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Baker, Colin ORCID logoORCID: <https://orcid.org/0000-0001-8971-2829>, Loughren, Elizabeth A, Crone, Diane ORCID logoORCID: <https://orcid.org/0000-0002-8798-2929> and Kallfa, Neville (2015) A process evaluation of the NHS Health Check care pathway in a primary care setting. *Journal of Public Health*, 37 (2). pp. 202-209. doi:10.1093/pubmed/fdv053

Official URL:

<http://jpubhealth.oxfordjournals.org/content/early/2015/04/27/pubmed.fdv053.abstract>

DOI: <http://dx.doi.org/10.1093/pubmed/fdv053>

EPrint URI: <https://eprints.glos.ac.uk/id/eprint/2404>

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Baker, Colin and Loughren, Elizabeth A and Crone, Diane and Kallfa, Nevilla (2015). *A process evaluation of the NHS Health Check care pathway in a primary care setting*. Journal of Public Health, 37 (2), 202-209.

Published in Journal of Public Health, and available online at:

<http://jpubhealth.oxfordjournals.org/content/early...>

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The URL for the published version is <http://jpubhealth.oxfordjournals.org/content/early...>

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

Journal:	<i>Journal of Public Health</i>
Manuscript ID:	JPH-14-0390.R2
Manuscript Type:	Original Article
Date Submitted by the Author:	n/a
Complete List of Authors:	Baker, Colin; University of Gloucestershire, School of Sport & Exercise Loughren, Elizabeth; University of Gloucestershire, School of Sport & Exercise Crone, Diane; University of Gloucestershire, School of Sport & Exercise Kallfa, Nevila; Public Health England,
Keywords:	Population-based and preventative services, Circulatory disease, Chronic disease

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Review

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3 **A process evaluation of the NHS Health Check care pathway in a primary care setting.**
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6
7 Baker, C. Research Fellow, University of Gloucestershire, Oxstalls Campus, Oxstalls Lane,
8 Gloucester, Gloucestershire, UK, GL2 9HW, cmbaker@glos.ac.uk, 01242 715198.
9
10
11 [corresponding author]
12
13

14
15
16 Loughren, E.A. Research Fellow, University of Gloucestershire, Oxstalls Campus, Oxstalls
17 Lane, Gloucester, Gloucestershire, UK, GL2 9HW, eloughren@glos.ac.uk, 01242 715197.
18
19

20
21
22
23 Crone, D. Professor of Exercise Science, University of Gloucestershire, Oxstalls Campus,
24 Oxstalls Lane, Gloucester, Gloucestershire, UK, GL2 9HW, dcrone@glos.ac.uk, 01242
25
26
27 715161.
28
29

30
31
32 Kallfa, N. Consultant in Public Health, Public Health England (former Consultant in Public
33 Health at Gloucestershire County Council), Public Health England, 1st Floor, 2 Rivergate,
34
35
36 Temple Quay, Bristol, BS1 6EH, nevila.kallfa@phe.gov.uk, 0300 3038162.
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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.

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 research⁶ 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 circumstances⁴ but variations in the

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3 interpretation and implementation of national guidance mean that patients attending different
4 general practices do not necessarily receive the same HC experience.⁹ Certain aspects of the
5 programme may benefit from greater standardisation or stronger national guidance in order to
6 ensure that the impacts are felt evenly at the population level.¹⁰ These amendments might
7 ameliorate challenges to programme effectiveness posed by the complexity of delivery
8 models, variations in patient uptake, delivery costs and patient targeting.^{6,7,11} There is also
9 concern that many patients misconstrue the HC as a general health check-up rather than a
10 specific health screening to assess CVD risk and review of health and lifestyle behaviours¹²
11 and some sections of the eligible population may be less likely to receive a HC than others.¹³
12 Uptake of the HC programme is likely to be uneven across the eligible population with older
13 aged patients and those from more affluent areas more likely to take up the offer of a HC.⁶
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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.

41 **Methods**

42 **NHS Gloucestershire Health Checks**

43 Health Checks were started in Gloucestershire in 2010. A total population of 210,513 is
44 estimated to be eligible for a HC based on the number of 40-74 year old patients registered
45 with GP practices (not including patients who are already on CVD practice registers). Of the
46 85 practices registered for the HC programme 60% ($n = 51$) are in areas with deprivation
47 scores lower than the Gloucestershire average. Although 90% have deprivation scores less
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3 than the England average there are pockets of high deprivation within the county, 7.2% of
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5 Gloucestershire's population living in the most deprived national quintile.¹⁴ CVD mortality
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7 rates for people living in the most deprived areas is 1.3 times greater than the rest of
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9 Gloucestershire and 1.6 times greater than those living in the least deprived areas.¹⁵
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12 13 14 **Health Checks service audit**

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16 A cross sectional review was undertaken to assess a service audit relating to the performance
17
18 of the first HC appointment within the NHS Gloucestershire HC care pathway (Figure 1) for
19
20 the period July 2011 to July 2012 using data submitted by the 83 of 85 Gloucestershire GP
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22 practices signed up to the programme. Audit criteria reflected national indicators⁴ and local
23
24 safety and quality standards, and included 39 key performance indicators including the
25
26 number of patient invitations and uptake, and assessments for CVD risk factors performed
27
28 during the appointment. These included physical measures for example, waist and height, and
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30 lifestyle factors for example, physical activity, smoking, and alcohol consumption in addition
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32 to QRISK score calculations which help practitioners assess a patient's risk of having a heart
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34 attack or stroke over the next ten years; CVD diagnoses, and further referrals.
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41 A database containing practice data for each of the Gloucestershire indicators was compiled
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43 by the Gloucestershire Public Health Intelligence Unit (GPHIU) as a practical means of
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45 benchmarking the data via comparisons with equivalent criteria in the NHS Health Checks
46
47 Ready Reckoner (2011).¹⁶ The Ready Reckoner tool assesses the potential cost and savings
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49 made by HCs using gender and age-based population estimates. The local estimates account
50
51 for an eligible population of 261,500 and a programme uptake of 75% by all practices over
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53 the first five years of programme implementation. These assumptions include estimates for
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55 CVD prevalence and investments in preventative services such as smoking cessation and
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3 weight management. Alcohol assessment and referral was reviewed but not compared to the
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5 Ready Reckoner as this was not incorporated in the tool. Descriptive analysis was conducted
6
7 to assess differences between the Gloucestershire HCs programme and the Ready Reckoner,
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9 and differences between practices concerning the implementation of the first HC
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11 appointment. While the Ready Reckoner uses a dichotomous division to define 'inactive' and
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13 'active' patients, the Service Audit employed classifications based on 'Good', 'Average' or
14
15 'Poor' based on local data requirements. As a practical means of exploring the data we
16
17 compared 'inactive' and 'poor' respectively, representing the lowest classification in each
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19 dataset.
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25 The database was developed using standardised MIQUEST queries sent out to the GP
26
27 practices which were used to populate spreadsheets once returned in secure GPHIU folders.
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29 Individual practice level data were generated using individual GP Practice Feedback Forms in
30
31 separate Excel Spread Sheets. Practice names were anonymised by GPHIU via the use of a
32
33 unique practice identifier prior to data being sent to the research team for analysis. Data were
34
35 subsequently loaded via Bulk Insert command into SQL Server which de-normalised the
36
37 data, applied flags, and row identifiers. SQL queries were used to group the data and produce
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39 lists of data and results which were then pushed into Excel workbooks to assess relative
40
41 overall practice performance and differences between expected and actual data based on the
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43 Ready Reckoner.
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50 Comparisons with the Ready Reckoner were made to assess referrals to services following
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52 risk assessments, specifically with regard to Health Trainers, smoking cessation, dietary
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54 advice, physical activity intervention, alcohol support, weight management and further GP
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56 appointments. Comparisons assessing the actual versus expected identification of CVD risk
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3 factors, specifically low physical activity, hypertension, smoking, obesity and raised fasting
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5 blood glucose were also made. An initial assessment of the data identified that patient
6
7 invitations to a HC by practices ranged between 0% and 427.3% across the cohort and
8
9 between 0% and 168.8% of the eligible population attended a HC suggesting that practices
10
11 were both over and under-inviting patients thus introducing potential bias in terms of
12
13 geographic spread and data concerning implementation.
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18 [Figure 1 here]
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21 22 23 **Ethical approval**

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25 Ethical approval for all aspects of the present study was given by the University of
26
27 Gloucestershire research ethics committee and the NHS Gloucestershire HC evaluation
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29 commissioner.
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32 33 34 **Results**

35 36 37 38 **Patterns of Health Check uptake**

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40 Just over half of those who received a HC were female (54.8%, $n = 11,487$) compared to
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42 males (45.2%, $n = 9,486$) and the overwhelming majority were British or Mixed British
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44 (94.8%, $n = 13,055$) which was consistent with the ethnic profile of Gloucestershire as a
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46 whole. We were surprised to find that patients aged 45-49 years old (17.3%, $n = 3,622$)
47
48 accounted for the largest proportion of those who had received a HC for both females
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50 (55.2%, $n = 1,999$) and males (44.8%, $n = 1,623$). This might reflect an approach in which
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52 GPs were inviting younger patients first. Four practices recorded no invites but did in fact
53
54 carry out HCs suggesting that some patients were being invited but not necessarily coded
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3 correctly. Based on Index of Multiple Deprivation (IMD) scores to assess average local
4 deprivation, patients in quintile 5 (the least deprived quintile) had the highest rate of HC
5 completion (41.3%, $n = 2,499$) and those in quintile 1 (the most deprived quintile) showed
6 the lowest (29%, $n = 1,773$), suggesting that uptake was proportionally highest in the least
7 deprived quintile.
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13 14 15 16 **Pre-Health Check assessment and risk assessments**

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18 Approximately one third (29.1%, $n = 6,106$) of eligible patients had a pre-HC assessment
19 total cholesterol blood test performed on the same date as the HC rather than on a separate
20 visit to the practice as required in the care pathway and there was considerable variation
21 between practices ($Mdn = 16%$, range = 0-100%). If the pre-HC assessment cholesterol blood
22 is done on the same date as the HC it is not possible to correctly calculate the QRISK.
23 Consequently, the HC care pathway which stipulates that blood tests should be performed 7-
24 10 days before the appointment was not being followed consistently. Risk assessments for
25 smoking, cholesterol and blood pressure are critical for calculating patient CVD risk scores
26 and so a low or sub-optimal rate of these being performed is a concern. Variations across all
27 risk assessments performed during the HC are presented in Table 1.
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47 **Performance of the Health Check pathway**

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50 Table 2 summarises the HC service audit data for patient invitations, uptake, identification of
51 CVD risk factors, patient referrals and CVD diagnosis. Overall, 49.8% of the target uptake
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3 was achieved and 5.3% of patients who received a HC were ineligible for example, patients
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5 with identified with pre-existing CVD.
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10 [Table 2 here].
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14 It is important to note that in the early years of programme implementation guidance for
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16 identifying the eligible population were adjusted nationally to ensure a better definition of the
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18 cohort. It is likely that these accounted for the variation between the estimated eligible
19
20 population between the Ready Reckoner and the actual eligible population covered by the
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22 evaluation presented in this paper (a variation of 15.2%). This may explain some of our
23
24 findings presented in Table 3.
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29 [Table 3 here].
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34 Variations for subsequent referrals and clinical management were: weight loss (-2.7%),
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36 which was likely due to the lack of Tier 2 weight management services at the time; smoking
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38 (+3.9%); brief exercise intervention (+1.1%), antihypertensive (+2.7%) and statins (+2.9%),
39
40 suggesting a potential over-prescription of statin therapy and miscoding. The proportion of
41
42 patients with a recorded lifestyle issue referred to a Health Trainer was deceptively high
43
44 given the small number of patients (74.1%, $n = 123$) and the data indicated that none of these
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46 patients were seen by Health Trainer. This might be attributable to problems with recording
47
48 or coding patient progress, or that information was not being fed back by the health trainer to
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50 the GP.
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53 54 55 56 **Discussion** 57 58 59 60

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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3 Other prevention programmes report similar uptake rates to those found in the present study
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5 ^{6,17} and underline the presently unrealistic target of 75% of the eligible population. Research
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7 investigating recruitment to cardiovascular disease risk screening programmes has
8
9 highlighted inconsistent use of screening protocols, varying degrees of uptake, and factors
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11 affecting responses to invitations for screening including mental health problems, gender,
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13 ethnicity, smoking status and regularity of contact with GP practices.^{11,18-21} Specifically with
14
15 regard to HCs, Nicholas *et al.*⁹ found similar process variations and raise concerns regarding
16
17 the consistency of programme implementation while Graley *et al.*¹⁰ found variation in the
18
19 way HCs were linked to non-medical support or services and only one PCT that was
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21 monitoring the quality of the checks.
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27 **What this study adds**

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29 While practices were broadly able to identify appropriate patients disparities in uptake and
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31 risk assessments across the practice cohort demonstrate that the implementation of HC is not
32
33 consistent despite the provision of a specific HC care pathway, tools and training, and support
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35 services. Variations in the application of risk assessment components suggests that factors
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37 beyond HC mandatory requirements are influencing the identification of modifiable disease
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39 risks and influencing its potential effectiveness. One potential factor is that proactive work in
40
41 primary care not solely attributable to the HCs in relation to hypertension, obesity and
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43 smoking cessation is helping to identify and address risks outside of the programme. A
44
45 second potential factor is that inconsistencies in the performance and recording of risk
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47 assessments might account for the lower than expected identification of risk factors,
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49 particularly hypertension. It is likely that a combination of both factors is influencing the
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51 identification of modifiable disease risks.
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3 The findings suggest that CKD seems to be underdiagnosed and that statin over prescription
4 was not in line with the recommendation from commissioners (first manage through diet and
5 exercise). As with inconsistent approaches to statin prescription identified in existing
6 research⁹ this might suggest that there is a need to improve the ways in which high risk
7 patients are identified and managed. While it was difficult to extract data concerning patient
8 cholesterol levels as found elsewhere,¹¹ it is noticeable that the identification of hypertension
9 was lower than expected. Similar to Artac *et al.*¹⁷ we were unable to fully assess the uptake
10 and adherence to other interventions following the Health Check because this information is
11 not recorded in electronic medical records. The findings highlight that greater and more
12 consistent adherence to the HC pathway is needed to ensure that each element is being
13 undertaken in order to improve outcomes for patients and the quality of data being collected,
14 and to ensure effective use of resources.
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32 **Limitations**

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34 The size of the cohort referred to in this paper differs from that established in the Ready
35 Reckoner and changes to guidance on eligibility during the period which this paper covers
36 make direct comparisons difficult. Disparities between the actual and expected data might be
37 explained by inconsistent implementation of the pathway, CVD overestimations by the Ready
38 Reckoner, local early identification efforts in primary care, and a lack of congruence between
39 the actual and expected eligible population data. This highlights the challenge of linking data
40 relating to HCs and for establishing definitive evidence concerning the programme. Due to
41 lack of data, deprivation could not be measured at an individual level which may mean that
42 there was inter-practice variation. We were unable to assess the values associated with
43 cholesterol measurements, neither compare alcohol assessment versus expected levels. It was
44 not possible to determine whether variations between practices indicated contrasting
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3 approaches to implementation or issues in the way data were being recorded. Provision of,
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5 access to and uptake of the HCs and referral services is not even across Gloucestershire and
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7 are subject to a range of factors including patient affluence, cultural differences and practice
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9 management of the pathway. These are likely to have affected the ability of practices to
10
11 perform HCs. There are numerous confounding variables that cannot be controlled or
12
13 accounted for and it is not possible to demonstrate a causal link between attendance at or
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15 performance of the HC and CVD outcomes.
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20 21 **Conclusion**

22 Although high risk patients were identified, differences in uptake and implementation of the
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24 risk assessments demonstrate that the implementation of HCs is not consistent. There appears
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26 to be an overestimation of CVD risk by the Ready Reckoner likely to be attributable to a
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28 failure to adjust for existing local early identification efforts in primary care. The national
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30 75% target may be unrealistic while the HC programme is further developed and refined to
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32 support implementation.
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38 39 **Funding**

40 This work was supported by Public Health Gloucestershire County Council.
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45 46 **Acknowledgements**

47 We are grateful to the Gloucestershire Public Health team who worked with the evaluation
48
49 team to compile the results and develop the approach, design and methods that facilitated the
50
51 evaluation of the Gloucestershire HCs Programme and to those staff who assisted,
52
53 particularly Dr. Ruth Wain, Michele Le Mero and Christian Howe. In addition Vicky Smith
54
55 from NHS Gloucestershire CCG who enabled the primary care data and analysis.
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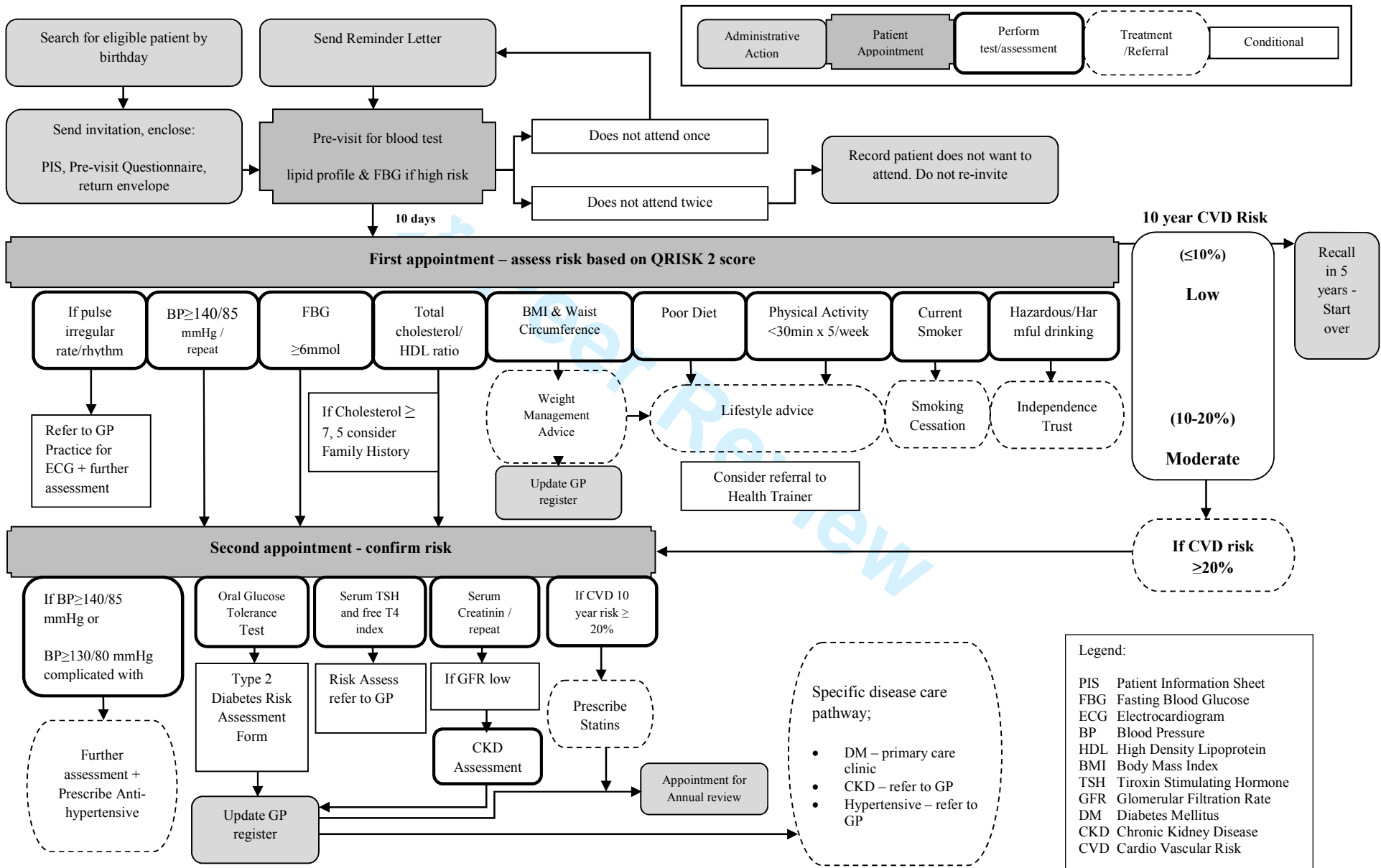
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For Peer Review

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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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5 date). ^c Number of patients with a smoking status recorded as part of their appointment (1 month up to and including the HC
6 date). ^d Number of patients with total cholesterol recorded as part of their appointment (up to 1 month prior to NHS HC date). ^e
7 Number of patients with blood pressure recorded as part of their appointment (up to 1 month prior to NHS HC date). ^f Number
8 of patients with a waist circumference recorded as part of their appointment (1 month prior to and including the HC date). ^g ACJ
9 = Asian, Chinese, Japanese. ^h Refers to post-NHS HC (including NHS HC date) as MIQUEST queries only pick up the latest
10 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
11 part of their appointment (1 month prior to and including the HC date). ^j HbA1c test were conducted on 269 (1.3%) of HC
12 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					
1/5 th 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

^aFrom national average. ^bTotal eligible practice population i.e. 100% ^cNational expected i.e. 75%. ^dOf Health Check patients with a QRISK score. ^eOf 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. ^gBased on total BME (Black and Minority Ethnic) population (*n* = 435). ^hBased on total non-BME population (*n* = 17,923). ⁱNon-BME Health Checks obese patients. ^jBME Health Checks obese patients. ^kRecorded Health Checks current smokers. ^lLow to moderate exercise grading. ^mAudit C or FAST value ≥ 5 .

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 = \geq 25) ^c	30.3	132	-	-	-
Non BME patients (BMI = \geq 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).