Supporting uptake of NHS Health Checks amongst residents in Cambridgeshire

Phase one report: Insight gathering and intervention recommendations

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Contents

Executive Summary

Sheffield Hallam University were commissioned by Cambridgeshire County Council and Peterborough City Council to undertake research to understand the barriers and facilitators for seven health behaviours.

In Cambridgeshire, we explored:

- Physical activity, Diet, Smoking in adults, Alcohol consumption, Uptake of NHS Health Checks, and Vaping in young people

In Peterborough, we explored:

- Uptake of routine childhood vaccinations

This report presents the findings from the NHS Health Checks workstream in Cambridgeshire. The findings for other health behaviours in Cambridgeshire and Peterborough are presented in separate reports.

The aim was to:

- Identify the barriers and facilitators for uptake of NHS Health Checks in Cambridgeshire amongst different population groups.
- Make recommendations for interventions that have the potential to address those identified needs.

Our approach

We used the Capability, Opportunity and Motivation – Behaviour (COM-B) [1] model to explore factors influencing uptake of NHS Health Checks.

We conducted a survey and carried out interviews with adults eligible for an NHS Health Check in Cambridgeshire to explore the barriers and facilitators for NHS Health Check uptake.

We conducted a rapid evidence review using the Behaviour Change Wheel (BCW) [2] to understand what types of interventions have been implemented to support uptake of NHS Health Checks.

We then produced a heat map [3] to explore whether, and to what extent, existing interventions have the potential to address these identified barriers and facilitators.

Informed by the BCW, we made intervention recommendations to address those identified barriers.

We used the APEASE evaluation criteria [2] and the IN-CASE framework [4] to explore which intervention recommendations are likely to be acceptable, practical, effective, and affordable for adults eligible for an NHS Health Check, and for Cambridgeshire County Council and/or wider stakeholders to deliver, and whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.

Key findings – local survey

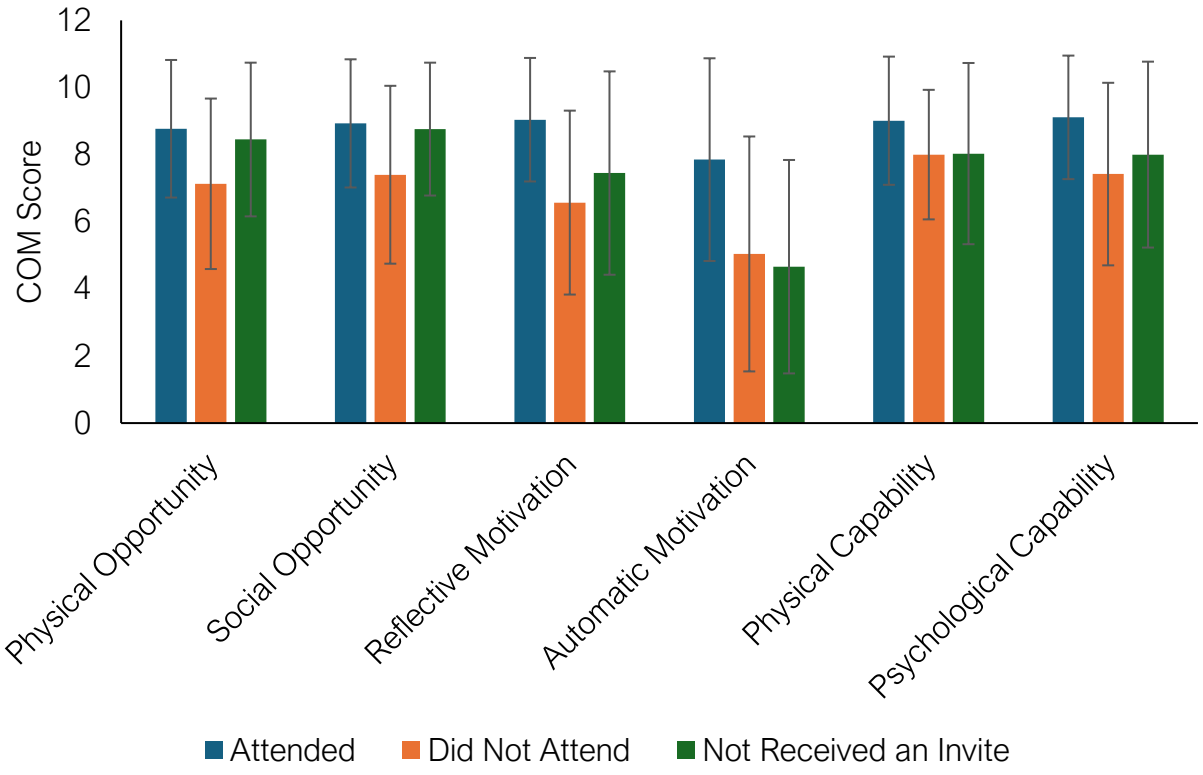
We surveyed 578 residents in Cambridgeshire who were aged between 40 – 74 years. Over 10% of residents in Cambridgeshire who report that they have received an invitation for an NHS Health Check have not attended. Over 10% of residents in Cambridgeshire who are eligible for an NHS Health Check are also unwilling or unsure whether they would attend an NHS Health Check.

Residents who have been invited but have not attended an NHS Health Check were more likely to be younger, male, live in more deprived areas of Cambridgeshire, be a resident of Huntingdonshire, be employed, and/or not living with a health condition or disability. These residents were also more likely to be unwilling or unsure whether they would attend an NHS Health Check.

Those who have been invited and have not attended an NHS Health Check, and those who are unwilling or unsure whether to attend an NHS Health Check, reported weaker capability, opportunity, and motivation to access an NHS Health Check.

Those who reported that they had not received an invite for an NHS Health Check tended to report having the physical and social opportunity to attend an NHS Health Check but reported weaker capability and motivation to take up the offer when invited, with these beliefs comparable to those who had received an invitation and had not attended an NHS Health Check.

Capability, opportunity, and motivation to attend an NHS Health Check, by invitation and attendance



Key findings – interviews

We interviewed 10 residents of Cambridgeshire aged 40-51 who were eligible for an NHS Health Check, including a mix of those who had previously attended and not attended. We identified a range of barriers (B) and facilitators (F) to attending an NHS Health Check, including:

- Knowledge about what an NHS Health Check is, and how to book one (B/F)
- Beliefs about potential negative consequences of attending an NHS Health Check, including anxiety about hearing negative feedback about one's health and/or being asked to make lifestyle changes (B)
- Perceived importance of attending an NHS Health Check (B/F), as well as relative perceived risk of cardiovascular disease and other health conditions (B/F)
- Concerns about wasting NHS time and/or a lack of capacity in the NHS (B)
- Concerns about practical challenges associated with getting or booking an appointment (B)
- Support to attend an NHS Health Check from friends, family or employers (B/F)
- Lack of personalised information in leaflets and appointment invites (B)

I actually don't know anything about them. I know I've been invited to one [P6, not attended]

"I don't really like going to the doctors anyway, I think it clogs up the system if all the healthy people go and then the old people can't get appointments."
[P3, not attended]

"If I knew, for example, I can have a Health Check in an evening or a weekend it would make a massive difference because I think people are under quite a lot of work pressure nowadays... it makes it harder for a number of people."
[P5, not attended]

"They could come out going oh, great I'm overweight, I drink far too much, I'm on vapes, right that- They could come out and sort of feel quite overwhelmed with all this information that they've suddenly got. And I'm living my life wrong and I eat too much fast food and I do this and I do that, you know, and then- Do you know what I mean they could come out and it could affect their mental health."
[P5, not attended]

Key findings – rapid evidence review

We conducted a rapid evidence review of 11 interventions that have been implemented to increase uptake of NHS Health Checks and that targeted population (individual people's) behaviour.

We identified 6 types of interventions to support uptake:

- **Education** (used in 7 interventions) – intervention components that aimed to increase knowledge or understanding
- **Coercion** (used in 1 intervention) – intervention components that involved punishment or cost
- **Persuasion** (used in 6 interventions) – intervention components that used methods of persuasive communication
- **Modelling** (used in 2 interventions) – intervention components that provide examples for people to copy
- **Environmental restructuring** (used in 9 interventions) – intervention components that aimed to change the physical or social environment
- **Enablement** (used in 4 interventions) – intervention components that increase facilitators or reduce barriers to uptake beyond education, training, or environmental restructuring.

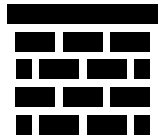
The most frequently reported behaviour change techniques used in these interventions were:

- **Prompts/cues** (used in 7 interventions)
- **Information about health consequences** (used in 5 interventions)
- **Credible sources** (used in 5 interventions)
- **Framing/reframing** (used in 5 interventions)

Overall, there is evidence to suggest that interventions that target both population behaviour (i.e., supporting people to take up/attend the offer of an NHS Health Check) and healthcare practitioner behaviour (i.e., supporting practitioners to offer and promote NHS Health Checks) are effective.

Key findings – heatmap

We identified whether 11 published interventions have the potential to address each of the identified barriers and facilitators for supporting uptake of NHS Health Checks.



No intervention that we evaluated addressed all the identified barriers for uptake of NHS Health Checks amongst residents in Cambridgeshire.

The most common strategy used to address barriers relating to beliefs about consequences was to provide information about health consequences. This included attaching the NHS Health Check leaflet to invite letters and providing reasons why NHS Health Checks are important to attend.

The most common intervention strategy utilised by the published interventions to target environmental context and resource barriers was the use of prompts and cues. This included sending follow up text-messages, phone calls and letters to non-responders.

Residents reported concerns of heightened health anxiety around finding out about health issues as a result of attending an appointment and also reported concerns about being told to take preventative action because of findings from an NHS Health Check. None of the published interventions addressed any of these concerns.

Our recommendations

Intervention recommendation 1:
Increasing awareness of an NHS Health Check

Residents have low awareness of NHS Health Checks. Many do not know that they exist, that they are eligible, and that there are different ways to book and access one. Helping people understand what an NHS Health Check is, the importance of them and what support is available afterwards could encourage more people to attend. Sharing information through leaflets, posters, or videos/ testimonials of "People like me" could help educate and persuade people about the importance of NHS Health Checks for them. These materials could be shared on social media or placed in public spaces often visited by eligible individuals, such as gyms, libraries, pubs and cafes.

Intervention recommendation 2:
Addressing (mis)perceptions about the need for an NHS Health Check

Some residents are less likely to attend NHS Health Checks due to the (mis)belief that they are unnecessary for people who feel healthy or those with low perceived cardiovascular disease risk. Others are concerned about potential NHS waiting times if a referral is needed afterwards or are concerned about the outcomes of attending an NHS Health Check. Our approach proposes providing communications to persuade people of the importance of NHS Health Checks by emphasising motivators for attending, alongside communications which address concerns residents reported for (not) attending an NHS Health Check. Addressing these concerns may be most effective via supportive conversations with healthcare practitioners, including opportunistic conversations during other healthcare appointments such as at the pharmacy.

Intervention recommendation 3:
Workplace & Community NHS Health Checks

Some residents were concerned with the increased load placed on colleagues if they were absent from work due to attending an NHS Health check, with others valuing having support from their employers to attend. Some residents reported difficulty in booking an appointment around work schedules. Local Authorities, including Cambridgeshire, have sought to address some of these concerns by offering workplace Health Checks. Unhealthy lifestyle behaviours such as smoking are more prevalent in certain occupations (e.g., routine and manual workers) and so expanding the offer of NHS Health Checks in such types of workplaces may support uptake, especially for those at a greater risk of cardiovascular disease.

Conclusions

We have identified key capability, opportunity and motivational barriers and facilitators for uptake of an NHS Health Check for residents in Cambridgeshire through mixed-methods research (i.e., rapid review, survey, interviews and heat map).

Existing interventions to support uptake of an NHS Health Check do not currently address all of the identified barriers and facilitators faced by Cambridgeshire residents, and so current interventions may not sufficiently meet and support the needs of Cambridgeshire residents.

We have offered three recommendations about how to support Cambridgeshire residents to access an NHS Health Check, through providing more information about how, where and when to book an NHS Health Check, why it is important, and providing information on the support available following receipt of an NHS Health Check; eliciting and addressing (mis)perceptions about the need for an NHS Health Check and concerns about the outcomes of an NHS Health Check; and offering NHS Health Checks in workplaces, especially in occupations where we know residents are at increased risk of unhelpful lifestyle behaviours (e.g., smoking).

Recommended citation:
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NHS Health Check Uptake: Main report

Background

The NHS Health Check is offered to 40–74-year-olds as a free check-up of your overall health [5]. The aim is for 20% of the eligible population to be offered an NHS Health Check each year, with a target take-up rate of 75% [6].

Although the proportion of invites being sent to eligible individuals to attend an NHS Health Check are below the recommendations, Cambridgeshire residents are more likely to receive an NHS Health Check than the England average [7].

Both in Cambridgeshire and across England, the take-up rate is below the target rate; but it should be noted the take-up rate in Cambridgeshire is nearly double that of England.

Information is provided for Cambridgeshire residents via the local "BeWell" website about what an NHS Health Check is, how to get one, and how to improve any test results received at the appointment. In addition, NHS Health Checks are promoted through an online video of an attendee's experience. The site also states that as well as offering NHS Health Checks at GP surgeries, Cambridgeshire residents can also book community and workplace appointments via HealthyYou [8].

However, locally, it is currently unknown who is, and isn't, accepting an invitation and attending an NHS Health Check, and the factors influencing this behaviour. Thus, it is unknown what needs to be in place to support and address any unmet needs of Cambridgeshire's residents.

	Population NHS Health Check Coverage (2023/24)	
	England	Cambridgeshire
People invited for an NHS Health Check per year	22.1%	15.3%
People receiving an NHS Health Check per year	8.8%	10.5%
People taking up an NHS Health Check invite per year	39.9%	68.4%

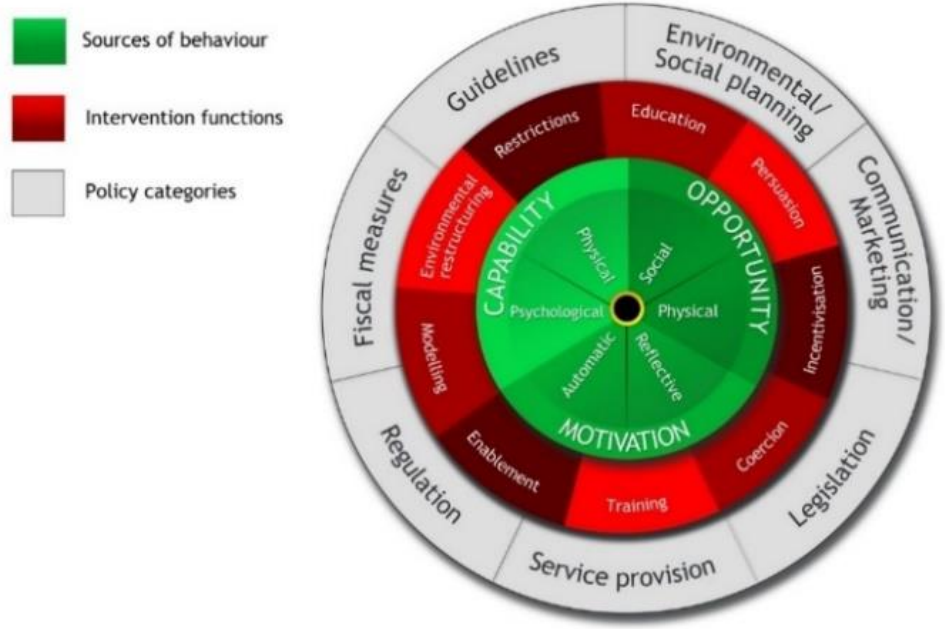
How we used behavioural science in this context

Theoretical approach

We used the Behaviour Change Wheel [2] to make theory-informed intervention recommendations for supporting uptake of NHS Health Checks. This involved:

- Understanding the barriers and facilitators for NHS Health Check uptake using the capability-opportunity-motivation model of behaviour (COM-B) (green circle) and the Theoretical Domains Framework (TDF) [9]
- Matching the types of intervention functions that are likely to address those identified barriers and facilitators (red circle)
- Matching the types of policy categories that can help to deliver those identified interventions (grey circle)

We described the content of the intervention recommendations in terms of its Behaviour Change Techniques (BCTs), which are the 'active ingredients' of the intervention [10].



We used the APEASE evaluation criteria [2] and the IN-CASE framework [4] to explore which intervention recommendations are likely to be acceptable, practical, effective, and affordable, and whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.

Local survey of residents in Cambridgeshire

We conducted a survey of residents in Cambridgeshire, including questions regarding multiple health behaviours (i.e., smoking, alcohol, diet, physical activity). Survey participants who were aged between 40 – 74 years were asked specific questions about uptake of NHS Health Checks.

The objectives were to:

(1) Understand who is accessing NHS Health Checks in Cambridgeshire

(2) Identify the barriers and facilitators to accessing NHS Health Checks amongst adults in Cambridgeshire

(3) Explore whether the barriers and facilitators to accessing NHS Health Checks vary by those who have and have not accessed an NHS Health Check

(4) Explore whether the barriers and facilitators to accessing NHS Health Checks vary by those who are and are not willing to access an NHS Health Check when offered

(5) Identify whether the barriers and facilitators to accessing NHS Health Checks vary by key demographic and health variables

Individuals were recruited via on-street market researchers between August – October 2024. Eligibility criteria included: participants aged 18 or above; Cambridgeshire resident; aged 40 – 74 years; able to provide consent. A purposive sampling strategy was used to recruit a diverse sample e.g., living in areas of deprivation; ethnicity; age.

The survey measured:

- **NHS Health Check attendance** i.e., whether they have or have not attended an NHS Health Check; whether they are or are not willing to attend an NHS Health Check when offered
- **Capability, Opportunity and Motivation for** attending an NHS Health Check [11]
- **Demographic and health data** i.e., age; partial postcode; gender; ethnicity; country of birth; languages spoken other than English at home; employment status; health status; annual household income; educational level

Descriptive statistics and/or statistical tests were conducted to address each research question. The analysis was done using SPSS version 26.0 (IMB Corp).

Ethical approval

Ethical approval was granted by Sheffield Hallam University Research Ethics Committee (ID ER65436549) and Cambridgeshire County Council. All participants provided informed consent before participating.

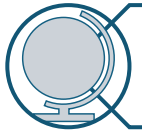
Survey findings – Participants

In total, 578 residents in Cambridgeshire aged between 40 – 74 years (eligible for an NHS Health Check) took part in the survey.

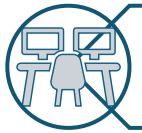
The mean age of residents was 58.01 years old (SD 11.32)

The majority of residents were female (55.5%)

207 residents reported income, with 20.8% reporting an annual income of ≤ £20,000



17% of residents were born outside of the UK, and 15.1% spoke a language other than English at home



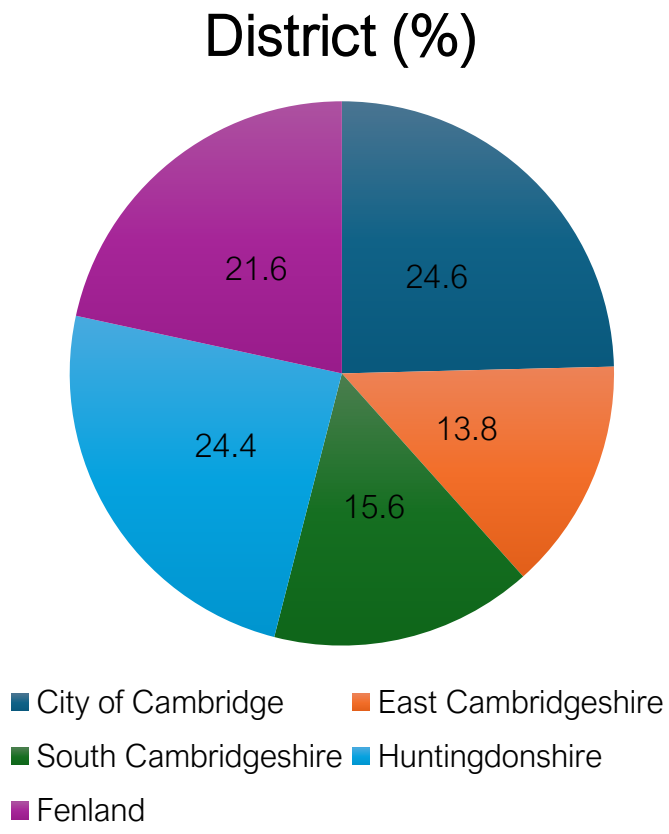
The majority of residents were in full/part-time or self-employment (56.3%)

40.5% of residents identified as having a health condition or disability

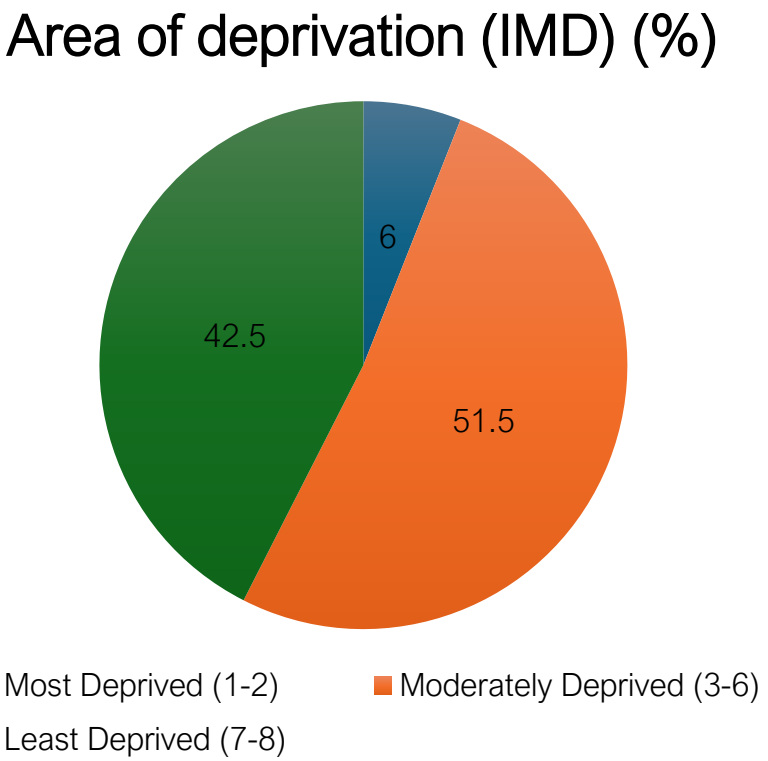
The majority who responded identified as White British (79%) with a further 11.4% identifying as a White background other than White British

Survey findings – Participants

We surveyed residents from across five districts in Cambridgeshire.



Most residents were from moderately deprived (IMD 3 – 6) and least deprived (IMD 7 – 8) areas of Cambridgeshire.

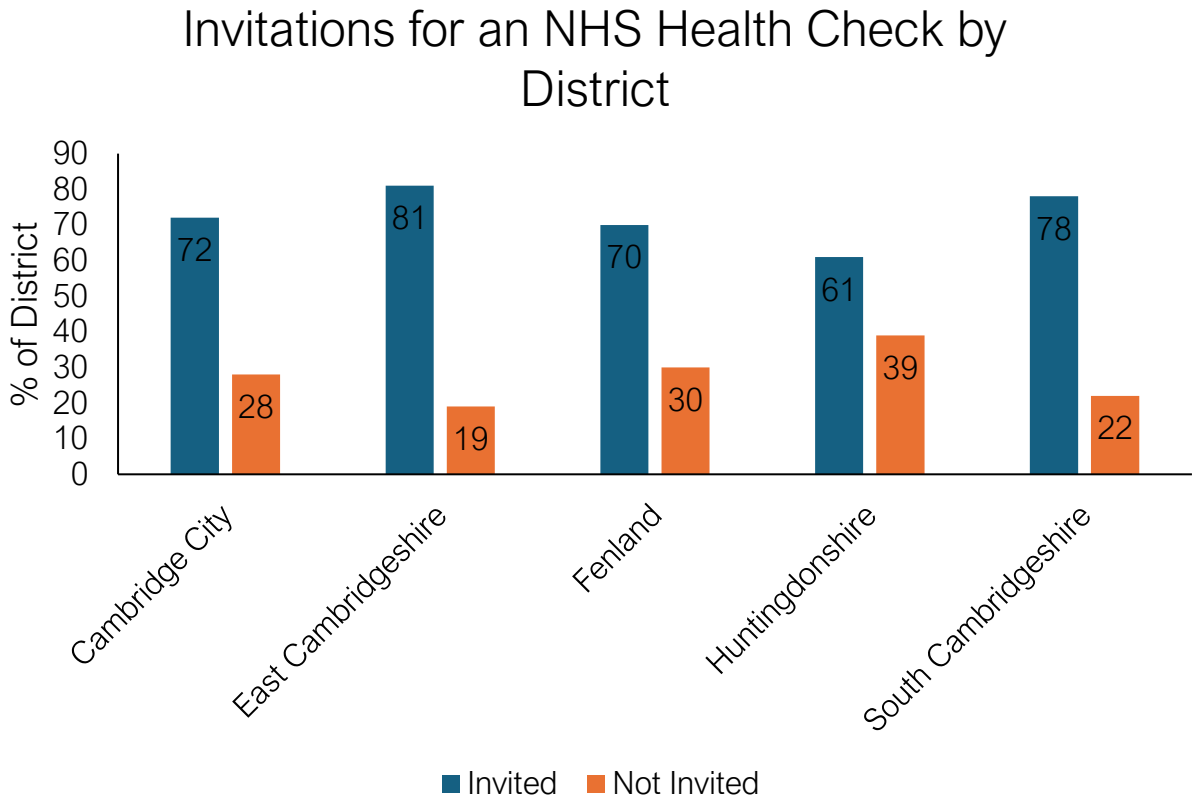


Research Question 1: *Who is accessing NHS Health Checks in Cambridgeshire?*

Of the 578 residents aged 40 – 74 years who were surveyed, 28.8% (160) reported that they had not received an invitation to attend an NHS Health Check yet.

There was a trend for a higher proportion of residents living in Huntingdonshire to report not having received an invitation for an NHS Health Check.

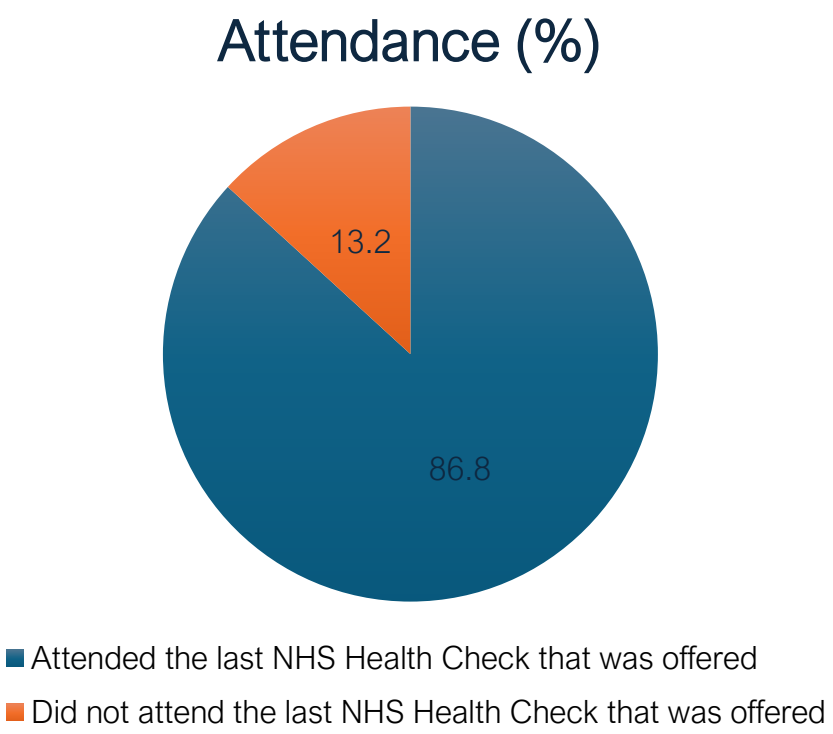
However overall, the proportion of residents who reported that they had received an invitation for an NHS Health was relatively comparable across the five districts.



Research Question 1: *Who is accessing NHS Health Checks in Cambridgeshire?*

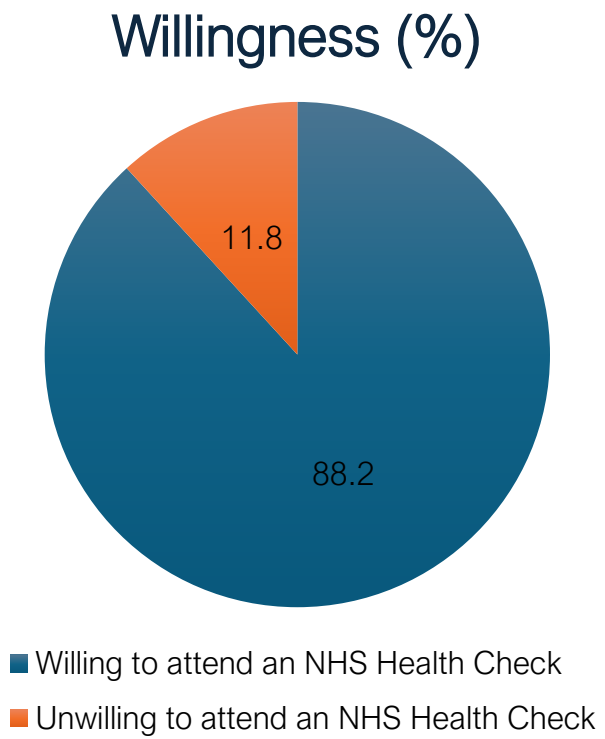
Of those who reported that they had received an invitation to attend an NHS Health Check (n = 395):

- 86.8% (343) reported that they attended the last NHS Health Check that was offered
- 13.2% (52) reported that they have not attended the last NHS Health Check that was been offered



Of those who reported whether they were willing to attend an NHS Health Check if offered (n = 550):

- 88.2% (485) were willing to attend an NHS Health Check
- 11.8% (65) were unwilling or unsure whether to attend an NHS Health Check

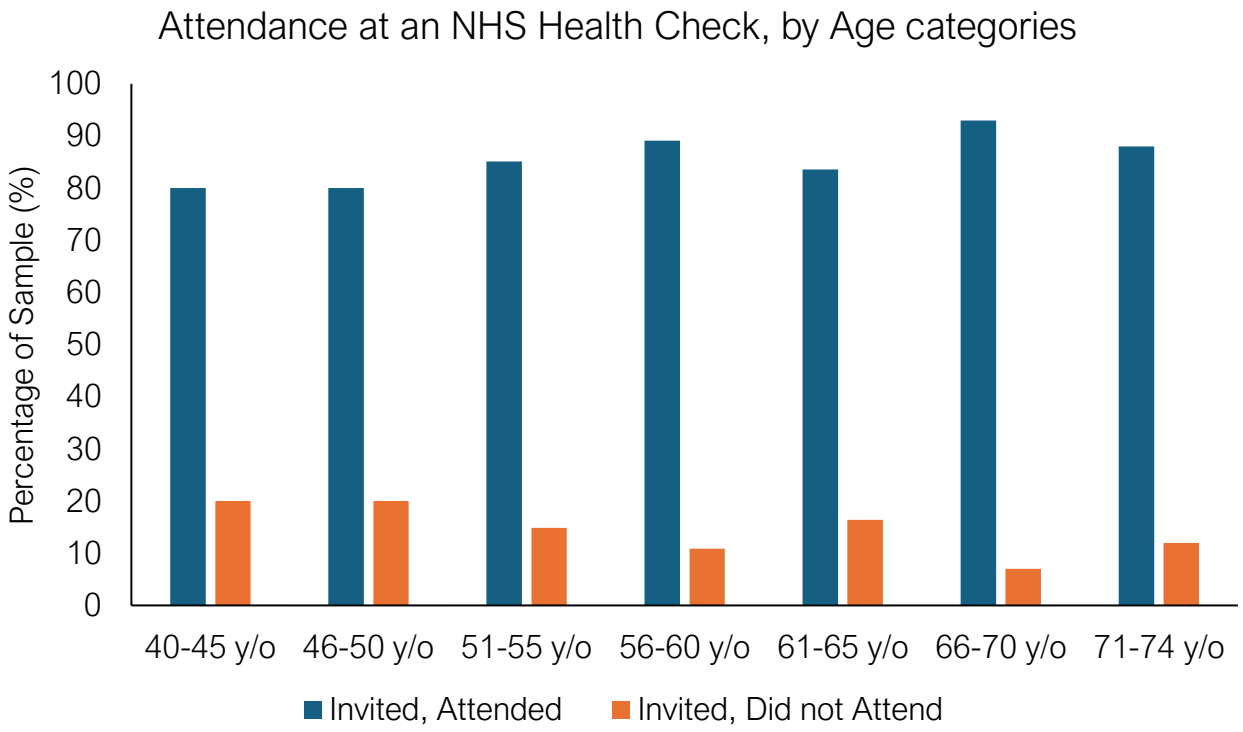


Research Question 1: *Who is accessing NHS Health Checks in Cambridgeshire?*

Those who had been invited to an NHS Health Check but **had not attended**, were more likely to be:

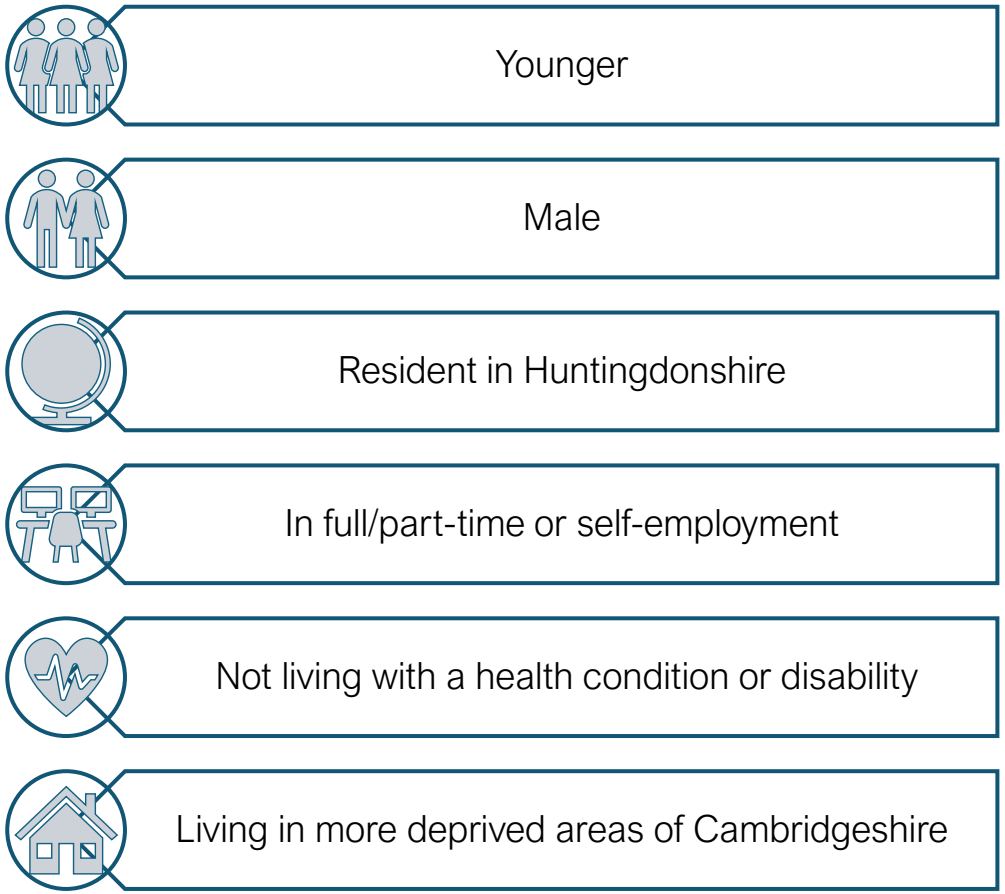
- Younger
- Male
- Have formal educational qualifications
- Resident in Huntingdonshire
- In full/part-time or self-employment
- Not living with a health condition or disability
- Living in more deprived areas of Cambridgeshire

Those aged 70-74 years old were the most likely (94%) to attend an NHS Health Check. Those aged 40 – 50 years were the least likely (20%) to attend an NHS Health Check.



Research Question 1: *Who is accessing NHS Health Checks in Cambridgeshire?*

Those who were **unwilling or unsure** whether to attend an NHS Health Check were significantly more likely to be:



Research Question 2: *What are the barriers and facilitators to accessing NHS Health Checks?*

This table presents the mean (SD) scores for each barrier and facilitator item. Each item is assessed on an 11-point scale, ranging from strongly disagree (=0) to strongly agree (=10). Across the entire sample, residents reported that they:

- Know about the importance of accessing an NHS Health Check and they have the skills to make decisions and plans to access an NHS Health Check **(psychological capability)**
- Have the physical skills and enough physical stamina to access an NHS Health Check **(physical capability)**
- Have sufficient time and the necessary resources (e.g., time to attend an appointment, able to travel to an appointment) to access an NHS Health Check **(physical opportunity)**
- Have the necessary support from people (e.g., from friends and family) to access an NHS Health Check **(social opportunity)**
- Intend to (or want to) access an NHS Health Check **(reflective motivation)**

Residents reported the **lowest score for automatic motivation**, compared with other aspects of capability, opportunity, and motivation. This means that residents were less likely to believe that accessing an NHS Health Check is an automatic behaviour (i.e., something they do without thinking about it).

Capability, Opportunity, and Motivation to access an NHS Health Check	Entire sample (mean, SD)
Psychological capability	
I know about the importance of accessing my NHS Health Checks and have the skills to make decisions and plans to access my NHS Health Checks	8.53 (2.42)
Physical capability	
I have the physical skills and enough physical stamina to access my NHS Health Checks	8.55 (2.28)
Physical opportunity	
I have sufficient time and the necessary resources (e.g., time to attend an appointment, able to travel to an appointment) to access my NHS Health Check	8.47 (2.24)
Social opportunity	
I have the necessary support from people (e.g., from friends and family) to access my NHS Health Checks	8.65 (2.14)
Reflective motivation	
I intend to (or want to) access my NHS Health Checks	8.30 (2.52)
Automatic motivation	
Accessing my NHS Health Checks is something I do automatically (without thinking about it)	6.62 (3.43)

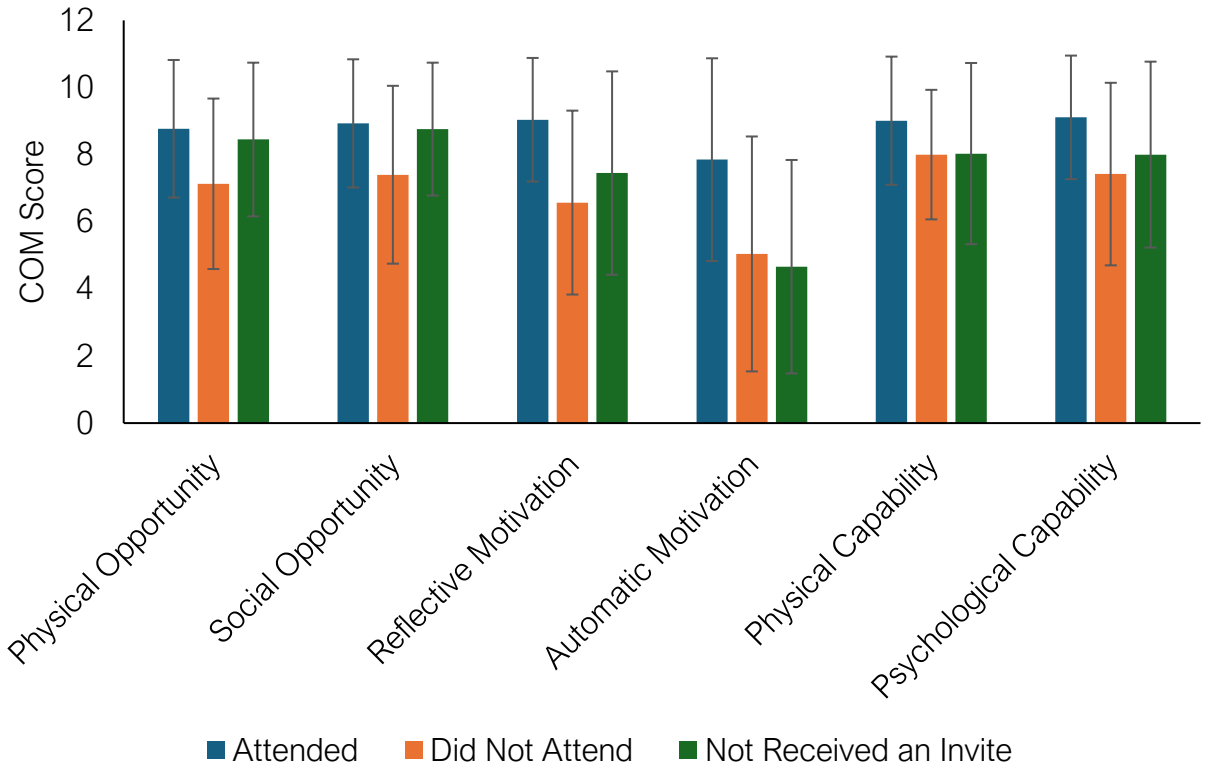
Research Question 3: *Do the barriers and facilitators to accessing NHS Health Checks vary by those who have and have not accessed an NHS Health Check?*

Residents who **had not accessed an NHS Health Check** were significantly more likely to report:

- Weaker knowledge about the importance of accessing an NHS Health Check and weaker skills to make decisions and plans to access an NHS Health Check **(psychological capability)**
- Weaker physical skills and physical stamina to access an NHS Health Check **(physical capability)**
- Having less time and resources (e.g., time to attend an appointment, able to travel to an appointment) to access an NHS Health Check **(physical opportunity)**
- Having less support from people (e.g., from friends and family) to access an NHS Health Check **(social opportunity)**
- Weaker intentions to (or willingness to) access an NHS Health Check **(reflective motivation)**
- Weaker beliefs that accessing an NHS Health Check is an automatic behaviour (i.e., something they do automatically without thinking about it) **(automatic motivation)**.

Those who reported that they **had not received an invite for an NHS Health Check** tended to report having the physical and social opportunity to attend an NHS Health Check. However, they reported weaker psychological and physical capability and weaker reflective and automatic motivation, with these beliefs comparable to those who had received an invitation and had not attended an NHS Health Check.

Capability, opportunity, and motivation to attend an NHS Health Check, by Invitation and Attendance

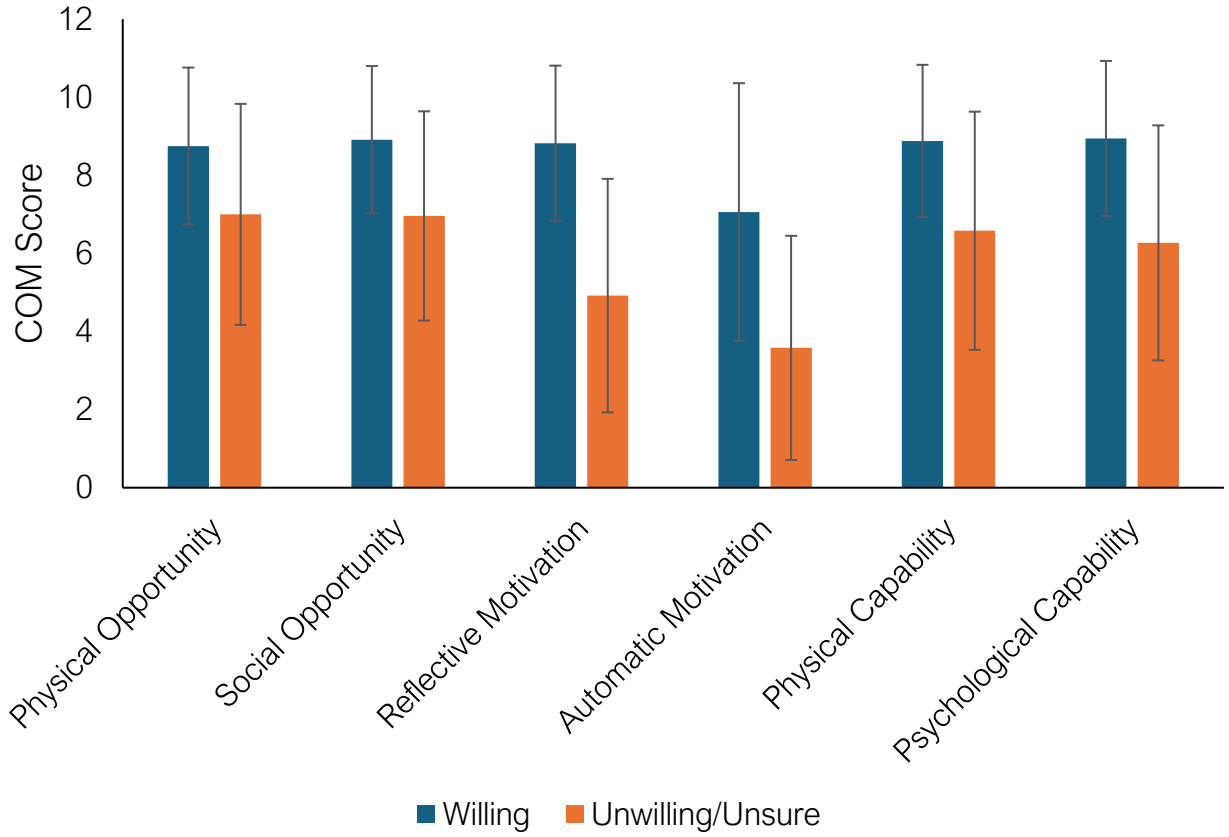


Research Question 3: *Do the barriers and facilitators to accessing NHS Health Checks vary by those who have and have not accessed an NHS Health Check?*

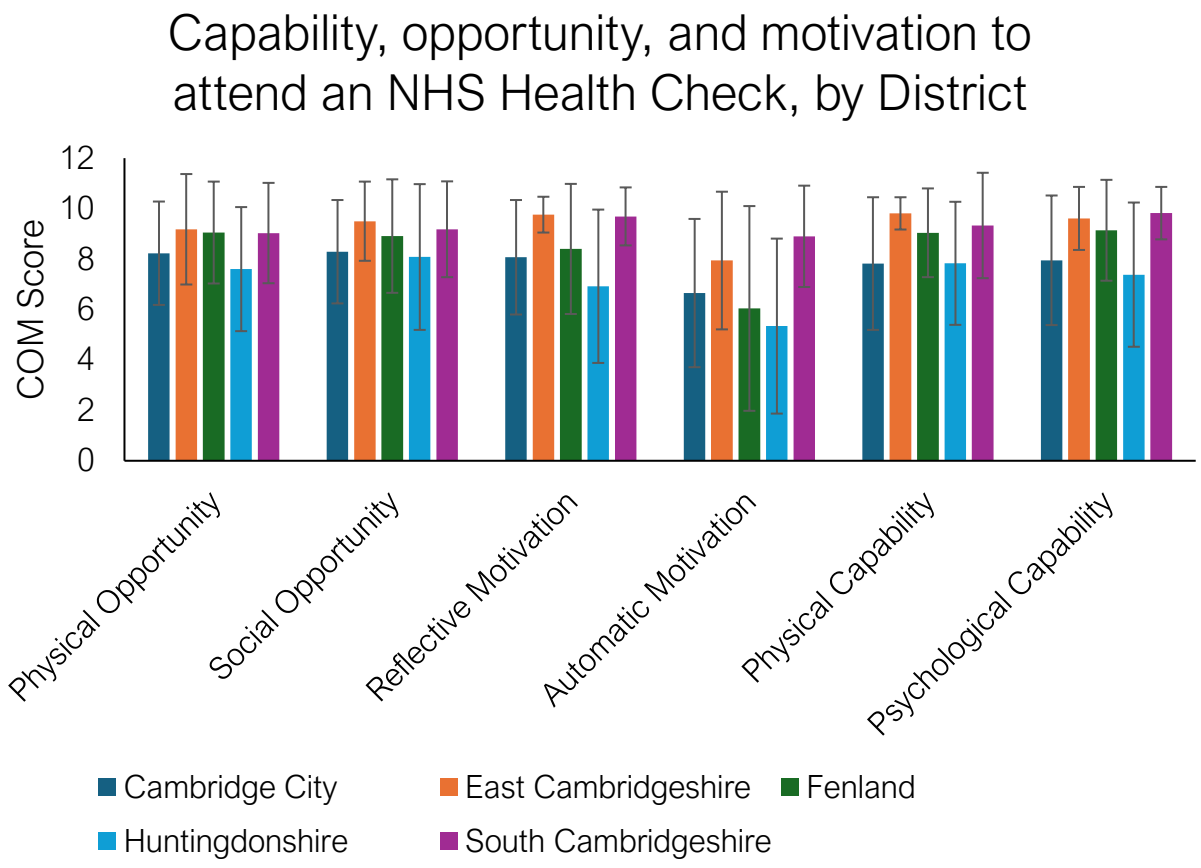
Residents who were **unwilling or unsure** whether to access an NHS Health Check were significantly more likely to report:

- Weaker knowledge about the importance of accessing an NHS Health Check and weaker skills to make decisions and plans to access an NHS Health Check **(psychological capability)**
- Weaker physical skills and physical stamina to access an NHS Health Check **(physical capability)**
- Having less time and resources (e.g., time to attend an appointment, able to travel to an appointment) to access an NHS Health Check **(physical opportunity)**
- Having less support from people (e.g., from friends and family) to access an NHS Health Check **(social opportunity)**
- Weaker intentions to (or willingness to) access an NHS Health Check **(reflective motivation)**
- Weaker beliefs that accessing an NHS Health Check is an automatic behaviour (i.e., something they do without thinking about it) **(automatic motivation)**

Capability, opportunity, and motivation to attend an NHS Health Check, by Willingness



Research Question 4: *Do the barriers and facilitators to accessing NHS Health Checks vary by key demographic and health variables?*



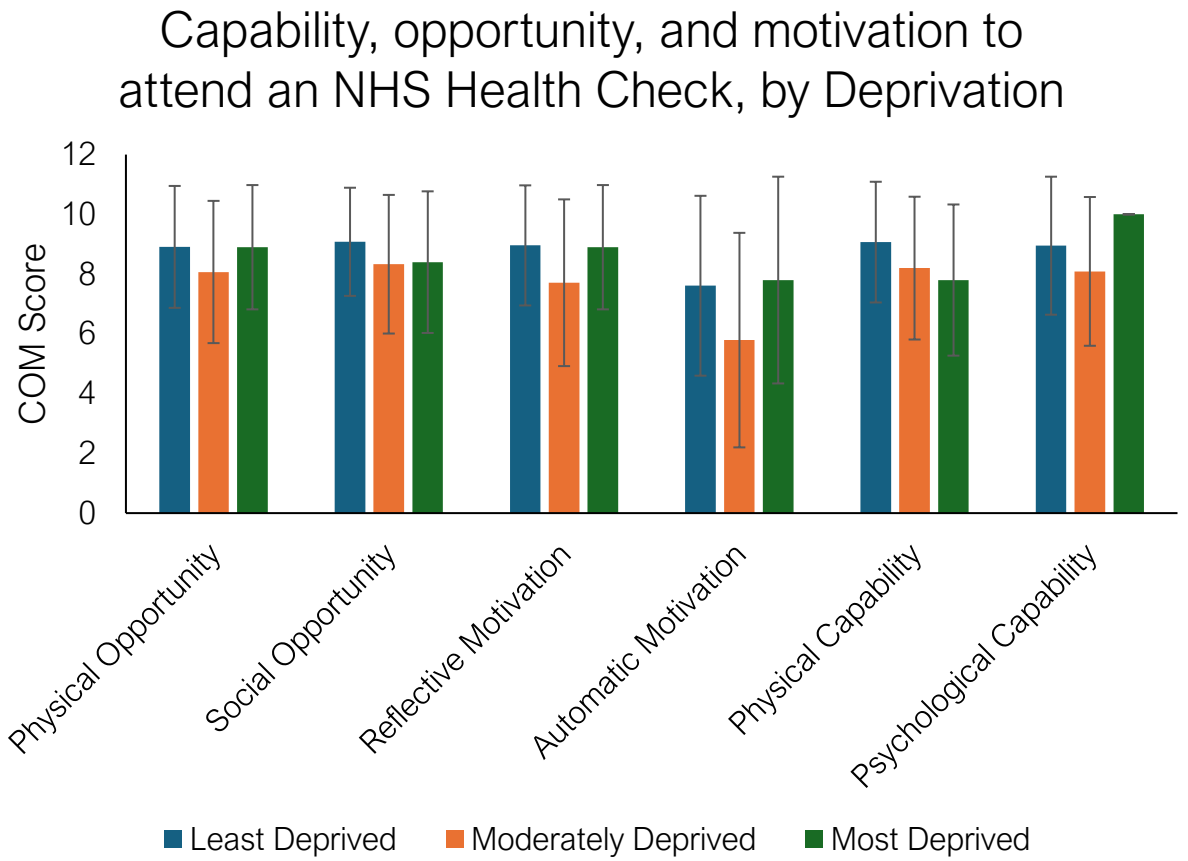
Residents living in Huntingdonshire were more likely to report:

- Weaker knowledge about the importance of accessing an NHS Health Check and weaker skills to make decisions and plans to access an NHS Health Check **(psychological capability)**
- Weaker physical skills and physical stamina to access an NHS Health Check **(physical capability)**
- Having less time and resources (e.g., time to attend an appointment, able to travel to an appointment) to access an NHS Health Check **(physical opportunity)**
- Having less support from people (e.g., from friends and family) to access an NHS Health Check **(social opportunity)**
- Weaker intentions to (or willingness to) access an NHS Health Check **(reflective motivation)**
- Weaker beliefs that accessing an NHS Health Check is an automatic behaviour (i.e., something they do without thinking about it) **(automatic motivation)**

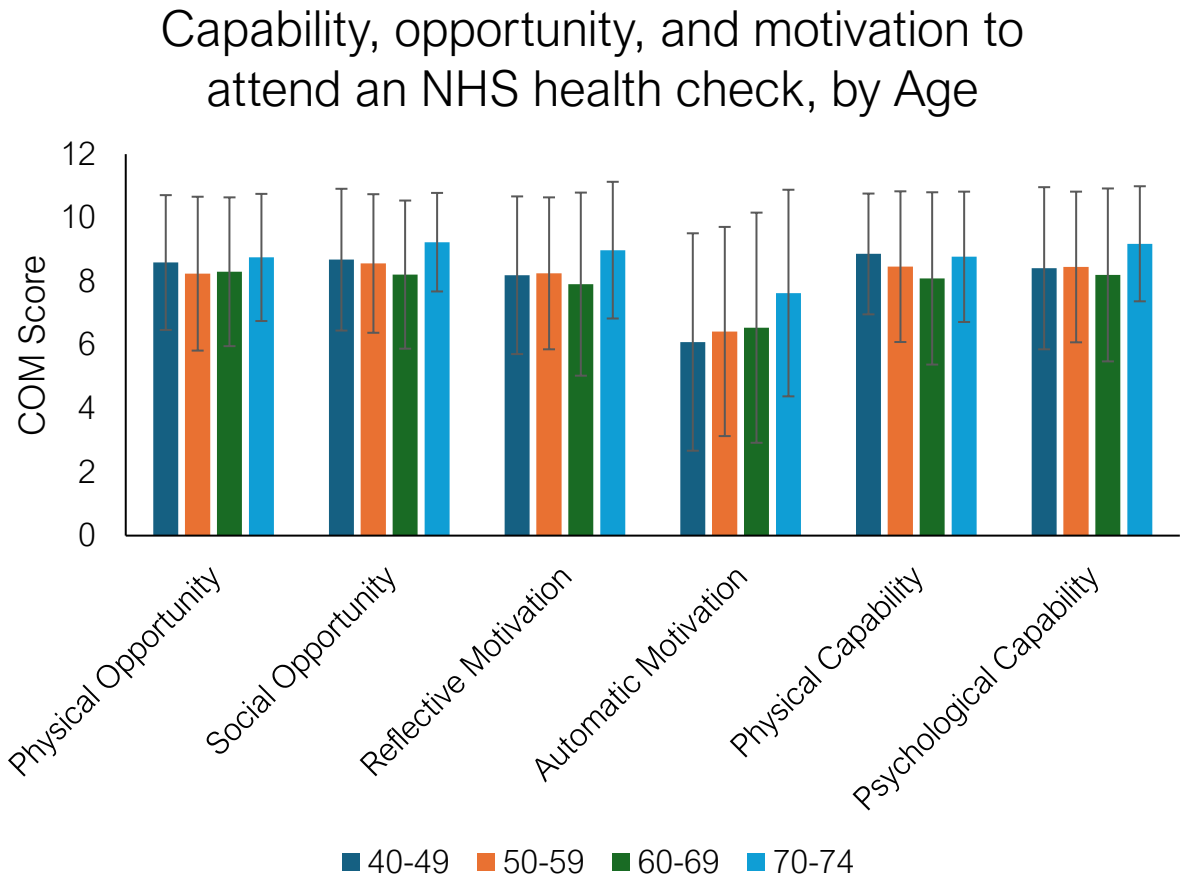
Research Question 4: *Do the barriers and facilitators to accessing NHS Health Checks vary by key demographic and health variables?*

Residents with an IMD score indicative of living in an area of moderate deprivation were more likely to report:

- Weaker knowledge about the importance of accessing an NHS Health Check and weaker skills to make decisions and plans to access an NHS Health Check **(psychological capability)**
- Having less time and resources (e.g., time to attend an appointment, able to travel to an appointment) to access an NHS Health Check **(physical opportunity)**
- Weaker intentions to (or willingness to) access an NHS Health Check **(reflective motivation)**
- Weaker beliefs that accessing an NHS Health Check is an automatic behaviour (i.e., something they do without thinking about it) **(automatic motivation)**



Research Question 4: *Do the barriers and facilitators to accessing NHS Health Checks vary by key demographic and health variables?*



Residents aged 70-74 years old were more likely to report:

- Stronger knowledge about the importance of accessing an NHS Health Check and stronger skills to make decisions and plans to access an NHS Health Check **(psychological capability)**
- Having more support from people (e.g., from friends and family) to access an NHS Health Check **(social opportunity)**
- Stronger intentions to (or willingness to) access an NHS Health Check **(reflective motivation)**
- Stronger beliefs that accessing an NHS Health Check is an automatic behaviour (i.e., something they do without thinking about it) **(automatic motivation)**

Summary – local survey

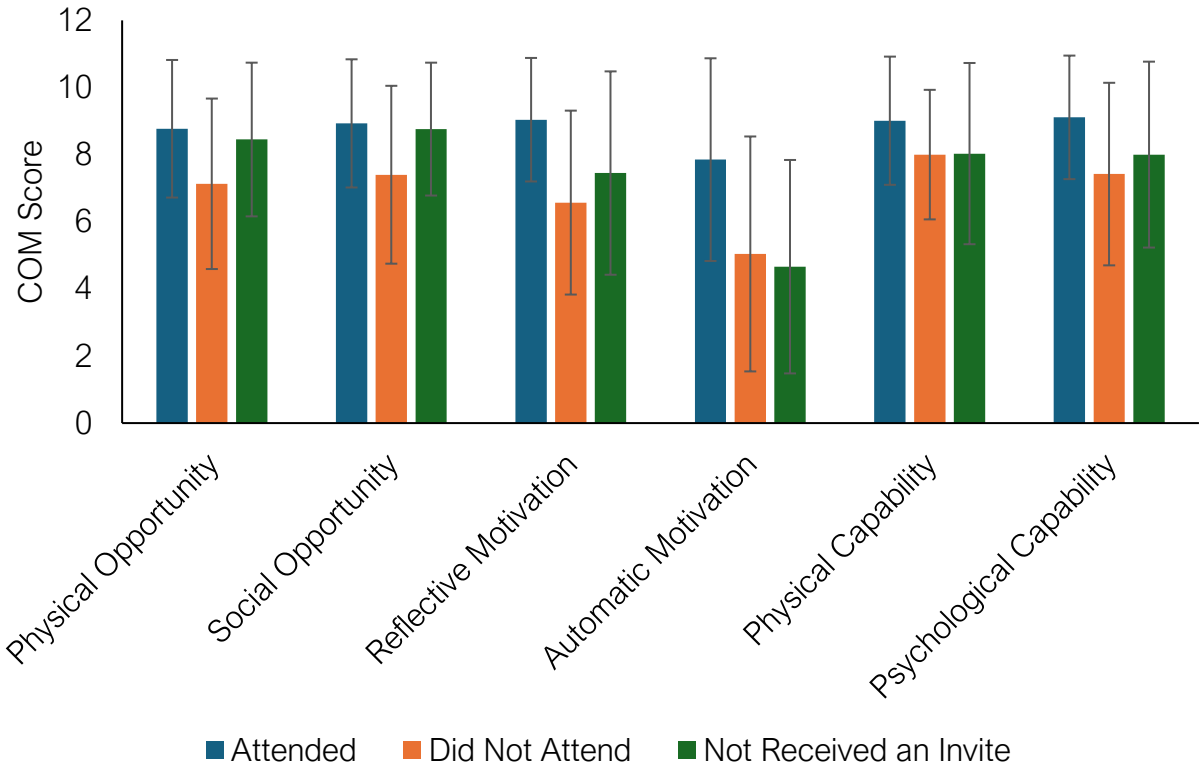
We surveyed 578 residents in Cambridgeshire who were aged between 40 – 74 years. Over 10% of residents in Cambridgeshire who report that they have received an invitation for an NHS Health Check have not attended. Over 10% of residents in Cambridgeshire who are eligible for an NHS Health Check are also unwilling or unsure whether they would attend an NHS Health Check.

Residents who have been invited but have not attended an NHS Health Check were more likely to be younger, male, live in more deprived areas of Cambridgeshire, a resident of Huntingdonshire, be employed, and not living with a health condition or disability. These residents were also more likely to be unwilling or unsure whether they would attend an NHS Health Check.

Those who have been invited and have not attended an NHS Health Check, and those who are unwilling or unsure whether to attend an NHS Health Check, reported weaker capability, opportunity, and motivation to access NHS Health Check.

Those who reported that they had not received an invite for an NHS Health Check tended to report having the physical and social opportunity to attend an NHS Health Check but reported weaker capability and motivation to take up the offer when invited, with these beliefs comparable to those who had received an invitation and had not attended an NHS Health Check.

Capability, opportunity, and motivation to attend an NHS Health Check, by Invitation and Attendance



Interviews with residents in Cambridgeshire

We conducted interviews with ten indiividuals aged between 40-74 living in Cambridgeshire. The objectives were to:

(1) Explore the barriers and facilitators for residents in Cambridgeshire to accept an invitation and attend an NHS Health Check.

(2) Explore what would help Cambridgeshire residents to accept an invitation and attend an NHS Health Check.

Sampling and recruitment

Individuals were recruited between January – April 2025. Eligibility criteria were: (i) aged 40-74 years old; (ii) invited to an NHS Health Check. Individuals were recruited via contacts provided from the survey, adverts distributed to organisations and on social media, and through an online research panel, to increase participation. All participants were offered a £20 gift voucher as a thank you for their participation.

Ethical approval

Ethical approval was granted by Sheffield Hallam University Research Ethics Committee (ID ER68324734) and Cambridgeshire County Council. All participants provided informed consent before participating in the interview.

Data collection

Interviews were conducted via video/audio or telephone call. A semi-structured topic guide was developed which consisted of questions about an individual's perceived capability, opportunity and motivation to attend an NHS Health Check, how they were invited and what it entailed (if attended), cardiovascular disease and risk, and potential interventions that could be efficacious to employ in Cambridgeshire.

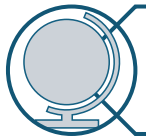
Analysis

Data were audio-recorded, transcribed, and anonymised. Framework analysis was used to code the data [12] using NVivo. The transcripts were coded into domains, using the 14 domains of the Theoretical Domains Framework. Text was coded under the domain (theme) that best matched the content. Text relating strongly to more than one domain was coded in both. The types of statements under each domain were than analysed using inductive content analysis. Sub-themes arising from the data (under each domain) were identified to create sub-categories.

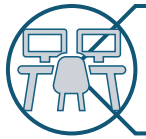
Interview findings – Participants

Residents ranged from 40 to 51 years old, with the average age of residents 45.6 years old

Eight residents were female, and two were male



9 residents identified as White British, and one resident identified as Black



Six residents were full-time employed, three were part-time employed, and one was unemployed

Five residents identified as having a health condition, and five did not

Four residents lived in Fenland, two lived in Huntingdonshire, two lived in South Cambridge, one lived in East Cambridge, and one lived in Cambridge City

Five of the residents we interviewed had attended an NHS Health Check, and five had been invited but not yet attended

*Are there **capability** barriers (B) and facilitators (F) for attending an NHS Health Check?*

Participants reported the following **capability** barriers (B) and facilitators (F):

Knowledge

- Having knowledge OR lack of knowledge about NHS Health Checks (B/F)
- Having knowledge OR lack of knowledge about the purpose of NHS Health Checks (B/F)
- Lack of knowledge about how to book an NHS Health Check appointment (B)
- Lack of knowledge regarding cardiovascular disease risk (B)
- Having knowledge about one's own health (F)

Capability barriers were similar for attendees and non-attendees, but those who previously had attended an NHS Health Check reported more accurate knowledge about the purpose of an NHS Health Check

I have heard of them, yeah. I don't know a great deal. I actually received a text message. I think it was last week actually, inviting me to one. I haven't booked that yet. But yeah, I kind of don't really know a lot about them at all to be honest. [P7, not attended]

I actually don't know anything about them. I know I've been invited to one [P6, not attended]

Well, I don't think I had heard...about them necessarily before I got sent an invitation to one, but now having been I do understand what they and what their kind of main purpose is. [P4, attended]

*Are there **motivation** barriers (B) and facilitators (F) for attending an NHS Health Check?*

Participants reported the following **motivation** barriers (B) and facilitators (F):

Beliefs about capabilities

- Perceiving booking an NHS Health Check to be difficult due to a lack of organisation/time (B)
- Perceiving booking an NHS Health Check to be easy due to being organised (F)

Intentions

- Having weaker intentions to attend an NHS Health Check (B)
- Having stronger intentions to attend an NHS Health Check (F)

Non-attenders more commonly reported barriers relating to i) **beliefs about capabilities** e.g., the perception that booking an NHS Health Check appointment was difficult and ii) **intentions** (i.e. less non-attenders expressed strong intentions to attend and more expressed weaker intentions about attending)

I was at work, to be honest. I just glanced over it, clicked the link. It took me to a page that...I was kind of a bit busy really and didn't really have time to book it [P7, not attended]

"Yes, I would, yeah, I'd definitely attend. I think it's important if you are invited to go, and also to keep a record for yourself as well. And if you are due to go, then to make that appointment."
[P8, attended]

"...I certainly wouldn't go to the doctors or hospital unless I was absolutely sure I needed to be there and if I didn't feel sure I'd, I probably wouldn't go."
[P3, not attended]

*Are there **motivation** barriers (B) and facilitators (F) for attending an NHS Health Check?*

Beliefs about consequences (non-attenders only)

Perceived low risk of health conditions (and therefore low perceived necessity to attend an NHS Health Check) due to…

- Younger age (B)
- Not having any pre-existing health conditions/ ill-health (B)
- Perceiving themselves to be a healthy person (B)
- Monitoring health at home (B)

Having concerns about….

- Finding out about any health issues (B)
- Being told they need to take preventative action (e.g., lifestyle behaviour change) (B)
- Heightening health anxiety (B)

Waiting a long-time to access a follow-up specialist appointment/ referral (B)

Impact on work if they attend an NHS Health Check (B)

Covid as a motivating factor due to concerns about underlying conditions (F)

Non-attenders more commonly reported these barriers relating to **beliefs about consequences** e.g., perceptions that they were at low risk of health conditions and therefore an NHS Health Check wasn't necessary, concerns about negative consequences such as hearing difficult feedback about one's health, and more practical concerns about the time needed to access appointments.
For non-attenders, a potential facilitator was concerns about unknown underlying conditions and susceptibility related to the Covid pandemic.

"I think you could open a can of worms for some people who are blissfully unaware of their health."
[P5, not attended]

"…They might make you rethink your lifestyle and you know, generally people don't want to do that either."
[P3, not attended]

"I suppose, you know, you should kind of get these things checked out really. But again, I don't go to the doctors a lot. I'm not ill. I'm not an ill person ever really. So, kind of not something that I'd put to the forefront of kind of doing really."
[P7, not attended]

*Are there **motivation** barriers (B) and facilitators (F) for attending an NHS Health Check?*

"Absolutely, I think it's important for anybody of this age range. I think 40 is pretty much where you start to realise that you're no longer young." [P1, attended]

"...you don't have the metabolism of a young person anymore. You're really not as active you know, maybe 40-year-olds are a lot more sedentary in their lifestyles and general health things are starting to crop up… so there's lots of little things that soon add up and I think you know, having the Health Check is important." [P1, attended]

Beliefs about consequences (attendees only)

Perceived increased risk of health conditions (and therefore greater perceived necessity to attend an NHS Health Check) due to…

- Increasing sedentary lifestyle (with age) (F)
- Increasing age (F)

Perceived stigmatisation during an NHS Health Check (B)

In contrast to non-attenders, previous attenders more commonly reported facilitators relating to **beliefs about consequences** including a perception that they were at increased risk of health conditions and therefore an NHS Heath Check was warranted. This often related to perceptions of increasing age and/or beliefs about increased health risks in midlife.

*Are there **motivation** barriers (B) and facilitators (F) for attending an NHS Health Check?*

Beliefs about consequences (both attenders and non-attenders)

Perceiving NHS Health Checks to be important…
- For those who do not access GP surgeries regularly (B/F)
- To understand their health status and take preventative action (F)
- To be reassured (F)
- Because they had received an invitation (F)

Having no concerns about attending an NHS Health Check (F)

Increasing NHS waiting times/wasting NHS time (B)

High or low perceived risk of developing CVD (B/F)

Facilitators to attending an NHS Health Check that were reported by both attenders and non-attenders included perceptions about the importance of attending, and a lack of concerns about attending. However, for all participants, concerns about increasing NHS waiting times, or wasting NHS time, and low perceived risk of developing CVD were barriers to attending

"It could be reassurance I suppose that everything's all right."
[P7, not attended]

"I don't think there's any reason not to go because forewarned is forearmed as well, you know, in those kind of things I think, you know, if you know something then you've got half a chance of acting on it…"
[P4, not attended]

"I don't really like going to the doctors anyway, I think it clogs up the system if all the healthy people go and then the old people can't get appointments."
[P3, not attended]

*Are there **motivation** barriers (B) and facilitators (F) for attending an NHS Health Check?*

Participants who had not attended an NHS Health Check reported **motivational** barriers (B) related to Emotion, meanwhile those who had attended reported barriers and facilitators related to their experiences of attending the Health Check

Emotion (non-attenders only)

- Anxiety/ worry about having conversations about CVD risk (B)
- Feeling overwhelmed if they are asked to make lifestyle changes (B)

"…I think whatever happens people always have that worry that there's going to be something wrong with them. And if they're already suffering with something else, they may not want to know." [P5, not attended]

"They could come out going oh, great I'm overweight, I drink far too much, I'm on vapes, right that- They could come out and sort of feel quite overwhelmed with all this information that they've suddenly got. And I'm living my life wrong and I eat too much fast food and I do this and I do that, you know, and then- Do you know what I mean they could come out and it could affect their mental health." [P5, not attended]

Reinforcement (attendees only)

- Experiencing positive consequences for prompting lifestyle behaviour change (F)
- Experiencing positive consequences in the form of supportive conversations (F)
- Experiencing negative consequences in the form of anxiety or worry about having health markers assessed (B)

"For me, it was very useful, it helped to pinpoint things like I'm just outside the prediabetic range which I didn't know so that prompted me to reduce my sugar intake which at that point was higher than it should have been but it also prompted me to work on losing weight." [P1, attended]

*Are there **opportunity** barriers (B) and facilitators (F) for attending an NHS Health Check?*

Participants reported the following **opportunity** barriers (B) and facilitators (F):

Social influences

- Having support from those around to attend (F)
- Having support from work to attend (F)
- People around you are OR are not accessing NHS Health Checks (i.e. presence or lack of social norms (B/F)
- Receiving support from healthcare professionals during the appointment (F)

Both previous attendees of an NHS Health Check, and those who had not attended reported facilitators relating to social influence which included knowing others who had attended and/or getting support from others, including in some cases employers, to attend. Meanwhile, not having others around you who had attended an NHS Health Check was a potential barrier to attending.

"but yeah it's, "Oh yeah boss I'm just nipping out for half an hour.", "Yeah, yeah no problem." You know what I mean and just go and get it done." [P2, attended]

"So my partner went for his…" [P4, attended]

"if I know it's three o'clock on this date, then I've got friends I can ring or I can get my husband to work at home or whatever to cover that off." [P6, not attended]

"I mean my brother…he's- I know what he'll say, "Oh there's nowt up with me." He will be all, "Oh…what do I want to do that for?" You know, yeah" [P2, attended]

*Are there **opportunity** barriers (B) and facilitators (F) for attending an NHS Health Check?*

Participants reported the following **opportunity** barriers (B) and facilitators (F):

Environmental context and resources

- Having resources to travel to the NHS Health Check (F)
- Living nearby to (F) OR too far from (B) the GP surgery
- Difficulties booking an appointment due to:
  - lack of time to make the booking (B)
  - lack of suitable appointment times available (B)
  - difficulty using the online booking system (B)
  - needing to contact the GP surgery to make a booking (no-self-booking option) (B)
- Receiving a text message can be:
  - easily ignored (B) OR prompt action (F)
- Seeing posters or leaflets (F)
- Promotional material perceived as lacking sufficient information and/or too generic or impersonal (B)

Non-attenders of an NHS Health Check more frequently described perceived difficulties associated with booking an appointment. Participants thought that they would be more likely to attend if they were sent informative information about the NHS Health Check, but some also suggested that written information and and/or phone reminders should be more personalised, as generic messages were more likely to be ignored.

"I know I can book it at my GP surgery. I know I have to phone my surgery, because I had a look. There was a link they sent you online for information. But then you couldn't go anywhere once you'd read the information. You have to go back to the GP, which is part of the reason I haven't done it. It would have been fine if it was like a link to book it in, but I couldn't do that."
[P6, not attended]

"If I knew, for example, I can have a Health Check in an evening or a weekend it would make a massive difference because I think people are under quite a lot of work pressure nowadays... it makes it harder for a number of people."
[P5, not attended]

"It was just sort of quite a generic letter that said, you know, now you're 40 you should probably go and have a check-up. And then had a leaflet with it that gave me more information that I can't remember."
[P6, not attended]

What did participants think would help local residents like themselves to attend an NHS Health Check?

1. Options to book: Easy to book appointments; Self-referral/self-book a time; Prefer to phone to get an appointment, rather than use the online system; Having a link to book/ direct telephone number, or an appointment letter (date + time) sent to you
2. Receiving more prompts/ reminders (if eligible and can book)
3. Choice of locations: Having more choice of location/timing so it fits with work schedules so that it is easy to access – need to be local
4. Options of type of appointment: Preference for face-to-face, rather than online consultation survey (more likely to be trustworthy about lifestyle behaviours); Others would like face-to-face or consultation using Microsoft Teams/Zoom
5. Health Care Practitioner led with focus on risks and concerns (not numbers)
6. Flexibility for times: More appointments at more flexible times (weekends, evenings, out of hours); Perceived lack of flexible timing of appointments, that fit with people's work schedules
7. Opportunistic appointments: Having NHS Health Checks in workplaces; Having drop-in NHS Health Checks
8. Personalised communications: Leaflets are too generic/not personal and so Leaflets don't get read; Personalised post/email
9. Education/Information: Need for more information/resources about what an NHS Health Check is; More information/resources about where, when, and how to book an NHS Health Check
10. Advertisement: Using social media to advertise; Putting posters etc in community locations – shops, libraries
11. Branding for trustworthiness – NHS branding is considered more trustworthy than the local authority

Summary – interviews

We interviewed 10 residents of Cambridgeshire, 5 attenders and 5 non-attenders, aged between 40 and 51 years, regarding the perceived barriers and facilitators towards attending (or not attending) an NHS Health Check.

Motivation

The most widely discussed motivational barriers and facilitators related to participants' beliefs about the consequences of attending an NHS Health Check. Non-attenders more commonly reported perceptions that they were at low risk of health conditions and therefore an NHS Health Check wasn't necessary. They also described concerns about negative consequences such as hearing difficult feedback about one's health status, and some anxiety about being asked to make lifestyle changes. Non-attenders also reported more practical concerns about the time needed to access appointments. In contrast, participants who had previously attended an NHS Health Check reported stronger intentions to attend and perceptions that the NHS Health Check was important.

Whilst not all participants expressed concerns about the negative impact on themselves of attending, several participants (regardless of previous attendance status) expressed concerns about limited NHS capacity and/or a desire not to waste NHS time.

Capability

Capability barriers and facilitators related primarily to knowledge about what constituted a Health Check and how it could be accessed and/or knowledge about one's own health. These factors were similar for attendees and non-attendees, but those who previously had attended an NHS Health Check reported more accurate knowledge about the purpose of an NHS Health Check

Opportunity

Both previous attendees of an NHS Health Check, and those who had not attended reported facilitators relating to social influence. These included knowing others who had attended and/or getting support from others, including employers, to attend. Meanwhile, not having others around you who had attended an NHS Health Check was a potential barrier to attending.

Non-attenders of an NHS Health Check more frequently described perceived difficulties associated with booking an appointment. Participants thought that they would be more likely to attend if they were sent useful information about the NHS Health Check, but some also suggested that written information and and/or phone reminders should be more personalised, as generic messages were more likely to be ignored.

Rapid evidence review of interventions

We conducted a rapid evidence review to identify what types of interventions haven been implemented to support adults to accept invitations and attend NHS Health Checks.

The objectives were to:

(1) Identify what types of interventions have been implemented to support NHS Health Check uptake.

Searches

A total of 5 electronic databases and two grey literature sources were searched using relevant search terms for literature after 2009. Studies were included in the review if they reported an intervention/initiative to increase booking of an appointment and/or attendance of an NHS Health Check for eligible adults and measured intervention effectiveness.

Data extraction

Data relating to the content of the intervention was extracted and classified using the Behaviour Change Wheel [2] and the BCT taxonomy [10]. Data were managed in Covidence and Excel.

Analysis

Using the Theory and Techniques Tool (a heat map identifying links between BCTs and Mechanisms of Action: MoAs) [3], we then identified whether these previously tested interventions have the potential to address the barriers and facilitators for accepting an invitation and attending an NHS Health Check in Cambridgeshire, as identified in our survey and qualitative insight gathering activities. That is, we explored the extent to which there was a *match* between the content of the interventions (i.e., how they seek to change behaviour) and the barriers and facilitators to accept an invitation and attend an NHS Health Check, and whether there were any gaps.

Rapid evidence review of interventions:

Description of included studies

In total, 11 interventions were included in the review.

- All interventions were conducted after 2009
- Interventions took place across England
- 7 of the interventions reported were in general populations, and a further 4 interventions were reporting findings in specific populations (3 demographic [e.g., area of deprivation, ethnic minorities]; 1 clinical [e.g., MSK patients])
- All interventions reported the uptake/attendance of an NHS Health Check

Types of interventions

We identified 6 types of interventions:

- Education (used in 7 interventions) – intervention components that aimed to increase knowledge or understanding to support of uptake.
- Coercion (used in 1 intervention) – intervention components that involved punishment or cost to support uptake.
- Persuasion (used in 6 interventions) – intervention components that used methods of persuasive communication to support uptake.
- Modelling (used in 2 interventions) – intervention components that provide examples for people to copy to support uptake.
- Environmental restructuring (used in 9 interventions) – intervention components that aimed to change the physical or social environment to support uptake.
- Enablement (used in 4 interventions) – intervention components that increase facilitators or reduce barriers to uptake, beyond education, training, or environmental restructuring.

Description of the strategies used in existing interventions

Intervention functions	BCTs	Description of the intervention component
Education	BCT 2.2 Feedback on behaviour	• 1 intervention sent a letter 8-weeks after the initial invite stating that they had not booked yet booked an NHS Health Check. (Study ID: 10)
	BCT 4.1 Instruction on how to perform the behaviour	• 1 intervention provided instructions on how to access an NHS Health Check in the invite letter (Study ID: 9)
	BCT 5.1 Information about health consequences	• 5 interventions provided information about health consequences of attending an NHS Health Check, including communication of the benefits of NHS Health Checks (Study ID: 3, 10), sending information leaflets (Study ID: 3, 4, 8, 10), providing information about the need for a NHS Health Check and what happens at one (Study ID: 4), and letters detailing information about what an NHS Health Check is and how to book one (Study ID: 9, 10) • 1 intervention provided personalised information about health consequences of CVD risk in invite letters (Study ID: 3)
	BCT 5.3 Information about social & environmental consequences	• 1 intervention emphasised on promotional materials that all findings were confidential and independent of occupational health records (Study ID: 1)
	BCT 6.2 Social comparison	• 1 intervention drew attention to others' behaviour and offered social comparison by providing GP responses to common excuses for not attending an NHS Health Check (Study ID: 10)
	BCT 7.1 Prompts/cues	• 4 interventions used prompts and cues in the forms of text messages pre and/or post receiving an invite letter (Study ID: 2, 10), phone call reminders to book appointments (Study ID: 9), and reminder letters after receiving the first invite to non-responders (Study ID: 5, 10)
Coercion	BCT 5.2 Salience of consequences	• 1 intervention emphasised the financial consequences of not attending and sent a 'sunk costs letter' stating GP funding had already been set aside for the appointment (Study ID: 10)
	BCT 13.2 Framing/reframing	• 1 intervention reframed the wording of the invitation letter stating an appointment 'is due' rather than 'you are invited' (Study ID: 10)

Study IDs: Abbas = 1; Alpsten = 2; Gidlow = 3; Gold = 4; McDermott = 5; Rawlinson = 6; Roberts & de Souza = 7; Sallis (2016) = 8; Sallis (2019) = 9; Sallis (2021) = 10; Whittaker = 11

Description of the strategies used in existing interventions

Intervention functions	BCTs	Description of the intervention component
Persuasion	BCT 5.1 Information about health consequences	• 5 interventions provided information about health consequences of attending an NHS Health Check, including communication of the benefits of NHS Health Checks (Study ID: 3, 10), sending information leaflets (Study ID: 3, 4, 8, 10), providing information about the need for a Health Check and what happens at one (Study ID: 4), letters detailing information about what an NHS Health Check is and how to book one (Study ID: 9, 10), and emotive language about protecting one's health (Study ID: 10) • 1 intervention provided personalised information about health consequences of CVD risk in invite letters (Study ID: 3)
	BCT 5.2 Salience of consequences	• 1 intervention emphasised the financial consequences of not attending and sent a 'sunk costs letter' stating GP funding had already been set aside for the appointment (Study ID: 10)
	BCT 6.2 Social comparison	• 1 intervention drew attention to others' behaviour and offered social comparison by providing GP responses to common excuses for not attending an NHS Health Check (Study ID: 10)
	BCT 6.3 Information about others' approval	• 3 interventions provided information of the approval of others, including social norm messages and testimonials with invite letters (Study ID: 9), and statistics of how many people have engaged with and completed an NHS Health Check (Study ID: 4), as well as staff bodies and unions endorsing the roll out of NHS Health Checks (Study ID: 1)
	BCT 9.1 Credible source	• 5 interventions described using credible sources for communications about NHS Health Checks, including letters signed by Drs (Study ID: 2, 4), using trusted branding such as NHS or Public Health England (Study ID: 2, 3, 4, 10), telephone calls made by GP surgery staff (Study ID: 3), patients being invited jointly by the council and NHS (Study ID: 10), staff bodies and unions endorsing the roll out of NHS Health Checks (Study ID: 1), and individuals receiving GP responses to common excuses for not attending an NHS Health Check (Study ID: 10)
	BCT 13.2 Framing/reframing	• 5 interventions reframed the wording of the invite letter to be time-sensitive (Study ID: 2) or that the NHS Health Check was due rather than just inviting them (Study ID: 9), or reframing the content of the letter to be risk-personalised (Study ID: 3), loss/gain-framed (Study ID: 4) or as a counterargument (Study ID: 10)
Modelling	BCT 6.3 Information about others' approval	• 2 interventions provided information about the approval of others, including social norm messages and testimonials with invite letters (Study ID: 9), and statistics of how many people have engaged with and completed an NHS Health Check (Study ID: 4)

Study IDs: Abbas = 1; Alpsten = 2; Gidlow = 3; Gold = 4; McDermott = 5; Rawlinson = 6; Roberts & de Souza = 7; Sallis (2016) = 8; Sallis (2019) = 9; Sallis (2021) = 10; Whittaker = 11

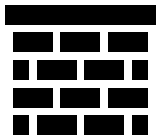
Description of the strategies used in existing interventions

Intervention functions	BCTs	Description of the intervention component
Environmental Restructuring	BCT 1.4 Action planning	• 3 interventions incited individuals to plan in advance, including providing space and time of appointments on a tear off slip (Study ID: 2, 8, 9)
	BCT 7.1 Prompts/cues	• 5 interventions reported using prompts and cues, including tear off sheets for booked appointments (Study ID: 2, 8, 9), reminders if an NHS Health Check is not booked (Study ID: 3, 4), and different letters to norm with instructions on booking NHS Health Checks (Study ID: 4)
	BCT 12.1 Restructuring the physical environment	• 4 interventions offered NHS Health Checks at alternative locations, including worksites (Study ID: 1), other healthcare facilities where an appointment was already planned (e.g., MSK Clinics; Study ID: 6), at pharmacies (Study ID: 11), and opportunistically at local venues (e.g., mosques, bus stations, football matches; Study ID: 7)
	BCT 12.5 Adding objects to the environment	• 3 interventions attached tear off slips for information about booked appointments with the message 'put me on the fridge' (Study ID: 2, 8, 9)
Enablement	BCT 1.4 Action planning	• 3 interventions incited individuals to plan in advance, including providing space and time of appointments on a tear off slip (Study ID: 2, 8, 9)
	BCT 3.2 Social support (practical)	• 1 intervention offered practical social support in the form of employers allowing staff to attend NHS Health Checks during working hours (Study ID: 1)
	BCT 12.1 Restructuring the physical environment	• 1 intervention offered NHS Health Checks at worksites during working hours (Study ID: 1)

Study IDs: Abbas = 1; Alpsten = 2; Gidlow = 3; Gold = 4; McDermott = 5; Rawlinson = 6; Roberts & de Souza = 7; Sallis (2016) = 8; Sallis (2019) = 9; Sallis (2021) = 10; Whittaker = 11

Heatmap

We identified whether 11 published interventions have the potential to address each of the identified barriers and facilitators for supporting uptake of NHS Health Checks.



No intervention that we evaluated addressed all the identified **barriers** for uptake of NHS Health Checks amongst residents in Cambridgeshire.

The most common strategy to address barriers relating to **beliefs about consequences** was to provide **information about health consequences**. This included attaching the NHS Health Check leaflet to invite letters and providing reasons why NHS Health Checks are important to attend.

The most common intervention strategy utilised by the published interventions to target environmental context and resource barriers was the use of **prompts and cues**. This included sending follow up text-messages, phone calls and letters to non-responders.

Residents reported **concerns** of heightened health anxiety around finding out about health issues as a result of attending an appointment and also reported concerns about being told to take preventative action because of findings from an NHS Health Check. None of the interventions addressed any of these concerns.

Intervention recommendations

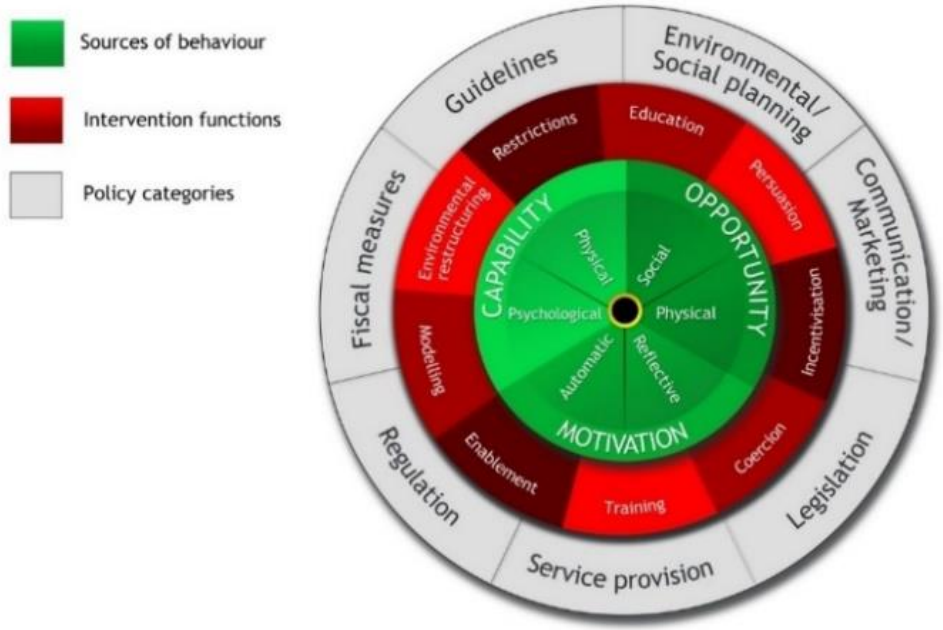
We used the Behaviour Change Wheel [2] to make theory-informed intervention recommendations for supporting residents to accept an invitation and attend an NHS Health Check.

We have matched the types of intervention functions (red circle) that are likely to address the identified barriers and facilitators for attending an NHS Health Check (green circle).

We have also matched the types of policy categories that can help to deliver those identified interventions (grey circle).

We describe the content of the intervention recommendations in terms of its Behaviour Change Techniques (BCTs), which are the 'active ingredients' of the intervention [10].

Using the APEASE evaluation criteria [2] and the IN-CASE framework [4], we have explored the likely acceptability, practicality, effectiveness, and affordability of the interventions (both from the perspective of the resident, and those who would deliver the intervention), and explored whether receiving and/or delivering these interventions are likely to result in unintended consequences or impact on inequalities.



Intervention recommendation 1:

Increasing awareness of NHS Health Checks

There was a general lack of knowledge about NHS Health Checks. Residents were unaware that they exist, or that they were eligible for one. Residents also reported uncertainty about how to book an NHS Health Check (including that they can self-refer and access them in community settings). Increasing residents' understanding of what an NHS Health Check is and why its important for them, alongside increasing awareness of where, when and how to book an NHS Health Check, may help support uptake. Such information should be provided prior to, and at the point of, being eligible for an NHS Health Check and being invited to book an appointment. It is important that residents are provided with information about what happens *during* an NHS Health Check – and importantly – that support is provided to support lifestyle behaviour change. Communications should signpost to reputable and trustworthy sources of support (e.g., NHS) and include trustworthy branding (e.g., NHS, CCC). This type of intervention should be delivered through different modes of delivery to maximise its reach, including leaflets, posters, and social media, as well as video resources and testimonials from 'People Like Me' describing what happens during an NHS Health Check. Communications should emphasise social norms for accessing NHS Health Checks (e.g., that 68% of eligible residents in Cambridgeshire took up an NHS Health Check) and use testimonials from 'People Like Me' who have accessed an NHS Health Check and who talk about the subsequent health benefits of the changes they have made. Communications should be distributed in places where those who are eligible may visit (e.g. libraries, workplaces, pubs, supermarkets), including places where those who may perceive themselves to be healthy and at low risk of cardiovascular disease (and thus less likely to attend an NHS Health Check) may visit (e.g., gyms, sports venues).

APEASE and IN-CASE evaluation criteria:
Residents stated that knowing more would have been beneficial prior to being invited to an NHS Health Check (**acceptability**) and could potentially support uptake (**effective**). Creating and distributing the materials in a variety of places and online is feasible (**practicality**) but could be costly (**affordability**). Providing information about cardiovascular risk could unintentionally raise anxiety or fear (**side-effects**) and so messages need to also provide information about the support provided during and after an NHS Health Check. Communications should be provided in different formats and languages spoken in the community (**equity**).

Behaviour change Wheel

Policy categories:
Communication/Marketing

Intervention functions:
Education
Persuasion

Key BCTs:
4.1 Instruction on how to perform the behaviour
5.1 Information about health consequences
6.1 Demonstration of behaviour
9.1 Credible source
12.5 Adding objects to the environment
16.3 Vicarious consequences

Identified need

Having knowledge of what an NHS Health Check is and what happens at one

Having knowledge that they are eligible for an NHS Health Check and how to book one

Increasing people's understanding of why an NHS Health Check is important to attend

Increasing awareness of the support provided after having an NHS Health Check

Intervention recommendation 2:

Addressing (mis)perceptions about the need for an NHS Health Check

Residents reported feeling less inclined to attend an NHS Health Check if they perceived themselves to be 'healthy' and at low risk of CVD. Communications are needed that persuade people about the importance of NHS Health Checks by emphasising key motivators for attending that were mentioned by residents i.e., feeling reassured, and accessing support to improve their health and wellbeing. Communications need to enable residents to recognise discrepancies between their own understanding of their health status vs. actual health profile [13]. Some also expressed concerns about wasting NHS time (especially if they perceived themselves to be healthy). Communications are needed that address such concerns using myth-busting evidence-based principles [14], for example communicating evidence that NHS Health Checks prevent and reduce cardiovascular disease through early detection and intervention [15], which in turn reduces the burden on the NHS [16]. Some residents also expressed concerns and anxiety about receiving information about their health status or being asked to make lifestyle changes. Eliciting and addressing more complex concerns about NHS Health Checks may be more effective if delivered via supportive conversations (either face to face or online) with healthcare practitioners (e.g., nurses, GPs) using a 'make every contact count' approach [e.g., 17, 18]. Such supportive conversations could also happen more opportunistically in other health-related settings (e.g., pharmacy, dentistry).

APEASE and IN-CASE evaluation criteria:

Residents discussed how they would value more information about NHS Health Checks and so having supportive conversations with healthcare practitioners is likely to be **acceptable** and **effective**. Healthcare practitioners would need training in how to deliver this kind of additional support (**practicability**), which could be expensive as it requires time and money to develop the training resources (and for healthcare practitioners to engage with the training resource) (**affordability**). Information about risk should be positively framed (e.g., focusing on the benefits of knowing and taking control over your health) and communications should emphasise that support is available during and after an NHS Health Check to help reduce any feelings of anxiety or worry (**side-effects**). Interpreters may need to be considered alongside the provision of translated materials (**equitable**).

Behaviour change Wheel

Policy categories:

Communication/Marketing

Guidelines

Intervention functions:

Persuasion

Education

Enablement

Key BCTs:

5.1 Information about health consequences

9.2 Pros and Cons

5.3 Information about social and environmental consequences

5.5 Anticipated regret

13.2 Framing/ reframing

Identified need

Having information and support from trustworthy sources (healthcare practitioners)

Having knowledge about support in place when attending an NHS Health Check

Understanding the need to attend an NHS Health Check

Valuing the individual need for an NHS Health Check

Having concerns about health issues, or experiencing heightened health anxiety

Having concerns about having to take preventative action or make lifestyle changes after attending an NHS Health Check

Intervention recommendation 3:

Offering NHS Health Checks in workplace settings

Cambridgeshire residents believed, and were worried, that attending an NHS Health Check offered in working hours would increase workload on colleagues. Others discussed how they valued having support from their employers to attend an NHS Health Check. Some discussed how it was difficult to book an appointment that fitted with their work schedule. Cambridgeshire have previously trialled workplace Health Checks [19] and do currently offer workplace Health Checks through the HealthyYou service [8]. Expanding the offer of NHS Health Checks in workplaces, especially in places that require employees to work shifts that usually coincide with GP opening hours (e.g., schools, factories, supermarkets) may help address these barriers and support uptake. Unhelpful lifestyle behaviours such as smoking are more prevalent in some occupations (e.g., routine and manual workers; 20) and districts (e.g., Fenland [21]), and so targeting such employees (and workplaces) may help support uptake of NHS Health Checks for those who are at greater risk of cardiovascular disease. Given the low uptake and willingness for males to attend an NHS Health Check demonstrated through our survey findings, it is important that this demographic is included in any approach used to improve uptake.

APEASE and IN-CASE evaluation criteria:

Residents described the challenges in attending an NHS Health Check when they had competing priorities, such as work commitments, and therefore the provision of this service within workplace settings would address such opportunity barriers and would likely be **acceptable** to residents. There is evidence that workplace NHS Health Checks are effective [e.g., 22], however such an intervention may be costly to deliver (**affordable**) and coordinate (**practicality**). This intervention could increase uptake of NHS Health Checks, especially amongst those who are at increased risk of CVD and may not access NHS Health Checks via their GP (**equity**). To reduce the risk of unintentionally exacerbating existing inequalities, other interventions (such as interventions 1 + 2) would need to be delivered alongside workplace interventions, to ensure that those who are not in employment are still encouraged and supported to attend an NHS Health Check (**side-effects**).

Behaviour change Wheel

Policy categories:

Service Provision

Intervention functions:

Social Influence

Environmental Context & Resources

Key BCTs:

3.2 Social Support (practical)

12.1 Restructuring the physical environment

Identified need

Reducing perceived burden on workplaces and colleagues when attending an NHS Health Check

Having accessible appointments to attend an NHS Health Check

Having support from employers to attend and prioritise an NHS Health Check

Conclusions

We have identified key capability, opportunity and motivational barriers and facilitators for uptake of an NHS Health Check for residents in Cambridgeshire through mixed-methods research (i.e., rapid review, survey, interviews and heat map).

Existing interventions to support uptake of an NHS Health Check do not currently address all of the identified barriers and facilitators faced by Cambridgeshire residents, and so current interventions may not sufficiently meet and support the needs of Cambridgeshire residents.

We have offered three recommendations about how to support Cambridgeshire residents to access an NHS Health Check, through providing more information about how, where and when to book an NHS Health Check, why it's important, and providing information on the support available following receipt of an NHS Health Check; eliciting and addressing mis(perceptions) about the perceived need for an NHS Health Check and concerns about the outcomes of an NHS Health Check; and offering NHS Health Checks in workplaces, especially in occupations where we know residents are at increased risk of unhelpful lifestyle behaviours (e.g., smoking).

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