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# A process evaluation of the NHS Health Check care pathway in a primary care setting



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**A process evaluation of the NHS Health Check care pathway in a primary care setting.**

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## Abstract

### Background

More evidence is needed concerning the implementation of the NHS Health Check programme in order identify areas for improvement. The aim of the study was to investigate the way in which the Gloucestershire NHS Health Check programme care pathway was followed and interpreted compared with national programme indicators.

### Methods

A cross sectional review of Gloucestershire's Health Checks was undertaken to assess programme performance via a primary care audit of key indicators within a cohort of 83 GP practices and an eligible population of 210,513. Data were assessed to compare differences between practices and to compare county data with national indicators.

### Results

The annual programme uptake was 49.8% and a total of 1,031 patients were diagnosed with CVD. Variations in the detection of modifiable risk factors in relation to the NHS Ready Reckoner were identified: diabetes (-0.04%), CKD (-0.9%), hypertension (-19.9%); obesity (-7.1%); low physical activity (-57.7%), and smoking (-14.3%).

### Conclusions

Disparities in uptake and implementation of the care pathway demonstrate inconsistencies in the application of processes and knowledge. There appears to be an overestimation of CVD risk by the Ready Reckoner tool likely to be attributable to a failure to adjust for existing local early identification efforts in primary care and prevention.


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## Background

Cardiovascular Disease (CVD) accounts for 36% of deaths and is responsible for a fifth of all hospital admissions in England.[1] Having one vascular condition increases the likelihood of people suffering from others and the burden of disease tends to fall disproportionately on people living in deprived circumstances, especially ethnic groups such as South Asians and African Caribbean.[2] In total, CVD is estimated to cost the UK economy £30 billion annually, almost half of these costs being directly attributable to health care provision.[3]

Launched in April 2009, the National Health Service [NHS] Health Check (HC) programme is designed to support individuals aged between 40 and 74 to manage their risk of developing vascular diseases by offering a cardiovascular risk assessment every five years.[4] The HC programme is a mandated service designed to cover enhanced aspects of clinical care and aims to identify people with previously unidentified established vascular disease risk factors so that they are able to obtain the maximum benefits from diagnosis and prevention.[4] Preventative approaches in primary care could address premature deaths, illness and the associated costs to society and the NHS by helping to avoid some forms of cancer, vascular dementia and a significant proportion of circulatory diseases.[5]

Emerging evidence suggests that HCs could offer some health benefit to patients with respect to decreasing CVD risk[6,7] but more evidence is needed concerning the implementation of the programme in order to identify areas for improvement. Research suggests that the economic modelling used to establish a benchmark for programme uptake (set at 75%) is not based on sound research[6] and the programme's effectiveness is likely to be challenged by capacity issues and establishing partnerships with wider local services.[8] The HC programme offers flexibility to help commissioners respond to local circumstances[4] but variations in the

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interpretation and implementation of national guidance mean that patients attending different general practices do not necessarily receive the same HC experience.[9] Certain aspects of the programme may benefit from greater standardisation or stronger national guidance in order to ensure that the impacts are felt evenly at the population level.[10] These amendments might ameliorate challenges to programme effectiveness posed by the complexity of delivery models, variations in patient uptake, delivery costs and patient targeting.[6,7,11] There is also concern that many patients misconstrue the HC as a general health check-up rather than a specific health screening to assess CVD risk and review of health and lifestyle behaviours[12] and some sections of the eligible population may be less likely to receive a HC than others.[13] Uptake of the HC programme is likely to be uneven across the eligible population with older aged patients and those from more affluent areas more likely to take up the offer of a HC.[6]

This paper reports results from a process evaluation of the HC programme in Gloucestershire, a county located in the South West of England. The aim was to investigate the way in which the HC care pathway was followed and interpreted by the main providers in order to assess performance in relation to national indicators and local programme standards.

## Methods

### NHS Gloucestershire Health Checks

Health Checks were started in Gloucestershire in 2010. A total population of 210,513 is estimated to be eligible for a HC based on the number of 40-74 year old patients registered with GP practices (not including patients who are already on CVD practice registers). Of the 85 practices registered for the HC programme 60% ($n$ = 51) are in areas with deprivation scores lower than the Gloucestershire average. Although 90% have deprivation scores less



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than the England average there are pockets of high deprivation within the county, 7.2% of Gloucestershire's population living in the most deprived national quintile.[14] CVD mortality rates for people living in the most deprived areas is 1.3 times greater than the rest of Gloucestershire and 1.6 times greater than those living in the least deprived areas.[15]

**Health Checks service audit**

A cross sectional review was undertaken to assess a service audit relating to the performance of the first HC appointment within the NHS Gloucestershire HC care pathway (Figure 1) for the period July 2011 to July 2012 using data submitted by the 83 of 85 Gloucestershire GP practices signed up to the programme. Audit criteria reflected national indicators[4] and local safety and quality standards, and included 39 key performance indicators including the number of patient invitations and uptake, and assessments for CVD risk factors performed during the appointment. These included physical measures for example, waist and height, and lifestyle factors for example, physical activity, smoking, and alcohol consumption in addition to QRISK score calculations which help practitioners assess a patient's risk of having a heart attack or stroke over the next ten years; CVD diagnoses, and further referrals.

A database containing practice data for each of the Gloucestershire indicators was compiled by the Gloucestershire Public Health Intelligence Unit (GPHIU) as a practical means of benchmarking the data via comparisons with equivalent criteria in the NHS Health Checks Ready Reckoner (2011).[16] The Ready Reckoner tool assesses the potential cost and savings made by HCs using gender and age-based population estimates. The local estimates account for an eligible population of 261,500 and a programme uptake of 75% by all practices over the first five years of programme implementation. These assumptions include estimates for CVD prevalence and investments in preventative services such as smoking cessation and



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weight management. Alcohol assessment and referral was reviewed but not compared to the Ready Reckoner as this was not incorporated in the tool. Descriptive analysis was conducted to assess differences between the Gloucestershire HCs programme and the Ready Reckoner, and differences between practices concerning the implementation of the first HC appointment. While the Ready Reckoner uses a dichotomous division to define 'inactive' and 'active' patients, the Service Audit employed classifications based on 'Good', 'Average' or 'Poor' based on local data requirements. As a practical means of exploring the data we compared 'inactive' and 'poor' respectively, representing the lowest classification in each dataset.

The database was developed using standardised MIQUEST queries sent out to the GP practices which were used to populate spreadsheets once returned in secure GPHIU folders. Individual practice level data were generated using individual GP Practice Feedback Forms in separate Excel Spread Sheets. Practice names were anonymised by GPHIU via the use of a unique practice identifier prior to data being sent to the research team for analysis. Data were subsequently loaded via Bulk Insert command into SQL Server which de-normalised the data, applied flags, and row identifiers. SQL queries were used to group the data and produce lists of data and results which were then pushed into Excel workbooks to assess relative overall practice performance and differences between expected and actual data based on the Ready Reckoner.

Comparisons with the Ready Reckoner were made to assess referrals to services following risk assessments, specifically with regard to Health Trainers, smoking cessation, dietary advice, physical activity intervention, alcohol support, weight management and further GP appointments. Comparisons assessing the actual versus expected identification of CVD risk

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factors, specifically low physical activity, hypertension, smoking, obesity and raised fasting blood glucose were also made. An initial assessment of the data identified that patient invitations to a HC by practices ranged between 0% and 427.3% across the cohort and between 0% and 168.8% of the eligible population attended a HC suggesting that practices were both over and under-inviting patients thus introducing potential bias in terms of geographic spread and data concerning implementation.

[Figure 1 here]

**Ethical approval**

Ethical approval for all aspects of the present study was given by the University of Gloucestershire research ethics committee and the NHS Gloucestershire HC evaluation commissioner.

**Results**

**Patterns of Health Check uptake**

Just over half of those who received a HC were female (54.8%, *n* = 11,487) compared to males (45.2%, *n* = 9,486) and the overwhelming majority were British or Mixed British (94.8%, *n* = 13,055) which was consistent with the ethnic profile of Gloucestershire as a whole. We were surprised to find that patients aged 45-49 years old (17.3%, *n* = 3,622) accounted for the largest proportion of those who had received a HC for both females (55.2%, *n* = 1,999) and males (44.8%, *n* = 1,623). This might reflect an approach in which GPs were inviting younger patients first. Four practices recorded no invites but did in fact carry out HCs suggesting that some patients were being invited but not necessarily coded



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correctly. Based on Index of Multiple Deprivation (IMD) scores to assess average local deprivation, patients in quintile 5 (the least deprived quintile) had the highest rate of HC completion (41.3%, *n* = 2,499) and those in quintile 1 (the most deprived quintile) showed the lowest (29%, *n* = 1,773), suggesting that uptake was proportionally highest in the least deprived quintile.

**Pre-Health Check assessment and risk assessments**

Approximately one third (29.1%, *n* = 6,106) of eligible patients had a pre-HC assessment total cholesterol blood test performed on the same date as the HC rather than on a separate visit to the practice as required in the care pathway and there was considerable variation between practices (*Mdn* = 16%, range = 0-100%). If the pre-HC assessment cholesterol blood is done on the same date as the HC it is not possible to correctly calculate the QRISK. Consequently, the HC care pathway which stipulates that blood tests should be performed 7-10 days before the appointment was not being followed consistently. Risk assessments for smoking, cholesterol and blood pressure are critical for calculating patient CVD risk scores and so a low or sub-optimal rate of these being performed is a concern. Variations across all risk assessments performed during the HC are presented in Table 1.

[Table 1 here]

**Performance of the Health Check pathway**

Table 2 summarises the HC service audit data for patient invitations, uptake, identification of CVD risk factors, patient referrals and CVD diagnosis. Overall, 49.8% of the target uptake



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was achieved and 5.3% of patients who received a HC were ineligible for example, patients with identified with pre-existing CVD.

[Table 2 here].

It is important to note that in the early years of programme implementation guidance for identifying the eligible population were adjusted nationally to ensure a better definition of the cohort. It is likely that these accounted for the variation between the estimated eligible population between the Ready Reckoner and the actual eligible population covered by the evaluation presented in this paper (a variation of 15.2%). This may explain some of our findings presented in Table 3.

[Table 3 here].

Variations for subsequent referrals and clinical management were: weight loss (-2.7%), which was likely due to the lack of Tier 2 weight management services at the time; smoking (+3.9%); brief exercise intervention (+1.1%), antihypertensive (+2.7%) and statins (+2.9%), suggesting a potential over-prescription of statin therapy and miscoding. The proportion of patients with a recorded lifestyle issue referred to a Health Trainer was deceptively high given the small number of patients (74.1%, $n$ = 123) and the data indicated that none of these patients were seen by Health Trainer. This might be attributable to problems with recording or coding patient progress, or that information was not being fed back by the health trainer to the GP.

**Discussion**



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**Main findings**

The systematic approach to HC delivery is still in development. The relatively high proportion of patients with a QRISK score recorded as part of the HC suggests that practices were generally clear on the importance of establishing a patient disease risk profile but variations in programme implementation between practices demonstrated a degree of inconsistency. High invitation rates suggested some practices were over-inviting patients which may disrupt the five year risk assessment cycle and there were apparent issues in the ways in which invitations were being coded (i.e. opportunistic invitations, not always coded) which makes it difficult to develop a wholly accurate picture of HC performance for the period covered in this paper.

Of those patients with a QRISK score (n = 15,086), 9.1% (n = 1,372) had scores of 20% or more (high CVD risk). While this suggests there was some success in identifying high risk patients it was evident that 28.1% (n = 5,887) did not have a QRISK score calculated. In addition to issues created by performing blood tests on the same day as the HC this could be due to practices not consistently following the pathway so that all necessary patient data were obtained. Rates of risk factor identification might also be influenced by proactive work in primary care which is not solely attributable to this programme particularly in relation to hypertension, obesity and smoking cessation. Potential over-subscribing of statins and antihypertensives suggests further HC pathway training is required and is likely to be a point of interest for practitioners implementing the HC programme elsewhere.

**What is already known on this topic**

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Other prevention programmes report similar uptake rates to those found in the present study [6,17] and underline the presently unrealistic target of 75% of the eligible population. Research investigating recruitment to cardiovascular disease risk screening programmes has highlighted inconsistent use of screening protocols, varying degrees of uptake, and factors affecting responses to invitations for screening including mental health problems, gender, ethnicity, smoking status and regularity of contact with GP practices.[11,18-21] Specifically with regard to HCs, Nicholas *et al*.[9] found similar process variations and raise concerns regarding the consistency of programme implementation while Graley *et al*.[10] found variation in the way HCs were linked to non-medical support or services and only one PCT that was monitoring the quality of the checks.

**What this study adds**

While practices were broadly able to identify appropriate patients disparities in uptake and risk assessments across the practice cohort demonstrate that the implementation of HC is not consistent despite the provision of a specific HC care pathway, tools and training, and support services. Variations in the application of risk assessment components suggests that factors beyond HC mandatory requirements are influencing the identification of modifiable disease risks and influencing its potential effectiveness. One potential factor is that proactive work in primary care not solely attributable to the HCs in relation to hypertension, obesity and smoking cessation is helping to identify and address risks outside of the programme. A second potential factor is that inconsistencies in the performance and recording of risk assessments might account for the lower than expected identification of risk factors, particularly hypertension. It is likely that a combination of both factors is influencing the identification of modifiable disease risks.

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The findings suggest that CKD seems to be underdiagnosed and that statin over prescription was not in line with the recommendation from commissioners (first manage through diet and exercise). As with inconsistent approaches to statin prescription identified in existing research[9] this might suggest that there is a need to improve the ways in which high risk patients are identified and managed. While it was difficult to extract data concerning patient cholesterol levels as found elsewhere,[11] it is noticeable that the identification of hypertension was lower than expected. Similar to Artac *et al*.[17] we were unable to fully assess the uptake and adherence to other interventions following the Health Check because this information is not recorded in electronic medical records. The findings highlight that greater and more consistent adherence to the HC pathway is needed to ensure that each element is being undertaken in order to improve outcomes for patients and the quality of data being collected, and to ensure effective use of resources.

**Limitations**

The size of the cohort referred to in this paper differs from that established in the Ready Reckoner and changes to guidance on eligibility during the period which this paper covers make direct comparisons difficult. Disparities between the actual and expected data might be explained by inconsistent implementation of the pathway, CVD overestimations by the Ready Reckoner, local early identification efforts in primary care, and a lack of congruence between the actual and expected eligible population data. This highlights the challenge of linking data relating to HCs and for establishing definitive evidence concerning the programme. Due to lack of data, deprivation could not be measured at an individual level which may mean that there was inter-practice variation. We were unable to assess the values associated with cholesterol measurements, neither compare alcohol assessment versus expected levels. It was not possible to determine whether variations between practices indicated contrasting

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approaches to implementation or issues in the way data were being recorded. Provision of, access to and uptake of the HCs and referral services is not even across Gloucestershire and are subject to a range of factors including patient affluence, cultural differences and practice management of the pathway. These are likely to have affected the ability of practices to perform HCs. There are numerous confounding variables that cannot be controlled or accounted for and it is not possible to demonstrate a causal link between attendance at or performance of the HC and CVD outcomes.

**Conclusion**

Although high risk patients were identified, differences in uptake and implementation of the risk assessments demonstrate that the implementation of HCs is not consistent. There appears to be an overestimation of CVD risk by the Ready Reckoner likely to be attributable to a failure to adjust for existing local early identification efforts in primary care. The national 75% target may be unrealistic while the HC programme is further developed and refined to support implementation.

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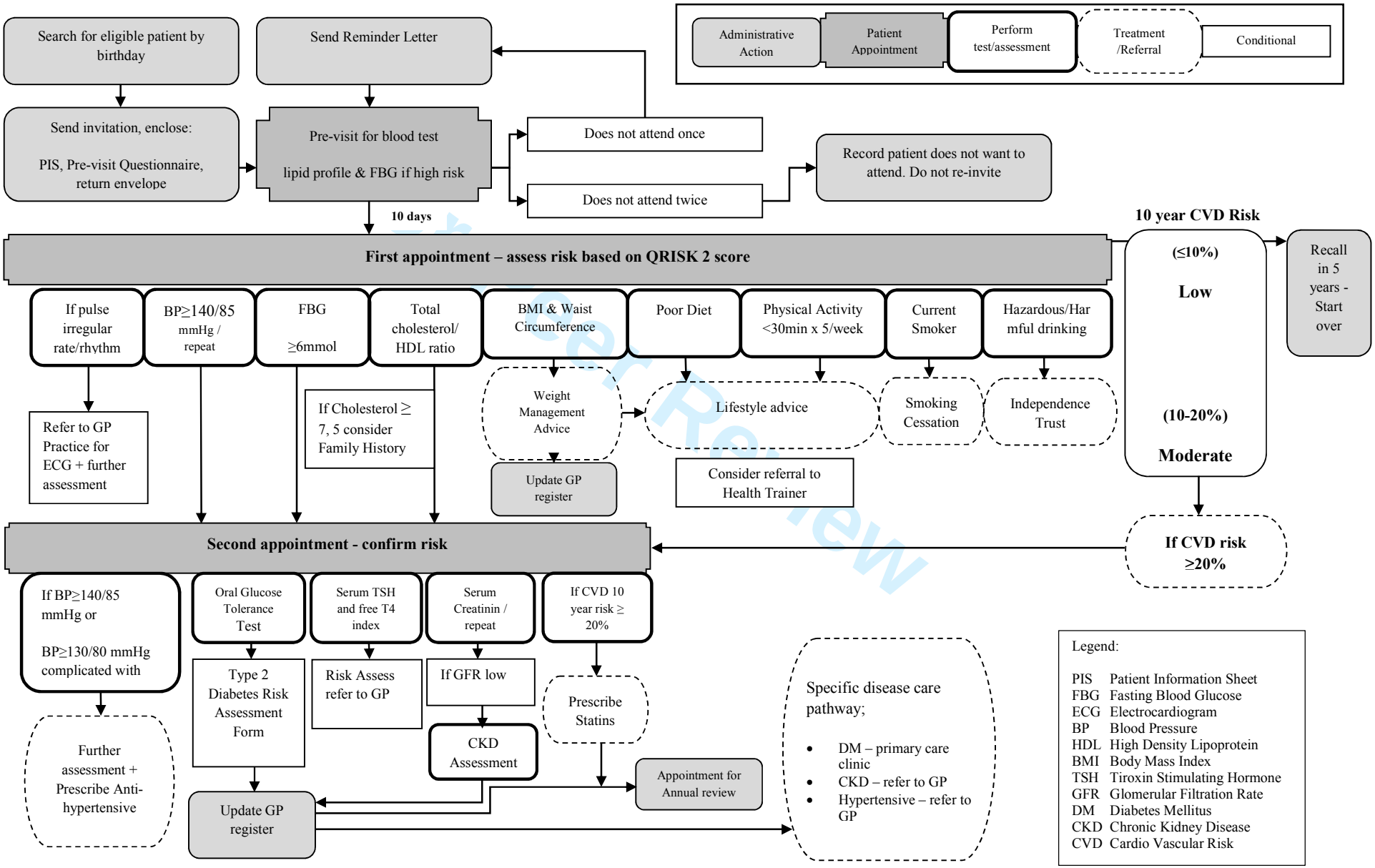


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| Assessment | Risk criteria | Overall practice cohort | | Inter-practice differences (%) | | |
|---|---|---|---|---|---|---|
| | | % | n | Mdn | Range (min. – max.) | |
| Physical activity / exercise[a] | Inactive | 87.8 | 18,408 | 93.0 | 0.0 | 100 |
| Diet[b] | Poor diet | 84.2 | 17,656 | 93.1 | 0.0 | 100 |
| Smoking[c] | Smoker | 83.2 | 17,447 | 84.7 | 0.0 | 94.6 |
| Total cholesterol[d] | > 6 mmol/L | 75.7 | 15,883 | 80.5 | 13.2 | 100 |
| Blood Pressure[e] | > 140/90 mmHg | 70.8 | 14,858 | 79.55 | 8.6 | 100 |
| Waist Circumference[f] (ACJ[g]) | BMI> = 27.5 | 65.2 | 178 | 0.0 | 0.0 | 100 |
| Waist Circumference (Non ACJ) | BMI > = 30.0 | 62.7 | 11,411 | 68.8 | 0.0 | 100 |
| Pulse[h] | Irregular resting pulse | 60.8 | 12,760 | 68.7 | 0.0 | 100 |
| Alcohol[i] | Audit C / FAST >3 | 53.9 | 11,294 | 72.2 | 0.0 | 100 |
| Fasting Blood Glucose[j] | >5.6 mmol/l | 38.8 | 8,132 | 29.6 | 0.0 | 90.2 |

[a] Number of patients with an exercise grading recorded as part of their appointment (1 month prior to and including the HC date). [b] Number of patients with dietary history code recorded as part of their appointment (1 month up to and including the HC

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date). [c] Number of patients with a smoking status recorded as part of their appointment (1 month up to and including the HC date). [d] Number of patients with total cholesterol recorded as part of their appointment (up to 1 month prior to NHS HC date). [e] Number of patients with blood pressure recorded as part of their appointment (up to 1 month prior to NHS HC date). [f] Number of patients with a waist circumference recorded as part of their appointment (1 month prior to and including the HC date). [g] ACJ = Asian, Chinese, Japanese. [h] Refers to post-NHS HC (including NHS HC date) as MIQUEST queries only pick up the latest pulse rate, so this may not be the pulse rate done at the NHS HC. [i] Number of patients with an Audit C or FAST recorded as part of their appointment (1 month prior to and including the HC date). [j] HbA1c test were conducted on 269 (1.3%) of HC attendees. While HbA1c is not mandatory it is considered best practice to offer all patients the test

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| Audit Criteria | Total population | Expected (n) | Actual (n) | Achieved / rate (%) | Difference (%)[a] |
|---|---|---|---|---|---|
| Eligibility, invite and uptake | | | | | |
| 1/5th of the eligible practice population | 210513 | n/a | 42103 | n/a | n/a |
| Patients invited to HC | 42103[b] | 42103 | 39871 | 94.7 | -5.3 |
| Patients who received HC | 42103 | 31577[c] | 20973 | 49.8 | -25.2 |
| Ineligible patients who received a HC | 22152 | 0 | 1179 | 5.3 | n/a |
| CVD risk factors identified | | | | | |
| Patients with a QRISK score >= 20[d] | 15086 | n/a | 1372 | 9.1 | n/a |
| Low physical activity[e] | n/a | 17576 | 1490 | 7.1 | -57.7 |
| Hypertension[f] | n/a | 7549 | 1663 | 7.9 | -19.9 |
| Smoking | n/a | 6416 | 1942 | 9.3 | -14.3 |
| Obesity | n/a | 6132 | 3255 | 15.5 | -7.1 |
| BME patients (BMI = ≥ 25)[g] | | - | 132 | 30.3 | - |
| Non BME patients (BMI = ≥ 30)[h] | | - | 3123 | 17.4 | - |

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| | | | | | |
|---|---|---|---|---|---|
| Raised Fasting Blood Glucose | | 1139 | 275 | 1.3 | -2.9 |
| Referrals and CVD diagnosis | | | | | |
| Non BME patients with weight advice or weight/diet referral[i] | 3123 | 4551 | 1,287 | 41.2 | 18.6 |
| BME patients with weight advice or weight/diet referral[j] | 132 | 192 | 41 | 31.1 | 8.4 |
| Patients with smoking advice/referral[k] | 1942 | 4963 | 1300 | 66.9 | 43.3 |
| Patients with exercise advice / referral[l] | 15456 | 13595 | 6830 | 44.2 | -20.6 |
| Patients with an alcohol referral[m] | 2425 | 839 | 17 | 0.7 | -3.3 |
| Patients diagnosed with CVD since HC | 20973 | 2726 | 1031 | 4.9 | -8.1 |

[a]From national average. [b]Total eligible practice population i.e. 100% [c]National expected i.e. 75%. [d]Of Health Check patients with a QRISK score. [e]Of those with recorded exercise grading, *n* = 20,973. While the Ready Reckoner uses a dichotomous division to define Inactive and Active patients, the Service Audit employs classifications based on Good, Average or Poor. Table 1 compares Inactive and Poor and hence does not necessarily make a meaningful direct comparison. [f] Of those with recorded blood pressure, *n* = 20,527. Hypertension represents both a risk factor and CVD diagnosis. [g]Based on total BME (Black and Minority Ethnic) population (n = 435). [h]Based on total non-BME population (n = 17,923). [i]Non-BME Health Checks obese patients. [j]BME Health Checks obese patients. [k]Recorded Health Checks current smokers. [l]Low to moderate exercise grading. [m]Audit C or FAST value >= 5.

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| Risk factors/CVD | Actual | | Expected | | +/- |
|---|---|---|---|---|---|
| | % | n | % | n | % |
| Low PA [a] | 7.1 | 1,490 | 64.8 | 17,576 | -57.7 |
| Hypertension [b] | 7.9 | 1,663 | 27.8 | 7,549 | -19.9 |
| Smoking | 9.3 | 1,942 | 23.6 | 6,416 | -14.3 |
| Obesity | 15.5 | 3,255 | 22.6 | 6,132 | -7.1 |
| BME patients (BMI = ≥ 25) [c] | 30.3 | 132 | - | - | - |
| Non BME patients (BMI = ≥ 30) [d] | 17.4 | 3,123 | - | - | - |
| Raised Fasting Blood Glucose | 275 | 1.3 | | 1,139 | -2.9 |

[a] The Ready Reckoner uses a dichotomous division to define Inactive and Active patients while the Service Audit employed classifications based on Good, Average or Poor. The table above compares Inactive and Poor, and hence does not necessarily make a meaningful direct comparison. [b] Hypertension represents both a risk factor and CVD diagnosis. [c] Based on total BME (Black and Minority Ethnic) population (n = 435). [d] Based on total non-BME population (n = 17,923).

For Peer Review