CVDACTION Implementation Evaluation Report

February 2025

CVDACTION

UCLPartners
Health Innovation

Contents

List of abbreviations

ARRS	Additional Roles Reimbursement Scheme
BAU	Business as usual
BP	Blood pressure
CFIR	Consolidated Framework for Implementation Research
CKD	Chronic Kidney Disease
CVD	Cardiovascular disease
GP	General Practitioner
ICB	Integrated Care Board
ICS	Integrated Care System
NHSE	NHS England
NWL	North West London
PCN	Primary Care Network
PHM	Population Health Management
PPIE	Patient and Public Involvement and Engagement
QOF	Quality Outcomes Framework
SQL	Structured Query Language
SWL	South West London
WSIC	Whole Systems Integrated Care

Acknowledgements

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Foreword

It is time to deliver the prevention shift in cardiovascular disease

Cardiovascular Disease (CVD) is a leading cause of premature mortality, health inequalities, emergency admissions, health and social care spend and economic inactivity. CVD is also highly preventable, not just through lifestyle change, but through the treatment of high-risk conditions like blood pressure, cholesterol, diabetes, chronic kidney disease and atrial fibrillation. However, there is longstanding and substantial under-use of NICE recommended treatments in these conditions. For example, a third of people with hypertension are not treated to target and 1 in 6 people with CVD are not on lipid lowering therapy.

It is striking that these numbers have changed little in recent years despite QOF, local incentives and quality improvement schemes. This is because whatever the support, it is hard to manage these conditions well in real world general practice where complexity, multimorbidity and time pressure are the norm and where there is no capacity to do more. More data, education and incentives do not change these realities for primary care clinicians.

And yet, if we could do things differently and enable a step change in use of the high impact treatments, the improvements in population health would be substantial and rapid. UCLPartners' **Size of the Prize** shows that 6,000 heart attacks and strokes would be prevented in England every year by increasing blood pressure optimisation rates from 67% to 80% – not an unreasonable expectation from a patient perspective. Optimising treatment in the other high-risk conditions would have similarly dramatic impact.

But we need to acknowledge that more of the same will not shift the dial, and providing data is not enough – the real world challenge is having capacity, pathways and organisational infrastructure to respond to data. If we want to deliver a step change in CVD prevention, we have to support primary care to do things differently at scale.

CVDACTION – focus on the *HOW-TO* of optimising CVD prevention in primary care

CVDACTION makes data highly actionable in real world general practice by making it easy for clinicians to spot and manage high-risk patients who are on suboptimal treatment, prioritising and stratifying to manageable numbers, incorporating multi-morbidity and targeting health inequalities.

The CVDACTION Demonstrator Programme, generously funded by NHS London, majored on the *how-to* of delivering a step change in CVD prevention in primary care. 10 PCNs, covering a 600,000 population, took part in the programme. Across these sites, three essential pillars were put in place: the CVDACTION smart data tool; support to mobilise the wider workforce to deliver rapid clinical optimisation and structured support for self-management; and operational support to build capacity for local transformation. Funding was also provided for additional clinical capacity and facilitation, but it is likely that in wider roll out this will come from repurposing of existing roles – as workforce is adapted to do things differently and manage patient care more proactively.

The results highlighted in this evaluation report and the accompanying case studies are very encouraging and show that a step change in prevention of heart attacks and strokes is highly feasible. The evidence shows that CVDACTION was welcomed on the ground and that, underpinned by local leadership and central implementation support, it catalysed substantial innovation in use of the wider workforce, pathway adaptation, patient involvement, targeted action on health inequalities, accelerated treatment optimisation and provision of broader proactive care. There was also very useful learning on how CVDACTION can be improved in future versions.

Quantitative data for blood pressure and cholesterol optimisation was available over a 6-month period. Despite the short time frame the data shows emerging evidence of a step change in rates of treatment optimisation with substantial numbers of patients with hypertension having their blood pressure optimised, and substantial numbers of patients with pre-existing CVD starting lipid lowering therapy. There is robust evidence that this improvement alone will prevent large numbers of heart attacks and strokes with significant cost savings in health and social care and benefit to the wider economy. Scaling CVDACTION over a longer time frame and a larger population and extending optimisation to other high impact treatments could be expected to deliver substantial impact on population health and the economy.

The National Mission to reduce deaths from heart attack and stroke by a quarter in ten years will not be achieved without a step change in the management of the high-risk conditions that cause CVD. The challenge is not what to do – that is well established in NICE guidance. The challenge is how to do it in real world primary care. The key learning from the CVDACTION demonstrator programme is that with actionable data tailored to capacity and structured support for implementation, primary care can deliver the step change that we need and that patients deserve.

Dr Matt Kearney OBE
General Practitioner and Senior Clinical Advisor UCLPartners

Executive summary

Cardiovascular Disease (CVD) challenge

Cardiovascular Disease (CVD) remains a leading cause of mortality, morbidity, and health inequality in the UK. Although there has been a decline in CVD mortality over recent decades, this trend has reversed since 2019, particularly affecting deprived communities. CVD is the largest contributor to the gap in life expectancy between the most and least affluent communities. The focus on preventing CVD is critical, both through primary prevention, which addresses lifestyle risk factors, and secondary prevention, which optimises management of high-risk conditions such as hypertension and high cholesterol.

What is CVDACTION?

CVDACTION, developed by UCLPartners, is a care transformation programme aimed at enhancing the CVD prevention pathway in primary care. Recognising the challenges of managing high-risk conditions in busy primary care settings, CVDACTION provides a translational data tool, which brings together clinical and demographic information within an algorithm, to identify patients at high risk of CVD. This tool facilitates directing patients into appropriate pathways for clinical optimisation and / or support for preventive care and self-management. Demonstrator sites receive implementation support to help them adopt the programme, including technical assistance, project management, patient and public involvement and engagement support, and funding to support pathway transformation.

The CVDACTION data tool operates on GP electronic patient record systems, integrating patient data into visual dashboards that enable prioritisation of clinical activity based on CVD risk factors. These dashboards provide actionable insights into managing high-impact conditions, presenting data stratified by demographic factors such as ethnicity and socioeconomic status. This approach aligns with national guidelines and helps address health inequalities by targeting vulnerable populations.

CVDACTION integrates a data tool with new patient pathways delivered by various primary care staff to optimise clinical care and support self-management. A key aim is to maximise the use of the broader primary care workforce and reduce the burden on GPs. The programme also aims to create a systematic, London-wide approach to CVD prevention, with a focus on long-term sustainability by tailoring implementation to local needs and circumstances.

Evaluation approach and key questions

The evaluation of CVDACTION focused on its early implementation across ten Primary Care Networks (PCNs) spanning two Integrated Care Boards (ICBs) in London, covering 600,000 patients.

The evaluation adopted a mixed-methods approach. The quantitative methods involved estimating the impact of CVDACTION on treatment optimisation, achieved via assessment of trends in performance on key indicators compared against a benchmark of 20-most-similar PCNs, and cohort analysis to track movement of patients into optimised states for hypertension and lipids. We also conducted an implementation cost analysis. The qualitative methods included interviews, focus groups, and documentary analysis, with emphasis on generating learning from implementation of CVDACTION at demonstrator sites.

Five key evaluation questions guided the study:

1. Is CVDACTION acceptable, feasible, and appropriate to primary care adopters?
2. Does CVDACTION, together with implementation support, deliver pathway transformation as intended?
3. Does CVDACTION enable targeted work on reducing health inequalities?
4. What investment is required to implement CVDACTION?
5. Does CVDACTION result in increased treatment optimisation rates, such as blood pressure and lipid control?

Findings

1. **Acceptability, feasibility and appropriateness:**
    - **Acceptability:** While there were challenges and suggestions for improvement, CVDACTION was broadly acceptable to participants, who saw value in its ability to support preventive care.
    - **Feasibility:** CVDACTION was successfully implemented across all participating PCNs, who used the dashboard to identify high-risk patients and develop pathways for optimising their care.
    - **Appropriateness:** CVDACTION provided a novel approach to using the primary care workforce to target preventive healthcare towards those most in need, aligning with local and national priorities.
2. **Transformation as intended:** The programme enabled primary care teams to target individuals with the greatest CVD risk, including those facing health inequalities, through novel care pathways and workforce utilisation. A cultural shift was observed in primary care practices, with staff engaging in new ways of delivering preventive care.
3. **Reducing health inequalities:** The CVDACTION dashboard was seen as a powerful tool for addressing health inequalities by allowing users to filter data by key demographic variables. However, further work is needed to ensure equitable access to new pathways and to avoid exacerbating existing inequalities. Additional engagement with patients facing inequalities to inform the design of accessible pathways would be valuable.

4. **Investment required:** Central support costs for the CVDACTION demonstrator programme were estimated but are unlikely to be indicative of costs for further roll out as staff costs (for implementation support) and set up costs may be reduced. Qualitative findings highlight the importance of ongoing investment to develop infrastructure and support implementation. Participating PCNs developed implementation models to suit their local context. The estimated cost per patient entering the pathway ranged from £21.34 to £46.85 depending on the model adopted. Staff costs (for delivery of patient treatment) could potentially be reduced – a significant part of PCN delivery costs was due to hiring additional clinical pharmacists for patient treatment optimisation. In broader implementation, existing primary care clinicians could repurpose their time to see patients based on clinical priority and an increased number of staff in ARRS roles could be deployed to support behaviour change.
5. **Treatment optimisation rates**: There were early signs within some PCNs to suggest that CVDACTION had begun to positively impact rates of optimisation of hypertension and lipids, particularly where PCNs have been actively engaged in reviewing and assessing their data and focussed on specific improvement actions. However, lack of consistency in data completeness and quality precluded full and robust review of the quantitative evidence at this time.

Challenges and implementation context

Several factors influenced the programme's implementation and evaluation:

- **Programme engagement at start up:** Delays in early engagement with senior decision-makers led to a slower start for the programme, with knock-on effects on the timelines for pathway transformation and data collection.
- **Technical challenges:** The complexity of translating the CVDACTION searches into a format suitable for pan-London data systems caused significant delays. Local variations in data infrastructure also affected the programme's implementation across different PCNs.
- **Local variation:** While local tailoring of the programme was intended to foster long-term sustainability, it also introduced variability in the implementation process, particularly around data security and system integration.
- **Nature of a demonstrator programme:** As a demonstrator programme, CVDACTION was not intended to be the final product, and further development is expected based on the insights gained during this phase.

Reflections on the evaluation approach

The evaluation team worked closely with the implementation team, which allowed for timely feedback that helped shape the programme's ongoing implementation. However, the evaluators' close connection to the implementing organisation necessitated careful reflexivity to ensure neutrality and transparency in reporting.

Conclusions

CVDACTION has demonstrated its potential as an acceptable, feasible, and appropriate approach to improving CVD prevention in primary care. Key facilitators of successful implementation included strong support from clinical leaders, alignment with national policies, and dedicated implementation support. The programme's ability to target preventive care at those most in need was particularly valued by participants.

Challenges included early delays in engagement and the need to rebuild the searches to operate in wider London data environments. The evaluation highlighted the need for sustained resourcing and ongoing development of the programme to ensure its long-term success.

The investment required for successful implementation of CVDACTION is likely to be variable depending on requirements in the local context. Dedicated implementation support, cited as a key facilitator of successful implementation, has a significant investment requirement which is expected to reduce for implementations outside of the demonstrator context.

Early assessment of key clinical outcomes were indicative of CVDACTION making a measurable difference to optimisation in priority areas of blood pressure optimisation and initiation of lipid lowering therapy in patients with diagnosed CVD. Considerations and concerns with regard to analysis methods and data quality prevent firmer conclusions being drawn. Further quantitative analysis and a favourable health economic evaluation will be crucial to making the case for wider rollout.

In conclusion, CVDACTION offers a promising approach to addressing the burden of CVD in the UK, but its full potential will only be realised through continued development, investment, and refinement accompanied by ongoing careful and independent evaluation.

1 Background and context

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1.1 Background to the project

The challenge

Cardiovascular Disease (CVD) is a leading cause of mortality, morbidity, and health inequalities across the UK[1]. Despite CVD mortality rates declining steadily in England in recent decades, this trend has stalled and started to reverse since 2019[2]. CVD is the largest contributor to the difference in life expectancy between the least and most deprived communities[3], accounting for a fifth of the life expectancy gap between people living in the most affluent areas compared to those living in the most deprived, demonstrating starkly how the burden of CVD falls unequally across the population.

Preventing CVD is critical to improving outcomes, such as mortality and emergency care usage, and reducing the inequity this causes. Recent health economic analysis has shown that achieving a 20% reduction in incidence of CVD would increase GDP by £2.2 billion in 6 years[4]. A key factor for the longer term particularly is primary prevention, tackling the lifestyle factors that increase risk of CVD such as obesity and smoking.

Also important, with much shorter term impact is secondary prevention; preventing CVD through effective management and optimisation of those people who have conditions that cause CVD, such as hypertension, atrial fibrillation, high cholesterol, chronic kidney disease, diabetes and pre-diabetes. In each of these conditions there is well established evidence that treatment substantially reduces the risk of heart attack and stroke.

Despite this – and the influence of NICE, Care Quality Commission and the Quality and Outcomes Framework – under-use of proven therapies in the high risk conditions remains common with marked variation between GP practices. The evidence is clear that improving optimisation rates would prevent large numbers of cardiovascular events. For example, Size of the Prize shows that if 80% of patients currently diagnosed with hypertension were treated optimally across England, up to 6,975 heart attacks and 10,410 strokes would be prevented over three years[5].

What is CVDACTION?

CVDACTION, developed by UCLPartners, is a care transformation programme, designed to enhance the cardiovascular disease (CVD) prevention pathway in primary care. It has been designed in acknowledgment that managing high risk conditions like hypertension is difficult in primary care consultations where multi-morbidity, complexity and time pressure are the norm. The challenge is not just in the availability of data, but in the ability of hard pressed teams to act on insights generated from the data. CVDACTION has been designed to make data easy to interpret and highly actionable, both in the way the data is presented and in the adaptation of pathways and workforce around that actionable data.

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[1] British Heart Foundation. (2024). *Cardiovascular disease statistics: Statistical compendium*. British Heart Foundation

[2] Office for Health Improvement and Disparities. (2024). *Cardiovascular disease profiles*. GOV.UK

[3] Office for Health Improvement and Disparities. (2024). Segment tool. GOV.UK. https://www.gov.uk/government/publications/segment-tool

[4] Prosperity through health the macroeconomic case for investing in preventative health care in the UK. Tony Blair Institute, London

[5] UCLPartners (2024). Size of the Prize: Hypertension, June 2024 update

CVDACTION comprises: a translational data tool to identify patients at highest risk of CVD; patient pathways that provide both clinical optimisation and broader proactive care to support education, self-management and behaviour change; and dedicated implementation support to put these into practice.

Demonstrator sites implementing CVDACTION receive access to the translational data tool and also wrap around implementation support from an experienced team at UCLPartners, including but not limited to technical support, project management support, facilitation of webinars and communities of practice. This reflects the findings from the Fuller Stocktake[6] report which recommended appropriate infrastructure and implementation support. Additional funding at £130,000 per 100,000 population was made available to support pathway transformation and optimisation of the care of patients with high risk conditions. The rationale for providing additional funding to the demonstrator sites was to pump prime changes in practice and to demonstrate how primary care teams can do things differently in order to deliver population health impact at scale, through enabling additional clinical support and capacity.

To make it easier to measure impact, all demonstrator PCNs were asked to begin with a focus on blood pressure optimisation and lipid lowering therapy in people with CVD, before moving onto other priority groups.

The translational data tool

The translational data tool operates on general practitioner (GP) electronic patient record systems (EMIS and SystmOne), with extracted data visualised through Tableau or PowerBI dashboards hosted on local information systems (for example within the GP practice or at ICB level) as per local preference or available architecture.

These dashboards consolidate the outputs of around 85 searches that cover key CVD prevention indicators related to primary care management, including high blood pressure, high cholesterol, atrial fibrillation, diabetes, pre-diabetes, and chronic kidney disease. These indicators complement CVDPREVENT[7], the national CVD prevention clinical audit, utilising similar business rules and codesets. The dashboards present data on multiple risk factors for individual patients, with the ability to view the data generated broken down by a number of demographic and socioeconomic variables including ethnicity, deprivation, serious mental illness and learning disability. This functionality helps to illustrate gaps, inequalities and opportunities for improvement in the management of high impact conditions that cause CVD. The CVDACTION dashboards also show where the indicators support achievement of QOF and DES (Direct Enhanced Service) or IIF (Investment & Impact Fund) indicators.

The dashboard outputs were designed to be uncomplicated, stratifying patients to make prioritisation of clinical activity easy, for example by focusing early on blood pressure and cholesterol optimisation in patients who have both hypertension and CVD, and producing actionable lists of patients and manageable chunks of work. An example screenshot from the tool is shown in **Figure 1**, with a link to a **demonstration video** for readers to familiarise themselves with the dashboard available in the caption.

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[6] Fuller, C (2022) Next steps for integrating primary care: Fuller Stocktake report, NHS England

[7] CVDPREVENT, available at: https://www.cvdprevent.nhs.uk/. Accessed 12.01.25

***Figure 1:** Example screenshot from the CVDACTION dashboard.*

Organisation:
Demo Practice Name
CVDACTION → **Hypertension**
Latest Date of Data: **May 18, 2023**

Pathway transformation

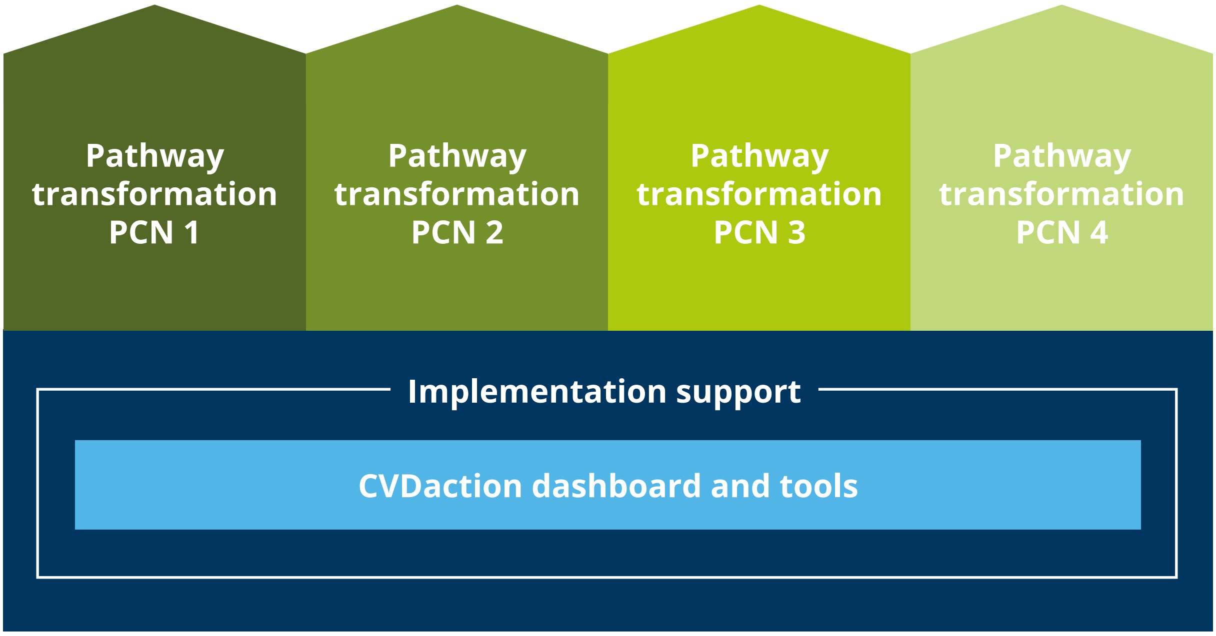
The integration of the CVDACTION translational data tool with novel patient pathways, delivered by a range of staff within the primary care workforce to optimise patients clinically and support self-management and positive behaviour change, is what drives the step change that the CVDACTION programme as a whole has been designed to realise. This is accompanied by an underlying principle of CVDACTION to maximise the utilisation of the wider workforce, making as much use as possible of the Additional Roles Reimbursement Scheme (ARRS) and other primary care roles from pharmacists to care coordinators, and avoiding adding to the workload of GPs. Implementation support tailored to local requirements was expected to enable teams in localities participating in the CVDACTION programme to use the CVDACTION translational data tool to inform the redesign and transformation of pathways, thus optimising the management of high-risk conditions and facilitating proactive patient care.

This integration of a translational data tool with pathway change aims to convert actionable data into practical, locally defined, interventions; supporting the delivery of local CVD prevention goals and the national mission to reduce deaths from heart attack and stroke by 25% in ten years. In addition, NHS London Region's ambitions for an effective single, systematic approach to CVD prevention across Greater London is supported by the core principles of CVDACTION's approach to 'joined up' data, integrated into pathway redesign and implementation activities.

Whilst the CVDACTION translational data tool is essentially the same for all participating localities, how that data is integrated and utilised in the design and implementation of transformed CVD prevention pathways is locally defined. This is to ensure that any change is in keeping with the specific needs, culture and circumstances of both patients and staff in the participating locality, and to help guarantee longer term sustainability and transfer to 'business as usual'.

Figure 2 below illustrates how the relationship between the CVDACTION translational data tool coupled with wrap around implementation support provided by UCLP, acts as a foundation for local pathway transformation.

***Figure 2:** Schematic of the CVDACTION programme as foundation for local pathway transformation.*



CVDACTION was initially rolled out and tested through a demonstrator phase funded in 10 PCNs in London. This report outlines the background, methods and findings from the evaluation of that demonstrator phase and makes recommendations for future implementation and scale up.

1.2 Context of the CVDACTION demonstrator programme

This evaluation report summarises the findings from a mixed methods study in relation to a set of key evaluation questions set to understand how the CVDACTION programme was implemented and what factors influenced successful implementation, and the acceptability of its adoption across ten Primary Care Networks (PCNs) in North West and South West London. CVD prevention is a regional priority in London; the regional leadership also saw the potential to integrate CVDACTION into the emerging pan-London data infrastructure which would enable regional analytics and a consistent approach to CVD prevention in London.

In order to review these findings most effectively, it is important to understand the context in which the CVDACTION programme was delivered, and the implications this has both for the programme and its evaluation.

Four key contextual elements are particularly important to reflect upon and consider when assessing findings against the key evaluation questions:

1. Programme engagement at start up
2. Technical approaches
3. Local variation
4. Nature of a demonstrator programme

Most of these contextual elements gave rise to time delays to the programme. Delay at this early stage meant that many participating PCNs were implementing CVDACTION late in the year, subject to additional pressure and with a foreshortening of timelines this meant that the expected and desired amount of CVDACTION activity was not realised. This also translated into far less quantitative evaluative data being generated than expected, a factor that is discussed further below.

Programme engagement at start up

The original intention was to engage with ten participant PCNs as 'demonstrators' across all five of London's Integrated Care Systems (ICSs), for a period of 12 months from May 2023 to May 2024. The timing of this initial engagement was critical; beginning start up shortly after the end of the financial year maximises the ability for GP practices to engage with the programme. This timing would mean completing start up activities before the inevitable pressures of winter and 'flu season over the September – February period, as well as providing ample time for pathway change and any impact to be realised before the pressures of QOF in the final quarter of the financial year.

In the event, there were considerable issues with early engagement with the CVDACTION programme at senior regional level, in part due to the ambition to use CVDACTION as an opportune use case for emerging pan-London data linkage programmes (see **Technical approaches**), which impacted significantly on the ability of the CVDACTION programme team to effectively 'start up' the initial work required to recruit participant PCNs. The NHS can often be a very political landscape to navigate and careful negotiation and relationship management can be required, particularly in areas that may perceive CVDACTION as a 'threat' to existing local programmes of work. The initial approach was led by a regional representative who engaged directly with senior business intelligence and strategic leads at each of London's five ICBs with limited involvement from the UCLPartners implementation team. Senior buy in at the ICB was made a requirement prior to engagement with PCNs who would be implementing the programme on the ground.

This particular challenge was mitigated by a highly personalised approach to kick off and set up with each PCN, repeated information sessions with each demonstrator site as required to ensure all participants were adequately briefed, and an agile approach in response to the support needs of each PCN. In addition, it was found that engagement at multiple levels was most effective in gaining the required traction for the programme in this early phase.

Technical approaches

NHSE London saw the opportunity to integrate the searches underpinning the CVDACTION data tool into its pan-London linked data work under the banner of the London Secure Data Environment, which would provide a uniform approach across London to search and stratification for CVD prevention, but also offered a potential future opportunity for London wide analytics.

Whilst CVDACTION was built to run directly on primary care systems (EMIS and SystmOne), a pan London approach with integration into London population health management systems required the CVDACTION searches to be reproduced in Structured Query Language (SQL) so that they could be applied to the wider London data sets, the idea being that all ICBs could run the SQL on their Population Health Management (PHM) systems and enable PCNs to access their own CVDACTION dashboard. NHSE London therefore funded the translation of all the CVDACTION query scripts (searches) into SQL for this purpose. This exercise took time, and with more than 85 searches required significant build and then testing time to ensure the original searches were applied as intended. In all, the delay amounted to several months.

Intelligence Solutions for London (ISL) were funded to undertake the SQL build and worked with North West London (NWL) as the first ICB to come on board with CVDACTION to apply and test the SQL. None of the teams involved in this work could have anticipated how long this process was going to take. This led to delays in CVDACTION being made available to London ICBs. It later emerged that ICBs had different approaches to PHM data with differing levels of maturity, with the result that not all were able to smoothly apply the SQL nor make data available in a patient identifiable way for PCNs without significant investment in time and resource.

NWL was able to incorporate CVDACTION into their Whole Systems Integrated Care (WSIC) integrated dataset and have practices/ PCNs log into WSIC to access their dashboard. Ability to utilise this approach was heavily dependent on the familiarity and confidence of the PCN staff in accessing WSIC.

South West London were able to apply the searches to their data platform but did not have a re-identification tool in place to be able to easily offer patient identifiable data to the primary care teams actually delivering care. Therefore, each PCN/ Federation ran the searches directly onto their primary care systems with varying impact in terms of time and expertise required (e.g. for Sutton Federation this was more straightforward as they had access to an instance of EMIS Enterprise covering all participating GP Practices; for Battersea Federation, the process was more intensive as they had to run and export the searches at each GP Practice and populate the dashboard).

Local variation

Local adaptation of the pathway transformation element is a key characteristic of CVDACTION and has been theorised to be a key facet for success and sustainability. However, this does give rise, naturally, to local variation in factors that influence implementation and, ultimately, programme outcomes, factors that are not always within the control of the programme team. In a complex innovation like CVDACTION, the multiplicity of mechanisms that influence implementation should be taken into account when considering evaluation findings.

The implementation of the CVDACTION translational data tool required local data infrastructure and expertise to support (see above); these factors varied considerably across different participating PCNs. The usual key factors that often challenge any kind of technical implementation such as system integration, data quality inconsistencies and effective and proportionate data security were all evident, but often in a number of different ‘flavours’. Of course, the CVDACTION programme as a whole is not just a technical implementation; the variation between participating PCNs in terms of the different workforce available, the nature of the pathways they wished to design and the cultural challenges inherent in changing ways of working (e.g. moving towards risk stratification informed prioritisation from an annual call/recall approach based on patient date of birth).

Some of this local variation is absolutely warranted and indeed desirable in terms of supporting longer term sustainability, and fostering a sense of local ownership. However, where variation was perhaps less desirable, for example differing approaches to information governance requirements, the CVDACTION context is made that much more complex.

Nature of a demonstrator programme

This iteration of the CVDACTION programme was meant as a demonstrator phase, serving as a pilot to test and refine the innovation and intervention in a controlled setting before any wider implementation. As such, the innovations implemented as part of the CVDACTION programme at this stage were not expected to be the 'final product', particularly in relation to the look, feel and functionality of the CVDACTION dashboard. It was expected that further development of the programme and its constituent parts would be needed beyond the demonstrator phase evaluated here. Indeed, it is anticipated that the evaluation will provide critical insight into *how and what* developments could and should be made.

1.3 Methodological concerns with early quantitative findings

The evaluation design for CVDACTION is a mixed methods approach, with a primary focus on the implementation evaluation, exploring the barriers and enablers to addressing the challenges of doing things differently in primary care in order to transform CVD prevention. We have included quantitative findings in addition to the in depth qualitative analysis of the implementation of CVDACTION but with reservations in relation to methods and data quality.

Methodological concerns and data quality

During the early data collection process, we identified several inconsistencies in practice coding and search implementation that could compromise the validity of quantitative findings, for example, patients being erroneously included in specific cohorts. Whilst such inconsistencies and errors have been subsequently identified and corrected, they impacted disproportionately on a data set that in the case of many demonstrator sites was, and is still, far from well established.

The time frame of the early data collected was primarily submitted over a period of time where the impact of QOF data submission has a well known impact on practice activity. Delays with implementation at some demonstrator sites impacting on data submission, coupled with the 'QOF effect'[8] gives rise to the kinds of validity issues that may be expected at an early stage in any programme but impacts the ability to undertake meaningful analysis at a programme level. In addition, the time series analysis approach requires high quality data over a longer period of time than is currently available across all demonstrator sites in order to establish the statistical power required to reach valid conclusions.

Before including quantitative findings, we sought to address these issues through rigorous data cleaning and validation processes, and allowing demonstrator sites more time to collate and submit data to the evaluation team. By addressing methodological concerns, improving data quality and seeking new approaches to analysis the groundwork for the early quantitative analyses included in this report was laid, ensuring that our quantitative analyses is a valuable complement to the rich qualitative insights we have gathered, but acknowledge that it will not reflect a full picture of progress across all demonstrator sites.

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[8] QOF effect: for many indicators, practice achievement peaks each year in March and then declines in subsequent months before improving again. The UCLPartners 'Size of the Prize' resources for hypertension demonstrate this in 2024/25.

2 Evaluation approach and evaluation questions

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2.1 Evaluation approach

The evaluation team comprised members of staff with specialist mixed methods evaluation expertise who work for UCLPartners. It is important to make clear that different staff members from UCLPartners developed CVDACTION and facilitated its implementation during the pilot period. Colleagues who carried out the evaluation had no role in the development or implementation of CVDACTION and vice versa. This approach, and indeed any evaluation approach, brings both strengths and limitations. Key benefits included the ability to feedback evaluation findings quickly and transparently to the implementation team, facilitating opportunities for the evaluation findings to drive improvements to implementation in near-time. Additionally, regular contact with the implementation team enabled the evaluation team to gain an in depth understanding of barriers and facilitators to implementation. Finally, the implementation team facilitated introductions between the evaluation team and participating sites, improving participation in evaluation activities. Careful reflexivity was required to ensure both the quantitative and qualitative datasets were analysed and reported with transparency and minimal risk of bias.

2.2 Key evaluation questions

Five key evaluation questions were developed:

1. Is implementation of CVDACTION acceptable, feasible and appropriate to primary care adopters?
2. Does the CVDACTION smart data tool, together with systematic implementation support, deliver pathway transformation as intended through, for example, use of wider primary care workforce?
3. Does CVDACTION enable targeted work on reducing health inequalities, for example by providing actionable data for the identification and focus on specific groups or communities impacted by health inequity?
4. What investment is required to implement CVDACTION?
5. Does use of CVDACTION result in increased treatment optimisation rates, including BP and lipids, and potentially other selected indicators, and to what extent does any improvement differ from what would otherwise be expected?

3 Quantitative methods

3 Quantitative methods

3.1 Estimated impact on treatment optimisation

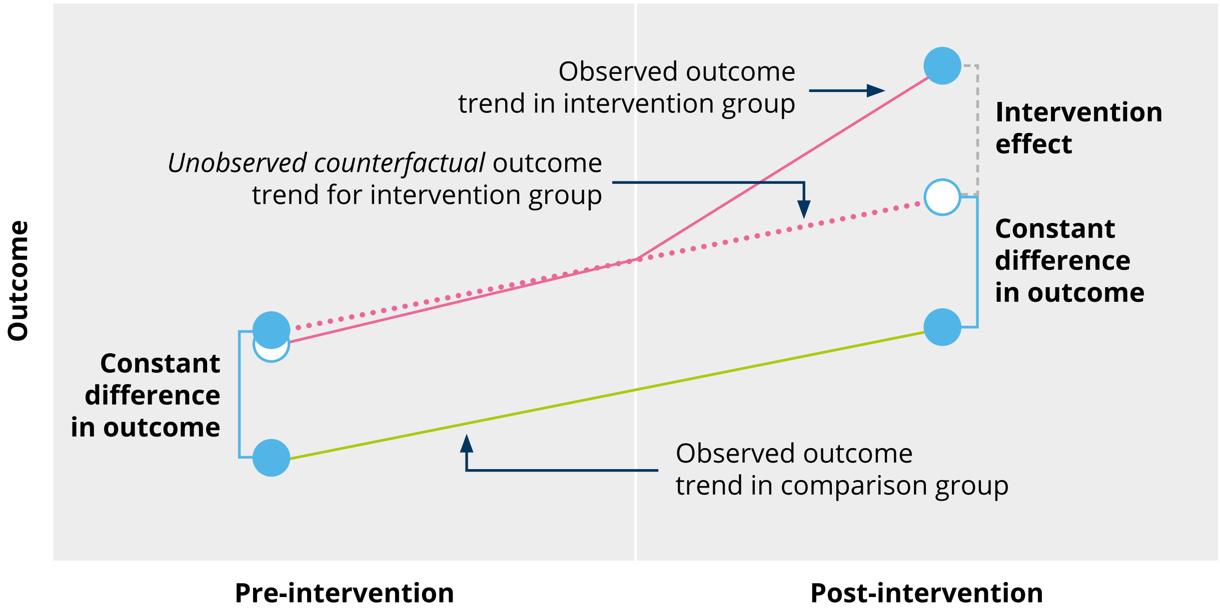
The degree of improvement in treatment optimisation measures which can be attributed to CVDACTION was assessed through the use of a matched control group of PCNs using a 'difference in difference' (DiD) design. The DiD approach is a quasi-experimental statistical technique used to estimate causal relationships in observational studies. This method is particularly useful for evaluating the impact of an intervention when random assignment is not feasible. The DiD approach compares the changes in outcomes over time between the intervention group (which experiences the intervention) and a control group (which does not).

In the DiD approach applied to CVDACTION, outcomes for both participating PCNs and control PCNs are measured before and after the implementation of CVDACTION. This helps in understanding the baseline (pre-intervention) and the effect (post-intervention) for both groups.

The differences in outcomes for both the intervention and control group before and after the intervention are then calculated, and the difference *between* these two differences taken. This essentially subtracts the change in the control group from the change in the treatment group, as shown in Figure 3 below.

The DiD approach isolates the effect of the intervention by controlling for time trends and other factors that might affect both groups similarly over time. This is important in the context of CVDACTION as there are other ongoing programmes (e.g. the Innovation for Healthcare Inequalities Programme (InHIP) and the national CVD prevention programme) that are likely to be being implemented in comparator PCNs which should be taken into account.

***Figure 3:** Explanatory graphic for difference in difference approach.*



The more closely the control group of PCNs can 'match' those where CVDACTION is being implemented, the more robust conclusions from such a design will be. This helps to support the 'parallel trend assumption' inherent in DiD designs, which states that if no intervention had occurred, the difference between the intervention and control PCNs would have stayed the same in the in the post-intervention period as it was in the pre-intervention period, all things being equal. PCNs are matched on range of demographic variables, outlined in Table 1.

***Table 1:** Demographic variables used for matching PCNs using a Euclidean Distance Matrix.*

Variable	Weighting	Data source
The average Index of Multiple Deprivation score in the LSOAs that constitute the PCN	25%	Indices of Multiple Deprivation
Total population registered with PCNs	15%	
% of population age 18 to 39	10%	
% of population age 65 to 84	10%	
% of population age 85+	10%	
% of population who live in areas defined by the ONS Rural Urban Classification as "Rural town and fringe in a sparse setting", "Rural village and dispersed" or "Rural village and dispersed in a sparse setting"	15%	
% of people who said they are of White (non-British) ethnic origin	3%	GP Patient Survey
% of people who said they are of Mixed ethnic origin	3%	GP Patient Survey
% of people who said they are of Asian ethnic origin	3%	GP Patient Survey
% of people who said they are of Black ethnic origin	3%	GP Patient Survey
% of people who said they are of Arab or Other ethnic origin	3%	GP Patient Survey

The approach to matching is as follows:

- PCN level data is calculated for the variables listed in Table 1. Each variable is validated and standardised by:
    - Capping each variable value at 5 standard deviations either side of the mean – to avoid outlier effects.
    - Taking the square root of all values – to reduce skew
    - Subtract mean and divide by the standard deviation (of square-rooted values)
- A calculation of similarity (Euclidean distance) is completed using the standardised variables for every pair of PCNs, applying the weights associated with each variable.
- This produces a distance matrix, ranking the similarity distance between each PCN. The similar PCNs are those with the lowest value in this matrix.
- The closest 20 to each PCN are chosen as the suggested set of peers for comparison

The application of the DiD approach is undertaken on three measures of treatment optimisation that reflect the clinical focus areas of the majority of participating PCNs. As CVDACTION metrics are not available for PCNs that are *not* participating in the intervention, measures from the national CVDPREVENT audit are utilised. This ensures that the same definitions for the metrics have been applied in both intervention and control PCNs and whilst not an exact like-for-like match with the definitions for CVDACTION, CVDPREVENT metrics align closely enough to be adequately indicative of any change.

The optimisation measures reviewed are:

- **Cholesterol treatment initiation:** Percentage of patients aged 18 and over, with GP recorded CVD, who have been prescribed lipid lowering therapy in the last 6 months
- **Hypertension treatment optimisation:** Percentage of patients aged 18 and over, with GP recorded hypertension, in whom the last blood pressure reading (measured in the preceding 12 months) is below the age appropriate treatment threshold
- **Chronic kidney disease management:** Percentage of patients aged 18 and over with GP recorded Chronic Kidney Disease (CKD) (G3a to G5) with an Albumin Creatinine Ratio (ACR) of less that 70mg/mmol in whom the last blood pressure reading (measured in the last 12 months) is less than 140/90 mmHg.

Data from CVDPREVENT was examined for the period from December 2022 to the latest available at time of analysis, June 2024. This provided a minimum of a year’s baseline period before the implementation of CVDACTION for all demonstrator sites.

Data management and analysis was undertaken in R v.4.3.1 and visualised using Tableau.

3.2 Time series analysis

Change in trends over time for individual PCNs is assessed using regular data extracts across all CVDACTION indicators sent to the central CVDACTION implementation team by participating PCNs. These extracts are generally supplied on a monthly basis from point of implementation to December 2024, and provide the number of patients that meet the criteria of each indicator (e.g. the number of patients in a PCN who have diagnosed CVD but are not recorded as being on a lipid lowering therapy).

Given the differing timescales on which individual participating PCNs implemented CVDACTION, there is not a single baseline period that can cover the whole pilot project in aggregate. Therefore, analysis of change over time is undertake on a PCN by PCN basis and findings from each triangulated into an overarching picture of change over time.

Where there is a critical mass of data points, more than ten, statistical process control (SPC) methods are used to assess any change in trend for statistical significance. SPC methods utilise control charts, which plot data over time to detect variations and trends, distinguishing between common cause variation (inherent to the process) and special cause variation (indicative of specific changes or issues). By identifying these variations it is possible to evaluate where change is occurring and quantify its extent and significance.

However, it was not possible to collect the required critical mass of data points for the majority of participating PCNs. Where this is the case we undertake analysis using the following techniques to build a picture of emerging trends and comment on likely impact, without statistical confirmation:

- **Run charts:** Simple plots of data points over time to identify trends, shifts, or cycles in the data available
- **Moving averages:** Smoothing the data using moving averages to identify any underlying trends by averaging out short-term fluctuations.
- **Exponential smoothing:** This approach gives more weight to more recent observations, making it useful for identifying trends in smaller datasets

Analysis was undertaken on the actual numbers of patients recorded for each indicator, with a focus on specific areas of interest that the participating PCNs had been working on, primarily in hypertension, lipid management and chronic kidney disease.

The time periods for the data collected and examined for this evaluation varied by participating PCN, dependent on when CVDACTION implementation occurred, but most were able to report data between February 2024 and December 2024 on at least a quarterly basis.

Data management and analysis was undertaken in R v.4.3.1[9] and visualised using Tableau.

3.3 Modelled impact

The likely long-term impact of improved optimisation of conditions that are high risk for CVD can be modelled in terms of the prevention of heart attacks and strokes, the most common acute cardiovascular events. The link between high-risk conditions and cardiovascular events is well documented (see **Background**).

Results derived from participating PCNs were used to forecast the likely impact at six months, assuming a linear trend, and were calculated for the following indicators:

- Total population with BP not treated to target
- CVD not on lipid lowering therapy

Established numbers needed to treat (NNT) calculations were used with the forecast impacts, expressed in terms of numbers of patients, to estimate the number of cardiovascular events that would likely be avoided in the next five years as a result of the improvements made through CVDACTION:

- For hypertension; anti-hypertensive medicines for five years to prevent death, heart attack and stroke. NNT for incidence of heart attack (fatal or otherwise) = 100, NNT for incidence of stroke (fatal or otherwise) = 67[10]
- For lipid management; in patients with known CVD, lipid lowering medicines for five years to prevent cardiovascular events and death. NNT for cardiovascular events = 1 in 10[11]

The modelled impact analysis is for illustrative purposes only.

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[9] R scripts utilized in the cleaning and management of CVDACTION data are available on request

[10] NNT.com

[11] Collins et al. (2016) Interpretation of the evidence for the efficacy and safety of statin therapy, *The Lancet*, 19, 2532-2561

3.4 Implementation cost analysis

The implementation cost analysis considers the costs and resource consequences resulting from the implementation of CVDACTION. This often goes alongside considering relevant clinical benefits. Here, the analyses include calculating and presenting estimates of resource use and of clinical benefits as separate domains.

Data collected from participating PCNs, the central implementation team and technical teams provided the data required to create a detailed list of components needed to deliver the CVDACTION intervention, and estimates of activity volume to be applied for an holistic view of the implementation cost for CVDACTION.

Data to inform the costing of these components was derived from the Personal Social Services Research Unit (PSSRU) unit cost manual 2023 (adjusted for inflation). This latter cost source is a well validated source for up-to-date, comprehensive annual cost estimates for the delivery of health and social care services. The research and costing work for the manual is undertaken by the Personal Social Services Research Unit (PSSRU) at the University of Kent and the Centre for Health Economics (CHE) at the University of York. This allowed quantification of costs for all elements of the CVDACTION intervention, including staffing, non-pay and overheads.

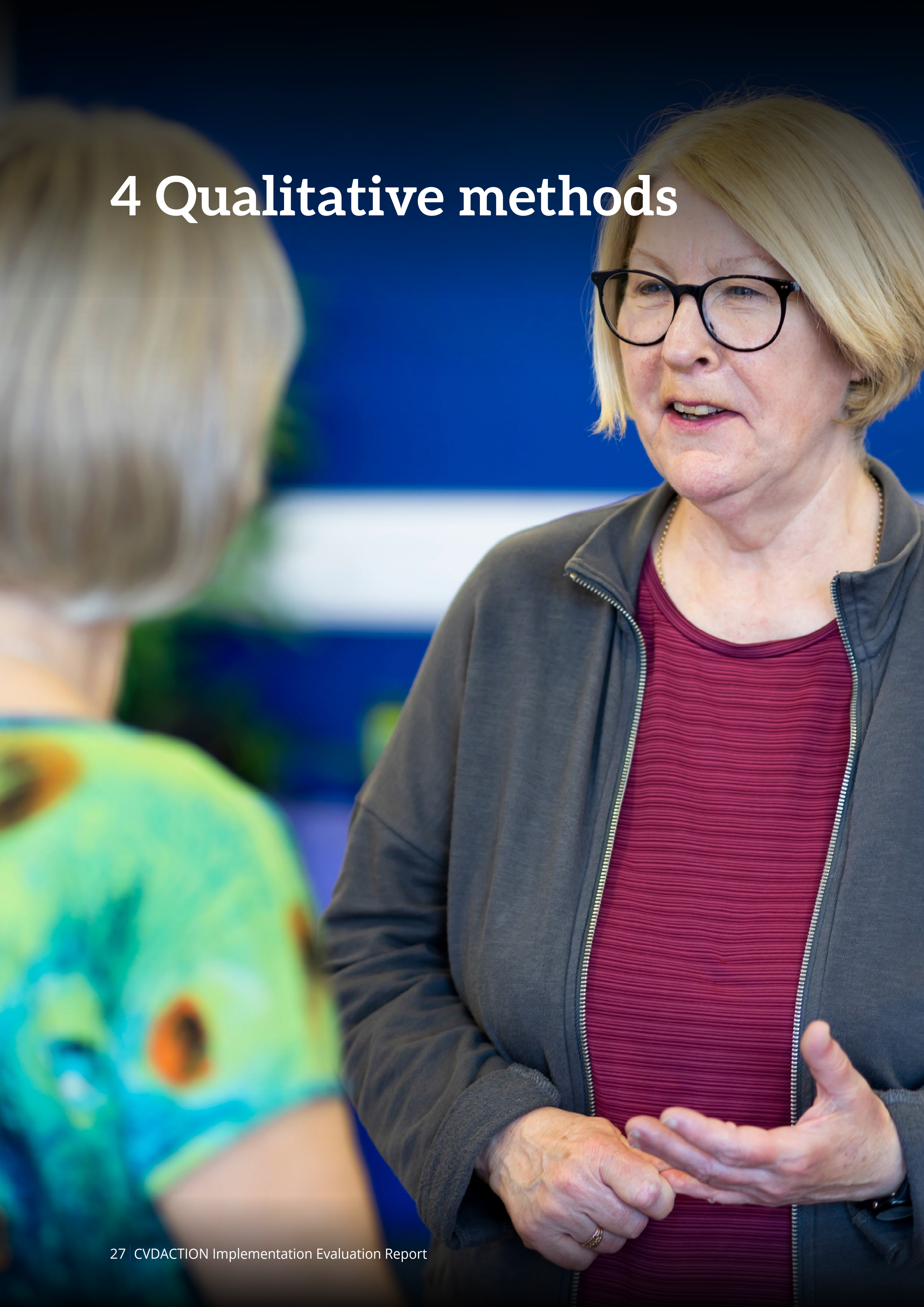
Implementation costs were estimated from two perspectives:

1. Participating PCN perspective
2. Implementation support perspective

It is also important to note that a significant element of the funding to CVDACTION demonstrator sites was provided as a pump prime to determine if step change improvement in treatment could be delivered with the appropriate clinical resources in place. It is not anticipated that the same level of investment, particularly for clinical resources, would be required with wider roll out. The work of clinical optimisation will not be additional to existing work but instead of, with existing clinical staff seeing the same patients, increasing capacity by working more proactively.

The cost analysis does not include any additional costs that may be associated with a roll out of CVDACTION, for example any centralised comms work or the recruitment of an independent evaluator.

4 Qualitative methods



4 Qualitative methods

4.1 Interviews with programme leads

Semi-structured one-to-one interviews were carried out with individuals who had been instrumental to the implementation of CVDACTION and / or who had relevant strategic oversight of the programme. The interviews explored perceptions and experiences of early implementation. The Consolidated Framework for Implementation Research (CFIR) interview guide tool[12] was used to develop a topic guide, with additional lines of enquiry relevant to our evaluation questions added and adaptations made to suit the timing of the interview and the role of the participant in CVDACTION (see supplementary materials). The CFIR was selected to support the qualitative evaluation as it is a practical, evidence-based framework to help guide systematic assessment of potential barriers and facilitators when evaluating implementation. All interviews were conducted online using Microsoft Teams with verbal consent given by participants to record the interview to facilitate production of written transcripts.

4.2 Focus groups

Members of staff from Primary Care Networks who participated in the pilot were invited to take part in online focus groups to explore experiences and perceptions of the CVDACTION dashboard and its implementation. The focus group questions were grounded in understanding the acceptability, feasibility and fidelity of CVDACTION. Questions were also asked around development of pathways and use of the wider workforce, implementation barriers and facilitators, and health inequalities and treatment inequity (see supplementary materials). The focus group discussion was designed to be relevant to multidisciplinary teams comprising clinicians, project managers and individuals with technical expertise. Focus groups took place on Microsoft Teams. Participants were informed in advance that focus groups would be recorded to facilitate production of a written transcript and were reminded of this at the start of the call.

4.3 Documentary analysis

Notes from discussions with pilot sites taken by members of the CVDACTION implementation team were utilised as qualitative data sources. Reports on patient and public involvement and engagement activities were also included. Additionally, members of the evaluation team kept diaries with a particular focus on documenting instances where evaluation findings were used to shape ongoing implementation.

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[12] CFIR Booklet (cfirguide.org)

4.4 Method of qualitative analysis

Analysis of qualitative data was facilitated by use of the data management software QSR NVivo 1.7.1. The updated Consolidated Framework for Implementation Research (CFIR)[13] informed initial coding and theme development. This framework provides a comprehensive list of domains to enable a systematic assessment of evidence-based barriers and facilitators that impact implementation. In line with the instructions for use, we added novel data-driven codes to capture salient themes not included in the updated CFIR and replaced some of the construct language with project specific language as needed. After initial line-by-line coding of a subset of data, theme and sub-theme development was undertaken. In the interests of time, the bulk of the data was then coded against these themes within Microsoft Word with additional novel sub-themes added as needed. Coding and theme development was undertaken by one evaluator with checking by three further members of the evaluation team to ensure reliability.

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[13] Damschroder, L.J., Reardon, C.M., Widerquist, M.A.O. et al. The updated Consolidated Framework for Implementation Research based on user feedback. *Implementation* Sci 17, 75 (2022). https://doi.org/10.1186/s13012-022-01245-0

5 Quantitative findings

5 Quantitative findings

5.1 Estimated impact on treatment optimisation

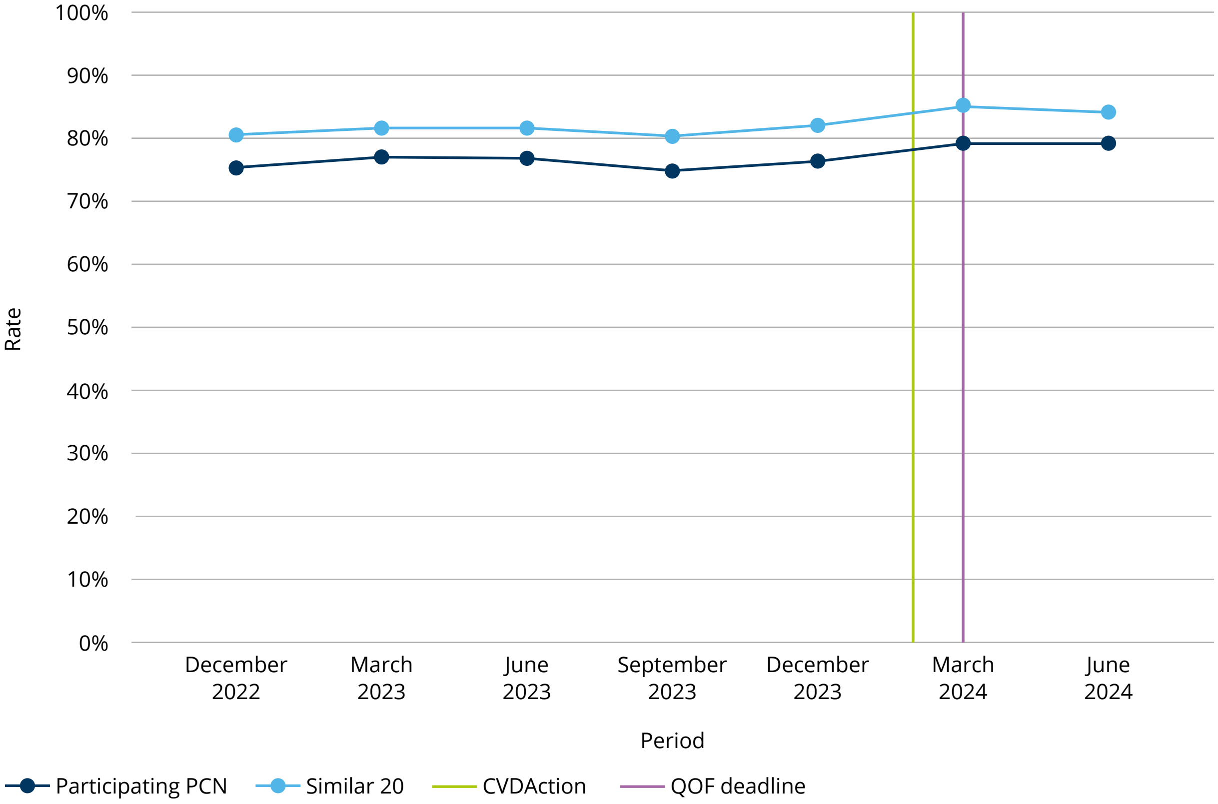
The assessment of the trend in performance on key CVDPREVENT indicators against a benchmark of 20-most-similar PCNs provided useful insight into the potential impact of CVDACTION. The data available for CVDPREVENT was, at the time of analysis, up to June 2024, so only provided, at best, 6 months of data post implementation CVDACTION. Indeed, for most PCNs it was significantly less than this. In addition, the early period of implementation of CVDACTION for participating PCNs coincided with the end of the QOF year. There is a known phenomenon in the final months of the QOF year, during which practice data for this quality framework is submitted, where performance is often notably higher than in other months of the year. This reflects the desire of practices to ensure all eligible patients have been reviewed and included in the QOF data collection. In addition, even where cohort analysis (see **section 5.3**) shows significant increase in treatment optimisation rates this is not reflected in the whole population view. This may be largely due to churn in practice population which in London ranges between 10 and 30+%

Given the relatively short time period, and the confounding effect of the QOF submission period, it would not be expected to see significant change, but there are clear early signs of PCNs which have participated in CVDACTION demonstrating change in key indicators which are different compared to the 20-most-similar benchmark. Results for participating PCNs across each of the indicators are reviewed in turn:

CVDP009CHOL: **Patients with GP recorded CVD (narrow definition), who are currently treated with lipid lowering therapy.**

The majority of participating PCNs do not show any significant difference in the CVDP009CHOL indicator compared to the trends evident in the 20-most-similar comparator group. West Wandsworth is a good example where the trend for the PCN tracks the trend for the comparator group very closely; note that the absolute performance of the participating PCN is not the key factor, rather whether or not the trend changes compared to the comparator group after the implementation of CVDACTION, indicated by the green vertical line. **Figure 4** shows the whole timeseries for West Wandsworth and is broadly representative of the majority of the results for the majority of PCNs. In this example, the difference-in-differences (DiD) between the participating PCN and the 20-most-similar comparator group is 1%; in other words, if West Wandsworth PCN had followed exactly the same trend as the 20-most-similar comparator group the June 2024 value for this indicator would be 78%, just 1% lower than what was actually observed.

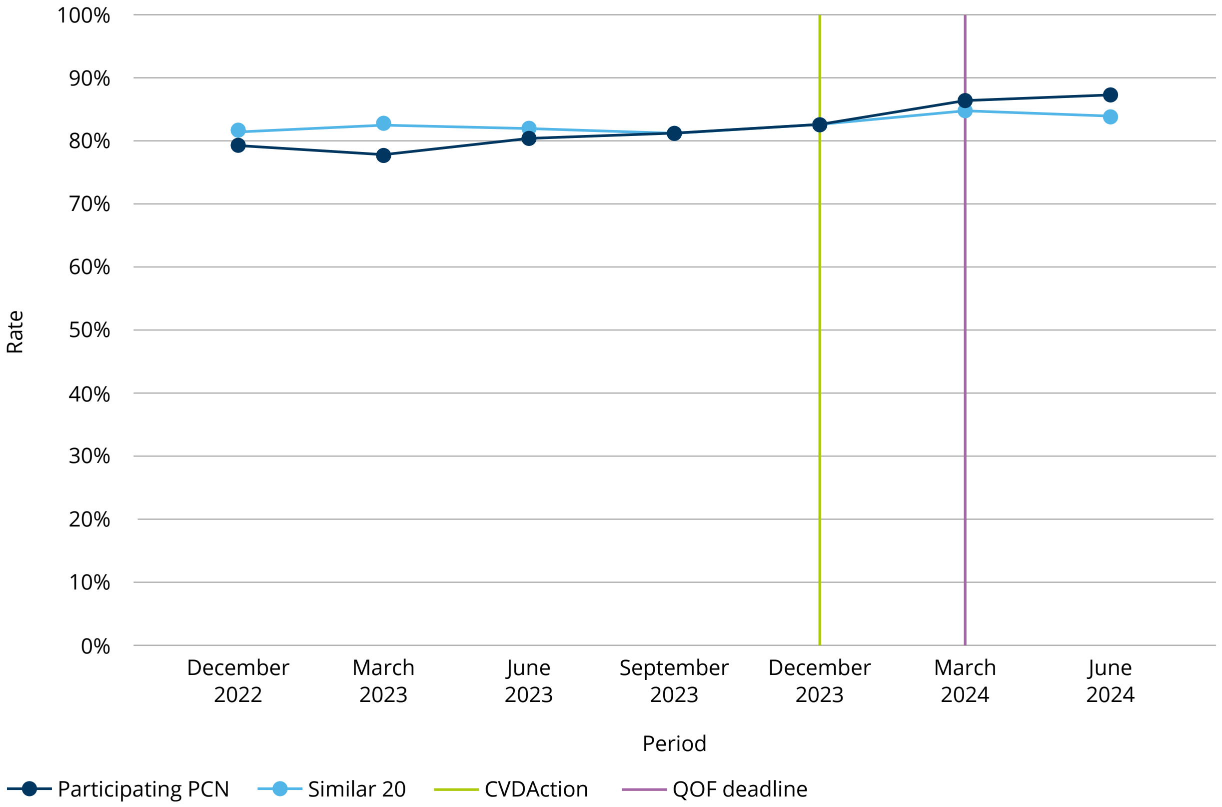
***Figure 4:** CVDP009CHOL: Patients with GP recorded CVD (narrow definition), who are currently treated with lipid lowering therapy results for West Wandsworth PCN compared to 20 most similar PCNs; CVDACTION implementation and QOF deadline dates shown.*



Source: CVDPREVENT, June 2024

However, green shoots are evident. In K&W Healthcare PCN there is a clear indication of a positive divergence in the result for the participating PCN compared to the 20-most-similar PCNs. This is shown in **Figure 5**, where the divergence in trend post CVDACTION implementation, indicated by the green vertical line, between the participating PCN and the 20-most-similar comparator is very evident. The difference-in-differences (DiD) value is 3.5%, meaning that if K&W Healthcare PCN had followed the same trend as the 20-most-similar comparator group, the estimated value for this indicator at June 2024 would have been 84.1%, as opposed to the actual value observed, 87.6%. It is worth noting that K&W Healthcare PCN had implemented CVDACTION earlier than other PCNs and as such had a longer time period to establish the approach as business as usual.

***Figure 5:** CVDP009CHOL: patients with GP recorded CVD (narrow definition), who are currently treated with lipid lowering therapy results for K&W Healthcare PCN compared to 20 most similar PCNs; CVDACTION implementation and QOF deadline dates shown.*



Source: CVDPREVENT, June 2024

A sub-group analysis by ethnicity also suggests that in some areas progress has been more pronounced for non-White ethnicities, potentially reflecting the focus that CVDACTION has been able to bring on underserved communities[14]. The Battersea group of PCNs is a good example of this (see **Figure 6**); the overall trend for CVDP009CHOL, and that for White ethnic groups only, mirror those same trends in the 20-most-similar comparator (DiD = 0.9%). However, this is not the case for non-White ethnic groups, which shows a small but ongoing improvement post CVDACTION implementation which is not evident in the White-only sub-group (DiD = 1.2%). Whilst the difference is small, it provides at least an indication that focussed work can drive improvement.

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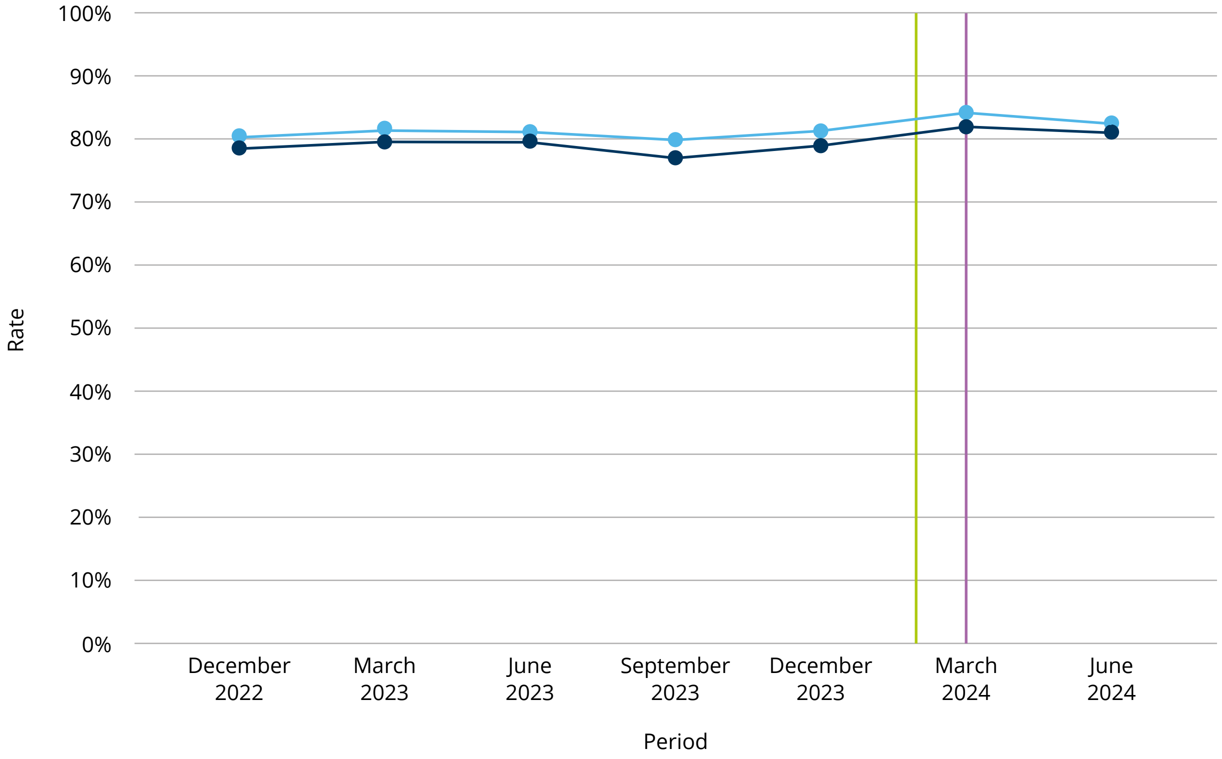
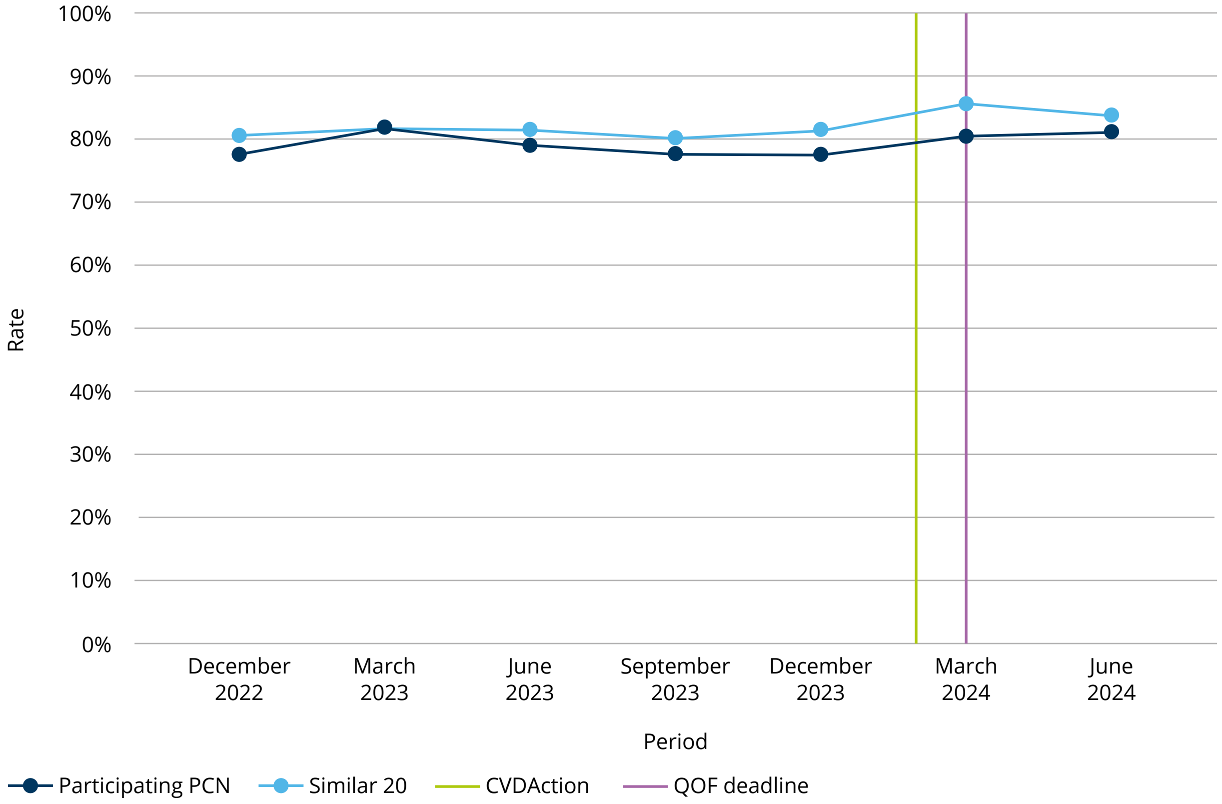
[14] Note that a detailed ethnic breakdown is not possible with the data available due to small numbers and the importance of data protection; therefore all non-White ethnicities have been grouped into one, acknowledging that this does not represent the rich diversity of ethnicities within participating PCNs.

***Figure 6:** CVDP009CHOL: Patients with GP recorded CVD (narrow definition), who are currently treated with lipid lowering therapy results for Battersea group of PCNs compared to 20 most similar PCNs, split by White ethnicities and non-White ethnicities; CVDACTION implementation and QOF deadline dates shown.*

White ethnicities



Non-White ethnicities



Source: CVDPREVENT, June 2024

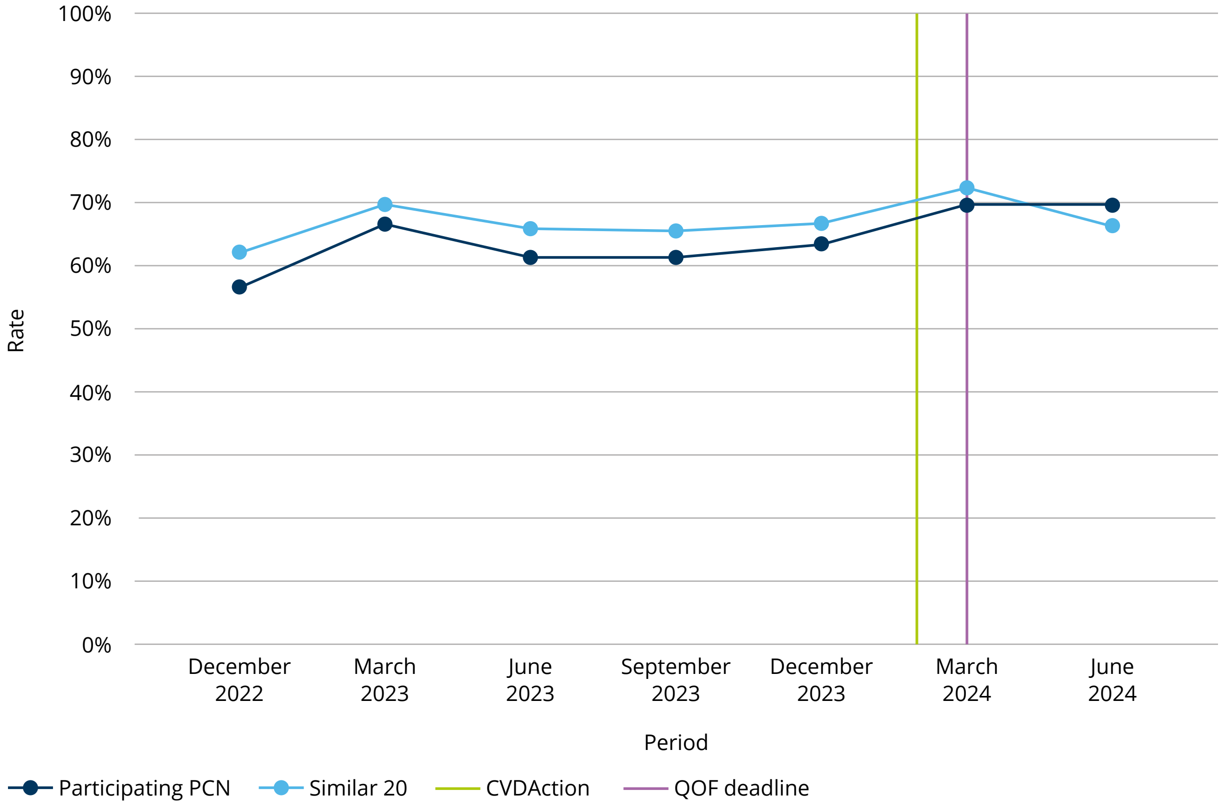
CVDP007HYP: Patients with GP recorded hypertension, whose last blood pressure reading is to the appropriate (age-related) treatment threshold in the preceding 12 months.

The pattern in the key hypertension indicator is similar to that for the preceding lipid indicator in that the majority of PCNs do not demonstrate any significant deviation, post CVDACTION implementation, from the trend apparent in the 20-most-similar comparator group.

Neohealth PCN is the exception, where a maintenance in the proportion of hypertensive patients treated to age-appropriate target was evident post QOF deadline, compared to the expected drop amongst the 20-most-similar comparison group (see Figure 7). This result is clear in terms of difference-in-differences (DiD= 6.2%), however is not indicative of a 'step change' and is also illustrative of the masking effect that the QOF-year end phenomenon can have when attempting to assess progress. It is also worth noting that Neohealth PCN implemented CVDACTION in February 2024, so only four months of post-implementation data is included in this analysis.

Sub-group analysis by ethnicity revealed some variation between White and non-White groups for specific PCNs that *overall* did not demonstrate significant differences from the 20-most-similar comparator group. Hammersmith & Fulham showed a DiD value of 4.7% in non-White groups compared to 1.9% in White groups. Acknowledging the limited time period post-implementation, this nevertheless could indicate impact of focussed work in inequalities in these PCNs.

***Figure 7:** CVDP007HYP: Patients with GP recorded hypertension, whose last blood pressure reading is to the appropriate (age-related) treatment threshold in the preceding 12 months results for Neohealth PCN compared to 20 most similar PCNs; CVDACTION implementation and QOF deadline dates shown.*



Source: CVDPREVENT, June 2024

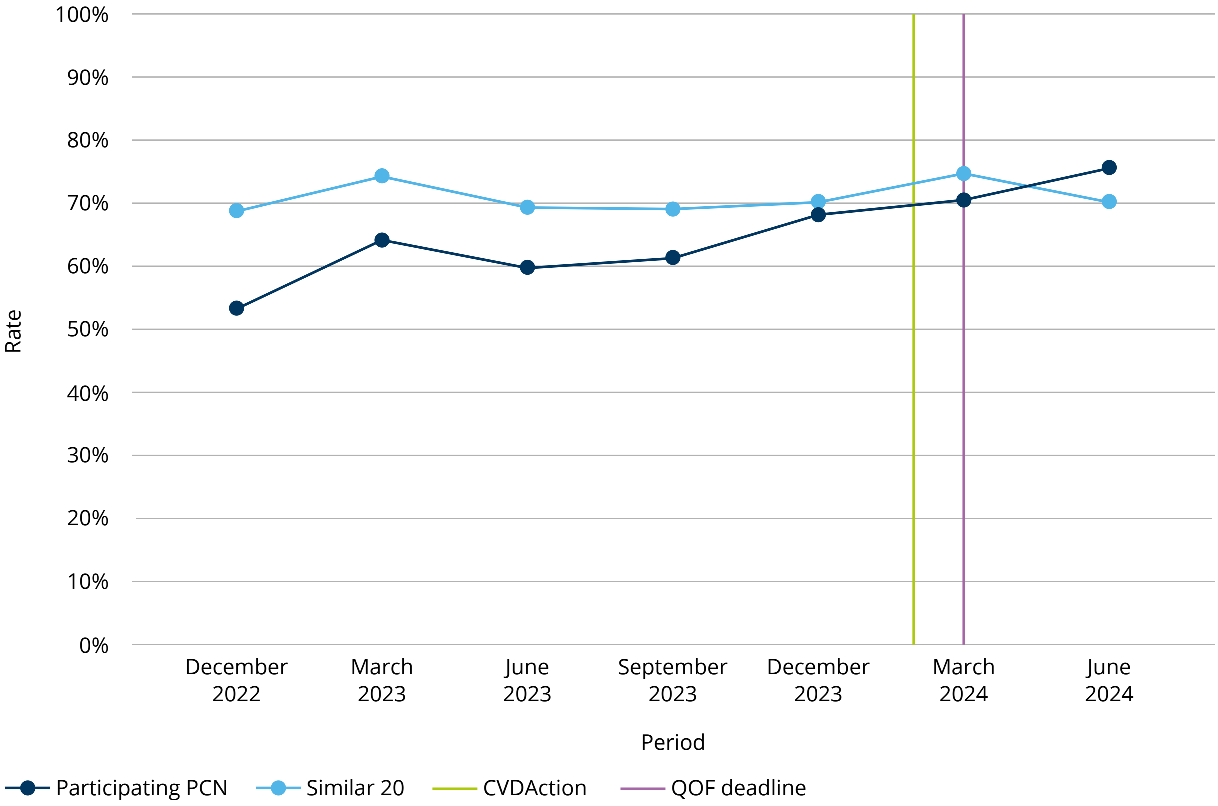
CVDP009CKD: Patients with GP recorded CKD (G3a to G5) with an ACR of less than 70 mg/mmol, whose last blood pressure reading is to the appropriate treatment threshold.

The pattern in this key CKD indicator is similar to that for the preceding lipid and hypertension indicators in that the majority of PCNs do not demonstrate any significant deviation, post CVDACTION implementation, from the trend apparent in the 20-most-similar comparator group. Once again, there are exceptions to this observation that may indicate early signs of impact.

Neohealth PCN shows a significant deviation from the 20-most-similar comparator group (see Figure 8), with a large DiD of 7.2%, which means Neohealth PCN's expected value in June 2024 for this indicator would be 68.5% as opposed to the 75.7% actually observed. It should be noted that Neohealth PCN was already showing some signs of improvement, from a relatively low position in late 2022, prior to the implementation of CVDACTION.

Cheam and South Sutton PCN also shows some indication of a significant difference-in-differences, but was a relatively late implementer of CVDACTION in April 2024; therefore there is not enough data to appropriately assess their performance on this indicator in the context of the difference-in-difference analysis.

***Figure 8:** CVDP009CKD: Patients with GP recorded CKD (G3a to G5) with an ACR of less than 70 mg/mmol, whose last blood pressure reading is to the appropriate treatment threshold results for Neohealth PCN compared to 20 most similar PCNs; CVDACTION implementation and QOF deadline dates shown.*



Source: CVDPREVENT, June 2024

The difference-in-differences analysis undertaken here is suggestive of some early impact on specific indicators for particular PCNs. In general, the data available does not represent enough of the implementation timeline to undertake this kind of analysis and expect to see significant change in all cases, so early signs in PCNs that have had specific areas of focus is encouraging. However, in order to reach firmer conclusions as to the impact and degree of impact of CVDACTION in participating PCNs, compared to other non-participating PCNs, a longer time period post-implementation is required for analysis, as well as one that is well beyond the masking effect of the QOF year end.

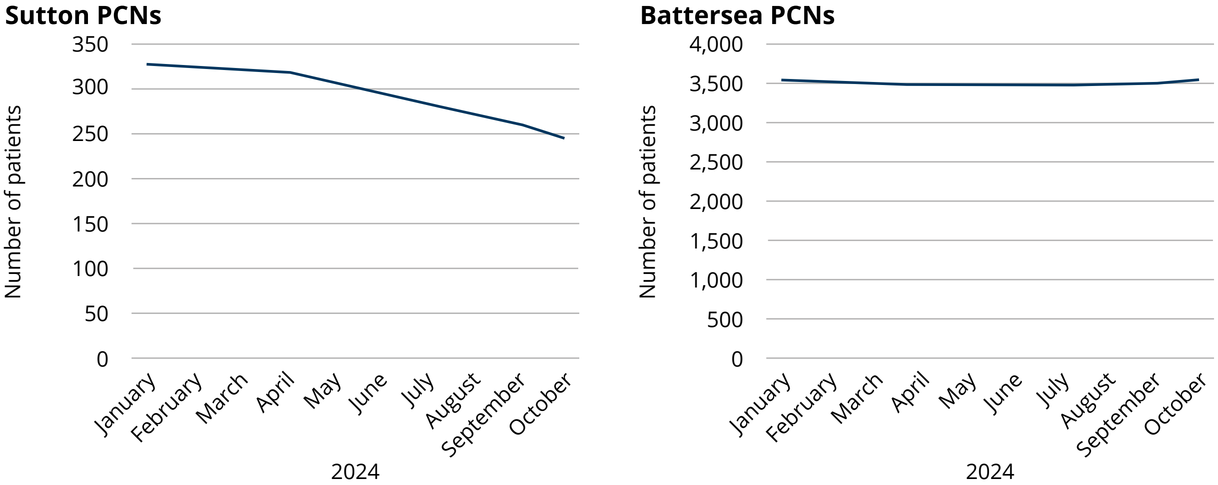
5.2 Time series analysis

As originally intended, participating PCNs provided data on a regular basis to the central programme team, reporting the numbers of patients in each CVDACTION indicator cohort. As noted above, there were significant methodological and data quality issues with the early data collection that precluded meaningful analysis. Since that early period of implementation, participating PCNs have had the opportunity to continue data submission through to December 2024, to help maximise the volume of time series data available for analysis, give a reasonable period of time to allow for CVDACTION to move toward 'business as usual' and to provide a gap between the QOF year-end period that is known to skew clinical indicators such as those included in CVDACTION.

As time series analysis was undertaken it rapidly became apparent that the approach was not fit for purpose for assessing impact of CVDACTION. In the main this is due to the underlying assumption inherent in this kind of analysis that the underlying population remains stable. Patient 'churn' notwithstanding, this may be largely true in terms of overarching PCN registered populations, but within individual indicators this assumption does not hold because of the dynamic nature of the clinical conditions being measured. In short, simply counting patients within each indicator cohort over time is not sensitive enough to the fluctuations of patients moving into and out of indicator cohorts. For example, part of the work of some participating PCNs has included case finding. Where successful, this has naturally resulted in increasing numbers in some indicator cohorts which may be interpreted as a 'bad thing' but is of course a desirable outcome. In this case, the addition of newly diagnosed patients to an indicator cohort will mask part of the overall story in terms of what is happening to those who were already diagnosed. This makes the interpretation of simple time series analysis in this context fraught with issues.

This is best demonstrated by examining some of the extreme results garnered from the participating PCNs' data collection. The example in **Figure 9** shows results from the Battersea and Sutton groups of PCNs for the indicator 'total population with hypertension not treated to target'; both PCNs had a focus on hypertension and evidence of step change in optimisation can be seen in the additional cohort analysis (see **section 5.3**). Yet, the trends of numbers of patients in this indicator cohort over time could not be more different, with Battersea showing a change of just 8 patients over the whole time period, compared to Sutton's 84 patients.

***Figure 9:** Sutton PCNs and Battersea PCNs time series of numbers of patients in 'total population with hypertension not treated to target' cohort.*



The reasons for such a difference are likely to be many and varied, but in essence the result does not have good face validity given what is known about the context and work of the PCNs.

In light of the issues with the planned time series analysis, a revised approach was taken that was felt to be able to better demonstrate the impact of CVDACTION. This is described in more detail below.

5.3 Cohort analysis

In a subgroup of participant PCNs, additional quantitative analysis has been undertaken that has added additional insight to the narrative emerging from the results above. The dynamic nature of patients' movement into, out of and through different clinical states, that in turn map to different indicators makes, as can be seen above, the interpretation of trends in terms of raw numbers of patients in individual indicator groups difficult to interpret.

This reflects important learning throughout the demonstrator phase that, in the short term at least, simple assessment of numbers or proportions of patients reported against each CVDACTION indicator is not fit for purpose as a measurement approach to assessing impact. In the longer term, assuming that patient population and demographic makeup remains broadly stable and CVDACTION is well embedded into BAU, we may expect to see trends in absolute numbers or proportions become more useful indicators.

In light of this learning, a retrospective piece of analysis was undertaken seeking to 'track' the movement of patients identified via the CVDACTION dashboard out of the four hypertension indicators that are indicative of poorly optimised hypertension (indicators HYP1, HYP2, HYP3 and HYP4), and one of the lipid indicators (LIP1) utilised in the CVDACTION dashboard[15]. If CVDACTION was having the desired 'step change' effect at least part of the cohort should 'move' into the optimised indicator (HYP5) as their hypertension is managed and readings reach age appropriate target. Similarly, there should be a significant shift out of the LIP1 cohort (CVD not treated with lipid lowering therapy). **Figure 10** illustrates this concept in a simplified way for hypertension optimisation.

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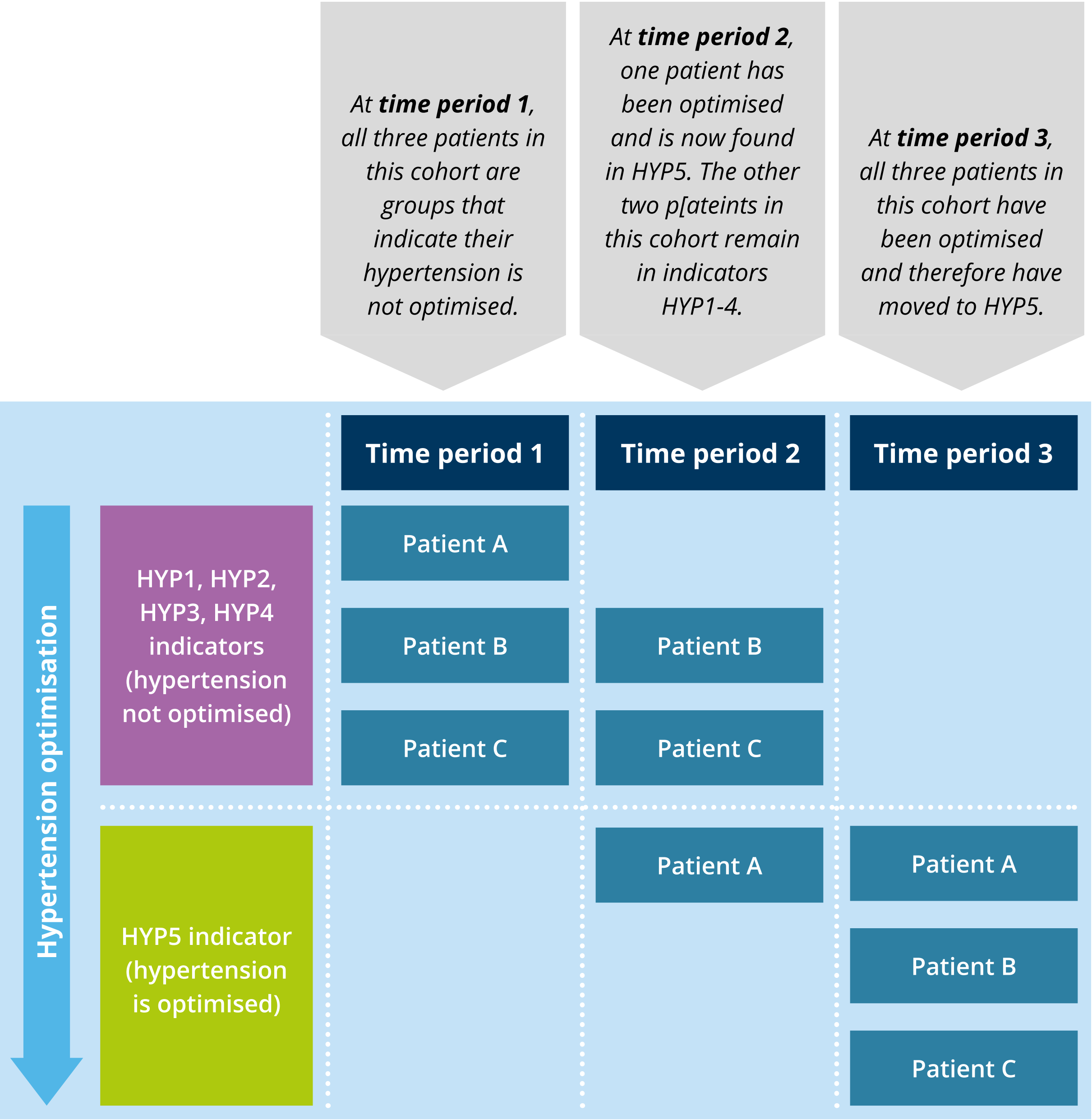
[15] HYP1 = BP Not at target Group 1 (>=180/120 or home equivalent)
HYP2 = BP Not at target Group 2 (>=160/100-180/120 or home equivalent)
HYP3 = BP Not at target Group 3 (under 80y >=140/90-160/100 or home equivalent)
HYP4 = BP Not at target Group 4 (>=80y >=150/90-160/100 or home equivalent)
LIP1 = CVD not on lipid lowering therapy
HYP5= Hypertension treated to age appropriate target

***Figure 10:** Illustration of cohort analysis.*



*At **time period 1**, all three patients in this cohort are groups that indicate their hypertension is not optimised.*

*At **time period 2**, one patient has been optimised and is now found in HYP5. The other two p[ateints in this cohort remain in indicators HYP1-4.*

*At **time period 3**, all three patients in this cohort have been optimised and therefore have moved to HYP5.*

The cohort analysis shows the number of patients that moved out of a particular indicator cohort to the optimised cohort in the subsequent time period. In the case of hypertension this means that patients appear in the HYP5 cohort and they are not present in any of the HYP1-4 indicators in the subsequent time period. Therefore, the cohort analysis shows, for hypertension and a key lipid indicator (LIP1, see footnote 14) the numbers of patients who have been ’optimised’ on these measures.

There are limitations with this approach. Firstly, movement out of uncontrolled hypertensive cohorts may be due to reasons other than optimisation, for example a patient leaving the practice. This could be a significant issue in London where patient turnover is often higher than in the rest of the country, due to a more mobile population and more diverse socioeconomic demographics. Secondly, it is not possible to see whether patients moving into the HYP5 cohort subsequently returned to an uncontrolled hypertensive cohort, to be moved back to HYP5 at a later point in time. In other words, there is a risk of counting individual patients more than once if they move rapidly between controlled and uncontrolled hypertensive cohorts over a number of time periods. Thirdly, an important caveat in interpretation is that initiation of lipid lowering therapy often occurs in a single consultation, whereas optimisation of BP may require several consultations over a number of weeks or months. Initiation of lipid treatment will be therefore be apparent immediately whereas improvements in BP may not be evident for some time.

Robust data that enabled this cohort analysis was available for 6 months, from April 2024 to September 2024 . This period included time for programme set up, training, pathway adaptation, patient call/recall and other activities relevant to the newly implemented CVDACTION pathway(s).

Despite the limitations, reviewing the data available reveals clear improvement evident, particularly in those PCNs that were able to provide data across longer time periods, reflecting a reasonable period of time post-implementation.

Across the 8 PCNs that prioritised hypertension optimisation, a significant step change in treatment optimisation was demonstrated in this six month time frame:

- In the Battersea PCNs (151,615 total population), in 1,659 patients hypertension improved enough to move them to a lower hypertension stage. Of these 1,412 patients progressed to the treated to target range.
- In the Sutton PCNs (211,573 total population), in 184 patients hypertension improved enough to move them to a lower hypertension stage. Of these 141 patients progressed to the treated to target range.
- In K&W Healthcare PCN (69,108 population), in 361 patients hypertension improved enough to move them to a lower hypertension stage. Of these 161 patients progressed to the treated to target range.

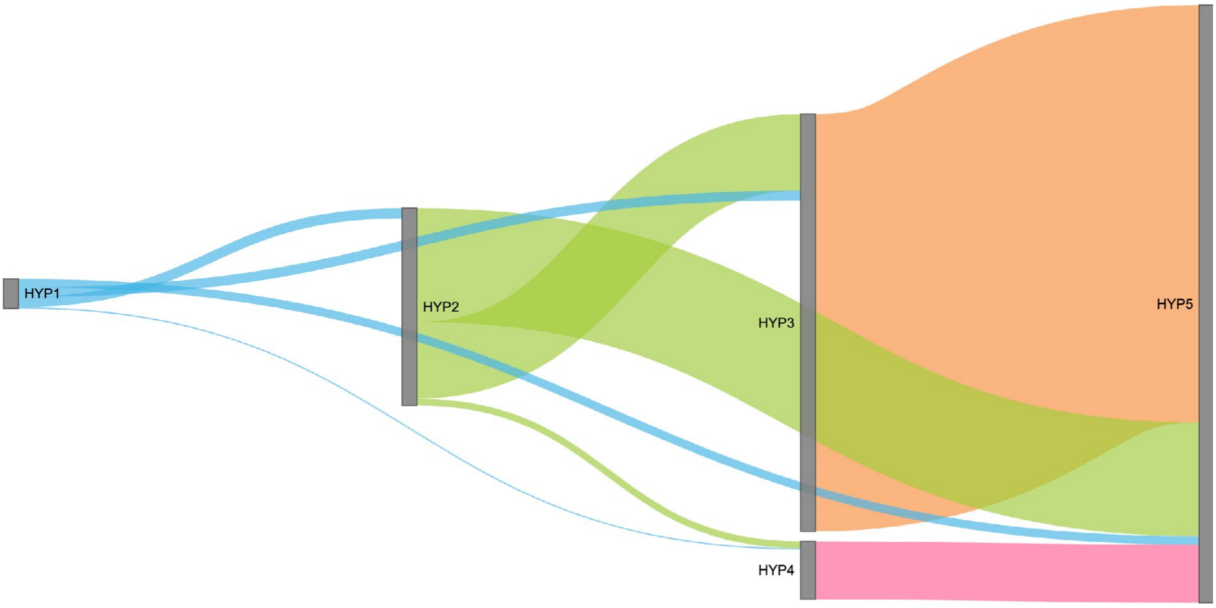
As a comparator, in the 2 PCNs that focused less on hypertension, much smaller changes were seen: in Hammersmith & Fulham (70,642 population) 45 patients were newly treated to target, with no additional patients moving to a lower hypertension stage; in Neohealth PCN (29,337 population), 26 patients were newly treated to target, with one additional patient moving to a lower hypertension stage.

Across all participating PCNs, lipid lowering therapy was commenced in relatively large numbers of patients with pre-existing CVD:

- Battersea PCNs – 127 patients
- Sutton PCNs – 156 patients
- K&W Healthcare PCN – 22 patients
- Neohealth PCN – 52 patients
- Hammersmith & Fulham PCN – 69 patients

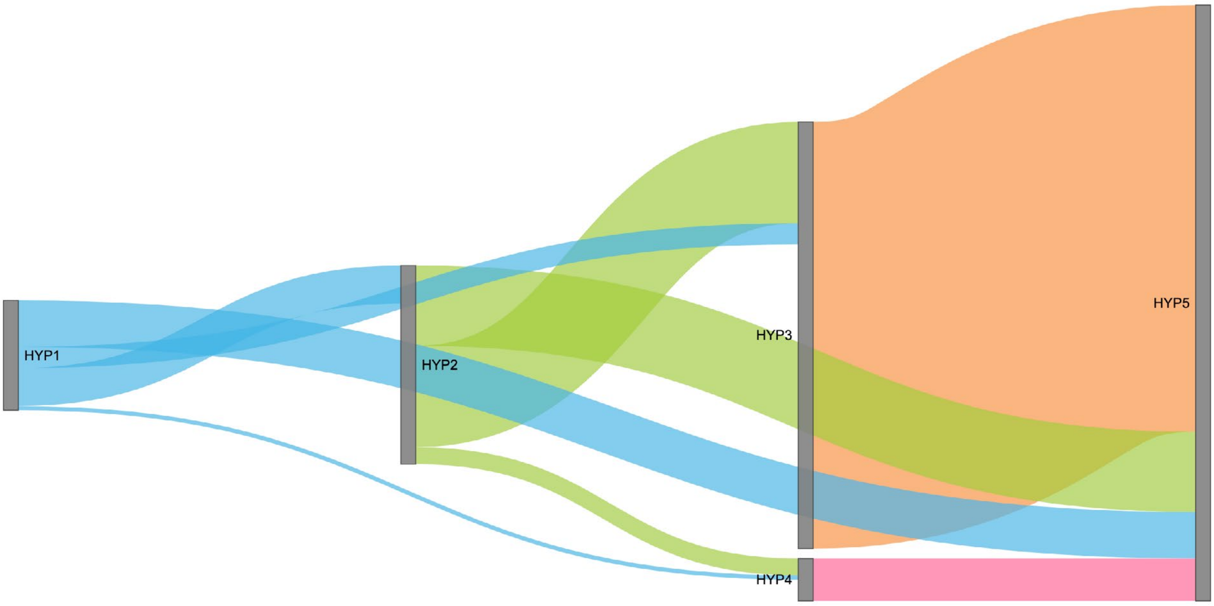
This approach to assessing impact for CVDACTION provides a clearer narrative than numbers of patients for each individual indicator alone and could, over time, provide a compelling visual story for participating PCNs when annotated with key actions and focus areas. For the purposes of assessing optimisation in hypertension and lipids we have focussed on the figures that represent the numbers of patients moving to a fully optimised state, but it is possible from the data gathered to examine the movement of patients between different cohorts, where this is applicable. **Figure 11** and **Figure 12** show this movement for the Battersea PCNs and Sutton PCNs respectively; note that the breadth of the links between groups should be interpreted relative to each other within a single diagram, rather than in terms of absolute numbers. These figures demonstrate how patients in the HYP1 cohort move to lower risk cohorts (HYP2, HYP3 or HYP4) and can move directly to an optimised state, demonstrating the principle that in the case of hypertension it can take time to achieve optimisation but improvement can be made, and risk reduced, in the interim. Both figures show that the majority of patients moving from an uncontrolled hypertensive cohort to the optimised state came from HYP3.

***Figure 11:** Movement of patients between hypertension cohorts, April – September 2024 in Battersea PCNs.*



Source: PCN CVDACTION extracts

***Figure 12:** Movement of patients between hypertension cohorts, April – September 2024 in Sutton PCNs.*



Source: PCN CVDACTION extracts

Taken alongside the comparative and time series analysis outlined above, this additional cohort analysis provides additional evidence for CVDACTION having a specific impact in areas of priority for participating PCNs and in the case of Battersea PCNs and Sutton PCNs evidence a significant step change in the optimisation of hypertension and a significant impact on lipid management in patients with CVD across all participating PCNs.

5.4 Modelled impact

The longer-term impact of optimisation of hypertension and lipids can be modelled utilising well established evidence from the research literature (see **Methods**) in terms of preventing cardiovascular events and realising financial savings from an NHS, and where relevant, wider care system perspective.

Based on the early results from the cohort analysis described above, aggregated across all demonstrator sites, a total of total 1,785 patients in the demonstrator site population had their hypertension newly treated to target. This could be expected to prevent around 18 heart attacks and/or 26 strokes in 5 years; this would lead to NHS savings of approximately £445,000.

In relation to lipids, 426 high risk patients with pre-existing CVD were newly commenced on lipid lowering therapy. This could be expected to prevent around 43 cardiovascular events (which includes heart attacks and strokes) in 5 years. Assuming half of these are heart attacks and half are strokes, this would lead to NHS savings of approximately £460,000.

Social care savings and reduction in economic inactivity as a result of a heart attack or stroke would add substantially to these savings. Stroke particularly has a significant impact beyond the NHS, with social care costs in the first year following a stroke estimated to be almost £10,000[16]. The potential impact of hypertension and lipid optimisation at scale can be further explored at individual PCN level using UCLPartners' 'Size of the Prize' tools[17].

Learning points

- It is important to give adequate time to ensure 'bedding in' of data flows, time to establish rigorous and accurate coding regimens and generally move beyond the variation inherent in implementation of complex programmes and towards 'business as usual'.
- There is still a lack of consistency in data completeness and quality across the participating PCNs that precludes a full and robust review of the quantitative evidence at this time.
- The simple assessment of numbers or proportions of patients reported against each CVDACTION indicator is not fit for purpose as a measurement approach to assessing impact over time; a cohort tracking approach is a more effective means of doing this.
- It is clear that there are 'green shoots' of improvement and in some cases early evidence of the 'step change' that CVDACTION has been designed to deliver, particularly where PCNs have been actively engaged in reviewing and assessing their data and focussed on specific improvement actions.

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[16] Source plus 4.6% inflationary uplift to 24/25 prices

[17] Available at: https://uclpartners.com/project/size-of-the-prize-for-preventing-heart-attacks-and-strokes-at-scale/

5.5 Investment

The investment provided to implement CVDACTION in the demonstrator sites was based on the recognition that while actionable data is critical to transform care it is not sufficient. As identified in Claire Fuller's report, ambitions for change in primary care will not be achieved unless the resources and infrastructure to enable that change are provided. The CVDACTION investment included resources for structured implementation support to enable action in response to the data including workforce and pathway transformation, as well as additional clinical resource. For wider and longer term roll out of CVDACTION, some of this resource may come from re-deployment of existing resources, using staff to work differently (see **Background** for further detail).

The investment required for the implementation and support for CVDACTION was undertaken from two perspectives, and based on insight gathered from the relevant programme team members and members of the teams based in participating PCNs.

Central support costs

The costs for the programme team that provided central implementation support to participating PCNs was made up of three broad components:

1. **Overarching set up costs:** These include recruitment of PCNs which incorporated the management of an expression of interest process, and general oversight and governance.
2. **Per-site set up costs:** These include drafting and agreeing relevant governance documentation, introductory meetings and preparation for these, close working with local Business Intelligence teams to move the technical elements forward and key stakeholder engagement (e.g. ICBs, NHSE).
3. **Whole programme implementation costs:** These include support for recruitment, pathway co-design, pathway development, support with dashboard access and outputs, primary care workforce training, Patient and Public Involvement and Engagement (PPIE) (including participant reimbursement), general troubleshooting and running communities of practice for participating PCNs.

Where PCNs were grouped together, this presented economies of scale, with specific set up and implementation tasks being undertaken once for multiple PCNs. This economy of scale has been taken into account in the final cost analysis. The majority of costs for central support was pay-costs and included on-costs and overheads. Some non-pay costs are included in the PPIE work.

The summary costs for each component are shown in Table 2 below.

Table 2: Summary costs for central implementation support.

Central support cost component	Estimated total cost across whole demonstrator	Notes
Overarching set up	£52,523	
Per site set up	£196,928	Adjusted to account for groups of PCNs
Whole programme implementation	£68,054	
TOTAL	**£317,504**	

This final total cost of central implementation support illustrates the resource that may be required to support participating PCNs to implement, establish and move CVDACTION into BAU. These costs do not reflect any concomitant activity that may be carried out by the same team, but is *not* of direct benefit to the participating PCNs' implementation of CVDACTION. Such additional activity includes comms support, evaluation work and any centralised analytic support.

The central implementation support costs outlined above should be viewed as indicative only. The total cost of implementation support for the pilot phase is unlikely to reflect the likely cost for a subsequent implementation of CVDACTION for a number of reasons:

- The individuals undertaking this early, first-of-its-kind work were relatively senior, equivalent mostly to NHS AfC bands 8b and 8d; subsequent CVDACTION implementation will be building on the demonstrator work and have additional resources available that could mean that less senior staff could be utilised.
- The 'overarching set up' cost component includes elements that may not be necessary for a more general implementation outside of the context of a demonstrator phase which had specific aims and objectives and therefore requirements of the participating PCNs in terms of reporting and engagement.
- Reflection from the programme team suggested that the communities of practice element was underutilised in the demonstrator phase; wider use of communities of practice in subsequent implementations could reduce the need to troubleshoot individual issues and improve efficiency.

Taking these differences into account it would be expected that central implementation support costs (excluding evaluation and comms support) would be lower than those for this demonstrator phase.

PCN implementation costs

One of the central tenets of CVDACTION is that there is no single 'right way' to implement pathway change and as such different participating PCNs will have different implementation costs based on the model that they have implemented. To provide an estimate of a range of PCN implementation costs, three different models of implementation were investigated, ranging from a pathway with significant clinical and additional support requirements, to a lighter touch MDT model.

- **Model A:** Call & recall for face-to-face appointments with Healthcare Assistant (HCA) or pharmacist, with face-to-face follow-up with pharmacist if required
- **Model B:** Call & recall for initial virtual appointment with pharmacist (focussed on statin prescribing), plus face-to-face appointments with HCA or pharmacist after three months, with face-to-face follow up with pharmacist if required
- **Model C:** Call & recall to pharmacist-led face-to-face clinics with MDT meetings to assess follow-up needs and complex cases

Costs were broadly made up of delivery components, the actual cost of undertaking the pathway, characterised by direct contact with patients or reviewing their records, and management and support costs. Management and support costs generally include clinical supervision and oversight, operations management and support and IT and development support.

Each service provided an estimate of a 'typical' number of patients entering the PCN's specific CVDACTION pathway each week (with relevant decline rates where appropriate) to enable an estimated cost per week to be provided. Assuming a 48-week per year service availability this can be extrapolated to an annualised figure for each model. These results are shown in **Table 3**.

***Table 3:** Summary costs for three PCN models of CVDACTION delivery.*

PCN pathway model	Patients entering pathway per week (estimated)	Estimated delivery cost per weekly cohort	Estimated management cost per weekly cohort	Estimated total annualised cost (delivery + management)	Estimated cost per patient entering pathway
Model A	400	£8,775	£2,525	£542,391	£37.67
Model B	400	£11,531	£2,525	£674,691	£46.85
Model C	105	£1,985	£255	£107,540	£21.34

Given the significant differences between these models of delivery of CVDACTION, comparison of implementation costs between them it is not recommended, but the results of the cost analysis serves to illustrate a range of what may be seen as 'typical' cost for a pharmacist led CVDACTION pathway.

It is worth noting that model A and model B both included additional support costs from IT and information governance specialists amounting to approximately £20,000 per annum. This was considered necessary for the PCN in question given their own longer term plans; the additional support was used for further local development of the CVDACTION dashboard and in-depth local analytics to support further pathway development and strategic decisions. Such additional support would not be a 'must have' for PCNs implementing CVDACTION.

A substantial proportion of the PCN delivery costs is accounted for by the cost of additional clinical pharmacists to optimise patient treatment. In wider roll out of CVDACTION, this clinical activity could be delivered by existing primary care clinicians re-purposing their existing time to see patients proactively according to clinical priority (as identified by CVDACTION), rather than in routine review eg on anniversary of previous QOF review. Similarly, some existing ARRS roles could be re-deployed to provide structured support for education, self management and behaviour change.

The CVDACTION team have identified that essential additional resources to enable successful implementation of CVDACTION include local clinical and operational leadership, multi-level engagement, technical support, support to use the dashboard, local facilitator to support pathway transformation.

6 Qualitative findings

6 Qualitative findings

6.1 Participants

Individual interviews

In total, 13 semi-structured interviews were conducted with ten individuals. Three individuals were interviewed twice, once during early implementation (October 2023) and again during later implementation (April 2024). Interviews lasted around one hour.

Participants have been allocated pseudonyms for reporting. Pseudonyms that start ‘PL’ indicate the participant was a member of the UCLPartners Programme Lead team – an ‘E’ at the end of the pseudonym indicates that the interview took place during early implementation and an ‘L’ signifies the interview took place during later implementation. Pseudonyms that start ‘KI’ indicate the participant was a key informant who was not a member of the UCLPartners Programme Lead team.

Focus groups

Seven focus groups were carried out involving participants from London PCNs who had implemented CVDACTION during the pilot. In total, 30 individuals participated (range two-to-eight participants per focus group), with three individuals taking part in two focus groups (one during early implementation and a second during later implementation). Participants included a mixture of clinical staff (e.g. pharmacists, doctors, nurses, health and wellbeing coaches) and managerial or technical staff who were involved in dashboard implementation and use.

Pseudonyms allocated to focus group participants start ‘FG’ and each focus group participant has been assigned an individual numerical identifier, e.g. FG1, FG7.

6.2 Themes

Findings from analysis of individual interviews, focus groups, and relevant documents have been synthesised for reporting. Findings reflect experience in using the CVDACTION data tool itself and suggestions for improvement/further development, and experience in local implementation of new models of care to optimise preventive treatments. During the analysis process eight overarching key themes were developed:

- Drivers underpinning adoption of CVDACTION
- Design, quality and ease of use of the CVDACTION dashboard
- Development of pathways and use of the wider workforce
- Factors impacting implementation
- Health inequalities
- Patient and public involvement and engagement
- Perspectives on impact
- Implications for sustainability and wider roll out

Drivers underpinning adoption of CVDACTION

Delivering a step-change in prevention of heart attacks and strokes

Participants reported that PCNs had elected to implement CVDACTION due to its ability to transform the prevention of heart attacks and strokes by substantially increasing the use of high impact treatments. Some participants referenced the "size of the prize"[18] resource which shows that suboptimal treatment of hypertension is widespread and longstanding and demonstrates the potential for reducing heart attacks and strokes in a relatively short time frame if management of blood pressure and cholesterol can be improved.

Several participants detailed the logical sequence of using data from primary care records to identify CVD risk for patients, creating suitable pathways that maximise the use of the primary care workforce, intervening to optimise patient care or support lifestyle changes, and ultimately reduce the risk of cardiovascular events.

> ***We know the line of evidence between optimisation and reduction in heart attacks and strokes and therefore money saved is concrete and evidence based.*** PL1L

> ***For blood pressure, if we get up to 80% optimisation rates, we will prevent something like 14,000 heart attacks and strokes in three years. Those numbers are huge. It is absolutely achievable.*** PL3E

The top priority placed locally, nationally and indeed globally on tackling preventable morbidity and mortality arising from CVD was emphasised by several participants, with CVDACTION viewed as *"one tool in the armoury"* (KI9) to achieve this.

A novel way of working based on at-scale targeted optimisation and proactive care delivered to those most in need

CVDACTION facilitates a novel approach to care, prioritising patient contact based on level of CVD risk, which many participants saw as a significant cultural shift for the NHS. This change is a move away from the traditional method of calling people in (for example for high blood pressure reviews) in order of date of birth to meet Quality and Outcomes Framework (QOF) targets, towards a proactive, public health centred model that prioritises those at greatest risk.

> ***It's a big technological leap in terms of, you know, using data in a smart way. There's a cultural leap as well, and the cultural leap is around QOF and other things…I think as a PCN, as an organisation, we're really bought into that way of thinking.*** FG17

> ***Primarily it's about a shift from a face-to-face, reactive, individual response, which is general practice historically, to something which is more proactive and population health based. Automation digital first. Utilising the workforce as a whole rather than, you know, one clinician in a clinic room kind of thing, so that's the fundamental shift. And overlaid on that for us is around the recognition of a holistic support for people with multimorbidities, rather than a condition specific approach.*** KI8

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[18] Size of the Prize – Hypertension | Tableau Public

Alignment with existing plans and incentives

Some interviewees noted that the decision to adopt CVDACTION during the pilot was often influenced by how well it fitted with existing plans and priorities within Integrated Care Boards (ICBs).

> “ ***I understand that the decision to proceed with CVDACTION or not is not related to the efficacy of the product or the proposal. It's more to do with the alternatives already available in the system, and the fit of the proposal with existing plans in ICBs, so it's not a judgment about the plan, the proposal, the product, the interventions themselves; it's how they might connect and dovetail with existing plans.*** KI5

Further, some participants talked about alignment with national policies and incentives as a driver underpinning CVDACTION. The CVDACTION dashboard shows which Quality Outcomes Framework (QOF) targets will be met through optimisation, aligning CVDACTION with national objectives for cardiovascular disease.

> “ ***A really helpful tool that is perfectly aligned with national objectives for cardiovascular disease.*** KI9

Optimal use of the workforce

A key driver was the expectation that CVDACTION would facilitate ways of working that make the best use of human resources in primary care, with a variety of staff roles, including the Additional Roles Reimbursement Scheme (ARRS) roles, working to optimise patient care. The engagement of the ARRS roles was described as a success and *“big enabler”* of CVDACTION – allowing *“that time and space to be able to have the conversation that they want to have with every patient.”* (KI8) This is discussed further within the dedicated theme on **development of pathways and use of the wider workforce**.

> “ ***This programme, which is a dashboard plus the wider pathway, enables those [ARRS] roles to have a meaningful role in delivery of care in terms of the functions and the roles that are set out within the frameworks that they can undertake.*** PL1E

Enthusiasm from system leaders

In areas that had adopted CVDACTION, enthusiasm and support from system leaders grounded in their belief in the transformative potential of CVDACTION had been instrumental in garnering support.

> “ ***The CVD leads within each ICB have been really critical, both those colleagues that are, you know, the clinical leaders for CVD in each of the ICBs, but also what I would call kind of more programmatic leads. So people who aren't necessarily clinicians but who have the brief around either long term conditions or CVD more specifically, and who's sort of bread and butter day job is to think about, you know, mobilising system resource around improving CVD outcomes.*** KI9

> “ ***[Influential leaders are] Pivotal, I mean that advocacy, you know, they've got the loudest voices and then they've got the furthest reach.*** PL2L

Non-adoption

Three of the five ICBs in London chose not to adopt the CVDACTION programme during the pilot. A range of potential reasons were suggested as to why some areas chose not to adopt.

Difficulties had been encountered with engagement at senior regional level at the start of the programme (see **Background and context**). This impeded engagement with decision makers in a position to adopt CVDACTION and teams 'on the ground'. Consequently, timelines for the programme were adversely affected. Members of the programme team felt that with hindsight, London wide communications about the CVDACTION 'offer' would have been a helpful approach.

> “ ***There was potentially difficulty in accessing the right conversations with the right people at the right time.*** KI5

> “ ***If we had our time again, I would have run it as like one pan-London session, as in this is what the offer is, this is what the programme is, this is how you access it. We can run this session as many times as you like, but this is to make sure everybody has the same information at the same time and that there aren't conversations behind closed doors.*** PL1E

Also, restructuring within ICBs had led to vacant posts and capacity challenges which limited the ability to engage.

> “ ***In common with other ICBs, we've gone through a reorganisation, we've lost clinical leads, we've had a change in clinical networks (…) we've had no clinical network for the last five months.*** KI8

Further, it was suggested that non-adopting ICBs and the PCNs within them were often already invested in their own local initiatives, in some cases including established systems and dashboards, which for some made the adoption of CVDACTION seem like an additional burden when they have no spare capacity and are concerned at the risk of distraction.

> “ ***Some areas in London have not wanted to take it up and I think it's often because they can see the value in it, but they're heavily invested in their own priorities and courses of action in local schemes, and I think that's really important. Some areas are doing lots of stuff and feel they should just continue with that and not be distracted by something new, don't have bandwidth for something new, may see it as a potential distraction. So that's a very legitimate response from systems who don't feel this is for them.*** PL3L

> “ ***Part of the challenge, I think, in this space is sort of the busyness of the landscape in a way. So I think there's probably some challenge around how it kind of landed in London, where existing ICSs were already sort of marching down a track around their population health management tools, their data dashboard, developing their own kind of approaches. Colleagues need to really understand how something new is aligned to what's already there and how it's going to be incorporated into maybe what they're already doing. I think it is part of the challenge.*** KI9

> “ ***People already have their own dashboards, so why should they? They haven't got the time. You know, they've already got something, so why should they prioritise just another tool to do the same thing. Quite understandable. The other thing is they have all got huge elective recovery in their mind and they're just so focused on knee jerk reaction, they c an't take a step back and think actually something like the principle behind CVDACTION would help us with elective recovery…So just the busyness and demand in the system is a key blocker for people to have that time to consider innovation and different things for improvement.*** KI4

Potential challenges with technical integration were also thought to underpin some non-adoption decisions. Some areas already had access to primary care data on a central server. Other areas did not have this, but developed local solutions. Those areas that did not have a central solution and did not want, or have the time or expertise, to explore a local solution were not in a feasible position to adopt CVDACTION.

The general 'busyness' of primary care and local political considerations relating to implementing an innovation that hadn't been evaluated and was not 'home-grown' were also cited as factors contributing to non-adoption.

> **“*Here are some exclusions for technical reasons and probably local political reasons as well, I suspect, about where they were placing their bets in terms of systems and data, rather than what CVDACTION was offering itself.” (…) “It's almost inevitable there'll be some antibodies created by Not Invented Here Syndrome.*** KI5

One participant noted that universal engagement is difficult to achieve without top-down mandates from NHS England.

> **“*London is complex and challenging, I don't think you necessarily get universal engagement and uptake on many things, unless it's a sort of NHSE top-down diktat, everybody has to do X, Y, and Z' kind of thing.*** KI9

Learning points

Drivers underpinning adoption of CVDACTION include:

- Potential for a significant advance in the prevention of heart attacks and strokes
- At-scale targeting of those who are most in need with preventative healthcare
- Alignment with local and national priorities and incentives
- Optimal use of the primary care workforce and pathway transformation
- Enthusiasm for CVDACTION from clinical and system leaders

Potential reasons for non-adoption during the pilot phase include:

- Challenges with early engagement at senior regional level
- ICBs working with existing innovations and not seeing how CVDACTION could be compatible or offer additional benefits to those existing innovations
- Lack of capacity to engage or receive implementation support
- Perceived difficulty with technical integration
- Reluctance to adopt an unknown / unproven innovation during the pilot phase

Design, quality and ease of use of the CVDACTION dashboard

Dashboard design and ease of use

The design of the CVDACTION dashboard was often praised by end-users, who tended to find it intuitive to use, straightforward to navigate and an improvement on existing systems. The ability to visualise alignment with QOF within the dashboard was welcomed.

> “***It was fairly well presented and easy to navigate. I think anything that differs from the way that EMIS presents and produces patient lists is a positive! I think the way that the onditions were split up was useful. We found the ability to select and export data from the dashboard quite interesting as well.*** KI10

> “***It's quite straightforward and it's got all the patients on the searches. It's quite quick to pick up patients, so just kind of prioritise from the different categories. And then I can select the patients that really need to be reviewed first and incorporate them into my rotas.*** FG4

> “***It is a lot easier to use than the SystmOne searches and all the data is here (...) I think the dashboard is quite good. I think the way it highlights QOF is useful and like it breaks down which QOF we'll be covering.*** FG1

The ability to look at data according to demographic characteristics to prioritise groups who are most in need was noted as a valuable feature by various participants – *"It is a game changer"* (FG17) – although feedback obtained during some of the focus groups suggested that this feature may be underutilised during the early implementation phase. The impact of CVDACTION on health inequalities is discussed within a **dedicated theme**.

A key purpose of the pilot was to gain user feedback on functionality of the first version of CVDACTION so that improvements could be made either via changes to the dashboard or to implementation (for example by providing additional training). This responsive approach was illustrated in the early implementation phase in one ICB, where the patient list produced by the CVDACTION dashboard was at PCN level and did not show which practice each patient was assigned to. This caused some frustration but was rapidly resolved by the creation of additional filters to disaggregate patients by practice.

Further suggestions for enhancing the design of future iterations of the dashboard included the ability to track progress being made, for example signifying when treatments have been started that should result in optimisation of lipids or blood pressure in time, and visually displaying targets.

> “***So is there a way that once you've seen a patient, you could almost have a progress bar within CVDACTION because people don't fall out of the category overnight, it takes a while for a lipid-lowering therapy to have the desired impact, it can take a while to optimise patients for various treatments. So is there a way we can see that progress as we go.*** PL1L

> “***One thing maybe it's lacking is it's just got bars, it hasn't got like targets or red, amber, green or something, which is another way of getting those dashboards to really motivate.*** FG5

Suggestions such as these indicate positive engagement with the dashboard and a keenness to see further iterations to support the broader work going forward.

Practice coding errors

A few participants reported instances of patients being erroneously flagged by the CVDACTION dashboard. End-users reported that this led to time consuming searches to determine which patients needed to be recalled.

> “***When we did our vetting of the list, it came up with a lot of people from the care home, but also some people that were paediatric, so it flagged quite a few children, flagged quite a few people that had passed away, but also it flagged lots of people that would have been eligible, but most of them had already been seen recently, already had things done already, had medications changed or approached. So the time to vet the list took longer than it did to do any other part of the project.*** FG21

> “***I found that sometimes the dashboard hadn't picked up the latest blood pressure, so in fact we had managed to sort out their blood pressures and they were getting much better blood pressures than the dashboard was telling me, so actually work to sift out patients, I think I've managed to go through 350 sets of notes before I found 50 patients, so that was a huge amount of work.*** FG20

When the implementation team investigated these issues, it was found that errors in the coding of primary care data were the cause – the CVDACTION dashboard was correctly flagging people who had been incorrectly coded by practice / PCN staff. This provides a useful lesson for sites that choose to adopt CVDACTION in the future, as the accuracy of the dashboard is dependent on the accuracy of the underpinning data. Sites may wish to develop a clear understanding of their coding practices as part of implementation preparations for adopting CVDACTION. This also demonstrates the value of having an implementation team who can support the exploration of implementation issues.

Exception codes

Several focus group participants from different sites questioned why the CVDACTION dashboard was not sensitive to exception codes (for example indicating patients who had very recently declined statins or whose clinical condition meant they could not be prescribed statins) which could result in additional work for staff who would need to check clinical records. Participants asked whether exception codes could be filtered out in future iterations of the dashboard.

> “***I've noticed like lots of patients I've already spoken with them and they've already been on statins, but they've been unable to tolerate them and I think they've still come up on the dashboard. So it's going back again and again and calling them again and having that discussion. So I don't know if that could be also changed so that the dashboard includes the exemption [sic] codes.*** FG6

> “***Not all these patients need a review, like you may have reviewed them, but they may be so frail that there's no point pushing those meds further and you have to keep going back and seeing the same list. It would be nice that you could just sort of mark them as reviewed so that the code in the notes would take them off that dashboard.*** FG5

Members of the programme team explained that it is deliberate that CVDACTION does not incorporate exception codes as these are established for performance management and payment purposes. The presence of an exception code does not necessarily indicate that a recent or comprehensive conversation has been had with the patient, with pros and cons examined and alternatives considered. For some patients it will be clear that further discussion is not indicated and the CVDACTION team advised local sites that this can be established in desktop reviews to triage patients before appointments are arranged.

Viewing multimorbidity

Some participants reported an inability to link together data across multiple pages or conditions which made it difficult to understand comorbidities efficiently and created additional work.

> “***At the moment you can only take a singular view. So you can only look at one of the six cardiovascular risk factors and look at patients affected by that one factor. If you could aggregate that and get a cumulative view of, you know patients who have AF as well as hypertension as well as lipids, that would be very, very helpful.*** FG19

> “***There were a few issues with lack of concatenated data or concatenated lists. We struggled to select conditions across multiple pages or boxes, and that made it difficult to produce a comorbidity patient list for actioning and operationalising. What we found we had to do was export lists individually and merge them separately in a different application, which certainly added to that administrative workload … having said that, it was still an improvement over EMIS.*** KI10

Some specific indicators included in the CVDACTION dashboard do incorporate multimorbidity to a limited extent, but this functionality does not enable the breadth and flexibility of defining multimorbidity in the context of CVD prevention indicated as being desired by end-users.

Members of the programme team indicated the intention to ensure that future versions of the CVDACTION dashboard enable users to select indicators across different health condition pages of the dashboard and therefore generate lists of patients with multimorbidity.

Integration with other systems

A number of participants suggested that ideally, the CVDACTION dashboard would be better integrated with electronic patient record systems such as EMIS and SystmOne and patient messaging services. The CVDACTION dashboard identifies patients who are at risk. The work needed to contact identified patients and record relevant information about the care offered or provided must be done using other systems.

> “***It doesn't directly integrate, which is always the key issue. Therefore, you're doing a dashboard and then doing the work somewhere else.*** FG21

> “***We obviously have other tools that you can text the patient and they can text you back. Using the approach that we've been advised to use, the pharmacists have to do individual calls to individual patients, which I think is very time consuming. And if we're doing population health, we should be thinking how we do it at scale in a clever way rather than having to, you know, do the same thing for 1000 patients. It doesn't really work well with how we'd like to operate.*** FG5

> “***With the dashboard we have patient lists on there, but our call handling team are unable to use that list because there's nowhere on there they can document that they've tried to call a patient or there's no way that we can follow up with that. So if the dashboard could have that built into it, it would be widely more widely used and we wouldn't have to rely on Excel spreadsheets.*** FG2

Post-processing and presentation of dashboard derived data

The need for additional post-processing of dashboard derived data, for example to ensure that patients did not appear more than once on the exported list, was a burden for some end-users. The need for further automation within the process was therefore highlighted.

> “***The post-processing described ate into that time saved, and so really the operation was still the same length of time, it just went a slightly different route and really we need to be shortening that route and automating where possible.*** KI10

Participant KI10 also highlighted that many of the indicator names included special characters (non- alphabetic or numeric characters, e.g. punctuation marks, for example ‘BP>180/120’) and this had complicated the process of exporting data into Windows compatible formats such as .csv or .xlsx. They suggested a different system for labelling indicators to facilitate communication with colleagues and analytics.

> “***We couldn't export patient lists with special characters. So that included: back slash, forward slash, semi colon, asterisk, question mark, quotation, less than, more than and splitters. We could run them, but we couldn't export them to a Windows operating system because it refused to save the file if it contained a special character, but over half of the 87 searches were named including special characters. (...) improved labelling of conditions and cohorts to avoid things getting lost in translation, especially when writing emails to colleagues, as the current labels are long and many sound similar. If the labels are abbreviated and coded numerically, that’s easier to digest from an analytics perspective.*** KI10

One focus group participant, who was not a user of the CVDACTION dashboard but who received the patient lists generated by the dashboard to enable patient recall, described the exported lists as *“messy and a bit chaotic”* (FG1) which is likely to be a product of the issues with special characters when exported into, for example, a .csv format.

Dashboard end-users are a relatively small group

The focus groups revealed that a relatively small number of staff within pilot sites had hands on experience of using the CVDACTION dashboard. Often administrative staff and clinicians, who were involved in the delivery of pathways set up as a result of the CVDACTION programme, stated that they had not seen the CVDACTION dashboard. It was suggested that having a small number of dedicated staff who have training in using the dashboard is optimal to make the best use of time and resources.

> “***Spending a good amount of time with a focused number of staff who are dedicated to using the dashboard pays returns further down the line.*** FG19

However some feedback suggested that this was not always a helpful approach.

> “***...there's just a list of patients, I suppose. We don't know why they're there. We've not seen the search, so we don't know what the background is. So we're having to find that which going through the sort of history and the letter and it might only take a couple of minutes, but that's a significant amount of time that we're allocated.*** FG1

This illustrates the need for training and clear communication for all staff being asked to act on CVDACTION data and could indicate that a working knowledge of the CVDACTION dashboard across the workforce could be beneficial.

Learning points

- Many end-users reported the CVDACTION dashboard was straightforward to use and an improvement in comparison to case finding and exporting data within existing primary care systems
- Reported limitations of the dashboard included: inability to easily view patients with multiple cardiovascular risk factors; the time requirement for post-processing of exported data; no integration with electronic patient record or messaging systems
- It is important the quality of local data underpinning the CVDACTION dashboard is understood as a factor in its success and that accountability for addressing this lies with individual deployment site
- Suggestions for improvement included: better integration with existing IT systems; ability to identify patients with multiple risk factors; progress bars or colour coding to demonstrate alignment with targets; ability to record contacts with patients and clearer labelling within the dashboard

Development of pathways and use of the wider workforce

Development of Pathways

CVDACTION is a data tool that generate lists of patients whose care needs optimising. The CVDACTION programme includes support for primary care to do things differently in response to the data. Participants talked about the dashboard being one element of CVDACTION – a tool in the causal chain linking identification of individuals at high risk to improved population health outcomes. In addition to the dashboard, new processes and pathways are required to enable review of patients who have been identified as at risk and take action to help reduce risk through treatment and / or lifestyle advice and support.

> ***It's not just a dashboard, it's a dashboard plus a wider pathway because data alone doesn't drive action.*** PL1L

> ***There needs to be a clear patient journey for them to be optimised and treated.*** PL2E

The new pathways need to be supported by appropriate training for the workforce and resources for behaviour change, self-management and education for both patients and staff. Participants emphasised the importance of integrating the expertise of individuals with relevant lived experiences into the designs of these pathways (discussed further within the **dedicated theme** on patient and public involvement and engagement).

The pathways put in place at pilot sites were entirely locally adaptable, though sites were asked to focus on blood pressure and lipids, offering treatment optimisation, lifestyle advice and support for self-management.

Utilising the wider workforce

Pilot sites had taken different approaches to the structure and staffing of new patient pathways. It was suggested that a key benefit of the new way of working afforded by CVDACTION was the opportunity to optimise staffing and release clinical capacity. The pathways implemented at pilot sites often relied on staffing by pharmacists, Health Care Assistants (HCAs) and the Additional Roles Reimbursement Scheme (ARRS) roles – including social prescribing link workers, health and wellbeing coaches and care co-ordinators. This represents a change from care being provided by General Practitioners, potentially over a series of different consultations, and a hypothesised reduction in cost.

> “***They are kind of utilising the other strengths within the teams. And they've been really encouraged to do that. So I think if you're like in your clinic room, 10 minutes slots, you don't have time to look up yet alone think about would this person benefit from a dietitian appointment or a health coach or a motivational interview or a CBT session or whatever or prescribed exercise. So I think that’s been a big enabler, the space for the ARRS roles to develop and to start to deliver.*** KI8

> “***Sites are using pharmacists largely to do the clinical optimisation, so important it's taking work away from GPs, releasing capacity for GPs and pharmacists who are well able to deliver this, but that they're also taking a structured approach to using the ARRS roles to support the broader proactive care, so education, self-management, behaviour change.*** PL3L

Most sites adopted a clinical pharmacist-led model for treatment optimisation, with pharmacists handling much of the on-the-ground work under the supervision of a GP lead. Other members of the workforce, including HCAs, health and wellbeing coaches, and social prescribers, supported the wider holistic proactive care for patients.

> “***Most have gone with the kind of clinical pharmacist-led model and they've used the funding for that purpose. Normally a GP lead is kind of the key person overseeing it and then the pharmacists are leading the work on the ground and then they're using different members of the workforce to support that. So, a couple are using HCAs, for example, to call the patients in, to check that their bloods are up to date, to request blood pressure readings, then the pharmacist sees them, and then they might also see a health and well-being coach or a social prescriber.*** PL1L

This multidisciplinary approach allowed patients to receive broader support and care from the most appropriate member of the workforce.

> “***We've put the coaching session or the lifestyle and well- being session after the clinical session so that they could have had that point to touch base and have those important facts kind of answered within the clinical setting (…) we're actually offering great sessions, so group discussion and coaching sessions (…) we're also kind of highlighting the peer to peer support aspect of the groups*** FG24

> “***Engagement of the ARRS roles has been a success and a big enabler of CVDACTION – allowing that time and space to be able to have the conversation that they want to have with every patient.*** KI8

Learning points

- New processes and pathways are needed to optimise care for patients identified by the CVDACTION dashboard
- Pilot sites made effective use of a wide range of roles within the primary care workforce to deliver new pathways. Commonly, pharmacists and staff under the Additional Roles Reimbursement Scheme (ARRS), for example Health Care Assistants and Social Prescribers, were involved in delivering patient care
- Engagement of the ARRS roles in supporting proactive, preventive care was cited as a success

Factors impacting implementation

Dedicated implementation support

A range of participants talked about the importance of dedicated (funded) implementation support, highlighting that success of CVDACTION is not just about the dashboard or the pathways, as implementation has a crucial role to play. Implementation support during the pilot came from the UCLPartners Implementation Team, staff within pilot sites and staff from the other Health Innovation Networks in London, Imperial College Health Partners and HIN South London. The support provided included project management, stakeholder engagement, facilitating a culture of shared learning, identifying training needs and providing training and supporting evaluation activities such as data extraction and reporting.

> “***Regular meetings, answering questions, supporting the transformation, providing data, feedback, sharing examples from other sites of how they're managing these things, these are all the glue, the critical glue that will help to make it happen.*** PL3L

The implementation support provided was cited as a factor underpinning the decision to adopt CVDACTION during the pilot.

> “***The fact that UCLP can provide project management support and user end-user support is an incentive for practices to get involved.*** KI4

Participants frequently gave great praise to members of the CVDACTION implementation team and the important facilitatory role that they had played in successful implementation.

> “***The support from [member of UCLPartners implementation team] and team when things aren't working has enabled us to put implement it faster than we would have had if we didn't have that support.*** FG13

> “***I benefited greatly from expert tuition.*** FG19

Occasionally, suggestions were made for ways in which implementation support may have been improved. These included reducing the need to repeat information when things weren’t working as expected, giving firmer guidance around expectations at the start of the programme, and reducing changes to the programme plan.

> “***They've said that working with UCLP has been really helpful, you know, really good, they've been really approachable and work through stuff. But they said that they have had to repeat the same things over and over, you know, the difficulties that they were facing.*** KI8

> “***We was never given a clear guideline at the beginning. We wasn't told how many patients that we needed to see, what categories that they wanted us to start with, a forward plan after that as well. We wasn't given any of that information. So we would go on to a weekly meeting and it would change, which then causes a lot of upsets to the team we have to feed that back to, because one minute we're doing it this way and then the next minute it's all changed and we've got to get this done and we've got to have it done this way.*** FG2

Engagement of leaders and local champions

Participants described the necessity of good engagement with influential leaders at national and regional level and local champions at ICB, PCN and practice level to facilitate implementation, with engagement continuing with suitable replacements when people change roles.

> “***You need both senior system leadership engagement and on the ground leadership engagement and on the ground general staff engagement. Because that way you can build, you get more real world input into your thinking and to your planning and around CVDACTION. But you also get wider engagement and storytelling and narrative around CVDACTION so that the word spreads a bit and people understand what it's about.*** PL3E

> “***I think it's as important to maintain those relationships [with influential leaders] as it is to generate the evidence because you can have the best evidence base in the world but if you've got no one to tell then... it sort of comes hand in hand, don't they?*** PL2L

> “***If we hadn't had those great local champions talking about it and getting excited about it, even though they didn't have it, I think we'd have lost a lot of programme. So having that enthusiasm and them sticking with it once it gets underway has been absolutely phenomenal.*** PL1L

> “***[A local Clinical Director] has basically done it through person skills, an incredibly personable person, very bright, to say they picked up a lot of issues, like I just didn't understand what was going on, was like straight on it. So yeah, that's a real potential point of failure there, If you don't have those people, if it'd been somebody else, yeah, could have fallen over.*** KI8

Technical challenges

Early technical challenges led to significant delays in deploying CVDACTION in the demonstrator sites (see **Background and context**). Some of these related to the intricacies of translation of searches built for GP systems (EMIS and SystmOne) into SQL (structured query language) that would run in population health data systems. This was a steep learning curve for the programme team – *"we didn't know what we didn't know"* (PL1E). The team asked questions and re-established timelines when 'unknowns' were faced to maintain oversight. Issues were also encountered relating to senior support for local Business Intelligence (BI) teams, local information governance requirements, a lack of prior experience in hosting dashboards, and integration with existing systems.

> ***I don't think we really understood how PCNs and ICSs were going to run the searches and populate the dashboard and that the dashboard would need to be hosted somewhere… We didn't appreciate the immaturity also of population health management systems and the different ICSs.*** PL1L

> ***Another challenge was making sure that the BI teams have on their side the senior sign off and sponsorship to be able to dedicate time to this programme because we've found that sort of ebbs and flows where they've got lots of competing priorities.*** PL2E

> ***Every single system has a very different set up and a risk appetite in terms of how they might want to do their IG [information governance] and how comfortable or confident they are in running the searches. There doesn't seem to be confidence generally or competence in hosting dashboards on Tableau and Power BI, that really has taken, I think, quite a lot of hand holding and understanding.*** PL1L

> ***The tech integration is a major issue. Particularly if you're trying to work at scale at PCN level, so you know, you're not working at a practice level. You're used to your clinical information, you play around with it. If you're working at a level up at a PCN level, then there are further integration issues.*** KI8

Implementation timing

At number of pilot sites, the timing of implementation coincided with the end of the QOF year, which created competing priorities for staff and potentially diluted their focus on CVDACTION.

> ***Timing-wise, by the time they got to that early implementation phase it was the end of the QOF year so that just meant that people were trying to focus on two things at once, and it just meant that perhaps they didn't have their full focus on CVDACTION, where they might have done in a different part of the year.*** PL2L

Evaluation

A handful of participants expressed concern that the plans for evaluating CVDACTION were negatively impacting implementation. Sites reported feeling under pressure to provide data for the evaluation. Some sites suggested they had altered their approaches to meet evaluation timelines, which may have led to compromises in the programme's implementation.

> ***One PCN has decided because as they were getting late starting, that they've kind of gone straight, bring everyone into the pharmacist as quickly as possible, and then see the HCA later so that we're getting people optimised sooner. There's a slight concern about not seeing the numbers within the time period for the evaluation.*** PL1L

> ***We were also told that we had a year for this project and now the evaluation is coming up at the end of June and there's a lot, there's been a lot of pressure on us to get the numbers as they expected to be done in a short period of time and we did not realise that was the case. So that to me has been a massive pressure within the project. If we would have had a clear scope at the beginning of what was expected, we could have fed this down to our teams which would have made the project more successful as well. We would have all known where we stood and we wouldn't have had this short, sharp change in the middle of it where we have to deliver over 100 patients a week.*** FG2

The pressure to produce data within the evaluation timeframe also influenced the focus on specific conditions, such as hypertension, potentially at the expense of a multimorbidity approach.

> ***Aspirations [regarding a multimorbidity approach] had to be tempered when the technical issues and IP issues started to kind of become difficult to manage, and with the significant pressure on producing data within the evaluation timeframe. So if there'd been more time, there might have been more of an effort in meeting the expectations of multimorbidity, rather than just 'better get on with doing hypertension because they need some data'.*** KI8

Contrastingly, one focus group participant felt that meeting the evaluation requirements was a helpful motivator and facilitator to implementation.

> ***What I found helpful with this programme is you've given us dedicated time to work in hypertension and that's something we haven't had before and it's a focus. And [name] has had to push all of us every week to send you guys data, which I know is tiring on all parties, but obviously it's in order to get us to do the work which is helping patients, which is fantastic.*** FG5

Learning points

Participants recounted several factors that impacted implementation of CVDACTION:

- Dedicated implementation support was crucial to successful implementation
- Engagement of leaders at regional and national level, and engagement of champions to spearhead implementation at local level, was essential
- Technical challenges relating to the scripting of underpinning searches and IT integration had significantly delayed implementation
- Some sites had to begin implementation during the QOF reporting period which meant there was less time available to focus on CVDACTION
- Concerns were raised that the evaluation of CVDACTION was putting undue pressure on staff at sites and negatively influencing implementation decisions, for example by dissuading teams from taking a multimorbidity approach

Health inequalities

Targeting populations who are most in need

The CVDACTION dashboard can filter data by factors such as deprivation, ethnicity, learning disability and severe mental illness, theoretically allowing groups who are usually disadvantaged by traditional models of healthcare to be prioritised.

All interviewees and focus group participants were asked for their perspective on the potential for CVDACTION to improve health inequalities. The ability to actively target those facing health inequalities was frequently praised and described as novel and a change to existing working practices.

> “***I think obviously in our patch it's going to definitely help with the health inequalities, cause you know, we're one of the most deprived boroughs in London. So you know, anything that helps with the cardiovascular risk is useful.*** FG14

> “***One of the key attributes of the offer, if you like, is to be able to focus on those groups [facing health inequalities] and highlight them, find them, intervene in an appropriate way.*** KI5

> “***It was good to have more of a focus again on these hard to reach patients. I think that was good. And I think that's something as a practice, we're going to have to kind of consider how we take that on. So just kind of getting our focus back on these patients again was a good thing I think.*** FG20

In one PCN, the CVDACTION dashboard was used to identify and prioritise Black individuals at high risk first, in accordance with local data that had demonstrated significant inequalities faced by this group.

One participant (FG12) suggested it would be helpful to be able to see a list of people who have previously declined to engage or declined treatment, as this may be a health inequalities issue with certain groups of people being more likely to decline. Knowing who these people are is an important first step towards designing services that will help to reduce health inequalities.

Understanding and addressing barriers to access

Several participants discussed the barriers to healthcare access faced by those most in need and how CVDACTION has highlighted some of these issues. These barriers necessitate additional resources, for example interpreters and extended appointment times, to ensure effective care.

> “***It's really highlighted some of the barriers and challenges as to why people haven't been optimised to date...patients who are in their 40s or even younger...whose blood pressure has not been managed for three years due to massive language barriers.*** PL1L

> “***We have access to an interpreter that the clinicians can use, and we generally book a double appointment if an interpreter is needed.*** FG2

Moreover, some sites took proactive steps to engage seldom-heard patients. For instance, in one area Community Health Workers have made home visits to understand why people are reluctant to attend GP appointments or take prescribed medication.

> “***The Community Health Workers literally going door-to-door to find out why these people don't want to take medicine or join a GP appointment.*** PL1L

Again, understanding barriers to access is an important first step towards designing services that meet the needs of those who are most in need. However, it is noted that this is not a straightforward task nor one that can be tackled by CVDACTION in isolation.

> “ ***How do you repair and rebuild some of that trust so that people are not mistrustful, not sceptical, are willing to engage with health systems, are willing to take medication… it has to sit alongside a much broader set of community-led interventions.*** KI9

The inverse care law

A couple of participants cautioned that in order for CVDACTION to effectively reduce health inequalities, it must be implemented with appropriate support and with suitable patient pathways in areas where inequalities are most pronounced. Without such support and tailoring, there is a risk that those with the greatest needs may not benefit from the programme.

> “ ***Without this [implementation support]…there's a risk that we will worsen the inverse care law and drive up health inequalities.*** PL3E

> “ ***Anything where you're sort of delivering a more preventative, proactive offer can widen inequalities, because we know the nature of the populations that often respond to and engage with those kind of proactive offers to be called in to have the reviews are not necessarily the groups that we are most keen to bring in. So something like CVDACTION has to sit within a kind of wider ecosystem of inequalities education and thinking about what else needs to sit alongside it to really optimise, engage and reach those particular communities.*** KI9

Training and education on health inequalities

It was evident during qualitative data collection that some participants did not have a clear understanding of the meaning of the terms health inequalities or treatment inequity. This points to the need for training and education as the ability to tackle health inequalities relies in part on the ability to identify them.

Learning points

All participants were asked for their perspective on the potential for CVDACTION to reduce health inequalities:

- The ability to filter for factors such as deprivation, ethnicity, learning disability and severe mental illness within the CVDACTION dashboard was frequently praised
- Some pilot sites had targeted groups facing inequalities first
- It would be helpful if the CVDACTION dashboard had the ability to filter for patients who have previously declined services or treatment to examine whether health inequalities may play a role in the decision to decline
- Known barriers to access necessitate additional resources, for example interpreters and extended appointment times
- Further work with communities is needed to understand currently unknown or less well-known barriers to access
- It is important that tools like CVDACTION are used in areas where health inequalities are most pronounced, otherwise it could inadvertently serve to perpetuate inequalities
- Offering the primary care workforce additional training on health inequalities and treatment inequity may be beneficial

Patient and Public Involvement and Engagement (PPIE)

Creation of pathways that meet patients' needs

The involvement of patients and the public in shaping delivery of CVDACTION was a key pillar in the overall CVDACTION implementation plan and pilot sites were given dedicated funding to support this. The funding was provided with the aspiration of creating pathways that are relevant and responsive to patient needs, in particular meeting the needs of those who are most disadvantaged.

Members of the programme team emphasised the need to involve patients in developing *"pathways that are relevant to patients and usable and address their needs"* (PL3L) and stressed the importance of pathways that are *"socially and culturally appropriate"* (PL1E).

Communicating effectively with patients about their risk and treatment options was identified as a significant factor in achieving the programme's intended outcomes. Participants noted barriers such as patient reluctance to take medications and the need to do work with patients to understand the reasons underlying this.

> ***...it's the bigger picture, how we can create better resources and better understand patients' challenges, and again particularly around why people don't take their medications because there are so many people, as you can see on the dashboard, who have hypertension and aren't on target.*** FG5

> ***There's been other examples around the kind of statin hesitancy, people just not wanting to take statins and just being quite difficult to contact and actually what we've seen through this is the systems leaning into really trying to understand 'why don't you want to come in? Why don't you want to take a statin?' What else can we do to kind of, you know, alter or have a conversation around that?*** PL1L

Variability in engagement

The level of involvement of patients and the public in shaping CVDACTION was varied across pilot sites. It was notable that several focus group participants said they hadn't given any consideration as to how patients might be involved in developing pathways and couldn't see how this would be of benefit.

> ***I don't think we have [involved patients and the public] no, because the path is not really differed. We've actually tailored our pathway to how we've been doing recalls in the past. So it's not really affected patients as much I would say.*** FG26

However, other sites had undertaken significant work to obtain feedback from public members. At one site, patients had been asked for their feedback on the care they received during clinics set up for CVDACTION.

> ***On some of our face-to-face sessions, we have a member of our team goes to the clinics and speaks to the patients. Afterwards [name] gains patient feedback from them and then we will review that patient feedback.*** FG2

One factor underpinning this variability was the altered timelines for implementation of CVDACTION at some sites caused by issues with technical integration of the dashboard.

> ***It's [PPIE] been quite variable...with the time pressures of CVDACTION...the scope of patient and public involvement and engagement has shifted and been crunched quite a bit.*** PL6

Where it hadn’t been possible to carry out originally intended PPIE activities, there was a concern that the pathways developed would not be as impactful as they could have been.

> “***I mean, it's [PPIE] all been incredibly rushed. Yeah, the whole process. Yeah, deadlines around evaluation, I understand why they're there, not allowing that kind of proper engagement and thinking through what will work best here. So yeah, I guess it's probably the best it can be within the time scales.*** KI8

Challenges and enablers

Encouraging sites to prioritise PPIE amidst other competing demands (for example QOF reporting, supplying data for the evaluation of CVDACTION and the general demands of providing primary care) was cited as a major challenge, particularly as co-ordinating meaningful engagement with public members can be time and resource intensive.

> “***Getting sites to prioritise PPIE amongst multiple other competing priorities has been the biggest sticking point.*** PL6

> “***A further challenge was slow and low engagement from patients, which required time, effort and perseverance from PCNs. Due to GDPR, we had to rely on PCNs to contact their patients for recruitment, which proved to be resource intensive. One PCN reported having to email over 270 patients for 23 people to express interest and another reported five members of staff having to encourage patients to get involved for only five patients to participate.*** Note within a CVDACTION PPIE report

There were perceived differences in enthusiasm and commitment across sites, with some viewing PPIE as a tick-box exercise rather than a meaningful component.

> “***There is still that culture that some organisations will see it as a tick box exercise.*** PL6

However, the dedicated funding for PPIE was viewed a key enabler and it was suggested that many of the pilot sites would not have engaged with patients, and patients may have been less inclined to participate, had this not been available.

> “***Funding to pay participants for their contributions is key, many patients reported expressing interest because of the incentive.*** Note within a CVDACTION PPIE report

It was suggested that finding different ways to engage with patients had widened participation.

> “***Offering multiple methods of engagement resulted in diverse insights gathered. Hosting a focus group in-person at one of the GP practice allowed people who may not normally engage with online activities to join. The PCN offered the physical space and organised booking the room, which enabled this to happen. Individual telephone interviews allowed people who may lack digital literacy to participate. This was enabled by PCN staff speaking with individuals about the project while they were attending existing appointments.*** Note within a CVDACTION PPIE report

Further, participation from the Health Innovation Networks (HINs) in London was seen as a key enabler for effective PPIE. These networks, familiar with their local areas and communities, provided valuable insights and connections.

> “***Those HINs know their local area a lot better than us...that's really helpful in terms of enabling high quality PPIE.*** PL6

The presence of local champions who had understanding and prior experience of PPIE, or who had their own relevant lived experience, was also an enabler of PPIE.

> ***A key enabler to the success was a local champion in [location] who carried out the interviews and participated in the focus group discussion. Their involvement was invaluable.*** Note within a CVDACTION PPIE report

For future implementation, training is recommended to enhance PPIE efforts.

> ***There is a need for training to support people, to help them understand actually what PPIE is...and then understanding how to design good meaningful PPIE.*** PL6

Learning points

- Pilot sites were given funding to support Patient and Public Involvement and Engagement (PPIE) – the aspiration was that this would support the design of pathways that are acceptable and meet people's needs
- The extent of PPIE varied across pilot sites. The shortened timeline for implementation of CVDACTION was felt to be a significant factor in scaling back PPIE plans. This led to a concern that the pathways developed may not be as good as they could otherwise have been
- The competing demands on time and resources at sites were a barrier to meaningful PPIE
- Some people did not believe that PPIE would add value – a PPIE training offer may be helpful
- Health Innovation Networks across London supported PPIE efforts – this was a significant facilitator
- Local champions of PPIE at sites were also an important enabler

Perspectives on impact

Impact on clinical outcomes

Participants commented on the impact they felt CVDACTION was having on clinical outcomes during the pilot, with a number of sites suggesting that positive progress had been made, especially with regards blood pressure optimisation.

> ***It has definitely helped us to identify patients that are at high risk for blood pressure as well as lipid optimisation.*** FG19

> ***We are seeing an initial indication that management for some patients is becoming more controlled, particularly with hypertension patients.*** KI8

> ***There are hundreds of patients being seen weekly who might have not been seen. If we were going by month of birth recall who might not have been seen for one, two, three more months even though they're in this sort of high risk condition, so I think it is delivering immediate benefit, giving the patients the attention that they need as quickly as possible, where that might not have been happening before.*** PL2L

An additional short-term benefit was awareness raising of heart health. It was theorised that in the longer term these changes would result in a reduction of heart attacks and strokes.

> ***Even if patients aren't booking into clinics, the concepts of CVD and their health is on their radar again because we've used the dashboard to contact people.*** KI10

> ***It's saving lives, less strokes, less heart attacks. Making people aware, I think also making the community aware about what their health looks like.*** PL7

One participant reported that less progress had been made in relation to commencement of lipid lowering therapies. The implementation team planned to ascertain whether additional training would be helpful to support conversations around lipid lowering therapies.

> ***We've seen progress on the blood pressure optimisation but less on lipid lowering therapies. So I just wonder again if there's a confidence issue or a competence gap in terms of cholesterol. So we are looking at how do we provide additional training to ensure that people have got access and feel confident in talking to patients about their cholesterol.*** PL1L

Wider impacts

Beyond clinical outcomes, participants discussed broader impacts of the CVDACTION programme.

Members of the programme team talked about the potential for CVDACTION to be a *“trailblazer”* (PL1) for using other clinical datasets to proactively identify people at risk and optimise care.

Programme Leads also suggested that CVDACTION had afforded a good opportunity to work with other Health Innovation Networks across London on a tangible project, providing an exemplar for future collaborative work.

One participant suggested that the focus on optimal use of the workforce had brought wider benefits to pilot sites in terms of aiding their capacity planning.

> ***It indirectly influenced my recruitment plans in a positive way, so it helps me stratify actually when I'm looking through 10 CVs for a pharmacist, because we've got a huge number of hypertensive patients, somebody who's got previous experience with hypertension or somebody who's a prescriber. I used the dashboard in that way as well to influence my recruitment to the PCN.*** FG19

The potential impact of the programme in promoting patient and public involvement and engagement (PPIE) was also emphasised.

> ***Maybe one of the teams that we've worked with would have done PPI independently in CVDACTION, if it hadn't been kind of like driven and part of the programme and built in, I think only one of them would probably have done it naturally. And so actually that's quite a bit of a victory to think all of these sites will be doing PPI to some extent. And so hopefully we will be starting to change the cultural perception by taking some of them on the journey and building some of that knowledge.*** PL6

CVDACTON was also considered a prototype for demonstrating the feasibility of working in new ways.

> ***I think over one year I don't really anticipate a huge amount of improvement clinically. But if there's a cultural shift, or a recognition beyond practise level that there's different ways of doing things, that would be a big win for us.*** KI8

Learning points

- Participants reported that improved clinical outcomes, particularly blood pressure optimisation, had been observed during the pilot
- It was suggested that CVDACTION had helped to raise awareness of heart health amongst communities
- One Programme Lead reported that less progress had been made in relation to commencement of lipid lowering therapies – plans were in place to offer further training

CVDACTION was considered an exemplar for:

- Demonstrating how clinical datasets can be used to proactively identify people at greatest risk and optimise care
- Making optimal use of the primary care workforce
- Showing the feasibility of working in new ways
- Educating sites on the potential impact of patient and public involvement and engagement
- Providing an example of cross Health Innovation Network collaborative work

Implications for sustainability and wider roll out

Evidence base and policy support

“A robust evidence base is needed to show the impact of CVDACTION on patient and service outcomes for it to be sustained at pilot sites and rolled out more widely. This evidence must be effectively communicated and should include *“a good health economic assessment”* (KI4).

> ***...[people need to] see people they respect using it and championing it. They want to hear about it, they want to see that it's evidence based.*** PL1E

> ***I think it really needs the evaluation piece demonstrating the benefits, demonstrating the impact ... what does this mean in hard numbers.*** KI9

The necessity for national policy support and incentives was also highlighted.

> ***If this is going to happen at scale, it would be supported by national policy and national incentives.*** PL3L

Resources

The ‘core pillars’ of CVDACTION delivery were defined as: the CVDACTION dashboard, the pathways put in place for patients identified at risk by the dashboard, patient voice in shaping pathways, clinical resource for delivering pathways, project management and implementation support, business intelligence support / IT support, and local clinical ownership and leadership.

While the pilot of CVDACTION was described by one participant as a *“well resourced project”* (KI5), participants were clear that dedicated resource for each of these elements would be needed to support any further roll out of CVDACTION.

If CVDACTION is shown to be effective in reducing heart attacks and strokes, a reduction in the cost of treating heart attacks and strokes within secondary care should follow. One participant hypothesised that savings could be reinvested in preventive care.

> “***If we really deliver a step change in the management of these conditions, primary care and prevent those heart attacks and strokes, then perhaps funding could be mobilised from those acute trusts to fund some of that preventive work.*** PL3L

Local leadership

The importance of local ownership and leadership was highlighted as a driver of sustainability, with a focus on allowing flexibility to address local priorities. Without local leadership organisations would likely struggle to make the necessary cultural shift required to embed new ways of working.

> “***You just can't underestimate the power of a great champion, can you? They just they make these things happen.*** PL1L

> “***I think we should encourage flowers to bloom in different areas, people to do what they're interested in because we're getting better local ownership and leadership, and it will complement what they're doing.*** PL3E

Technical requirements

Technical expertise and support appear prerequisite for sustainable implementation and wider rollout. Issues with the CVDACTION dashboard, as outlined in the theme on **design, quality and ease of use of the dashboard**, need to be ironed out prior to wider implementation. Similarly, robust plans for local information governance and dashboard hosting need to be made in the earliest phases of planned implementation.

Learning points

To support sustainability of CVDACTION at pilot sites and to build the case for wider roll out the following are required:

- An evidence base that demonstrates impact of CVDACTION and provides a health economic evaluation
- Effective communication of this evidence base
- National policy support
- Resources for: maintaining the CVDACTION dashboard including business intelligence support / IT support; developing and delivering patient pathways including clinical resource and integration of patient voice; project management and implementation support; and local clinical ownership and leadership
- Updates to the CVDACTION dashboard to improve functionality and user experience
- Robust local information governance and dashboard hosting plans

7 Discussion and conclusions

7 Discussion and conclusions

In this section we discuss the findings in relation to the relevant **key evaluation questions** that were developed at the outset of the programme. We then reflect on the evaluation approach taken, including consideration of the strengths and weaknesses of the work, and present conclusions.

7.1 Is CVDACTION acceptable, feasible and appropriate?

Acceptability refers to the degree to which an intervention is agreeable, palatable or satisfactory. The CVDACTION programme, comprising a dashboard, implementation support and new pathways, was broadly acceptable to the participants who took part in this evaluation. Participants particularly welcomed the 'cultural shift' to identifying individuals according to level of risk of CVD and believed that heart attacks and strokes would be prevented as a direct result of the programme. The provision of dedicated implementation support and funding to support local implementation were foundational elements of successful adoption of CVDACTION that enhanced acceptability of the programme.

However, demonstrator sites had experienced challenges with technical integration and suggestions for improvement to the dashboard were given. Participants wished for better integration of the CVDACTION dashboard with electronic patient record and messaging systems and improved functionality, for example facilitating the ability to view patients with multiple cardiovascular risk factors. This feedback is being considered by the implementation team for future iterations of the dashboard.

Feasibility relates to the extent to which an intervention can be successfully used within its intended setting.[19] Findings from the interviews and focus groups show that the CVDACTION dashboard was used effectively across all participating PCNs to identify patients at greatest risk of CVD and that pathways were successfully developed to optimise care of these patients. Implementation of CVDACTION was made feasible by provision of dedicated implementation support, funding for additional clinical support and the ability of individual participating PCNs to develop pathways relevant to their local context. Pathways commonly made use of a variety of roles within the primary care workforce; this was seen as a key enabler for sustainable implementation.

Appropriateness is the perceived fit, relevance or compatibility of an intervention within its intended setting and / or to address a particular issue or problem.[19] Evaluation findings highlighted that CVDACTION afforded a novel way of utilising the primary care workforce and targeting those who are most in need with preventive healthcare, demonstrating compatibility with local and national priorities and incentives.

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[19] Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, Griffey R, Hensley M. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health*. 2011 Mar;38(2):65-76. doi: 10.1007/s10488-010-0319-7. PMID: 20957426; PMCID: PMC3068522

7.2 Did CVDACTION, together with implementation support, deliver transformation as intended?

Transformation in healthcare has been defined as "the emergence of an entirely new state prompted by a shift in what is considered possible or necessary which results in a profoundly different structure, culture or level of performance".The King's Fund highlight that transformation is "multi-layered, messy, fluid and emergent. It is not merely about changing how a service operates, but also about shifting mindsets, changing relationships and re-distributing power".[20]

Our qualitative findings suggest that the CVDACTION programme has created a cultural shift by enabling primary care to target people facing inequalities and those with the greatest risk of CVD with care that could prevent heart attacks and strokes. Furthermore, CVDACTION facilitates involvement of the wider primary care workforce to work in new ways to deliver novel care pathways. The implementation support provided alongside the CVDACTION data tool and new patient pathways was deemed essential to support transformational change.

The quantitative findings pointed to early signs of improved performance on optimisation of blood pressure and lipids at some sites, however, challenges with data quality and completeness limited the ability to produce a robust analysis.

7.3 Does CVDACTION enable targeted work on reducing health inequalities?

Health inequalities are systematic, avoidable and unfair differences in the health of different groups of people.[21] All of our focus groups and interviews included questions on perceptions of the ability of CVDACTION to reduce health inequalities. The ability to use the CVDACTION dashboard to filter according to deprivation, ethnicity, learning disability and severe mental illness was described as 'game changing'. Quantitative analysis suggested that some PCNs may have seen greater progress in the optimisation of non-White groups. However, further efforts (in close collaboration with public members) may be needed to ensure that new care pathways are accessed optimally by those facing health inequalities to avoid inadvertently widening inequalities. In 2018 the British Heart Foundation and Public Health England commissioned a synthesis of findings from 10 international cardiovascular disease prevention case studies which concludes *"going to where the people are, empowering individuals and the wider community with information and an understanding of CVD risk, that they can monitor themselves, is clearly important in the success of the programmes."*[22] Explicitly incorporating such principles into the CVDACTION programme going forward may be useful in supporting participating sites to consider in more depth how new care pathways may impact health inequity at the same time as CVD prevention.

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[20] The King's Fund. Transformational change in health and care: reports from the field. Available from: Transformational Change In Health And Care | The King's Fund (kingsfund.org.uk). Accessed 16.08.24

[21] The King's Fund. Health Inequalities in a nutshell. Available from: Health inequalities in a nutshell | The King's Fund (kingsfund.org.uk). Accessed 19.01.25

[22] International Cardiovascular Disease Prevention Case Studies. Available from: https://www.sph.nhs.uk/wp-content/uploads/2018/11/final-cvd-prevention-report-08-oct-18.pdf. Accessed 19.01.25

7.4 What investment was required to implement CVDACTION?

The analyses of investment covered central support costs (the support provided by the UCLPartners implementation team) and PCN implementation costs (utilisation of resources by demonstrator sites to deliver CVDACTION).

The central support provision largely consisted of staff costs with minimal non-pay costs. Central support included overarching (cross-site) and per-site set up costs for onboarding demonstrator sites, and implementation support provided throughout the programme by the UCLPartners team (e.g. support for recruitment, pathway co-design, pathway development, support with dashboard access and outputs, primary care workforce training, Patient and Public Involvement and Engagement (PPIE), general troubleshooting and running communities of practice for participating PCNs). The total cost of central support was estimated at £317,504. However, this figure is unlikely to reflect future roll-out expenses, as both staff and setup costs could be lower now that implementation has been successfully tested and learning generated. Nevertheless, qualitative findings highlighted the importance of continued investment in dedicated resource for infrastructure development and implementation support should CVDACTION be spread more widely to support successful and sustained transition to new models of care.

Participating PCNs tailored their implementation models to their local contexts. The estimated cost per patient entering the pathway ranged from £21.34 to £46.85, in the sample of different models we examined. Staff costs for patient treatment delivery could potentially be reduced, as a significant portion of PCN delivery costs stemmed from hiring additional clinical pharmacists for patient treatment optimisation. In broader implementation, existing primary care clinicians could repurpose their time to prioritise seeing patients who have been recalled based on level of CVD risk as identified via the CVDACTION dashboard (as opposed to current ways of working where recall is organised by date of birth), and more staff in ARRS roles could be deployed to support behaviour change.

7.5 Did CVDACTION result in increased treatment optimisation rates, such as blood pressure and lipid control?

The analyses were unable to support firm conclusions about the impact of CVDACTION on the optimisation of blood pressure and lipids due to challenges with data quality, completeness and limitations with the analytical approach. However, the cohort analysis we were able to undertake showed evidence of a ‘step change’ in some sites, with some indication from the early difference in difference analysis that this was attributable to CVDACTION. Despite the limits to the quantitative evidence at this time, it remains plausible that CVDACTION could deliver the intended significant improvement in patient outcomes. Primary care staff feel confident that there are clear logical links between adoption of CVDACTION and improved treatment optimisation rates. Future analyses of the impact of CVDACTION should continue to track outcomes for defined cohorts of patients, rather than simply observing the number of patients for each indicator at a specific point in time, to ensure that turnover of patients does not impact accuracy of the results.

7.6 Strengths and limitations

The quantitative analyses were limited by data availability and quality. However, the approach to tracking defined cohorts of patients to measure improvements in outcomes was successful and we recommend that this approach is taken in future evaluations of CVDACTION.

In total, 10 individuals participated in individual interviews and 30 individuals took part in focus groups. Many more people than this were involved in the CVDACTION demonstrator programme, thus the full range of perceptions and experiences will not have been captured. However, this sample size is typical for qualitative work which prioritises depth of understanding over breadth. The sampling of participants was purposive, covering a variety of professional roles and spanning all demonstrator sites. The volume and depth of data collected was adequate to provide answers to our key evaluation questions. Use of an evidence-based framework, the Consolidated Framework for Implementation Research12, to guide data collection and initial analysis was a particular strength of the qualitative work.

As is common for real-world transformation programmes, the timelines for implementation and therefore evaluation of CVDACTION shifted during the course of the programme (reasons for this are discussed in the **Context**). We were able to extend the quantitative data collection period for several months beyond the originally anticipated timeline. However, with the benefit of hindsight, we would have undertaken the ‘late phase’ qualitative data collection at a later point in time, for example in the autumn of 2024 rather than in spring/summer 2024, to gather perspectives once CVDACTION had been afforded a longer time to bed-in. When interpreting the findings, it is therefore important to remember that qualitative data were collected in the early days of implementation of a complex programme, and the qualitative findings are not completely synchronous with the quantitative findings.

Reflections on evaluation approach

As outlined in **section 2.1**, our model of evaluation involved colleagues from UCLPartners, who have specific evaluation expertise, focussing solely on delivering the evaluation – colleagues who worked on the evaluation had no role in either developing or implementing CVDACTION.

However, evaluation team members met with colleagues who were responsible for implementation frequently (at least weekly) which enabled the evaluation team to gain a deeper understanding of how CVDACTION was being implemented and the barriers and facilitators to this.

A further advantage was the ability to use early evaluation findings to shape implementation. For example, as a result of evaluation feedback:

- The implementation team provided sites with guidance to explain why people with exception codes (e.g. those who had previously declined statins) should not be excluded from CVDACTION dashboard outputs.
- Further discussion around health inequalities and how CVDACTION may help to ameliorate these was built into support / training sessions.
- The implementation team revised an existing Microsoft Form so that colleagues working on the ground on implementation of CVDACTION could provide ‘micro feedback’ regularly rather than sending multiple emails to members of the UCLP implementation team.
- The implementation team discussed the possibility of a WhatsApp group or Teams group to share learning across sites implementing CVDACTION rather than relying solely on communities of practice.

Reflexivity

It is important to acknowledge the impact that our chosen evaluation approach may have had on the findings. Members of the evaluation team regularly reflected on their own experiences, perceptions and biases and how these may have shaped the evaluation findings. Of particular note is the fact that the evaluation team are members of the organisation responsible for developing and implementing CVDACTION and have working relationships with colleagues responsible for implementation. During data collection, analysis and reporting, evaluators were cognisant of the need for neutrality and transparency. Having multiple (five) experienced evaluators involved in data collection and checking of the findings helped to ensure that the findings reported were an accurate reflection of the quantitative and qualitative data. We believe the result is a report that openly reflects on challenges and concerns as well as more positive findings, thereby enhancing the ability to learn.

7.7 Conclusions

CVDACTION is perceived as acceptable and appropriate by primary care staff. CVDACTION provides a feasible way of identifying people at highest risk of CVD, including those facing inequalities, enabling care to be optimised and lifestyle support to be given.

Key facilitators for implementation included:

- Support for the programme from clinical and system leaders and local champions
- Demonstrable alignment with local and national policies and incentives, e.g. QOF
- Dedicated implementation support
- Optimal use of the primary care workforce, including the ARRS roles
- Recognition that those most in need could be targeted with preventive healthcare
- Providing additional resources to address known barriers to access, for example providing interpreters and extended appointment times
- A dashboard that is relatively straightforward to use and perceived to be an improvement on case finding using existing systems
- The involvement of patients and public members in providing feedback on new pathways was valued by some. The dedicated funding for PPIE, collaborative working with HINs across London that provided support for PPIE, and local champions for PPIE at demonstrator sites were important facilitators for meaningful public engagement

Challenges for implementation included:

- Early engagement with senior decision makers who would make decisions about whether or not to adopt CVDACTION did not include the UCLPartners implementation team. It was felt this made it harder to communicate the value and compatibility of CVDACTION and caused delays to implementation across the London demonstrator sites
- Technical issues relating to the logic underpinning searches which initially caused significant delays to implementation
- Limitations of the dashboard which impacted some end users' perceptions of acceptability and feasibility included: inability to easily view patients with multiple cardiovascular risk factors; the time requirement for post-processing of exported data; and a lack of integration with electronic patient record or messaging systems

- Some sites had to begin implementation during the QOF reporting period which meant there was less time available to focus on CVDACTION
- Concerns were raised that the evaluation of CVDACTION was putting undue pressure on staff at sites to optimise high numbers of people in a short space of time. This may have negatively influenced implementation decisions, for example by dissuading teams from taking a multimorbidity approach
- Competing demands on time and resources and inexperience of some staff made it difficult to incorporate extensive involvement of patients and the public in developing and providing feedback on new pathways. Additional work with public members is needed to understand and overcome barriers to access

For CVDACTION to be sustainable, and to support the case for wider roll out, additional evidence demonstrating positive impact of CVDACTION on clinical outcomes and a favourable health economic evaluation will be required. In tandem with the findings of this implementation evaluation, this evidence base would need to be effectively communicated and built into policy. Ongoing implementation of CVDACTION would need to be adequately resourced. This would include resources for: maintaining the CVDACTION dashboard including business intelligence support / IT support; developing and delivering patient pathways including clinical resource and integration of patient voice; project management and implementation support; and local clinical ownership and leadership. Robust local information governance and dashboard hosting plans would be needed in advance of implementation. Further, updates to the CVDACTION dashboard, in light of the implementation evaluation findings, would improve functionality and user experience.