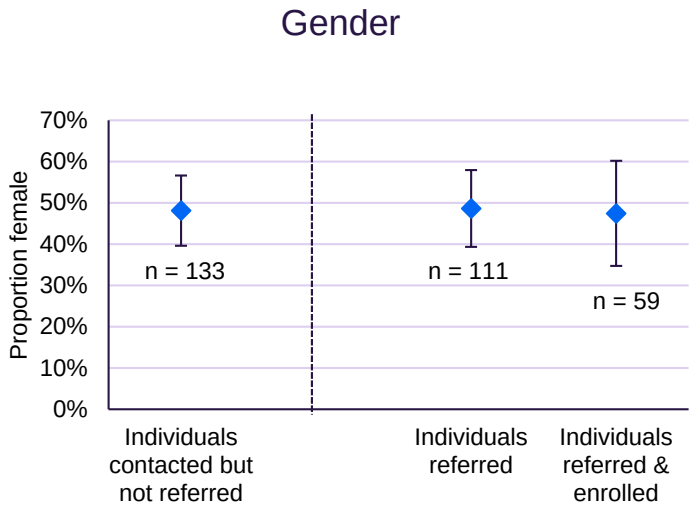
Liva Uptake: age and gender





Referred patients have a significantly younger mean age

There are no notable differences in gender mix between those referred and not referred

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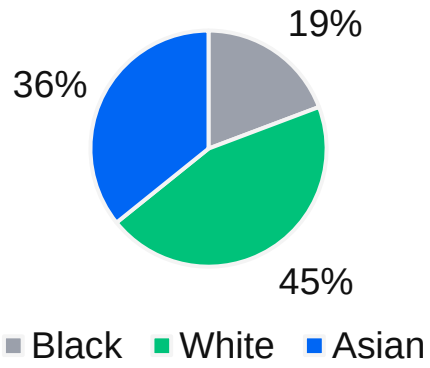
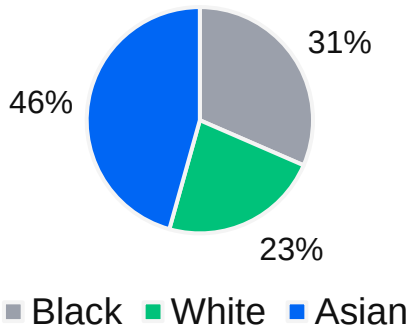
Liva uptake: ethnicity

A larger proportion of people from black or Asian groups were referred and enrolled in comparison to the white population

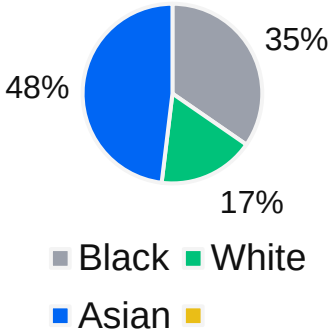
Individuals contacted but declined or not suitable



Individuals referred



Individuals enrolled



NB: Other ethnicities have been excluded due to small numbers

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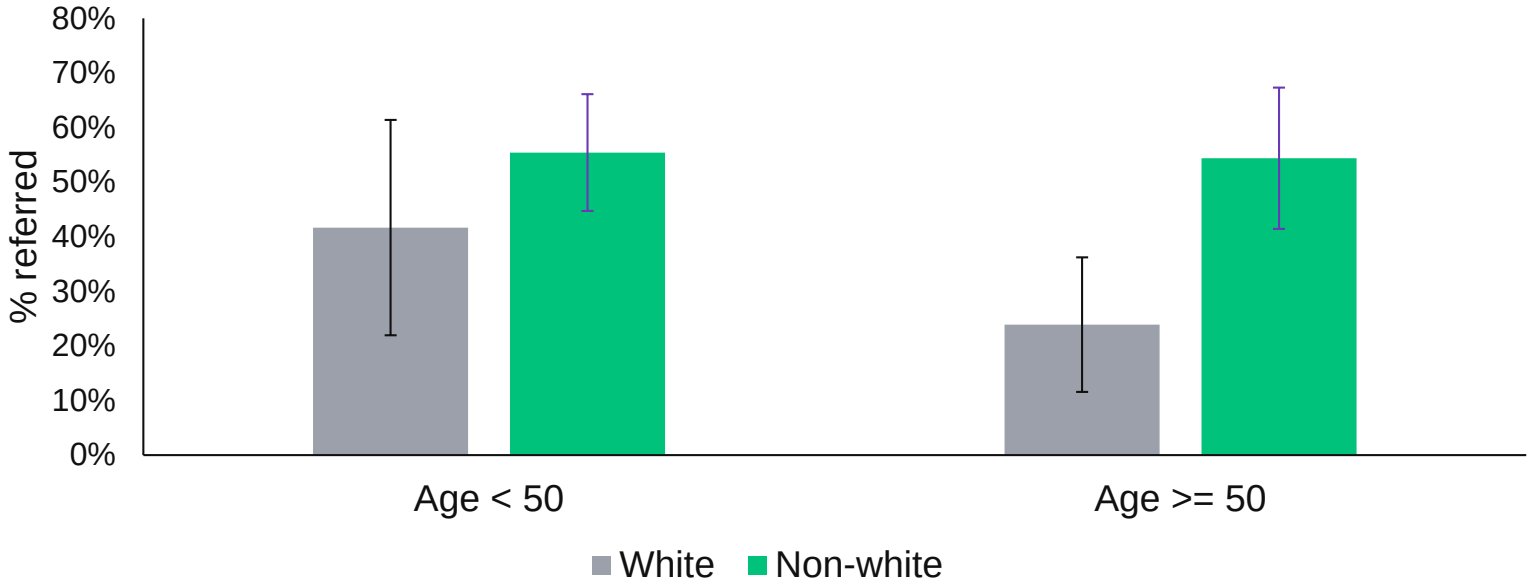
Liva: Proportions referred by ethnic group within age bands

Differences in uptake between ethnic groups may be partly explained by age differences: the white population being, on average, older.



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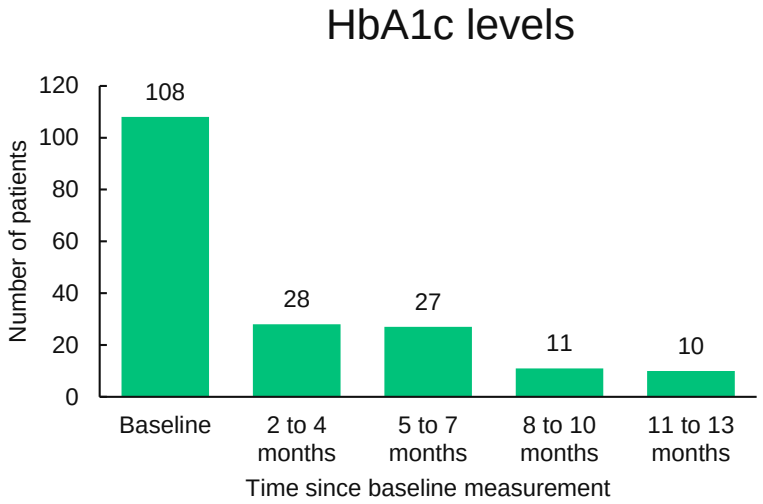
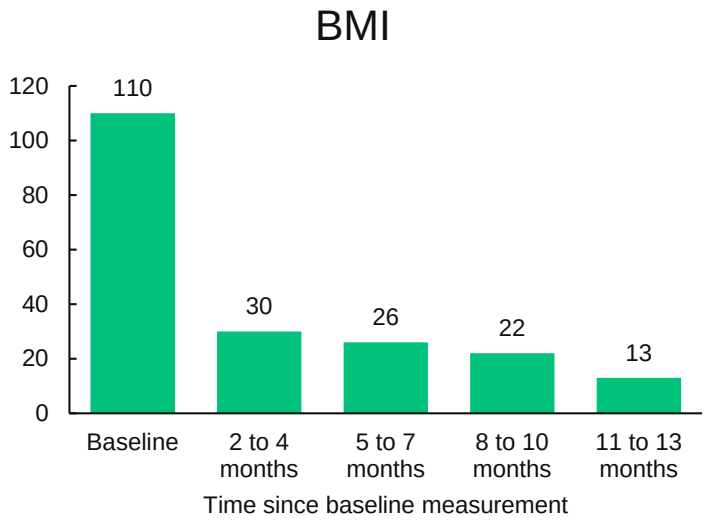
Liva: Patient follow up

Numbers of follow-up measurements taken over time for patients referred for Liva





Lack of follow up has affected the ability to robustly analyse changes since baseline

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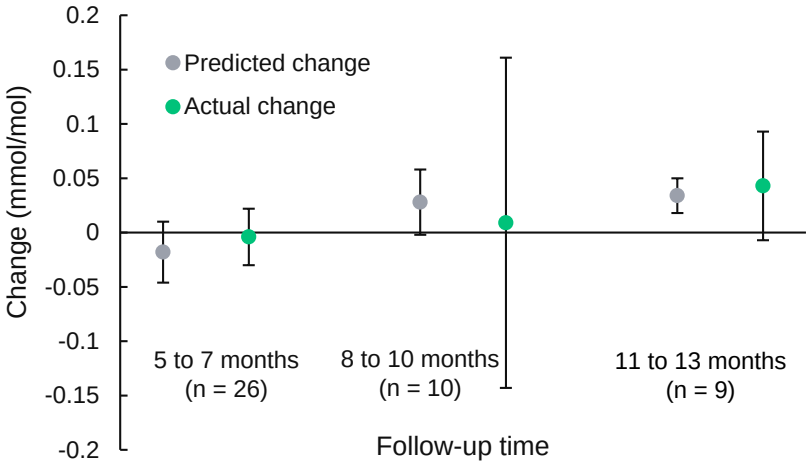
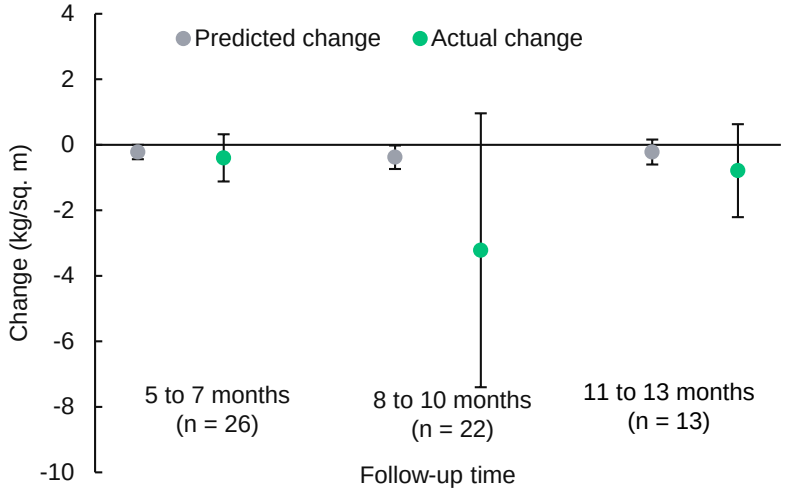
Changes in HbA1c and BMI from baseline (patients referred for Liva)

No significant differences between cases and controls were observed.

Changes in HbA1c from baseline (error bars are 95% confidence intervals)



Changes in BMI from baseline (error bars are 95% confidence intervals)



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Liva: Caveats for the analysis of impact

Analysis was of “intention to treat”: i.e impact was measured among the group of patients who were referred for Liva rather than restricting to only those who were onboarded.

Numbers of follow-up measurements for BMI and HbA1c were low which reduces the chances of identifying any true impact, if one exists.

The follow-up period may not have been long enough to observe an impact.

Patient outcomes: engagement and satisfaction

Recruitment

- Patient uptake was considered a challenge. It is important to understand the factors that influence patient engagement - staff reported that uptake was better if discussing the app face to face with patients.
- Patient barriers included digital access, digital literacy, language barriers.
- Early on in the implementation, there were some issues relating to how the innovation was communicated to patients (i.e. clarity in how the Liva programme had been explained to patients). Staff were provided with a script for when discussing the innovation with patients.

Patient experience

- Feedback from patients was overwhelmingly positive, particularly focused on their accountability to the health coach and their support in providing motivation, encouragement, knowledge, education, and providing regular check-ups and reminders.
- Patients and staff reported positive outcomes including healthy eating, losing weight, and improved Hba1C.
- The support of non-health care professionals (e.g. family members and/or friends) in downloading, accessing and using the innovation, particularly those who were less confident using digital technology (such as smartphones and apps) was important.

Key implementation findings

Consider the impact of local priorities on the implementation.

- Diabetes is considered a priority within the local area, as shown by the local incentive scheme associated with meeting diabetes care targets. As a result, implementation staff across practices were generally engaged with the implementation.

There is no ‘one size fits all’ approach to implementation.

- There was considerable variation in workforce structures and organisational set-up across practices. The presence of specialised staff stationed within the practices (e.g. a diabetes nurse) was particularly beneficial to help facilitate the implementation, to prioritise the innovation and to provide leadership.

Training for implementation staff should include the functionality of the technology and its capabilities.

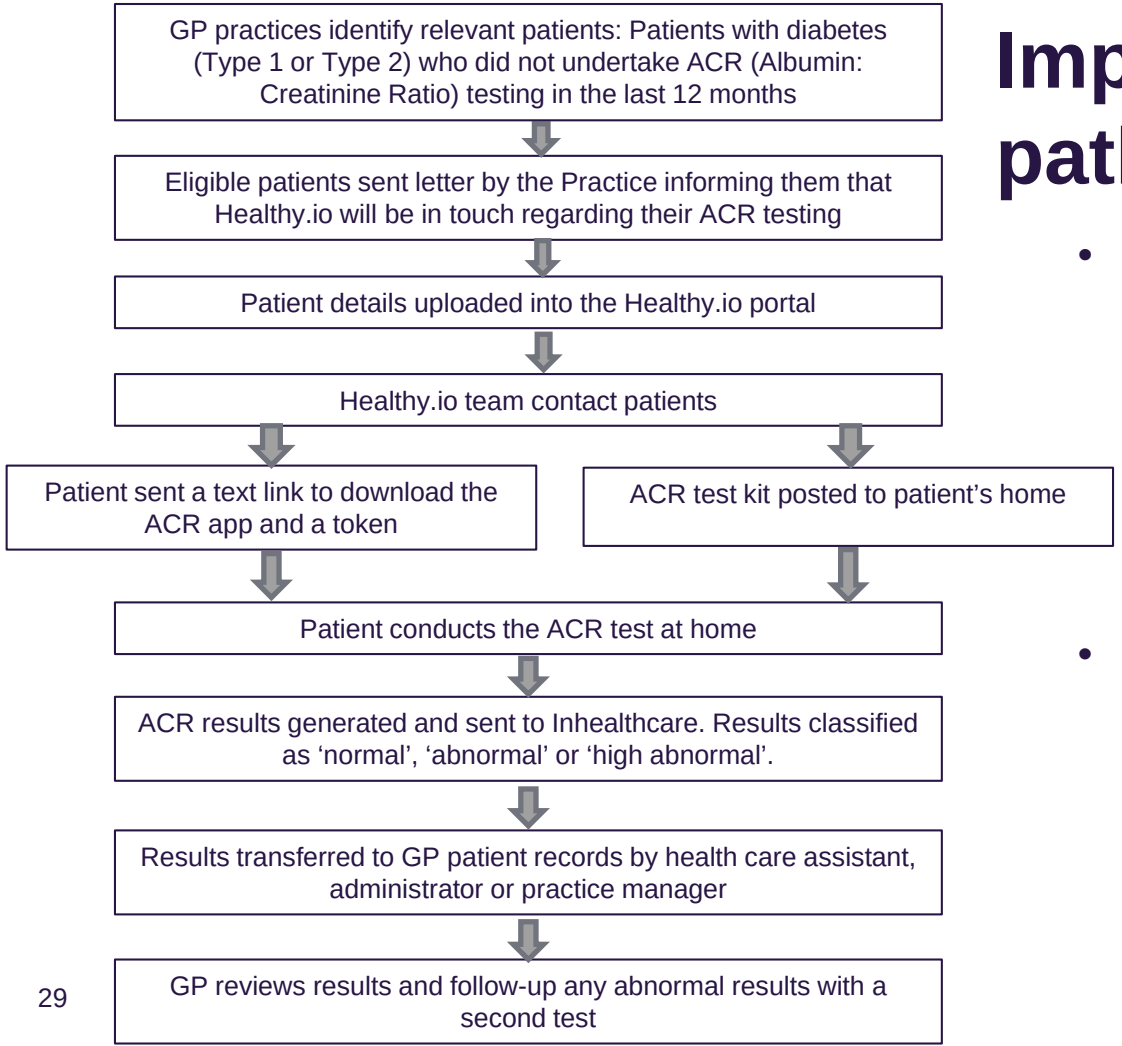
- Early on, implementation staff identified additional training needs related to understanding how the technology functions (to have a better understanding of how to navigate the app in order to better explain it to patients and answer any queries).

Understand the aspects of the programme that patients value.

- Patient feedback relating to the Liva Healthcare app was positive. Patients particularly focused on their accountability to the health coach and the support they provided.

3. Healthy.io ACR test (now Minuteful Kidney)

Smartphone based diagnostic test	
Background	• NICE recommends that all patients at risk of chronic kidney disease perform an annual urine albumin to creatinine ratio (ACR) test.
Aim and benefits	• To improve adherence to the annual ACR test, focusing on patients who have not engaged with this care process through the traditional method. • Flexibility for patients to carry out the test when and where convenient for them such as their own home. • Compliance with the annual ACR test is a particular challenge –it is hoped that the test will increase uptake.
Description of technology	• The ACR test is a smartphone-based diagnostic test for home use by the patient and results are automatically filed in the patient's electronic record (held by their GP or other clinician).



Implementation pathway

- Patients diagnosed with type 1 or type 2 diabetes who had not undertaken an ACR test in the previous 12 months (and therefore had been difficult to engage with).

- Healthy.io team were responsible for contacting the eligible patients to introduce the app and testing kit, providing information and supporting the download, as well as posting the kits to patients.

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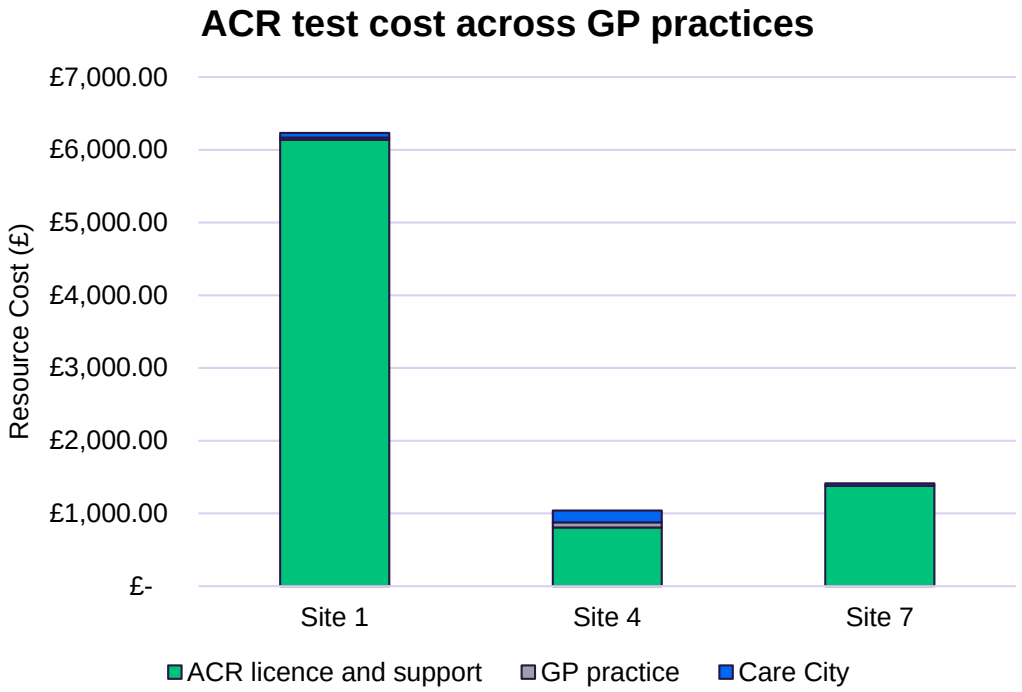
Healthy.io Costs



Innovation	ACR Test
Implementation cost range across practices	£1,040 - £6,233
Factors affecting cost variability	• Number of consenting patients (due to nature of pricing model) • Minor differences in workforce roles supporting the implementation across practices

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Cost to scale up Healthy.io

	Estimate	Notes
Eligible patients	Diabetic patients who have not had an ACR test in last 12 months	Patients identified from search of GP electronic record.
Unit cost of innovation	£17/patient tested	Healthy.io undertook the majority of the work including recruiting patients. The unit cost per patient tested allows for the proportion of patients who consented by but did not complete a test, and also includes implementation time within practices including following up on test results.
Estimate of eligible patients per 1,000 population	11.5/1,000 population	Estimated from prevalence of diabetes, proportion of the population who are adults, and proportion of diabetic patients with ACR tests in last 12 months.
Estimate of cost to implement across population of 1,000	£89	
Estimate of cost to implement across population of 50,000	£4,450	Estimate assumes uptake is 46% based on Test Bed.
Estimate of cost to implement across population of 300,000	£26,701	

Factors affecting the cost of scale up:

- Uptake rate, prevalence of diabetes and proportion of abnormal results.

How could the innovation impact the overall care pathway in terms of cost?

- Earlier identification of chronic kidney disease enabled by home testing, could allow earlier treatment and reduction in long-term consequences.

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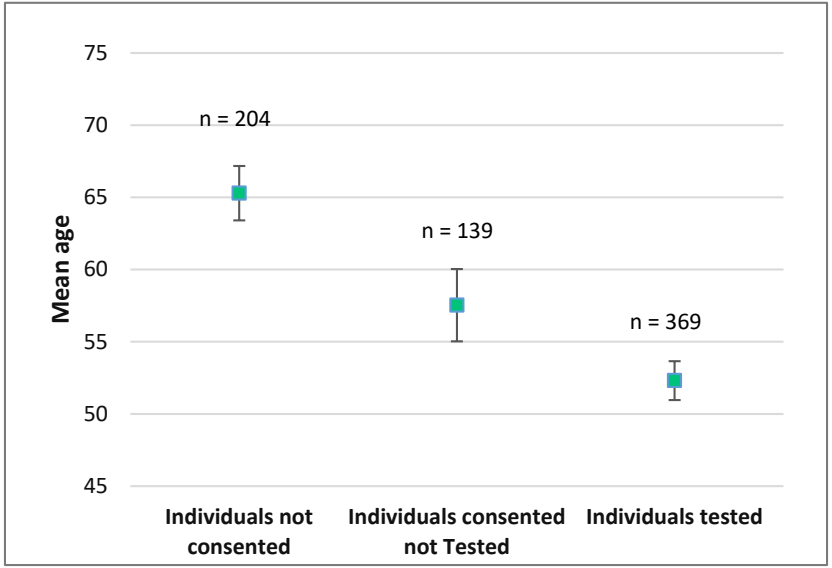
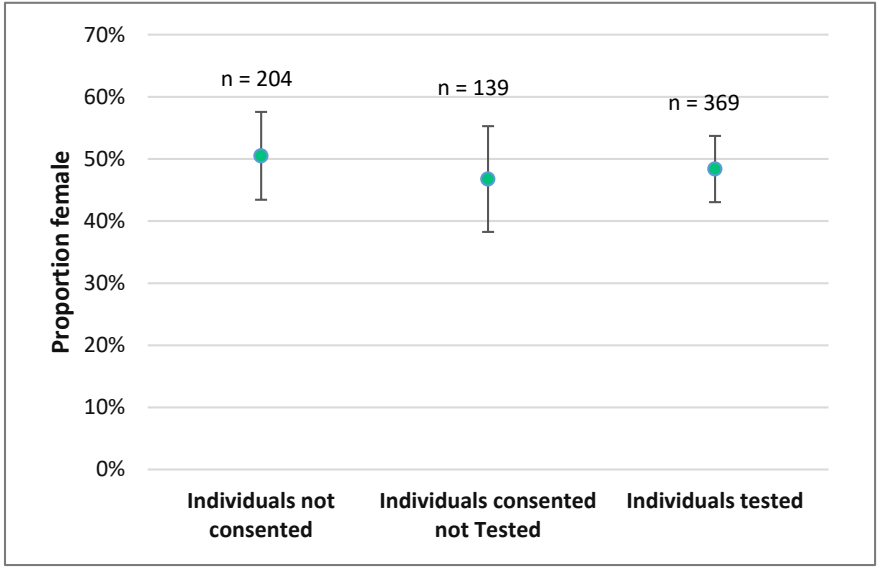
ACR Uptake: age and gender

Age



Patients consented and tested have a significantly lower mean age

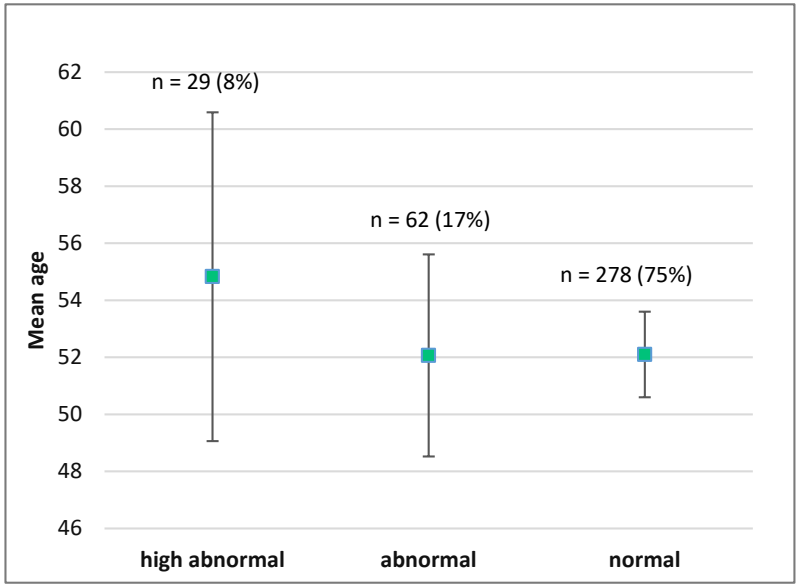
Gender



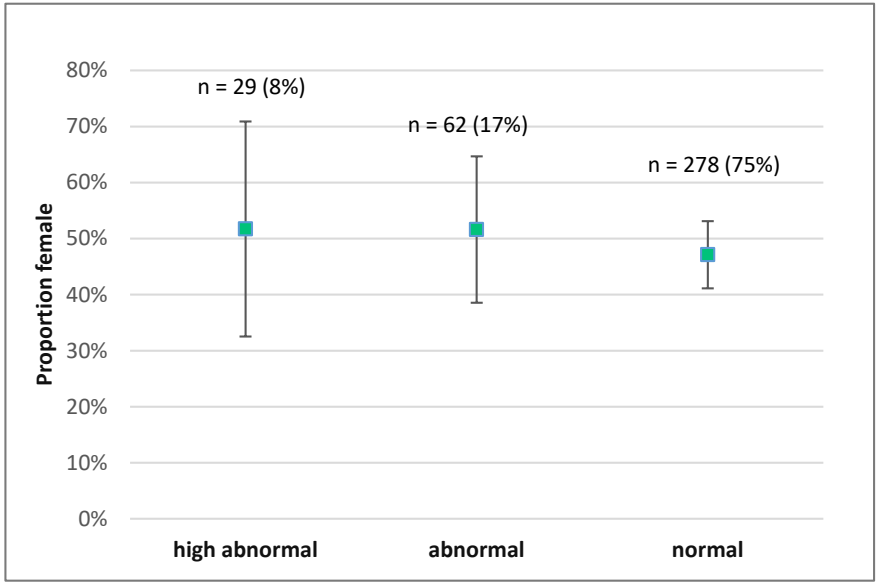
There is no significant difference in the gender breakdown between those consented and tested and those not

ACR Test Results by age and gender

Age



Gender



There was no significant difference in the age or gender mix of those with a high abnormal or abnormal test and a normal test result

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Patient outcomes: engagement and satisfaction

Recruitment - Patient uptake was good.

- Staff reported that the test had successfully engaged even the “difficult to engage patients” who hadn’t completed an ACR for years.
- Patient barriers included digital access (e.g. residents in care homes), patients with a catheter, digital literacy (e.g. downloading the app). Support from practice staff or friends and family was reported to be required in some cases.

Patient experience

- The vast majority (97.7%) found the test easy or very easy to use.
- Only 3% of respondents encountered any problems with the ACR test, and all respondents scored between 5-10 when asked how likely they would be to recommend the test to a friend or colleague.

Key implementation findings

Consider the value of the innovator in supporting the implementation

- The role of the innovator in enrolling patients, supporting the download and sending the kit to patients was seen as a key factor in the ‘success’ of the implementation.

Be open and flexible to adaptations to the innovation and implementation pathway.

- The innovator made changes to the way that the data was transferred from the app to the patient records.

The innovation team should provide regular feedback to implementation teams.

- Implementation teams reported the benefit of receiving the regular ‘dashboard’ from the innovation team – this included feedback relating to the number of patients contacted, uptake and test outcomes.

Consider how the innovation fits into the wider pathway or service

- NICE guidelines recommend that any abnormal ACR test results are confirmed by a second test. Some implementation staff reported that it could be difficult engaging with some patients to complete a re-test, which posed a particular challenge for their care.

References

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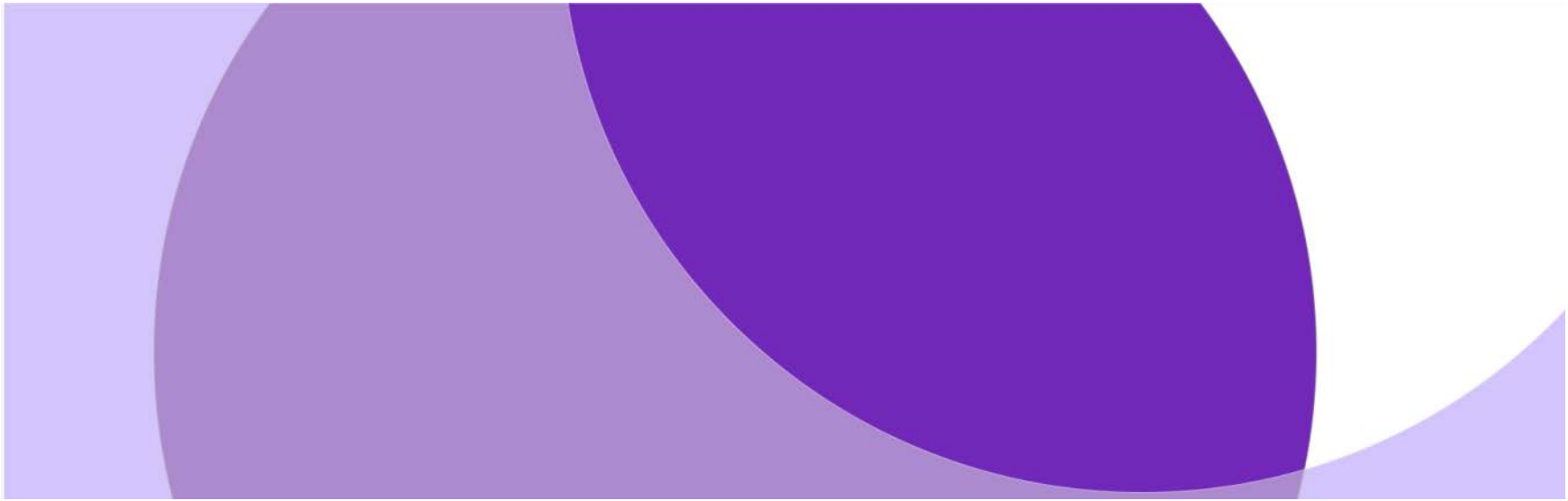
3 Kyle SD, Hurry MED, Emsley R, Marsden A, Omlin X, Juss A, Spiegelhalder K, Bisdounis L, Luik A, Espie CA and Sexton CE (2020) ‘The effects of digital cognitive behavioral therapy for insomnia on cognitive function: a randomized controlled trial’, *Sleep* 43(9), zsaa034. https://doi.org/10.1093/sleep/zsaa034 . Accessed 27 February 2021.



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