BP@home:
Pan-London Evaluation

Report Presented to NHSE I & LCEG (London)

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Contents

Executive Summary

Report objectives

This report summarises the key findings of a Pan-London evaluation to assess levels of implementation and identify key barriers and enablers to the streamlined implementation of the BP@home program across London. Specifically, we mapped the reception and distribution of BP@home monitors, investigated the views and experiences of primary care workers involved in the implementation of the programme, and quantify changes in outcomes using SNOMED codes. This data was synthesised and used to develop a list of evidence-based recommendations for the consideration of NHSE leadership team.

Methods

We used a mixed methods research approach and six phases of investigation to address these aims, including desktop research, personal interviews and focus groups, action research, data analysis, synthesis and reporting.

Results

The evaluation showed that there are different levels of readiness and implementation across the 5 London ICSs. The roll-out of BP@home programme has been challenging due to a number of key factors across the pathway, including the limited IT infrastructure, insufficient human and financial resources, and the lack of adequate and specific SNOMED codes. These challenges were further increased by the competing demands on limited capacity in Primary Care, especially during the Covid-19 pandemic. However, respondents also identified some facilitators, including the onboarding material provided by NHSE, the inclusion of the UCLP criteria the EHR and the provision of conditional incentives in certain ICSs. A more structured and holistic approach to onboarding patients is needed to ensure high quality compliance and satisfactory results for patients. Another key recommendation devised by respondents was to offer BP monitors on prescription, along with the creation of specific SNOMED codes.

Conclusion

At the time of redaction of this report, there are local evaluation plans in each ICS & a national evaluation of @Home programme was recently commissioned by NIHR. There is an urgent need to develop & use system-wide codes to track activity as well as carry additional research especially regarding patients' experience and perspectives as recipients of the BP@home programme.

Introduction

Background

Noncommunicable diseases (NCDs) are responsible for 71% of deaths globally, with cardiovascular diseases (CVD) accounting for most deaths (1). Investing in CVD prevention is integral to achieving or at least progressing towards several Sustainable Development Goals (2). However, many public health policies were affected by the COVID-19 pandemic which resulted in the rapid implementation of a national government policy of shielding to protect vulnerable patients. This meant that shielded patients with uncontrolled hypertension were no longer able to safely access blood pressure (BP) monitoring in person. Loss of follow-up meant that healthcare professionals (HCPs) were unable to provide tailored interventions to control the patient's BP and medication dosage.

Delays of only a couple of months in medication intensification and BP follow-up are associated with an increased risk of an acute cardiovascular event (CVE) or death, highlighting the importance of timely medical management and follow-up in the treatment of hypertensives (3). Disruption of only nine months to the delivery of routine care for NHS patients diagnosed with hypertension was estimated to result in almost 12,000 additional acute CVEs including stroke and heart attack or deaths over a three-year follow-up period (4).

The NHSE-funded BP@home program (5) launched in 2020 sought to address this issue. BP@home is part of the larger NHS@home initiative (6) which aims to provide more personalised, convenient, high quality and timely alternatives to face-to-face care by maximising the use of technology to support more people's self-care in the home and community setting. An estimated 280,000 BP monitors (BPMs) were procured by NHSE to support the BP@home program and distributed to various primary care networks (PCNs) across England. Allocation of BPMs was coordinated by the 42 Integrated Care Systems (ICSs).

The BP@home standard operating procedure (SOP) encouraged each local area and GP practice to decide which patients had the greatest need and should be prioritised for regular home blood pressure monitoring. Recommended criteria for prioritization included age, BP level, deprivation and pre-existing CVD. A list of search and stratification tools based on the nationally recommended UCLP Proactive Care Framework was provided to be used within GP systems (SystmOne and EMIS). Once eligible patients were identified, HCPs contacted patients and offered them a BPM for a limited period in order to maximise their use by other eligible patients. **Figure 1** presents an overview of the processes involved in delivering a successful BP@home initiative.

Evaluation aims

The project aims presented were co-produced by NHSE commissioners, Zara Brookes & Joseph Fraser, and by Imperial SCARU/ARCN NWL evaluation team (Austen El-Osta, Eva Riboli-Sasco & Gabrielle Kerr)

1. **Assess levels of implementation** of BP@home across all 5 ICSs in London
2. **Characterize main barriers & drivers** to successful roll-out, onboarding & follow up of patients
3. **Quantify improvement in outcomes** following participation in BP@home
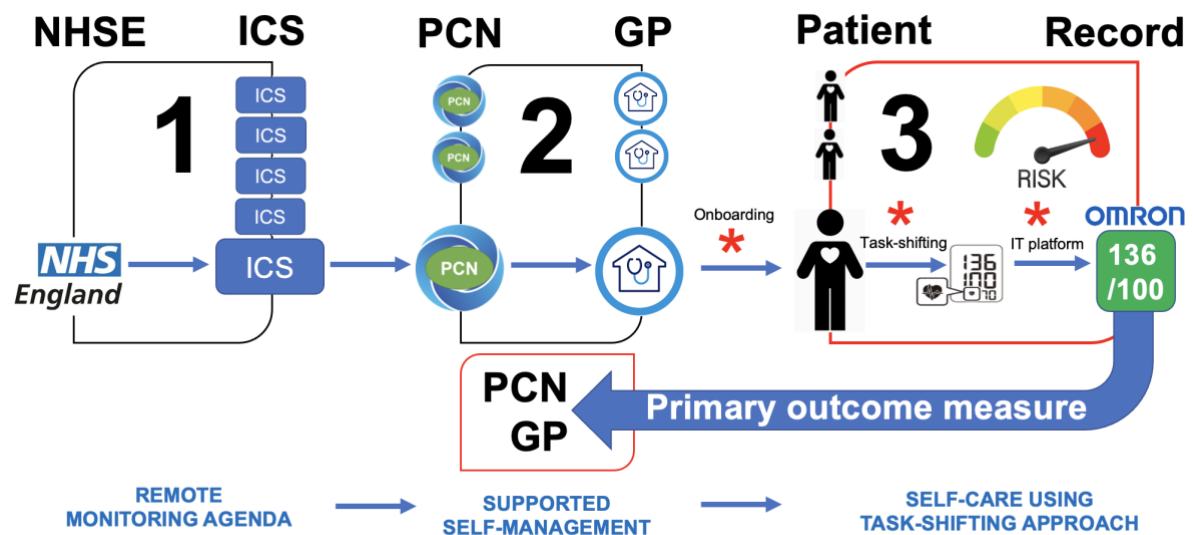

Figure 1: Overview of the processes involved in delivering a successful BP@home initiative

The primary outcome is accurate and frequent recording of BP reading by the patient in the home setting. This is only possible if the patient is enabled to utilise the device effectively & to create a record of their BP on a specified IT platform with functionality to reflect these readings on patient's EHR on the GP system. Processes in the first (left) block are under the remit of the Responsible Officer at each ICS; the middle block is reliant on the appropriate use of NHSE & local formula to ensure equitable distribution of BPM & logistical support to PCNs & GP practices (e.g., storage & centralised audit); The block on the right of the schema is dependent on person-centred patient interaction & the effective use of streamlined IT platform with added functionality. The greatest risk to the initiative is concerned with poor self-care by task shifting (e.g., patients not monitoring their blood pressure, and/or sending readings to GP practices)

Methods & Approach

A mixed methods research approach was used to answer the research questions and address aims, combining audit, qualitative and quantitative research. The pragmatic evaluation was carried out using 6 core phases of investigation and reporting as follows (**table 1).** The study received a favourable opinion from Imperial College London Research Ethics Committee (ICREC # 22IC7676).

Table 1: Project delivery using six phases of investigation & reporting

#	Phase	Description
1	**ICS audit**	We used a simple online tool to audit the number, type, availability, accessibility, and distribution of BP monitors per ICS
2	**Qualitative Research**	Personal interviews and focus group discussions with 20 primary care workers (PCWs) involved in delivering BP@home across London aimed at gathering their experiences, perspectives & recommendations regarding the program. Potentially eligible participants were approached via email with study information including participant information sheet and consent form and invited to take part. Interviews were recorded & auto transcribed with permission. Contextual data was anonymised and analysed thematically by both researchers
3	**Quantitative Research**	Quantitative evaluation of key process & clinical outcomes using local / ICS data assets (WSIC case study)
5	**Synthesis**	Consolidation of emergent themes and synthesis of evidence-based recommendations
6	**Reporting**	This report concludes with evidence-based recommendations of the consideration of commissioners in London.

Findings

We interviewed a total of 18 primary care workers, working in four of the five London Integrated Care Systems: North West London (NWL), North East London (NEL), North Central London (NCL) and South West London (SWL). All respondents were involved at different levels and stages of the BP@home initiative. They included 11 primary care workers (PCWs) such as GPs, clinical pharmacists, and nurses as well as seven non-medical respondents with managerial or administrative roles. Participant characteristics are summarised in **Table 2**.

Table 2: Participant characteristics

	N	(%)
Total	18	(100)
Gender		
Female	11	(61)
Male	7	(39)
Designation		
General Practitioner	5	(27)
Clinical Pharmacist	3	(17)
Practice Nurse Manager/lead, nursing associate	3	(17)
Program/practice manager	7	(39)

BP@home monitors allocation & distribution

Figure 2 presents a geographical mapping of the device allocation, PCN uptake & IT platforms used across the 5 London ICSs historical data as of 1 June 2022). **Figure 3** presents a geographical mapping of the BP@home monitors distribution across the 5 London ICSs (historical data as of 1 June 2022)
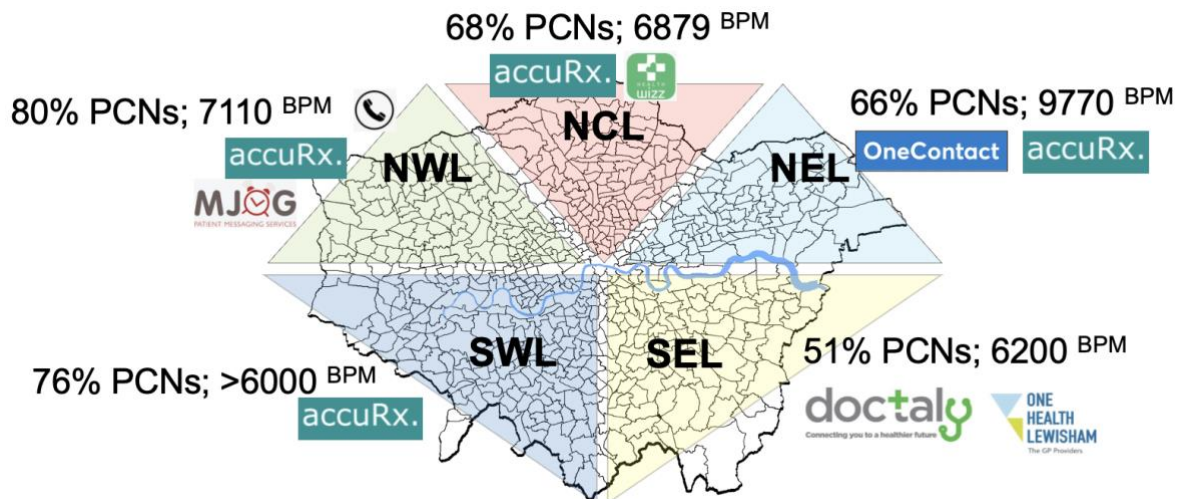

Figure 2: Allocation, PCN uptake of BP@home monitors & IT platforms across London (historical data)
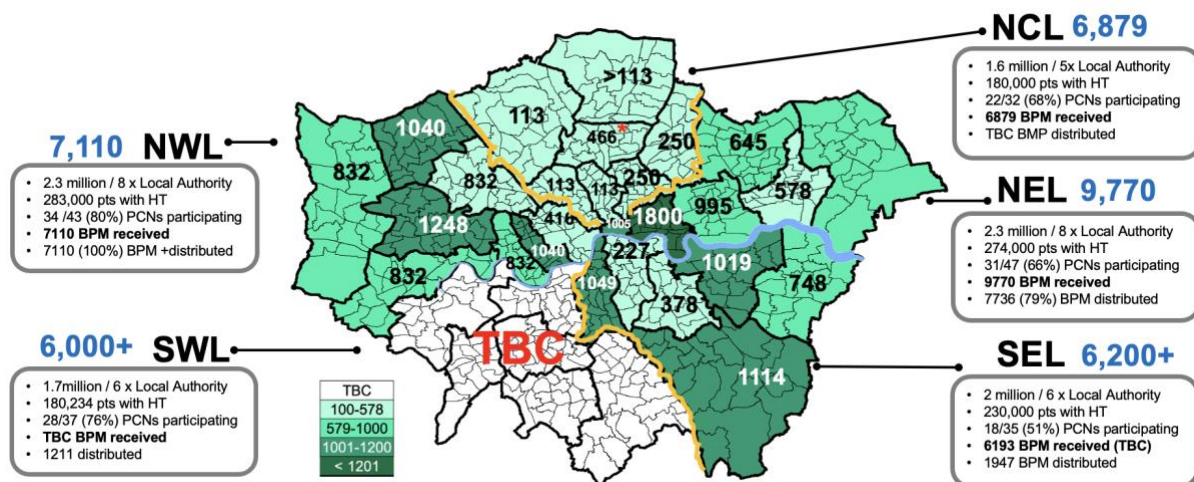

Figure 3: Distribution of BP@home monitors across London (historical data)

1. Primary Care Workers' perspectives regarding the BP@home programme

Through focus groups discussion and individual interviews, participants shared their perspectives regarding the barriers and drivers to the streamlined delivery of BP@home across London. **Table 3** below summarizes these key challenges which were encountered along the BP@home pathway, at all levels (ICS, PCN and general practice), while **Table 4** presents a synthesis of the facilitators.

Table 3: Key challenges and barriers to the streamlined delivery of BP@home identified by respondents

#	Challenges
1	**Fragmented logistics**, including delivery & storage issues, insufficient availability of XL cuffs
2	**No clear directive regarding recycling & duration of loan of device** - ICSs 'own' the devices but mechanisms for maintenance & loaning vs donating to patients are at ICS discretion
3	**General lack of resources (human, financial & Quality Improvement resources)** esp. during Covid-19 pandemic
4	**No standardized tool to capture data** to track onboarded patients, or number of machines loaned or follow-up touchpoints
5	**Processes must be practice-specific** & communication channels to receive readings must be diversified to fit each patient preference & accessibility
6	**Extra funding** (Additional Roles Reimbursement Scheme) helpful but **not enough to ensure sustainability** in the long-term
7	**Huge variation in how patients are onboarded** & in methods used to capture readings (i.e., telephone / eConsult & SMS, WhatsApp / smartphone app)
8	Assumption that "**BP@home is a 6-month pilot**…" & conflation with other blood pressure monitoring initiatives
9	**Patients' limited engagement** due to lack of digital literacy & access, level of deprivation, preference for face-to-face, lack of interest and/or information, etc.

Table 4: Key drivers to the streamlined delivery of BP@home identified by respondents

#	Drivers
1	**Good communication with NHSE & quality of the onboarding resources**
2	**A conditional incentive scheme** in NWL improved recruitment and offered the opportunity to put in place a structured plan & clearly defined aims.
3	**UCLP criteria integrated into EMIS** which provided list of eligible patients
4	**Building on previous experience, capacities and/or processes,** especially related to supporting self-management by patients for long-term conditions

Finally, respondents also shared their own recommendations regarding the future of the BP@home initiative. They are presented in Table 5 below.

Table 5: Key recommendations to the streamlined delivery of BP@home devised by respondents

#	Recommendations
1	**Provide BP monitors on prescription**
2	**Devise of more structured approach to onboarding**
3	**Create a SNOMED code for "loaned BP monitor"** (note: in process of being requested by NHSE)

Quantitative evaluation using SNOMED codes

SNOMED codes have the potential to capture & evaluate relevant process & clinical outcomes. However, only 4 out of 353K SNOMED codes are useful to track activity of remote monitoring of BP (the first 3 were outlined in the BP@home SOP). They are presented in **table 6** below:

Table 6: Presentation of four SNOMED codes used in BP@home

SNOMED code	Activity
1085031000000100	Home BP monitoring declined by patients
413606001	Average home systolic BP
413605002	Average home diastolic BP
413153004	BP recorded by patient at home

The current list of codes cannot be used to ID patients enrolled in BP@home programme specifically as multiple BPM initiatives exist & this may conflate results. Most ICSs agreed to integrate proxy codes into developed templates which were shared to facilitate local extraction of data in due course. The graphs below (**figure 4**) show the total number of instances a SNOMED code was recorded by NWL primary care (on WSIC) over a 15-month period (January 2021 - May 2022).
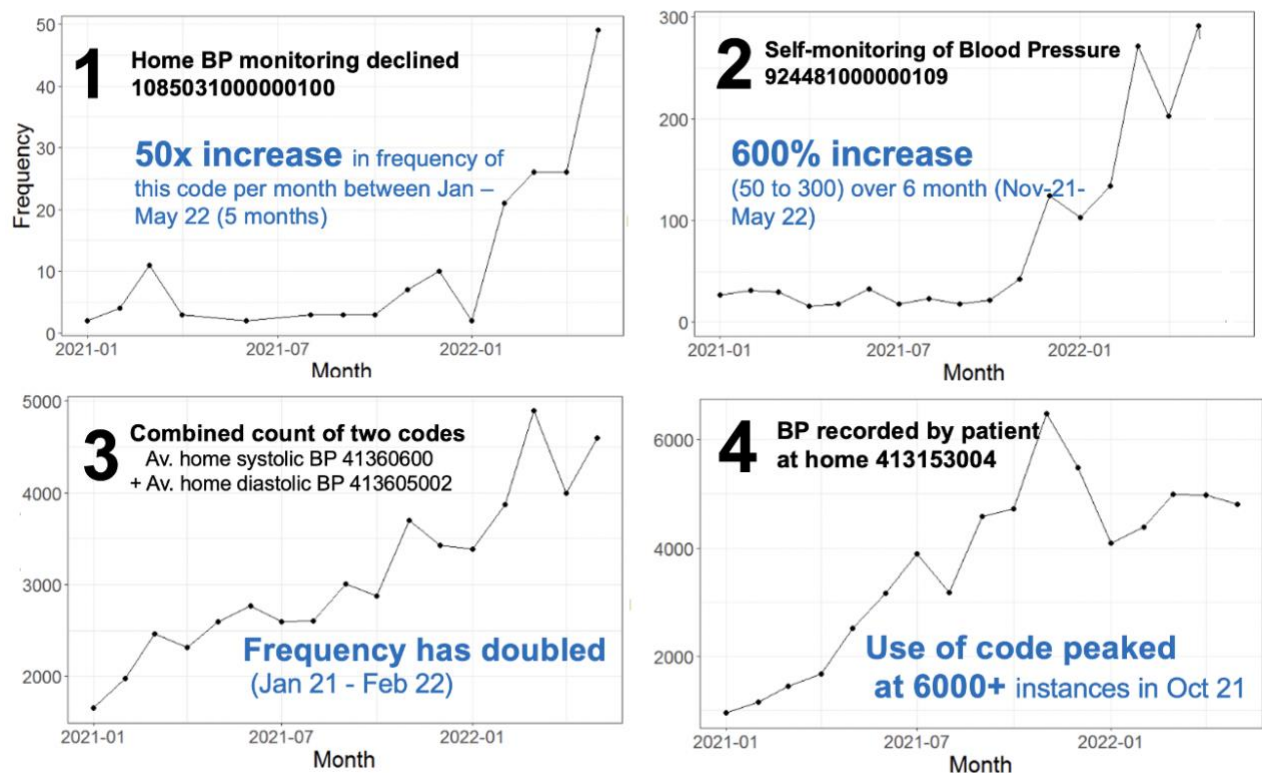

Figure 4: Monthly frequency of SNOMED codes associated with home BP monitoring in North West London WSIC primary care data, Jan 2021 to May 2022

We observed a huge uptick in use of these codes. However, this activity cannot be attributed to BP@home only because other blood pressure monitoring programmes exist and use the same SNOMED codes.

The current list of SNOMED codes is insufficient to track & evaluate progress and clinical outcomes. SNOMED is only useful as a proxy measure. To address this, each ICS is conducting its own place-based evaluation. Local processes & codes for templates are being developed at ICS/PCN level: a separate spreadsheet is being used to track devices, patient follow-up & non-responders at practice level. There is an urgent need to develop & use system-wide codes to track BP@home activity.

Discussion

Summary of main findings

Despite varying levels of implementation of the BP@home program across London, all ICSs shared common experiences, practices and perspectives. Key barriers to the successful roll-out of the BP@home programme included fragmented logistics, the general lack of technical, human and financial resources and the absence of a standardized tool to track patients' readings and devices.

All these issues might have further reinforced patients' unequal engagement capacity, due to lack of digital literacy and access, deprivation, and limited access to information and support. However, respondents also identified a variety of enablers including frequent communications from NHSE and the high quality of onboarding resources, the provision of a conditional incentive scheme (in NWL), the integration of the UCLP selection criteria into the EHR and building on previous experience, capacities and/or processes related to self-management for long-term conditions. Suggestions to improve the implementation of BP@home included the provision of BP monitors on prescription, the adoption of a more structured approach to onboarding and the creation of a SNOMED code for "loaned BP monitors". Indeed, as shown by the quantitative analysis, the current list of SNOMED codes limits evaluation of practice-level outcomes. There is therefore an urgent need to develop & use system-wide codes to track activity. **Figure 5** presents a mapping of the BP@home pathway, including the challenges identified by respondents.
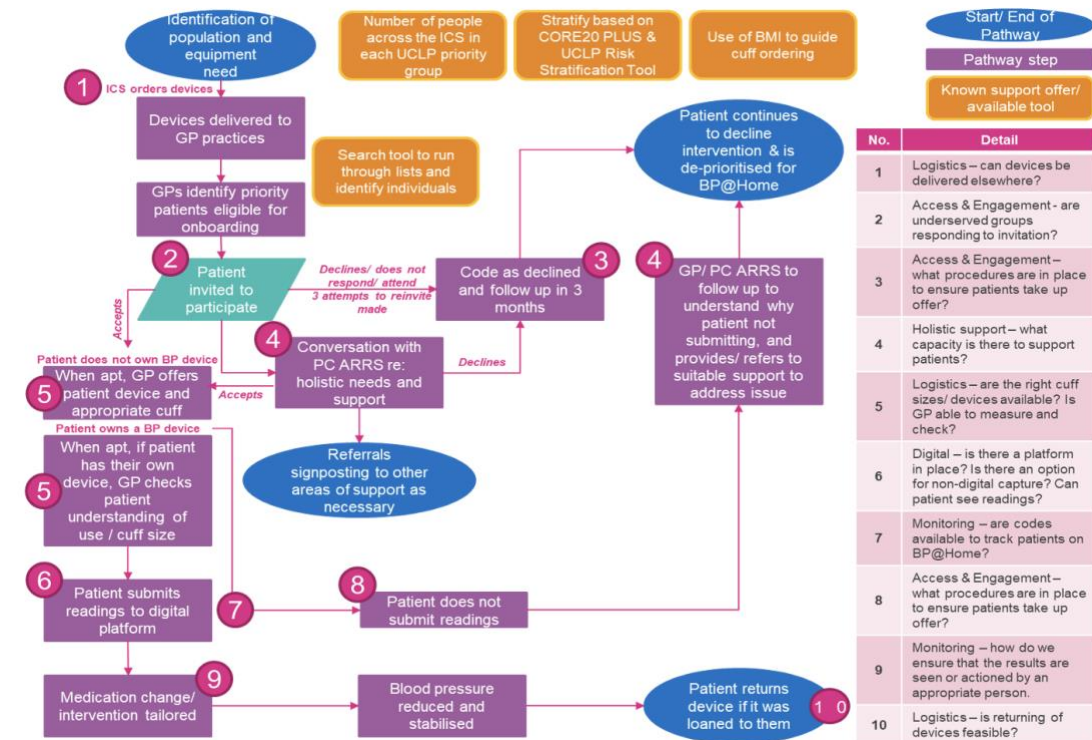

Figure 5: Mapped BP@home pathway & identified challenges

Recommendations for the consideration of clinical leadership in London

A list of 12 recommendations derived from this evaluation is presented in **table 7** for the consideration of NHSE leadership team. These recommendations were presented to LCEG which was asked to: (i) note the work undertaken to implement BP@home, (ii) comment on the emergent challenges that have impacted its rollout, and (iii) discuss the subsequent recommendations to address the identified challenges.

Table 7: Key recommendations to streamline the delivery of BP@home

#	Key recommendations
1	PCNs & General Practices are inundated with competing priorities and pressures. Other delivery channels need to be explored & supported rapidly (e.g., Pharmacy, Secondary Care & Remote Monitoring hubs)
2	There is an urgent need to develop & use specific system-wide codes to track activity, monitor impact & inform local action
3	Improving alignment across all Remote Monitoring programmes can reduce avoidable duplication at a regional, ICB & local level, reduce "siloing" of interventions, and improve patient experience
4	The challenges with BP@home seem generic to a Remote Monitoring programme. ICB leads & regional team believe better alignment with Remote Monitoring support is necessary to improve delivery
5	Remote Monitoring pathways are complex & need dedicated resourcing at regional & sub-regional level to stand up
6	Emphasis of delivery should be on onboarding to Remote Monitoring & reflect a more personalised approach, not just the provision of devices
7	Outline of requirements needed for a functional Remote Monitoring solution that encompasses the complexity of patients & likely co-morbidities, with an emphasis placed on patient empowerment
8	Remote Monitoring cannot happen effectively without patient involvement & compliance. Holistic support is needed for the patients we are trying to reach in order to raise their activation capacity prior to the intervention
9	Patient engagement & coproduction approach are crucial to engaging all patients in these pathways, but especially to reach those from underserved communities who we are trying to reach with this programme
10	Work with the Behavioural Science team to develop 'nudge' approaches to spread this programme in the NHS & for offering patients Remote Monitoring options
11	To optimise delivery, this programme needs to work in closer partnership with all regional stakeholders (e.g., the Health Inequalities, Cardiac, Stroke, Diabetes & Personalised Care Clinical Networks, regional Primary Care, Weight Management, Remote Monitoring programmes)
12	BP@Home needs to reset within the context of an overarching CVD Prevention Strategy for London

Summary & conclusion

This evaluation showed varying levels of readiness and implementation across the 5 London ICSs. The roll-out of BP@home programme has been challenging due to a number of key factors across the pathway, including the limited IT infrastructure, insufficient human and financial resources, and the lack of adequate and specific SNOMED codes. These challenges were further increased by the competing demands on limited capacity in Primary Care, especially during the Covid-19 pandemic. However, respondents also identified some facilitators, including the onboarding material provided by NHSE, the inclusion of the UCLP criteria the EHR and the provision of conditional incentives in certain ICSs. A more structured and holistic approach to onboarding patients is needed to ensure high quality compliance and satisfactory results for patients. Another key recommendation devised by respondents was to offer BP monitors on prescription, along with the creation of specific SNOMED codes.

Further research and quality improvement initiatives are needed to help streamline how BP@home is delivered in the real-world setting, coupled to research that seeks to investigate patients' experience and perspective as users and beneficiaries of the program.

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