

Table 1. Objective 1: Are there differences in demographic factors of those attending and not attending an NHS Health Check?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
29	observational studies ^a	not serious ^b	not serious ^c	not serious	not serious ^d	none	⊕⊕○○ LOW	IMPORTANT

- a. One study had a quasi-experimental design, the others were observational studies of various designs.
- b. A significant proportion of the studies were rated low for baseline imbalances between groups and lack of control for confounding, however the purpose of this question was to assess variations in NHS Health Check attendance versus non-attendance between population sub-groups in relation to social characteristics, therefore imbalances in characteristics between the intervention and control groups were expected and these are likely to reflect reality.
- c. Overall the results indicate that older persons and females were most likely to attend an NHS Health check. The results were less consistent in relation to ethnicity. Results tended to vary according to the sample size and geographic coverage of each study. Studies also varied in relation to setting and the cardiovascular risk profile of participants, therefore inconsistencies were not unexplained.
- d. The overall sample size is large.

References:

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3. Attwood S, Morton K, Sutton S. Exploring equity in uptake of the NHS Health Check and a nested physical activity intervention trial. *Journal of public health* (Oxford, England) 2016;38(3):560-68.
4. Baker C, Loughren EA, Crone D, et al. A process evaluation of the NHS Health Check care pathway in a primary care setting. *Journal of public health* (Oxford, England) 2015;37(2):202-9.
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7. Chang KC, Lee JT, Vamos EP, et al. Impact of the National Health Service Health Check on cardiovascular disease risk: a difference-in-differences matching analysis. *CMAJ* 2016;188(10):E228-E38.

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Table 2. Objective 2.1: Do socio-demographic factors affect update of the NHS Health Check?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
12	observational studies ^a	not serious ^b	not serious ^c	not serious	not serious ^d	none	⊕⊕○○ LOW	IMPORTANT

- a. One study was a randomized controlled trial, one study had a quasi-randomized design; the remaining studies were non-randomized studies, mainly experimental.
- b. Six (50%) of the studies received a 'low' rating for domains relevant to the risk of bias, however four of these the issues were in relation to baseline imbalances and confounding, however the purpose of this research objective is to identify sociodemographic differences between attendees and non-attendees. Only two of twelve studies received a low rating for domains relevant to the risk of bias (exposure and outcome measurement and blinding). However, in the context of the NHS Health Checks programme, where the intervention is obvious and data are routinely collected and subject to inaccuracies, these issues don't necessarily indicate poor quality research methods were used.
- c. Generally, older persons, females and individuals from least deprived background were most likely to attend NHS Health Checks. The results in relation to ethnic group were mixed. Variations in results across studies are likely to reflect heterogeneity between studies, including different methods and geographical coverage.
- d. The sample size overall, across the included studies was large.

References:

1. Attwood S, Morton K, Sutton S. Exploring equity in uptake of the NHS Health Check and a nested physical activity intervention trial. *Journal of public health (Oxford, England)* 2016;38(3):560-68.
2. Cochrane T, Gidlow CJ, Kumar J, et al. Cross-sectional review of the response and treatment uptake from the NHS Health Checks programme in Stoke on Trent. *Journal of public health (Oxford, England)* 2013;35(1):92-8.
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4. Dalton AR, Bottle A, Okoro C, et al. Uptake of the NHS Health Checks programme in a deprived, culturally diverse setting: cross-sectional study. *Journal of public health (Oxford, England)* 2011;33(3):422-9.
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Table 3. Objective 2.2: Do variations to the invitation method affect NHS Health Check attendance? Assessment of quantitative evidence

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
13	observational studies ^a	serious ^b	not serious ^c	not serious	not serious ^d	None	⊕○○○ VERY LOW	IMPORTANT

- a. 6 RCTs; N=2 quasi-randomized trials; the remaining studies used observational designs.
- b. Most (>50%) of studies scored low for one or more domain that could introduce bias into the study results.
- c. The standard national invitation letter was generally associated with reduced uptake compared to variations. The variations differed between studies, therefore differences in relative uptake between groups in each study are expected.
- d. The sample size was large (in the thousands) across studies.

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2. Kumar J, Chambers R, Mawby Y, et al. Delivering more with less? Making the NHS Health Check work in financially hard times: real time learning from Stoke-on-Trent. *Qual Prim Care* 2011;19(3):193-9.
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Table 4. Objective 2.2 Do variations to the invitation method affect NHS Health Check attendance? Assessment of qualitative evidence

Finding	Studies contributing to findings (see report reference list)	Methodological limitations	Coherence	Adequacy	Relevance	CERQual assessment of confidence in the evidence	Explanation of CERQUAL assessment
Differing views on opportunistic recruitment depending on setting	Greenwich <i>et al</i> (2011) Ismail <i>et al</i> (2015) Perry <i>et al</i> (2014) Riley <i>et al</i> (2015)	Most papers were highly rated in terms of quality, with only one being rated overall as medium quality. Two papers scored low in ethical issue and one in rigour	There were no or few concerns identified in any of the papers as they all presented similar data to the findings presented in the review.	Three papers had minor concerns due to not presenting a rich picture of the data gathered. The other had no or few minor concerns	One of the papers had moderate concerns as the quote presented in the review was not clearly linked to the theme and the paper did not otherwise refer to this theme. ⁵¹	Moderate confidence	Reduced grade due to moderate concern and minor concerns around ethical issues and richness of data
Benefit of community ambassadors, particularly for ethnic minority groups	Riley <i>et al</i> (2015) Stone <i>et al</i> (2019)	One paper was medium and one high rated, both scored lower in their description of the relationship between researcher and participants.	There were no or few concerns identified in either paper in this domain.	No or few minor concerns	No or few minor concerns in either paper	High confidence	No reason to downgrade
Preference for telephone contact	Stone <i>et al</i> (2019) Strutt <i>et al</i> (2011) Greenwich <i>et al</i> (2011)	Greenwich and Stone medium quality overall, Strutt high quality overall	No coherence concerns	Moderate concern due to richness of data gathered	No concerns	Moderate confidence	Reduced grade due to concerns on richness of data

Table 5. Objective 2.3 Does GP practice versus alternative setting affect NHS Health Check uptake?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
2	observational studies	serious ^a	not serious ^b	not serious	not serious ^c	none	⊕○○○ VERY LOW	IMPORTANT

- a. Both studies scored low for imbalances in baseline characteristics between groups and confounding.
- b. One study reported higher uptake in GP surgeries whereas the other reported similar attendance between settings. This variation is likely to reflect heterogeneity between studies in relation to the population, mode of invitation and the type of non-GP setting in which the NHS Health Checks were performed.
- c. Overall sample size across the two studies was large (in the thousands)

References:

1. Roberts DJ, de Souza VC. A venue-based analysis of the reach of a targeted outreach service to deliver opportunistic community NHS Health Checks to 'hard-to-reach' groups. *Public Health* 2016;137:176-81.
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Table 6. Objective 4 Support for the concept of management of people identified as being at risk of CVD, as an outcome of the NHS Health Checks intervention
Assessment of mixed methods evidence.

Domain	Assessment of support	Level of support
Truth value/bias	Inferences and conclusions were reflected in the quantitative and qualitative data.	Moderate
Explanation credibility	The issues raised by health professionals were sound. There was a lack of exploration of the reasons why service delivery/ implementation/ follow up, between practices.	Moderate
Weakness minimisation	Data in relation to this concept were collected from quantitative, qualitative and mixed methods although the study designs were homogeneous (quant data collected from cross-sectional surveys; qualitative data collected from free text responses and semi-structured interviews). Consistencies were apparent across different study types in relation to variations in service delivery, referrals and follow ups.	Strong
Inside-outside	Quantitative and qualitative data were collected, however interview and survey methods may entail responder and reporting biases. Objectivity of these methods is therefore limited.	Low
Publication bias	Lack of significance testing therefore it is not possible to assess for this criterion	n/a
Additional comments	None	n/a
Overall assessment	Moderate	

References:

1. Baker C, Loughren EA, Crone D, et al. A process evaluation of the NHS Health Check care pathway in a primary care setting. *Journal of public health (Oxford, England)* 2015;37(2):202-9.
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7. Alageel S, Gulliford MC, McDermott L, et al. Implementing multiple health behaviour change interventions for cardiovascular risk reduction in primary care: a qualitative study. *BMC Fam Pract* 2018;19(1):171.
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10. Nicholas JM, Burgess C, Dohia H. Variations in the organization and delivery of the 'NHS Health Check' in primary care. *J Public Heal* 2013;35:85-91.
11. Oswald N, McNaughton R, Watson P. Tees Vascular Assessment Programme Evaluation. 2010
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15. Shaw RL, Pattison HM, Holland C. Be SMART: examining the experience of implementing the NHS Health Check in UK primary care. *BMC Fam Pract* 2015;16:1.
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20. Krska J, du Plessis R, Chellaswamy H. Views of practice managers and general practitioners on implementing NHS Health Checks. *Prim Health Care Res Dev* 2016;17(2):198-205.
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Table 7. Objective 5 Support for the concept of patient experiences as an outcome of the NHS Health Checks intervention Assessment of mixed methods evidence.

Domain	Assessment of support	Level of support
Truth value/bias	<p>Inferences and conclusions made by authors were reflected in the quantitative and qualitative data reported. For example, high levels of satisfaction were evident in the results from quantitative survey data, and participant quotes supported the themes derived by authors.</p> <p>The quantitative data presented from satisfaction surveys were based on questions that were perhaps too broad in focusing on general, overall satisfaction. However, the negative aspects of patients' experiences were captured in the qualitative data.</p> <p>It would have been helpful if the studies which used mixed methods had collected numeric data based on the results from the qualitative methods. For example, by quantifying the number/ proportion of patients who issues expressed through the qualitative data (e.g. how many understood their risk score)</p>	Moderate
Explanation credibility	The issues regarding patient experiences of the NHS Health Checks programme that were reflected in quotes are understandable (e.g. patient expectations that a 'Health Check' would entail testing for medical conditions not just affecting the cardiovascular system; lack understanding of the risk score). Some studies lacked exploration of the social and psychological mechanisms relating to the issues that patients experienced. For example, the reasons why many attendees would struggle to interpret the risk score.	Moderate
Weakness minimisation	Supported across limited quantitative (cross-sectional surveys) and several qualitative designs (free-text survey responses; focus groups and interviews). The quantitative data indicate a high level of patient satisfaction, whereas the data from qualitative studies highlight issues with the NHS Health Checks Programme	Inconsistent support
Inside-outside	The data covers views and quantitative responses from patients. These methods are all at risk of responder bias and may represent the views of those with particularly strong opinions. Objectivity of these methods is therefore limited.	Low
Publication bias	Lack of significance testing therefore it is not possible to assess for this criterion	n/a

Additional comments	None	n/a
Overall assessment	Low/moderate	

References

1. Corlett SA, Krska J. Evaluation of NHS Health Checks provided by community pharmacies. *Journal of public health (Oxford, England)* 2016;38(4):e5 16-e23.
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19. Alageel S, Gulliford MC. Effect of the NHS Health Check programme on cardiovascular disease risk factors during 6 years' follow-up: matched cohort study. *Lancet* 2018;392:17-17.
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21. Riding L-E. Public health transformation twenty months on: adding value to tackle local health needs. http://www.localgovuk/documents/10180/6869714/L15_15+Public+health+transformation+twenty+months+on_WEB_39693pdf/7bb8060e-9a7b-4b85-8099e854be74cfb5 2015
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23. McNaughton RJ, Shucksmith J. Reasons for (non)compliance with intervention following identification of 'high-risk' status in the NHS Health Check programme. *Journal of public health (Oxford, England)* 2015;37(2):218-25.
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Table 8 Objective 6.1 Are disease detection rates higher for GP practices in areas with high versus low population coverage of the NHS Health Check programme?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
3	observational studies ^a	not serious	not serious ^b	serious ^c	not serious ^d	none	⊕○○○ VERY LOW	CRITICAL

- a. Study descriptions were: quasi-experimental study; non-randomised controlled study and an observational study
- b. Palladino (2017) found that high NHS Health Checks program coverage was associated with increased detection of diabetes whereas Lambert (2015) found that increased population coverage of the NHS Health Checks programme was not associated with growth in GP practice disease registers for diabetes. Caley (2014) found no significant associations between % eligible completing an NHS Health Check and change in prevalence of five conditions including diabetes. These variations could reflect ecological effects, attributable to differences in the geographical coverage of each study.
- c. The nature of the intervention group varied between studies. For example, Palladino (2017) compared GP practices with high versus medium or low coverage; Lambert (2016) assessed variation in detection rates in relation to number of health checks performed across practices (therefore no binary intervention and control groups) and Calley (2014) compared practices that offered the intervention with control practices which did not.
- d. One of the studies (Palladino 2017) used data from a large sample and the confidence intervals did not cross the line of no effect.

References

1. Palladino R, Vamos E, Chang KCM, et al. Impact of a national diabetes risk assessment and screening programme in England: a quasi-experimental study. *Lancet* 2017;390:S65-S65.

2. Caley M, Chohan P, Hooper J, et al. The impact of NHS Health Checks on the prevalence of disease in general practices: a controlled study. *Br J Gen Pract* 2014;64(625):e516-21.

3. Lambert MF. Assessing potential local routine monitoring indicators of reach for the NHS health checks programme. *Public Health* 2016;131:92-8.

Table 9 Objective 6.1 Are disease detection rates higher amongst those attending an NHS Health Check following an opportunistic versus standard invitation?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
1	observational studies	not serious ^a	^b	not serious	serious ^c	none	-	CRITICAL

a. The study received one low overall rating, however this was in relation to the external rather than internal validity of the study.

b. Not applicable as only one study is included in this GRADE assessment.

c. The sample size was relatively small and the confidence intervals quite wide for >10% CVD risk in this study.

References

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Table 10 Objective 6.1 Are disease detection rates higher amongst those attending an NHS Health Check versus those who do not attend?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
4	observational studies ^a	not serious ^b	not serious ^c	not serious	not serious ^d	strong association ^e	⊕⊕⊕○ MODERATE	CRITICAL ^f

- a. One study had a quasi-experimental design, three were cohort studies.
- b. None of the studies received low ratings for domains relevant to internal validity/ risk of bias.
- c. Overall, the intervention was associated with increased disease detection. Rates for individual diagnoses varied across studies however this is likely to reflect differences between samples, as some studies used national data whereas others used data from regions or smaller spatial units.
- d. Some of the studies were small and potentially under powered, however several studies used national data sets and therefore the overall sample size is large. Confidence intervals crossed the line of no effect in some cases however generally, confidence intervals were not large.
- e. Robson (2017) reported the rate of chronic kidney disease diagnosis amongst attendees as 83%.
- f. The purpose of the NHS Health Checks program is to screen for chronic health conditions.

References

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Table 11 Objective 6.2 Does NHS Health Check attendance versus non-attendance influence health-related behaviour (smoking status/ prevalence)?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
5	observational studies ^a	serious ^b	serious ^c	not serious	Not estimable ^d	none	⊕○○○ VERY LOW	IMPORTANT

- a. One randomised study and four observational studies.
- b. Mode of collection of smoking data wasn't consistently reported, however it is likely to have been self-report and entered into routine medical records which relies on patients both attending the general practice and being asked about their smoking status within that time. Issues associated with self-report data and completeness could introduce biases in relation to the outcome measurement.
- c. Although point estimates indicated a reduction in smoking across studies, there were inconsistencies regarding the statistical significance of these effects between studies.
- d. Imprecision is not estimable due to differences in effect calculations between studies.

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Table 12 Objective 6.3 What proportions of NHS Health check attendees receive risk management advice or referrals?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
11	observational studies ^a	serious ^b	serious ^c	not serious	not serious ^d	none	⊕○○○ VERY LOW	IMPORTANT

- a. One quasi-randomised controlled trial(Kennedy *et al* 2019)⁹⁷; the remaining studies had an observational design.
- b. Two studies (Krska *et al* 2015²³ and Baker *et al* 2015¹⁷) were rated low on confounding; one study (Foster 2015¹³) was rated low on outcome measurement. These are issues relevant to the internal validity of a study.
- c. Large variations existed in the proportions of patients being referred to lifestyle services between studies. This heterogeneity is likely reflective of geographical variations in referrals.
- d. The eleven studies which reported relevant data to address the research question were mixed in their coverage; some used national datasets with large sample sizes other studies used regional data. Overall however, the sample size was large. Confidence intervals were not presented for several studies and it is likely that the confidence intervals were large for the regional studies, however in several of the larger studies for which CIs were presented, these were narrow.

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Table 13 Objective 6.4 Does the NHS Health Check versus no NHS Health Check reduce cardiovascular disease risk?

Nº of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
5 ^a	observational studies ^b	serious ^c	not serious ^d	not serious	not serious ^e	none	⊕○○○ VERY LOW	CRITICAL

a. One study was a randomized trial, the other four were observational studies.

b. One study had a domain with a low rating - Forster (2015), for outcome measurement. This could affect the internal validity for assessment of the association between NHS Health Checks and CVD risk. Although the other four studies studies were rated as medium or high for this domain, the study by Forster (2015) was the largest study in the analysis and could have impacted significantly on the overall results.

c. Results were generally consistent across studies

d. Decision based on confidence intervals which were reasonably narrow and did not cross the line of no effect. Also, only one of the studies did not use a national data set with a large sample size.

e. Decision based on confidence intervals which were reasonably narrow and die not cross the line of no effect. Also, three of the studies used national data sets with a large sample size.

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Table 14. Objective 6.5 Does the NHS Health Check versus no NHS Health Check increase prescribing of statins or antihypertensive medication?

№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Certainty	Importance
16	observational studies ^a	not serious ^b	not serious ^c	not serious	not serious ^d	none	⊕⊕○○ LOW	IMPORTANT

- a. One study was a randomised trial, the remaining 15 had an observational design
- b. The only study that received a low rating for a domain relevant to risk of bias was Krska 2016 which scored low for confounding. As other studies scored medium or high on this domain, it was deemed that risk of bias overall wouldn't be significantly affected.
- c. Most studies show an increase in prescribing following the NHS Health Check. The exception is Alageel 2019 in relation to prescribing of anti-hypertensive medication.
- d. Although variations in effect estimates are present between studies, this heterogeneity may be attributable to factors including different sample sizes and differences in study designs. The confidence intervals reported appear reasonably small and do not cross the line of no effect.

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