



RESEARCH ARTICLE

REVISED **The NHS Health Check programme: a survey of programme delivery in England before and after the Covid-19 pandemic response [version 2; peer review: 2 approved]**

Erica Wirmann Gadsby ^{1,2}, Janet Krska³, Claire Duddy⁴, Vivienne Hibberd⁵, Geoff Wong ⁴

¹Faculty of Health Sciences and Sport, University of Stirling, Stirling, Scotland, FK9 4LA, UK

²Centre for Health Services Studies, University of Kent, Canterbury, England, CT2 7NX, UK

³Medway School of Pharmacy, Universities of Greenwich and Kent, Medway, ME4 4TB, UK

⁴Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford, OX2 6GG, UK

⁵Public Involvement in Pharmacy Studies Group, Medway School of Pharmacy, Medway, ME4 4TB, UK

v2 First published: 22 Jun 2023, 3:32
<https://doi.org/10.3310/nihropenres.13436.1>

Latest published: 25 Aug 2023, 3:32
<https://doi.org/10.3310/nihropenres.13436.2>

Abstract

Background: This study investigated NHS Health Check programme delivery before and after the Covid-19 pandemic response, with a focus on support services and referral methods available to Health Check attendees. The NHS Health Check is an important part of England's Cardiovascular Disease (CVD) prevention programme.

Methods: Public health commissioners from all 151 local authorities responsible for commissioning the NHS Health Check programme were surveyed in 2021, using an online questionnaire to capture detail about programme delivery, changes in delivery because of the pandemic response, and monitoring of programme outcomes. Four-point rating scales were used to obtain level of confidence in capacity, accessibility and usage of follow-on support services for Health Check attendees. A typology of programme delivery was developed, and associations between delivery categories and a range of relevant variables were assessed using one-way analysis of variance.

Results: Sixty-eight responses were received on behalf of 74 (of 151) local authorities (49%), across all geographical regions. Our findings suggest a basic typology of delivery, though with considerable variation in who is providing the Checks, where and how, and with continued changes prompted by the Covid-19 pandemic. Support for risk management is highly varied with notable gaps in some areas. Local authorities using a model of delivery that includes community venues tended to have a higher number of services to support behaviour change following the Check, and greater confidence in the accessibility and usage of these services. A minority of local authorities gather data on referrals for Health Check attendees, or on outcomes of referrals.

Open Peer Review

Approval Status

	1	2
version 2 (revision) 25 Aug 2023	 view	
	↑	
version 1 22 Jun 2023	 view	 view

1. **Maria Guzman-Castillo** , University of Helsinki, Helsinki, Finland

2. **Carissa Bonner**, The University of Sydney, Sydney, Australia

Any reports and responses or comments on the article can be found at the end of the article.

Conclusions: The Covid-19 pandemic has prompted continued changes in delivery, which are likely to influence patient experience and outcomes; these need careful evaluation. The programme's delivery and commissioners' intentions to follow through risk communication with appropriate support is challenged by the complexity of the commissioning landscape.

Keywords

local government, public health, cardiovascular disease, prevention, health check

Corresponding author: Erica Wirrmann Gadsby (e.j.gadsby@stir.ac.uk)

Author roles: **Gadsby EW:** Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Writing – Original Draft Preparation, Writing – Review & Editing; **Krska J:** Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Writing – Original Draft Preparation, Writing – Review & Editing; **Duddy C:** Conceptualization, Investigation, Methodology, Project Administration, Writing – Review & Editing; **Hibberd V:** Funding Acquisition, Methodology, Writing – Review & Editing; **Wong G:** Conceptualization, Funding Acquisition, Investigation, Methodology, Project Administration, Writing – Review & Editing

Competing interests: CD and GW are both members of the Royal College of General Practitioners (UK) Overdiagnosis and Overtreatment Group. GW is an NHS General Practitioner and was deputy chair of the National Institute for Health Research Health Technology Assessment Prioritisation Committee: Integrated Community Health and Social Care Panel (A) and member of the Methods Group (A).

Grant information: This project was funded by the National Institute for Health and Care Research (NIHR) Health Services and Delivery Research programme (NIHR129209). The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Copyright: © 2023 Gadsby EW *et al.* This is an open access article distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite this article: Gadsby EW, Krska J, Duddy C *et al.* **The NHS Health Check programme: a survey of programme delivery in England before and after the Covid-19 pandemic response [version 2; peer review: 2 approved]** NIHR Open Research 2023, 3:32 <https://doi.org/10.3310/nihropenres.13436.2>

First published: 22 Jun 2023, 3:32 <https://doi.org/10.3310/nihropenres.13436.1>

REVISED Amendments from Version 1

In this version, in response to reviewers' feedback we have highlighted the ways in which the involvement of stakeholders and public contributors helped to shape our analysis and interpretation of the research findings. We have slightly re-arranged the presentation of the results to help make terminology in relation to the typology clearer, and we have further clarified how the typology was developed. We have also introduced a new Figure 1, which presents the typology in a diagram. Our revised lay summary is now less complex and more readable. Finally, some of the tables and figures have been enhanced through the inclusion of percentages and data labels.

Any further responses from the reviewers can be found at the end of the article

Plain English summary

The NHS Health Check programme is for adults in England aged between 40 and 74. It aims to help people to reduce their risk of some major conditions such as heart disease and stroke. The Check involves taking measurements and calculating a 'risk score'. People considered 'at risk' are then advised on how to reduce this. Professionals can refer people to services that will help, like weight management services. Different professionals might provide the Checks in various settings. This depends on choices made by local councils. How and where they are provided, and how well they work, differs across England.

Our study helped us learn more about this programme. We focused on what happens after people are told their risk score. There are 151 local councils that make decisions about how to deliver the Health Check programme in their area. We contacted these councils in 2021 to ask them questions in an online questionnaire. These questions were about programme delivery, including during the Covid-19 pandemic. And about whether and how they track programme outcomes. We also asked about the follow-on support services that are available for people. Using this information, we developed broad categories of programme delivery.

About half of all local councils responded. Our findings show lots of variation in who is providing the Checks, where and how. The Covid-19 pandemic prompted even more changes. However, we were able to suggest three broad categories of delivery based on our findings. Support for people to manage their disease risk varies, with notable gaps in some areas. Most local councils gather very little information on what happens to people who attend the Health Checks. We need to know more about how different ways of delivering Health Checks affects patient experience and outcomes.

Introduction

The National Health Service (NHS) five-yearly Health Check is an important part of England's cardiovascular disease (CVD) prevention programme¹; it features in the NHS Long Term Plan² and strategy for addressing health inequalities³. In theory, eligible adults (aged 40–74, without a pre-existing

CVD-related health condition) are invited to undergo a Check in which a range of behavioural and physiological risk factors are assessed. Depending on their risk score, people are then given personalised advice on how to reduce their risk and referred for further assessment (e.g., for diabetes) and/or intervention (e.g., medication prescription, weight management, smoking cessation) as appropriate. The achievement of longer-term health outcomes depends on both effective delivery of the programme, and Health Check attendees subsequently taking action to manage or reduce their CVD risk.

Whilst there are no set targets for uptake of NHS Health Checks, the estimated uptake rate was originally modelled at 75%⁴. An evaluation of uptake during a five year cycle (2012 to 2017) found that on average, 52.6% took up the offer, with uptake within different local areas ranging from 25% to 85%⁵. There has been considerable attention paid to the lower-than-anticipated uptake of Health Checks^{6,7}, and on the large variation in delivery of this national programme^{8,9}. However, there has been very little attention paid to post-Check management of those identified as having modifiable risk factors. A limited number of studies have demonstrated mixed results on post-Health Check improvements in relevant risk factors⁹, and there is a notable lack of understanding of what happens in practice, after a person's risk has been assessed.

In England, there are 151 upper-tier and unitary local government councils/authorities, which have a statutory responsibility for improving the health of their local population and for certain public health services as defined by the Health and Social Care Act 2012¹⁰. The Act specifies the duties of local authorities (LAs) to deliver the NHS Health Check programme, and a portion of the public health grant paid to local authorities from the Department of Health and Social Care budget is designated for the commissioning of NHS Health Checks. Overseen by the Office for Health Improvement and Disparities (OHID), they have considerable flexibility in who to commission and how to deliver the programme. In fulfilling their public health duties, LAs work closely with NHS bodies which, at a local level, have undergone several recent rounds of reform¹¹. Consequently, the local picture of public health service commissioning and delivery is complex, and Checks are delivered by a range of providers in different settings.

Local Authorities Regulations (2013) stipulate the measures that should be recorded (and forwarded to the individual's GP) as part of a Check: age, gender, smoking status, family history of CHD, ethnicity, body mass index, cholesterol level, blood pressure, physical activity level, alcohol use disorders identification test score, and cardiovascular risk score¹². NHS Health Check programme standards introduced in 2014 and most recently updated in 2020, set out minimum (not mandatory) standards necessary to deliver a safe and effective Check¹³. Commissioners and providers of the programme are also supported with 'best practice guidance'¹⁴. Local authorities have a statutory duty to provide data for each financial quarter on the number of NHS Health Checks offered, and the number of NHS Health Checks received. This data is quality assured and published as official statistics. Two national surveys have

previously highlighted the considerable variation in delivery practice across England^{15,16}. Both focused almost exclusively on issues to do with prioritisation, invitation, and delivery of the initial steps of the Health Check pathway (involving risk assessment and communication). Only the 2014 survey included a question on provision of support for lifestyle change.

Our research aimed to fill the gap in understanding of what happens after the risk assessment. The project involved a survey of LA commissioners, a realist review of the literature¹⁷, and stakeholder engagement with professionals (policy makers, commissioners, trainers and providers of Health Checks) and members of the public. The cross-sectional survey was to investigate any variation in the support services and referral methods available to Health Check attendees, as well as gain more detailed information about Health Check provision. Given the project's timing (2021), it also examined changes in delivery caused by the Covid-19 pandemic. In general, programme delivery was paused in April 2020 for a full year, with service resumption depending on local safety arrangements and the need to prioritise the Covid-19 vaccination programme. Even in May 2022, according to the patient-facing NHS Health Check website, delivery remained paused in some areas.

This paper reports the survey findings to describe how Health Checks are delivered across England, particularly in relation to follow-on services supporting risk management, and to determine how the Covid-19 pandemic has changed delivery. It develops a typology of NHS Health Check programme delivery and examines associations between delivery of the Health Check and other relevant aspects, including support services available and NHS Health Check programme performance.

Methods

Patient and Public Involvement

Prior to project funding, we involved members of the public and charities in the drafting of the protocol. We sought feedback on the importance of the proposed study and on what we should focus on from members of two established public engagement in research groups (Public Involvement in Pharmacy Studies at Medway School of Pharmacy and Opening Doors to Research at the Centre for Health Services Studies), and from representatives from several charities with an interest in NHS Health Checks. Feedback highlighted the importance of investigating variation in experience and quality of the NHS Health Check by region and by professional groups delivering them, and outcomes related to NHS Health Check attendance, including changes in lifestyle. This feedback informed our research questions and study design and highlighted the importance of a survey alongside our realist review of the literature.

Throughout the project, our strategy for patient and public involvement (PPI) was informed by our PPI lead and co-author (VH). VH is an experienced PPI contributor who brought her valuable perspective as a member of the public, and skills in group facilitation. Our PPI group involved ten members of the public from six different English regions, all of whom were

eligible to receive the NHS Health Check. Members were purposively selected to be as diverse as possible in relation to gender, age, ethnicity and geographical location, with the aim of capturing a range of different perspectives from individual members of the public. The group was consulted via regular online meetings throughout the project, using [Zoom](#) (Version 5, Zoom Video Communications, Inc.). They provided feedback on our draft survey questions, discussed our emerging findings, helped to shape our analysis, helped to develop practical recommendations for NHS Health Check delivery, and informed our dissemination strategies.

A separate professional stakeholder group also provided us with content expertise and a range of perspectives throughout the project, via regular online meetings using [Microsoft Teams](#) (Version 1.0, Microsoft Corporation). For this group, we recruited (via our project team's existing networks and snowballing from these) 14 people across the following categories: LA commissioners, NHS Health Check providers, NHS Health Check trainers, and representatives from relevant health charities. In addition, we maintained close contact with Public Health England's (latterly the Office for Health Improvement and Disparities) CVD Prevention Programme Lead.

The online survey (see extended data: supplementary file¹⁸) was developed in collaboration with our professional stakeholder group, using [Jisc Online Surveys](#), to complement data gathered in the previous national survey of 2020, and also to capture a) detail about the delivery of the programme following the risk assessment, and b) any changes in delivery because of the pandemic response. It asked how the programme outcomes were monitored and whether LAs had commissioned, conducted or been part of any assessments of the programme in the previous five years. It included a mix of closed- and open-ended questions (19 in total), the latter to enable respondents to explain their responses and add any further relevant information about commissioning and delivery (illustrative extracts of these are presented in the Results). Four-point rating scales were used to obtain level of confidence in capacity (considering e.g., eligibility criteria, waiting times), accessibility (considering e.g., opening times, location, cost to users), and usage of support services (range from 1 'not confident at all' to 4 'very confident'). Designed to be completed by a lead person for CVD prevention or Health Check commissioning in each LA, the survey was piloted within seven LAs; three completed it fully and provided positive feedback, with one subsequent minor change made prior to launch.

Ethics approval was granted by the University of Kent SRC Ethical Review Panel (Division of Law, Society and Social Justice) (SRCEA id 0367).

The survey (with direct link and password) was disseminated to key individuals in all 151 LAs in England with responsibility for commissioning the NHS Health Check programme. Public Health England (PHE) (at the time responsible for overseeing the programme at national level) sent the survey on our behalf, using the same distribution methods as for their own

previous surveys, via regional Health Check leads and the programme's Local Implementor National Forum. It was also publicised via the established NHS Health Check webinar series. It opened 17th May and closed 18th July 2021, with two reminder emails sent by PHE, and a third targeted reminder sent to Health Check leads in regions where the response rate was below 35%. The questionnaire was preceded by an information page, a privacy notice and a consent form. Active consent was required to proceed with the form. Individuals completing the survey were invited to provide their name and email address if they wished, to allow us to send the findings of our research. Names and contact information were separated from the data file and stored separately from all other information.

Survey responses were downloaded into Microsoft Excel v2304 (RRID:SCR_016137) and IBM SPSS Statistics v27 (RRID:SCR_019096). Where individuals responded for more than one LA (where LA public health teams are merged), unique identifiers were given to both respondents and LAs. Single responses provided on behalf of multiple LAs were copied exactly. Open-ended question responses were used to clarify or amend responses where relevant.

Data analysis

Simple descriptive statistics were used to analyse quantitative responses, which were enhanced and illustrated by qualitative responses, where the open comments sometimes provided clarification or further detail. One response was amended, where the respondent had not ticked 'pharmacist' as a provider, but had told us in a free text comment that pharmacists were used to deliver the Checks. A typology of Health Check delivery was derived from the data, in consultation with our stakeholder group (see Results).

The research team and stakeholder groups were interested in whether delivery method was associated with support service availability, accessibility and use, and whether commissioners with more complex delivery methods also used additional factors to prioritise Health Check invitations and/or engaged in more monitoring of their providers. Therefore, we assessed associations between category of delivery and: total number of commissioned support services reported, total number of referral processes reported, average reported confidence in capacity, accessibility and usage of support services, total number of methods used to prioritise invitations pre- and post-Covid-19 pause, and total monitoring and evaluation reported.

Our emerging review findings and discussions with our professional stakeholder group pointed to additional key variables understood to be of significance to Health Check programme delivery. For each of these variables, statistics were obtained from publicly available data, and associations assessed between these and delivery category. The variables used were: geographic region; estimated population for 2019; Public Health budget per head, 2019/20; Indices of Multiple Deprivation (IMD), 2019; and proportion of eligible people receiving a Check between 2015/16 and 2019/20 <https://www.health-check.nhs.uk/>. Rurality was an additional factor perceived

likely to influence Health Check delivery but was not possible to include given the way it is classified at district, rather than county council level.

One-way analysis of variance was used to assess associations. Relationships between variables were assessed using Spearman's correlation coefficient.

Results

There were four LAs for which there were two identical responses. Removal of these duplicates left 68 responses (R01–R68), reporting on behalf of 74 LAs (LA01–LA74). Whilst the overall response rate was 49%, the proportion of responses varied across PHE geographic regions, ranging from 29% of LAs in West Midlands region to 72% of LAs in the South East (Table 1).

Typology of NHS Health Check delivery

A typology of delivery was developed through an iterative process, looking across the data to compare and contrast delivery locations, modes and staff involved (these aspects are presented in more detail in the sub-sections below). The professional stakeholder group were consulted regarding various iterations of the typology. The 74 LAs represented in our sample were categorised as:

- **General practice delivery** (24; 32%): delivered in the general practice setting only, by one or more of the following staff: GP, nurse, health care assistant, health trainer, and pharmacist. No remote methods used for delivering any aspect of the Check.
- **Blended delivery** (21; 28%): seven LAs delivered in GP practices and pharmacies, with or without some use of remote methods post Covid-19 pause. All others delivered in GP practices only, but also used remote

Table 1. Survey respondents by region.

Geographic region	Number of LAs	Number of Responding LAs	% of Responding LAs
East Midlands	9	5	56%
East of England	12	8	67%
London	33	18	55%
North East	12	4	33%
North West	23	9	39%
South East	18	13	72%
South West	15	6	40%
West Midlands	14	4	29%
Yorks & Humber	15	7	47%
Total	151	74	49%

LAs: local authorities

methods to deliver part of the Check. They were delivered by one or more of the following staff: GP, nurse, health care assistant, pharmacist, pharmacy assistant, and paramedic.

- **Blended with outreach delivery** (29; 39%): all LAs except one delivered the Check in GP practices. In addition, they all delivered the Check in at least one other venue, one of which was a community venue other than a pharmacy. Eighteen LAs in this category used no remote methods. Eleven used some form of remote methods.

This typology is depicted diagrammatically in Figure 1.

Location and mode of Health Check delivery

In 64/74 LAs, delivery of Checks had resumed since the Covid-19 pause. General practice was the most common setting for face-to-face delivery both pre- (73/74) and post-Covid pause (64/64). Other commonly used venues pre-Covid were community settings such as workplaces, community centres and places of worship (n = 30; 41%) and pharmacies (n = 16; 22%); however, these had reduced after the pause in delivery to 15 and 9 respectively. The use of alternative (remote) methods of delivery increased, mostly via the telephone (two pre- and 26 post-Covid pause) and video (one pre- and 11 post-Covid) and the range of venues expanded to include a Covid vaccination centre. Several LAs used multiple remote methods, including on-line self-completion of the Health Check assessment. Two had used a remote digital check pre-Covid; one discontinued this post-Covid pause, while the other increased its availability.

To provide partially remote Health Checks, 11 LAs required the patient to attend the practice for blood tests; six others used data on file, providing they were sufficiently recent. In two LAs, a drive-through blood testing service was used. The future potential use of remote methods combined with face-to-face testing was regarded positively by most respondents (n = 54; 75%). Several described how they were operationalising these, for example:

We are testing the feasibility and acceptability of remote blood testing using a kiosk in community setting and then linking back to an online questionnaire tool. This system would be for lower risk patients predominantly. (R61)

Online completion of a lifestyle questionnaire prior to a face-to-face appointment was variously seen as a way of reducing the time taken for the Check, but also offering the potential for prioritising those most able to benefit and to enable the face-to-face appointment to focus on risk communication, personal support and advice. Conversely, others (e.g., LA04, LA07, LA20) were gathering the physical measurements in a face-to-face appointment followed by a telephone consultation to discuss the results and offer interventions. Many were uncertain about what would work best in the future. Some were trialling these new methods; others were waiting for guidance on how to proceed.

Health professionals involved in Health Check delivery

Several respondents indicated within the open comments some uncertainty about which health professionals were currently employed (in 2021/2022) to deliver the programme, due to the commissioning process. For example:

We commission GP practices to deliver it through suitably qualified, trained (and overseen) staff. It is then up to them who that actually is. (R30)

Overall, respondents indicated that the professionals most frequently involved in delivering Checks were health care assistants and/or nurses, followed by GPs, both face-to-face and remotely (Table 2). Other providers included wellbeing advisers, health improvement practitioners, lifestyle coaches and paramedics. Seven respondents reported that the category of professional delivering the Checks had changed following the Covid pause. Delivery by leisure centre and primary care staff was reported to be more problematic. As staff were mobilised for the vaccination campaigns, more healthcare assistants were involved in Health Check delivery and fewer nurses or GPs.

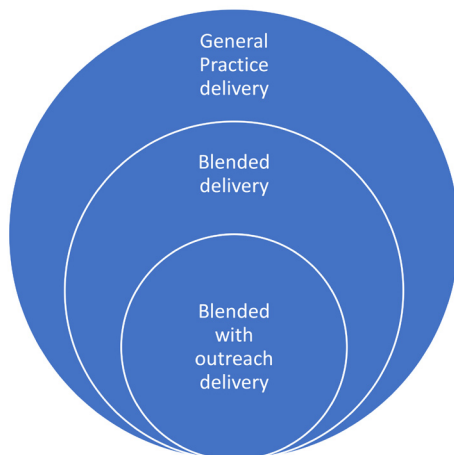


Figure 1. Typology of NHS Health Check delivery.

Table 2. Health professionals providing NHS Health Checks.

Number of professionals involved in providing NHS Health Checks		
	Face to face	Remotely
Health care assistant	61	19
Nurse	61	18
GP	48	12
Pharmacist	17	1
Pharmacy assistant	14	1
Health trainer	14	5
Other	9	3

Some areas reported making less use of health trainers, and in some areas LA staff and paramedics were taking over delivery.

Prioritisation of eligible candidates

Data in Table 3 shows that many LAs did not consistently use factors such as ethnicity, deprivation or other risk factors to prioritise invitations to the Health Check. The most frequently used factor for prioritisation pre-Covid was deprivation (Table 3). After the Covid-19 pause, more LAs used a range of factors to target individuals, including Covid risk, with some areas starting to prioritise where they hadn't previously done so.

Examples cited in the 'other' factors category included: diagnosed mental illness, homeless, from a traveller community, inactivity, routine and manual workers, and gender/age (e.g., men over 65).

Some respondents recognised that targeting by risk was desirable but not always feasible, as illustrated by the following comment:

Smoking status, BMI above 30, Family history, ethnicity other than white, deprivation quintile 1. Practices

tell us that this data is not always up to date and so it's not easy to identify those at higher risk. (R13)

Services to support risk reduction/management

The majority of responding authorities reported at least one service being available to support smoking cessation, alcohol and drug misuse, weight management, diabetes prevention, psychological support and social prescribing; some indicated no service, or that they didn't know who provided the service (Table 4). Many reported having more than one provider for some services. Five respondents reported also commissioning physical activity/exercise on referral services. Most of these services were provided through public, private or third sector commissioning; some were provided by GP or LA staff.

Most respondents provided ratings for their level of confidence in the capacity and accessibility of the support services available in their LAs. However, several felt unable to do so, especially for services that were not commissioned by the LA. This is reflected in the variable amount of missing data and in several comments from respondents, which highlighted the difficulty of pulling together information across a very fragmented system.

Confidence in the capacity to support Health Check referred patients was mostly positive, but this varied across the different services (see Figure 2).

Several comments explained the variation in level of confidence around capacity, including reasons for poor provision, with one reporting no local services at all for weight management and stop smoking services:

If all who are eligible and ready to be referred were so, there would not be enough capacity in the system, specifically weight management and mental health alone. (R08)

With austerity measures, the capacity in the system has become so limited that there is very little capacity available. (R13)

Table 3. Factors used to prioritise invitations to a Health Check before and after the Covid-19 pause.

Factors used to prioritise Health Check invitations	Number of LAs using each factor Before Covid (N = 74)	Number of LAs using each factor After Covid Pause (N = 74)
Ethnicity	22 (30%)	35 (47%)
COVID risk	-	21 (28%)
Deprivation	31 (42%)	34 (46%)
Other	28 (38%)	33 (45%)

LAs: local authorities

Table 4. Number of local authorities (LAs) offering support services.

Service	Number of LAs in survey sample (N=74) commissioning:					
	Don't know who commissions	No service provider/no response	1 service provider	2 service providers	3 service providers	4 service providers
Smoking cessation	1 (1%)	2 (3%)	45 (61%)	18 (24%)	8 (11%)	
Alcohol and drug misuse	3 (4%)	0 (0%)	52 (73%)	15 (20%)	3 (4%)	1 (1%)
Weight management	5 (7%)	6 (8%)	45 (61%)	16 (22%)	2 (3%)	
Diabetes Prevention	7 (10%)	2 (3%)	60 (81%)	4 (5%)	1 (1%)	
Psychological support	20 (27%)	6 (8%)	39 (53%)	7 (10%)	1 (1%)	1 (1%)
Social prescribing	10 (14%)	2 (3%)	46 (62%)	13 (18%)	3 (4%)	
Other services			7 (10%)			

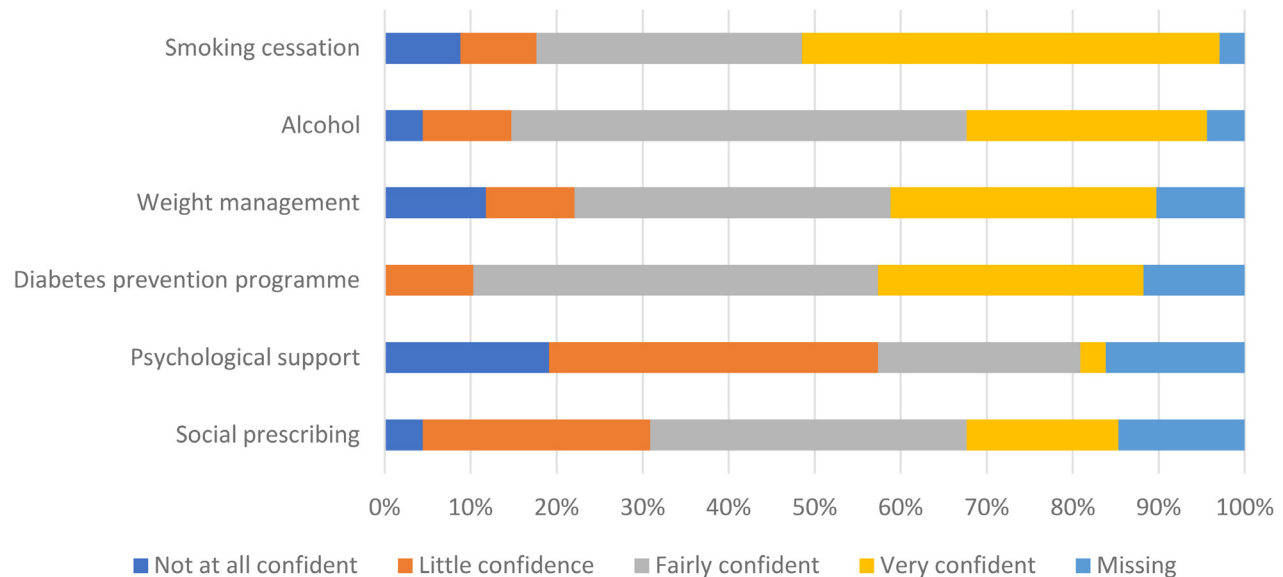


Figure 2. Commissioners' confidence in the capacity of services to support Health Check patients.

Confidence in the accessibility of the services (Figure 3) was similar and directly correlated to confidence in the capacity (Spearman's $r = 0.752$; $p < 0.001$). Respondents were least certain about whether psychological support services had sufficient capacity and accessibility.

All respondents provided an overall confidence rating for the extent to which appropriate use was made by Health Check providers of the available support services. This was generally low, with over half of the respondents ($n = 50$; 68%) having relatively little/no confidence. Reasons for the lack of confidence varied, including lack of awareness among providers and lack of data on use of these services:

We do highlight support services as part of our NHS Health check training but have no way of following patients through to know how many access support successfully. (R64)

Onward referrals from Health Checks into our own services are higher from our own team of Health Trainers, which suggests that we aren't getting all the referrals we should be getting from other providers. (R23)

Changes in either capacity or accessibility of support services since the Covid-19 pause were reported by 40 respondents while 13 reported no change, and 15 didn't know. Several described the impact of moving support services to online provision as affecting both accessibility and capacity both positively and negatively.

Many of these services have had to move online for part of the time at least, possibly making them more accessible for some but less accessible for others. (R50)

Services moved onto telephone support where possible and this increased accessibility for people as

they did not have to travel to attend appointments. (R66)

F2F [face-to-face] services have moved online only which are more popular and more efficient, permitting advisers to see more clients. (R40)

In some areas, Covid-19 has prompted greater investment in support services, e.g., increased funding for and an expansion of tier-two weight management service, more social prescribing due to an increase in Primary Care Network link workers, and more funding for substance misuse services.

Referral processes

Multiple processes were reported for enabling Health Check attendees to access follow-on services in many LAs, although some respondents did not know the referral processes in place in their area (Table 5). As with the services themselves, awareness of the referral processes was least well known for psychological support services. Smoking cessation services had the greatest range of referral options. The number of referral processes reported was strongly related to the number of services commissioned across the LAs (Spearman's $r = 0.423$; $p < 0.001$).

In 12 LAs, respondents reported that referral processes had changed following the Covid-19 pause. Changes were mainly positive, with increased accessibility to self-referrals and clearer gateways to a range of services.

Monitoring and evaluation

The number of LAs that monitored the outcomes of Health Check programmes was relatively low. Twenty-two (31%) respondents gathered data on GP referrals, and 30 (42%) on the outcomes from such referrals, e.g., new diagnoses; 24 (34%) gathered data on referrals to lifestyle support services, and 19 (26%) on the outcomes from these, e.g., weight loss. Information

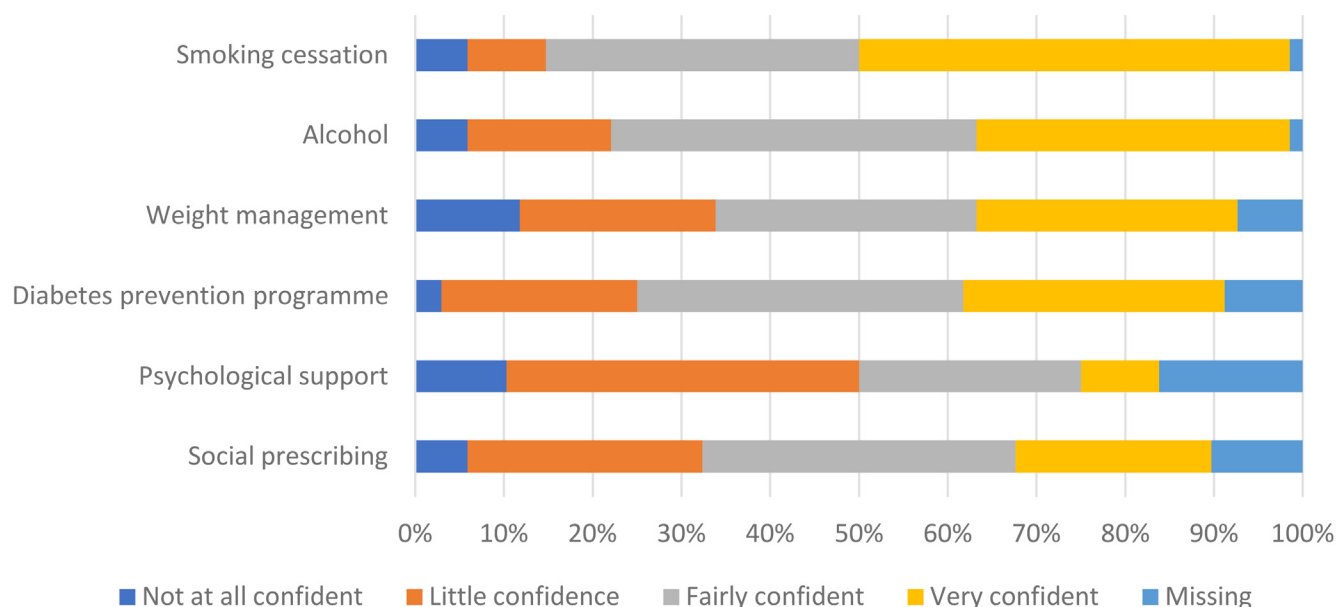


Figure 3. Commissioners' confidence in the accessibility of services to support Health Check patients.

Table 5. Number of local authorities (LAs) offering referral processes.

Service	Number of LAs reporting referral routes: (N=74)					
	Client makes own appointment	Provider makes appointment	Referral via link worker	Other	Don't know	Missing response
Smoking cessation	59 (80%)	41(57%)	22 (30%)	2 (3%)	4 (5%)	3 (4%)
Alcohol	42 (57%)	38 (51%)	24 (32%)	1 (1%)	16 (22%)	1 (1%)
Weight management	37 (50%)	34 (46%)	24 (32%)	1 (1%)	10 (14%)	5 (7%)
Diabetes prevention programme	28 (38%)	35 (47%)	18 24%)	1 (1%)	14 (19%)	2 (3%)
Psychological support	24 (32%)	26 (35%)	12 (16%)	0	28 (38%)	5 (7%)
Social prescribing	22 (30%)	28 (38%)	25 (34%)	0	23 (31%)	4 (5%)

gathered on the uptake of prescriptions (8; 11%), and on the outcomes of prescribing, e.g., lowered cholesterol (4; 6%) was even lower. Fewer than half the LAs (33; 46%) reported any evaluation or assessment of their local programme in the last five years.

Associations between delivery category and other variables

An association was found between the delivery category and the total number of commissioned follow-on services reported. The mean number of commissioned services was significantly

higher in the LAs categorised 'blended with outreach' (7.6) compared to 'general practice' (6.6) or 'blended' (5.9) ($F = 3.85$; $p = 0.026$). The LAs falling in the blended with outreach delivery category also had the highest mean number of referral processes (8.0), compared to those categorised as general practice (7.5) and blended delivery (7.0), although the difference was not statistically significant ($F = 0.311$, $p = 0.764$).

Respondents' confidence in the capacity, accessibility and usage of the support services varied little across the categories of delivery, although trends were visible in the confidence in

accessibility and usage with the increasing use of non-general practice-based delivery (Table 6).

The number of methods used to prioritise invitations was not related to the category of delivery, but LAs in the blended and blended with outreach categories reported a greater increase in the number of factors used post-Covid pause compared to LAs in the general practice delivery category. The degree of monitoring and evaluation reported as being undertaken was also unrelated to the category of delivery.

There were notable differences in the proportions of LAs in the three delivery categories in each geographical region.

Whilst five out of the seven responding LAs in Yorkshire and Humber fell in the blended with outreach category, seven out of the nine responding LAs in the North West fell in the general practice delivery category (Figure 4).

There were no significant differences in the relative size of the LAs falling into each delivery category, although the LAs delivering via community outreach tended to be larger than those in other categories.

There were also no significant differences in the relative size of the public health budgets of LAs, or in the relative deprivation of LAs falling in each delivery category. With

Table 6. Reported confidence levels in capacity, accessibility and usage of support services by delivery category (where n is number of respondents).

Delivery category	Overall confidence ratings for all services (where 1 means 'not confident at all' and 4 means 'very confident')		
	Capacity average (n = 66)	Accessibility average (n = 67)	Usage (single rating) (n = 68)
General practice	2.76 ± 0.67	2.68 ± 0.67	2.00 ± 0.73
Blended	2.62 ± 0.80	2.74 ± 0.75	2.10 ± 0.70
Blended with outreach	2.74 ± 0.79	2.77 ± 0.71	2.48 ± 0.89

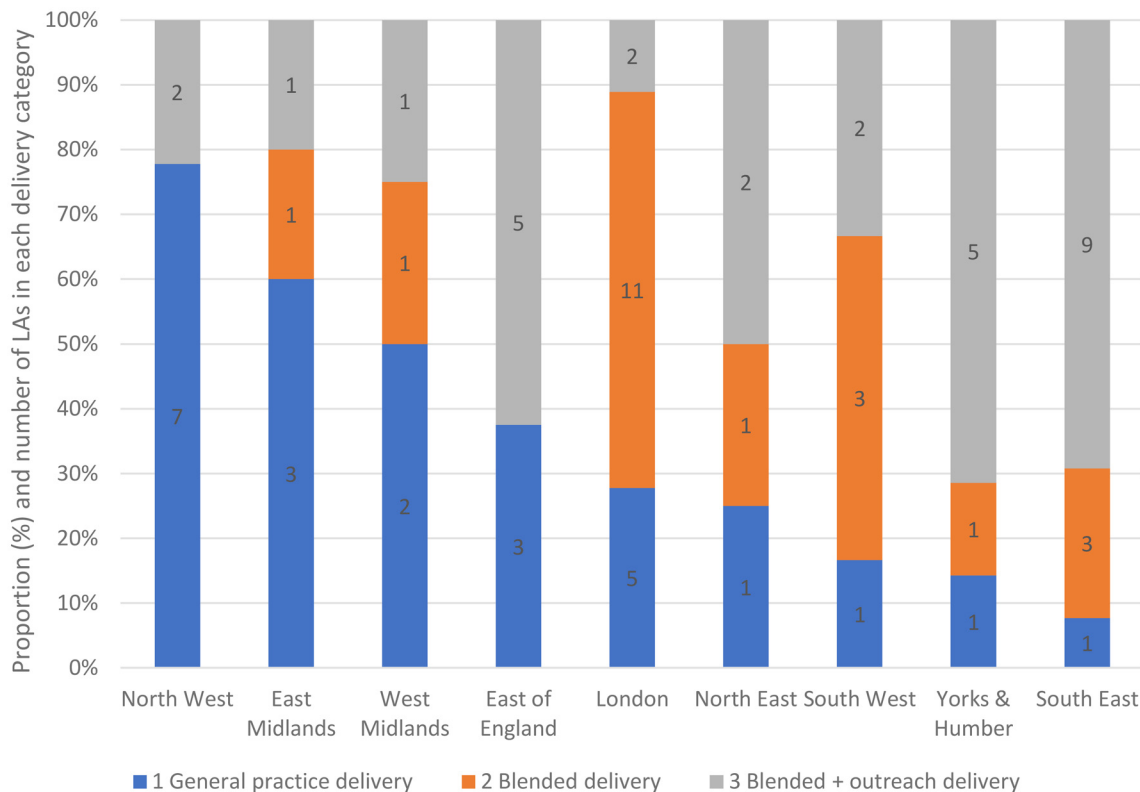


Figure 4. Proportion of LAs in the Health Check delivery categories by geographical region.

regards to Health Check programme delivery performance, LAs delivering Checks using a blended with outreach model achieved, on average, a lower coverage (37.8%) than those delivering using a general practice (46.7%) or blended (45.4%) delivery model ($F = 3.217$; $p = 0.046$). However, as the boxplots show, the medians (the lines within the boxes), interquartile ranges (the box lengths) and the overall spread (whiskers) were overlapping, indicating that the categories were not significantly different in respect to programme delivery performance (Figure 5).

Discussion

This is the first national survey of commissioning of the NHS Health Check programme which was not undertaken by PHE, with a sample that includes half of all LAs and a spread of authorities across the nine regions. It is also the first to focus on the support given to Health Check attendees to make lifestyle changes following the risk assessment, and to attempt to categorise methods of delivery, in consultation with a professional stakeholder group. The timing of the survey is also important; it clearly demonstrates the variation in delivery of the Health Check before the Covid pause in terms of where and how it was provided and by whom, and some of the innovations in delivery that have emerged since. The variation and innovation in delivery found in the survey resonated with members of our professional and PPI groups, who

further illustrated the findings by describing multiple examples from their own experience. Input from these groups helped us to confirm and interpret our survey findings. Yet, the study has a number of limitations. The possibility of sampling bias or social desirability cannot be ruled out. Our data suggest that amongst those who responded, there may have been potential bias towards enthusiastic commissioners who are champions of the programme. Our response rate was relatively low in comparison with the previous national surveys, which is unsurprising given the timing of the survey during the pandemic. There are, therefore, still many gaps in the national picture. Moreover, there were questions (for instance relating to availability of and referral routes for some follow-on services) about which some commissioners might not have had the relevant knowledge. A national survey of Health Check providers would be a valuable complement to the commissioner survey.

Two previous national surveys reported which provider organisations deliver the Health Check, but not which health professionals^{15,16}. We found that whilst healthcare assistants and/or nurses delivered the Check in most responding LAs, GPs delivered at least some of the Checks in two thirds of the LAs. A wide range of other professionals delivered the Checks to differing extents in some LAs, although some commissioners were not aware of who delivered them. Attention to *who* is

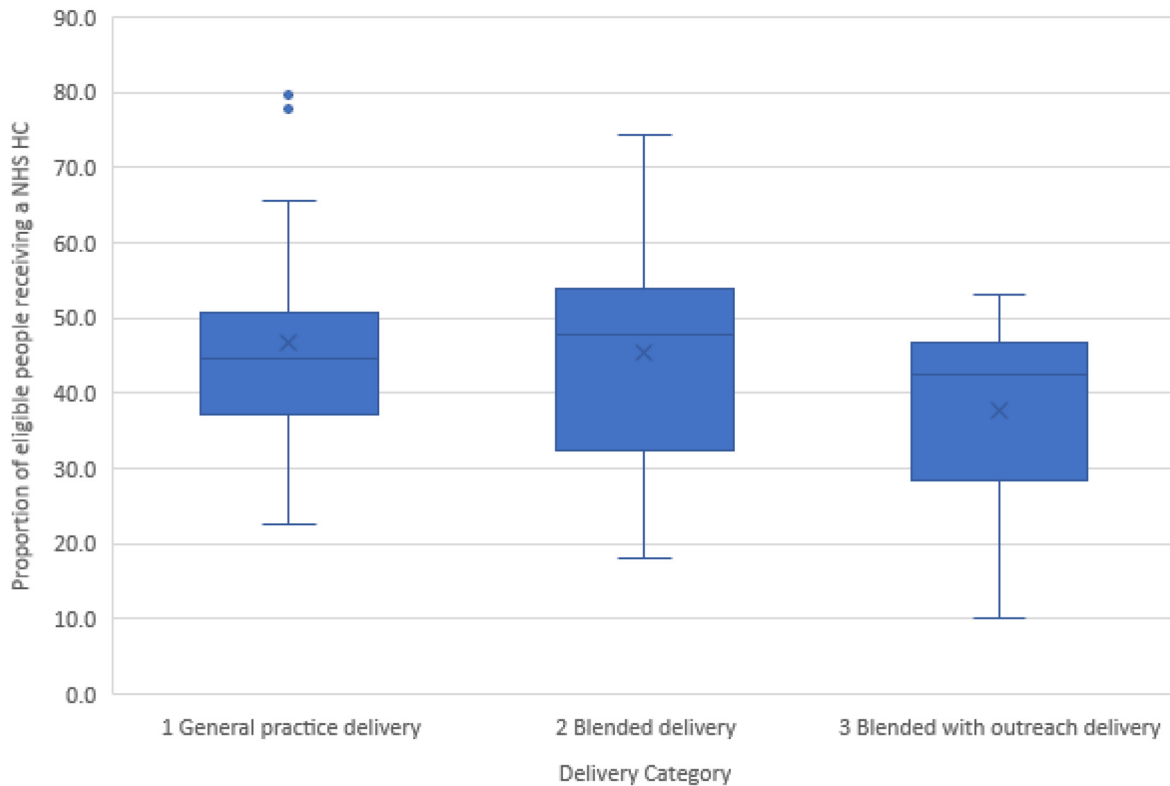


Figure 5. Health Check delivery performance by category of delivery.

providing the Checks on the ground is important given the variation in skills, experience and confidence amongst different professionals, and the extent to which they are likely to face challenges related to workload, information technology, funding and training^{19–21}. These issues are all likely to influence patient experiences and outcomes^{20,22}.

Our findings confirm that most LAs commission at least one service to support key aspects of behavioural change. However, there are some LAs in which significant service gaps exist. This is consistent with previous research demonstrating gaps in weight management services²³, and the reductions in spending by LAs on a range of support services including smoking cessation²⁴. It was notable, given the importance of obesity as a CVD risk factor²⁵, that four of the LAs reported no weight management services being commissioned at all. Given the frequency with which LAs review and change public health service commissioning²⁶, it is useful to update data from the PHE survey in 2014, which found that the majority of LAs provided lifestyle interventions including stop smoking services (96%), exercise referral (89%), weight management (84%) and diabetes prevention (58%). Amongst our sample, only five (5%) mentioned exercise referral in the ‘any other services’ comment box. However, this might be underestimated since they could have been included as part of either weight management or diabetes prevention services. Following guidance from our professional stakeholder group, we did not include exercise referral schemes in the list of services in the survey question. We also found signs of increasing fragmentation and complexity in commissioning since the 2014 survey, with support services being delivered by a range of different public, private and third sector providers, often with a mix in each area.

The clear variation in availability and accessibility of support services, together with the diverse ways in which the programme is delivered, and the complexity of the commissioning landscape in which interdependent services are commissioned and provided by a range of different organisations, is likely confusing for both Health Check providers and attendees. Whilst most commissioners feel reasonably confident about the capacity and accessibility of support services to accept referrals for Health Check attendees, they are much less confident that appropriate use is being made of them by Health Check providers. This points to a disconnect between the intended aim of the programme, where the intention is to follow through risk communication with appropriate support, and the way the programme is delivered in many areas, where providers are not necessarily linking (or able to link) attendees to appropriate support. Respondents were least certain about whether psychological support services had sufficient capacity and accessibility, and had least awareness of the referral processes for them. This may be because these services are generally commissioned by NHS organisations, so LA commissioners know less about them. However, whilst psychological services are less central to the risk management aim of the programme, the Health Check is sometimes a potential conduit to them, and they are a relevant adjunct to lifestyle support services. They play an important part in the assessment

and treatment of a range of motivational, behavioural, and cognitive/affective factors implicated in overweight, for example²⁷.

Various changes in programme delivery appear to have been prompted by the pandemic. Delivery had yet to resume in ten of our responding LAs. In those that had resumed, the use of community venues had decreased, and the use of alternative (remote) methods of delivery had increased. The shifts in location and the demands of the pandemic response meant some changes were seen in who delivered the Checks. Some commissioners also appear to be placing a greater emphasis on prioritising specific groups of eligible candidates for a Health Check following the pandemic. In relation to the capacity and accessibility of support services for Health Check attendees, our data points to both challenges, for example with services being overwhelmed, and opportunities, such as greater investment in specific areas. The moving of support services to online provision was described as both a challenge and an opportunity. These changes will need careful evaluation in relation to issues such as digital exclusion²⁸, impacts on inequalities, and the quality, efficiency and cost-effectiveness of Health Check delivery.

Of previous surveys we have identified, only one other²⁹ sought information on programme monitoring. This reported that three of the eight commissioners sampled gathered data on advice offered, four on the number of referrals and four on outcomes, such as new diagnoses and new statin prescriptions. These authors considered that such monitoring was an important ingredient of the programme’s effectiveness. Our survey suggests that little has changed, with only 41% gathering data on outcomes of referrals to GPs. There is evidence to suggest that the lack of emphasis placed on monitoring and follow-up is something that Health Check attendees also find frustrating³⁰. Moreover, the lack of a requirement to gather such information for the national dataset and the omission of this topic in the previous two national surveys suggest that outcomes data will continue to be sparse for the foreseeable future.

The novel typology of delivery modes, based on our survey data, identified three main models in use prior to the Covid-19 pause. We found more LAs reportedly commissioning pharmacy or outreach methods compared with the 2020 national survey¹⁶. In addition, the 2020 survey found that 57% *only* delivered the Health Check in general practice, compared to 32% in our survey. We found only two other surveys of commissioners, both small in scope: a survey of eight London Primary Care Trusts (PCTs) conducted in 2010²⁹ and a survey of 16 LAs achieving high uptake rates conducted in 2019³¹. Two of the eight PCTs surveyed in 2010 used models akin to blended with outreach, while six of those surveyed in 2019 had some form of outreach, which included pharmacy provision. There appeared to be regional differences in the commissioning of delivery models, with a high proportion of general practice only delivery in the North West, while LAs offering blended with outreach delivery tended to have larger populations. It is not clear what is behind this regional variation in models of provision.

LAs using a blended with outreach model tend to have a higher number of support services to support behaviour change following the check and greater confidence in the accessibility and usage of these services, although there was no association between delivery model and public health budgets. The blended with outreach model is also associated with more post-Covid-19 prioritisation of Health Check candidates. However, the evidence did not suggest that the use of this model significantly influenced coverage, in terms of the proportion of eligible people receiving the Check. This might point to the fallibility of using overall coverage as an indicator of best practice where a more targeted approach, using a range of methods to reach those who might benefit the most, might deliver the greatest gains for population health, particularly in terms of addressing health inequalities. However, given the general assumption that improving access (e.g., through outreach provision) will encourage more people to take up the offer of a Check³², the further examination of delivery models in relation to outcomes is warranted. A comparison of delivery models according to outcomes other than programme coverage would also be valuable, particularly in the context of health inequalities and the Government's 'Levelling Up' agenda³. However, this would require the gaps in reporting of key outcomes data to be addressed.

Conclusions

This study has confirmed the variation in delivery of the Health Check programme identified in previous surveys and has provided further insight into the ways in which delivery is continuing to change – particularly in response to the Covid-19 pandemic – both in relation to who delivers the check, and how it is delivered. Our findings also highlight the gaps and variation in support services that Health Check attendees might be referred to, and which are so important for achieving programme impact.

Our findings support the description, for the first time, of a basic typology of NHS Health Check programme delivery. However, given the lack of association between delivery models and programme uptake/coverage, we cannot advocate any particular model. There is a real need for more monitoring, to enable comparisons to be made concerning important outcomes such as lifestyle changes. Similarly, the lack of any association with public health budget suggests that it is not the amount of money available which is important, but how it is spent (i.e., what services are commissioned and provided). The pandemic may have provided an impetus to identify highest risk individuals, which might encourage more LAs to prioritise invitations according to specific risk factors, particularly as they deal with the inevitable backlog resulting from the pause in delivery. This could have implications for

programme impact, particularly in reducing health inequalities, but there is a need to ensure that risk assessments are followed up with appropriate support, and that services for onward referral exist and are used appropriately by Health Check providers. Our study suggests there is some way to go in achieving this.

Data availability

Underlying data

Open Science Framework: Underlying data for 'The NHS Health Check programme: a survey of programme delivery in England before and after the Covid-19 pandemic response', <https://www.doi.org/10.17605/OSF.IO/N84JV>¹⁸

This project contains the following underlying data:

- Responses for 74 LAs suitable for data sharing 280323.xlsx

Some responses to open-ended questions were removed from the shared dataset to preserve the anonymity of the responding organisation. Readers/reviewers wishing to apply for access to the full dataset (for academic non-commercial research purposes) should contact Dr Erica Gadsby e.j.gadsby@stir.ac.uk. Data will be shared on the condition that ethical requirements are complied with and the privacy of research participants can be safeguarded.

Extended data

Open Science Framework: Extended data for 'The NHS Health Check programme: a survey of programme delivery in England before and after the Covid-19 pandemic response', <https://www.doi.org/10.17605/OSF.IO/N84JV>¹⁸

This project contains the following extended data:

- NHS Health Check programme: Introduction and description of files.docx
- Survey post pilot.pdf

Data are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](#) (CC0 1.0 Public domain dedication).

Acknowledgements

We would like to thank our project steering groups (one of professionals and one of lay members) who supported and guided the project throughout. We would also like to thank Dr Noora Seilo for valuable comments on an earlier draft.

References

1. Department of Health and Social Care: **Prevention is better than cure: our vision to help you live well for longer**. Gov.UK, 2018. [Reference Source](#)
2. NHS England and NHS Improvement: **The NHS Long Term Plan**. Gov.UK, 2019. [Reference Source](#)

3. HM Government: **Levelling Up. Levelling Up the United Kingdom.** HM Government, 2022.
[Reference Source](#)
4. Department of Health: **Economic Modelling For Vascular Checks.** Department of Health, 2008.
[Reference Source](#)
5. Patel R, Barnard S, Thompson K, *et al.*: **Evaluation of the uptake and delivery of the NHS Health Check programme in England, using primary care data from 9.5 million people: a cross-sectional study.** *BMJ Open.* 2020; **10**(11): e042963.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
6. Bunten A, Porter L, Gold N, *et al.*: **A systematic review of factors influencing NHS health check uptake: invitation methods, patient characteristics, and the impact of interventions.** *BMC Public Health.* 2020; **20**(1): 93.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
7. Martin A, Saunders CL, Harte E, *et al.*: **Delivery and impact of the NHS Health Check in the first 8 years: a systematic review.** *Br J Gen Pract.* 2018; **68**(672): e449-e459.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
8. Usher-Smith JA, Mant J, Martin A, *et al.*: **NHS Health Check Programme rapid evidence synthesis.** Public Health England, 2017.
[Reference Source](#)
9. Tanner L, Kenny R, Still M, *et al.*: **NHS Health Check programme: a rapid review update.** *BMJ Open.* 2022; **12**(12): e052832.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
10. Health and Social Care Act 2012: **UK Public General Acts 2012 c.7.** (Accessed 01 May 2023).
[Reference Source](#)
11. Paton C: **NHS reform and health politics in the UK: revolution, counter-revolution and Covid crisis.** Springer Nature, 2022; 206.
[Reference Source](#)
12. **The Local Authorities (Public Health Functions and Entry to Premises by Local Healthwatch Representatives) Regulations 2013 No. 351.** 2013; (351).
[Reference Source](#)
13. Public Health England: **NHS Health Check programme standards: a framework for quality improvement.** 2020.
[Reference Source](#)
14. Public Health England: **NHS Health Check Best Practice Guidance for commissioners and providers.** 2019.
15. Public Health England: **Findings from the NHS Health Check delivery survey.** 2014.
16. Public Health England: **Findings from the 2019/20 NHS Health Check Delivery Survey.** 2021.
[Reference Source](#)
17. Duddy C, Gadsby E, Hibberd V, *et al.*: **Understanding what happens to attendees after an NHS Health Check: a realist review.** *BMJ Open.* 2022; **12**(11): e064237.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
18. Gadsby E: **The NHS Health Check Programme: A Survey of Programme Delivery in England before and after the Covid-19 Pandemic Response.** 2023. <http://www.doi.org/10.17605/OSF.IO/N84JV>
19. Cooper AM, Dugdill L: **Evidence of improved uptake of health checks: rapid review.** University of Salford, UK, 2014.
[Reference Source](#)
20. Usher-Smith JA, Harte E, MacLure C, *et al.*: **Patient experience of NHS health checks: a systematic review and qualitative synthesis.** *BMJ Open.* 2017; **7**(8): e017169.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
21. Chatterjee R, Chapman T, Brannan MG, *et al.*: **GPs' knowledge, use, and confidence in national physical activity and health guidelines and tools: a questionnaire-based survey of general practice in England.** *Br J Gen Pract.* 2017; **67**(663): e668-e675.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
22. Shaw RL, Holland C, Pattison HM, *et al.*: **Patients' perceptions and experiences of cardiovascular disease and diabetes prevention programmes: A systematic review and framework synthesis using the Theoretical Domains Framework.** *Soc Sci Med.* 2016; **156**: 192-203.
[PubMed Abstract](#) | [Publisher Full Text](#)
23. Public Health England: **National mapping of weight management services.** Provision of tier 2 and tier 3 services in England. 2015.
[Reference Source](#)
24. The King's Fund: **Spending on Public Health.** 2021.
[Reference Source](#)
25. Cercato C, Fonseca FA: **Cardiovascular risk and obesity.** *Diabetol Metab Syndr.* 2019; **11**: 74.
[Publisher Full Text](#)
26. Jenkins LM, Bramwell D, Coleman A, *et al.*: **Integration, influence and change in public health: findings from a survey of Directors of Public Health in England.** *J Public Health (Oxf).* 2016; **38**(3): e201-e208.
[PubMed Abstract](#) | [Publisher Full Text](#)
27. BPS Obesity Task and Finish Group: **Psychological perspectives on obesity: Addressing policy, practice and research priorities.** 2019.
[Reference Source](#)
28. Seifert A: **The Digital Exclusion of Older Adults during the COVID-19 Pandemic.** *J Gerontol Soc Work.* 2020; **63**(6-7): 674-676.
[PubMed Abstract](#) | [Publisher Full Text](#)
29. Graley CEM, May KF, McCoy DC: **Postcode lotteries in public health--the NHS Health Checks Programme in North West London.** *BMC Public Health.* 2011; **11**: 738.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
30. Shaw RL, Pattison HM, Holland C, *et al.*: **Be SMART: examining the experience of implementing the NHS Health Check in UK primary care.** *BMC Fam Pract.* 2015; **16**: 1.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
31. O'Flaherty M, Lloyd-Williams F, Capewell S, *et al.*: **Modelling tool to support decision-making in the NHS Health Check programme: workshops, systematic review and co-production with users.** *Health Technol Assess.* 2021; **25**(35): 1-234.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
32. Public Health England: **Top tips for increasing the uptake of NHS Health Checks.** 2016.
[Reference Source](#)

Open Peer Review

Current Peer Review Status:  

Version 2

Reviewer Report 08 September 2023

<https://doi.org/10.3310/nihropenres.14617.r30321>

© 2023 **Guzman-Castillo M.** This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Maria Guzman-Castillo 

Department of Social Research, University of Helsinki, Helsinki, Finland

I approved the revision. The authors did not incorporate all my comments but those were mainly to improve readability of the text.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 03 August 2023

<https://doi.org/10.3310/nihropenres.14574.r29604>

© 2023 **Bonner C.** This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Carissa Bonner

Faculty of Medicine and Health, School of Public Health, The University of Sydney, Sydney, New South Wales, Australia

This is a well written report of a survey examining NHS health check delivery and changes during COVID-19, with stakeholder input to inform the design. I have minor comments that could be considered to improve the clarity of the paper.

Introduction sections

Abstract – conclusion doesn't quite follow from results (innovation and commissioning not mentioned); add base rate for % response (i.e. 151 areas)

Lay summary – some parts are complex especially last paragraph, aim for grade 8 and explain complex phrases like public health commissioners
Introduction gives a clear overview of the context

Methods

Methods is detailed and mostly clear

Can you clarify how much data was “amended” in response to open comments?

How was the typology developed? In abstract it sounds like it was derived from the data but here it sounds like it was a priori

Results

Here you say you remove duplicates but in methods you say you used duplicates for individuals answering for multiple regions – can you clarify how many duplicates there were and how you identified them as needing removal

Can you give some context for how representative your survey is by region

Table 3/4/5 – add percentages throughout results text and tables; this is reported in some sections but not others so should be consistent
Figures are clear

Table 7 – report SD with mean

Discussion

Good comparison to other relevant surveys

Novel typology is emphasised so important to explain how this was derived a bit more

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: CVD risk assessment, implementation, general practice, risk communication

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 18 Aug 2023

Erica Gadsby

We would like to thank the reviewer for their careful reading, positive feedback and helpful comments. In response to the points raised:

1. Abstract - The 'key innovations' mentioned in the conclusions related to the 'continued changes' mentioned in the results. This has been clarified by changing the wording to 'continued changes' in both sections. The conclusion section now refers to 'commissioners' intentions'. We have also added (of 151) after number of responding LAs to clarify base rate.
2. Lay summary - Thank you for this feedback. We have revised the lay summary. The Hemingway App now judges it as 'Good' readability at Grade 8 level.
3. Methods - Thank you for this point. We have further added "... where the open comments sometimes provided further clarification or detail. One response was amended, where the respondent had not ticked 'pharmacist' as a provider, but had told us in a free text comment that pharmacists were used to deliver the Checks."
4. Results
 - We have now clarified that the typology was '*derived from the data, in consultation with our stakeholder group*' in the data analysis section. We have removed Table 1 from the methods section to help make this clearer, and renumbered subsequent tables.
 - We have now clarified in the text: There were four LAs for which there were two identical responses. Removal of these duplicates left 68 responses ...
 - The representativeness by region is illustrated in table 2: survey respondents by region.
 - Percentages have now been added to results tables. Thank you for your comment that the figures are clear.

- Table 7 now reports SD with mean
- We have added the following to the results section: *"A typology of delivery was developed through an iterative process, looking across the data to compare and contrast delivery locations, modes and staff involved (these aspects are presented in more detail in the sub-sections below). The professional stakeholder group were consulted regarding various iterations of the typology."*

Competing Interests: There are no competing interests to disclose.

Reviewer Report 03 August 2023

<https://doi.org/10.3310/nihropenres.14574.r29610>

© 2023 **Guzman-Castillo M.** This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Maria Guzman-Castillo 

Department of Social Research, University of Helsinki, Helsinki, Finland

I congratulate the authors on an exceptionally well-written manuscript. I have provided some additional comments for your consideration:

1. The results section should incorporate the involvement of the public and stakeholder engagement meetings discussed in the methods, to show how their views influenced the results. Currently, the results only include the analysis of the survey.
2. It would be beneficial to include uptake statistics for each region in Table 2.
3. Tables 4-7 should include the percentage (%) values, and it would be helpful to remind the reader of the total number of LAs.
4. The term "delivery" has two different meanings in the manuscript, which makes it difficult to follow the authors' intent. The first meaning refers to the physical place, as discussed in "Delivery of the NHS Health Check." However, in the section on "Associations between delivery category and other variables," the authors use "delivery" to refer to the "typology of delivery," which encompasses not only the physical place but also the health professionals involved.
5. The authors could reduce the text on "Delivery of the NHS Health Check" and "Health professionals involved in Health Check delivery" and instead provide more details on the "typology of delivery." These three sections currently overlap, making them sound repetitive and unnecessary. Additionally, considering moving tables 2 and 3 to the appendix and

grouping these sections together to improve the flow of the paper.

6. Adding the percentage (%) values within each of the color bars in figures 1-3 would facilitate the reader in calculating the exact percentages more easily.
7. Provide keys or explanations to help readers interpret the boxplot in figure 4. It is important to consider that some readers may not be familiar with how to interpret whiskers.
8. In figure 4, the whiskers and boxes overlap for the three categories, which indicates that we cannot state the groups are different.
9. Ensure consistency when discussing changes pre/post-Covid. Some sections discuss changes in the table, while others discuss them in the text. Create a new subsection specifically dedicated to discussing changes after Covid to maintain consistency throughout the manuscript.
10. Since the typology of delivery seems to be one of the main elements of the paper, consider using a data visualization tool to effectively represent it.
11. It would be beneficial to add some key results at the beginning of the discussion section.
12. Discuss the public health implications of this study more comprehensively. Currently, some ideas are scattered throughout the manuscript, so it would be better to consolidate them into a single paragraph.
13. The discussion focuses heavily on the differences in coverage among different typologies of delivery, but as previously stated, the boxplot indicates that there are no differences between the groups. This should be acknowledged and addressed in the discussion.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

No source data required

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public Health modelling

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 18 Aug 2023

Erica Gadsby

We would like to thank the reviewer for their careful reading, positive feedback and helpful suggestions. Below, we response to each point in turn:

1. The contributions from public and stakeholder contributors were not treated as research data, and so are not incorporated in the results section. However, we have included some additional text in the discussion section to highlight the ways in which these contributions helped to shape our analysis and interpretation of the research findings.
2. Thank you for this point. We think you mean the NHS Health Check performance figures (as in uptake of checks)? The authors discussed this at length and decided it wouldn't be useful to include these statistics in table 2. Table 2 is reporting the representativeness of the survey by region (in terms of how many and what proportion of LAs in each region responded to the survey). We reasoned that including a snapshot of NHS Health Check performance data within this table would be confusing.
3. Total number of LAs and percentages for each cell have now been added to tables 4-6. Table 7 presents average confidence scores of respondents.
4. Thank you for this feedback. The section titled 'Delivery of the NHS Health Check' discusses both location (i.e. physical place) and mode of delivery (e.g. remote). The typology of delivery does include information on health professionals as well. To make terminology clearer throughout, we have moved the sub-section 'Typology of NHS Health Check delivery' to precede the detail on location, mode and professionals involved (see point 5). We have also changed the subheading 'Delivery of the NHS Health Check' to 'Location and mode of Health Check delivery'.
5. Thank you for this point. We have moved the section 'Typology of local authorities' (and re-named it 'Typology of NHS Health Check delivery') up to the start of the results section. This helpfully precedes the further detail on location, mode and personnel in the subsequent sections. Having done this, we felt (former) Table 1 was no longer required so we have deleted this and renumbered subsequent tables. We felt that given the importance of regional coverage and detail related to health professionals involved, we would prefer to keep these in the main body of the article.
6. Given the number of colour bars in figures 1 and 2 we felt that adding percentage values made them less clear. Since Reviewer 2 commented that the figures are clear, we have

opted not to add them. However, we have chosen to add values (as opposed to percentages) in the colour bars in figure 3, since we feel this is quite helpful. We have added a title to the vertical axis to make this clear.

7. We have amended the wording preceding the boxplots to help readers interpret them.

8. In the amended wording preceding the boxplots we have included a clarification of our interpretation.

9. All sections in the results discuss pre/post covid in the text except 'monitoring and evaluation', where it is not relevant to do so. We have included an additional sentence and slightly changed the ordering of text in the section 'health professionals involved in Health Check delivery' to better highlight changes post Covid. We felt it would lead to too much repetition to have a separate section in results that deals just with changes after Covid. There is a paragraph in the discussion section that is specifically dedicated to discussing changes after Covid. Given this was quite brief, we have added some additional text here.

10. We have included a proposed Figure 1. We hope this is along the lines that Review 1 was thinking.

11. Given the range of results presented, we felt this would lead to too much repetition. We have checked that the Discussion section summarises and discusses each sub-section of results in turn.

12. The public health implications of this study are dealt with in the Discussion section where we summarise each key aspect of the results and the public health implications in turn. First, we discuss the findings related to which professionals provide the checks, and highlight the implications in terms of patient experiences and outcomes of the Checks. Next, we discuss findings related to follow-on support services, and highlight the implications in terms of risk reduction/management and inequalities in access to services. Next, we discuss findings related to changes in programme delivery prompted by the pandemic, and the implications in terms of access to services, prioritisation, digital exclusion, inequalities, and service quality, efficiency and cost-effectiveness. Next, we discuss findings related to monitoring and evaluation, and the implications in terms of our ability to evaluate the impact of the programme. Finally, we link this lack of monitoring and evaluation data to the diversity in delivery models, and highlight how little we know about how best to deliver the programme (particularly to reduce health inequalities). We believe this is a more thorough approach than trying to deal with all public health implications in one paragraph. The final paragraph of the conclusion section further summarises these implications.

13. In the paragraph that discusses associations between delivery category and other variables, we have changed one sentence to clarify the lack of association between delivery category and programme performance.

Competing Interests: No competing interests to disclose.