

Re audit of the Prevention of Diabetes through NHS Health Checks 2014-15

1. Aims and objectives

Aim: To ensure patients identified as at increased risk of diabetes at the NHS Health Check receive appropriate assessment and management.

Objectives:

1. To assess the quality of current practices in Bromley against audit standards in identifying patients at high risk of Diabetes Mellitus.
2. To review recommendations made following the 2011-13 audit prevention of diabetes through NHS Health Checks and identify further areas for improvement.

2. Background and introduction

Diabetes prevalence in Bromley's population is increasing at an alarming rate. The latest diabetes estimates suggest there are 21,436 people aged 16 years or over (8.2% of the adult population) with diabetes in Bromleyⁱ. This reflects an ongoing rise in diabetes prevalence over the past 12 years (with only 4,846 people on the diabetes register in 2002)ⁱⁱ. In addition, data suggests that there are 29,872 people in Bromley at high risk of diabetes, equal to 11.5% of the adult populationⁱⁱⁱ. This is slightly higher than the rate for England (11.4%). A search of GP systems in 2016 found that approximately 15,419 people have blood test results indicating that they have non-diabetic hyperglycaemia (NDHG)^{iv}.

The NHS Health Checks programme is an important way of identifying people at high risk of developing diabetes and early identification of people with diabetes. The NHS Health Checks Programme has a Diabetes Filter, to aid identification of those at high risk of diabetes, who then require further assessment through blood testing of HbA1c (glycated haemoglobin) or Fasting Plasma Glucose (FPG):

NHS Health Checks Diabetes Filter Criteria²

Body Mass Index ≥ 30 (or ≥ 27.5 in South Asian and Chinese population)
Blood Pressure ≥ 140 mmHg Systolic and/ or ≥ 90 mmHg Diastolic

People identified through the NHS Health Check (HC) as meeting the Diabetes Filter should be managed according to the South London NHS Health Checks Diabetes Filter Pathway (See attached document). This pathway was launched in 2010 (and updated in 2015) to support the implementation of the Diabetes component of the NHS Health Checks in General Practice locally. There is strong evidence that providing intensive lifestyle interventions for patients at increased risk of developing diabetes can prevent or slow its progress^v. Once identified support can be put in place, either through means of referral to Bromley's diabetes prevention programme, advice around diet and physical activity or referral to a structured education programme.

This report assesses the follow up and outcomes of those people at risk of premature vascular morbidity, who had an NHS Health Check 1st April 2014 to 31st March 2015. This time delay between the NHS Health Check and the audit, allows for the time taken to perform investigation, follow up, diagnosis and review. It follows on from an initial audit carried out in 2011-2013. Reviewing progress and the recommendations of the 2011-13 is therefore a key aspect of this report to ensure ongoing quality improvement.

3. Review of 2011-2013 Recommendations

An audit of the prevention of diabetes through NHS Health Checks was first carried out in 2014, looking back at the data over the period 2011-2013. This provided a number of recommendations for action to improve the programme in relation to diabetes prevention. In addition, this audit provides a baseline to review subsequent audits against.

The 2011-2013 audit presented some positive results in the use of the NHS Health Checks in picking up patients at risk of developing diabetes mellitus whilst also identifying areas for improvement.

The table below shows the recommendations from 2011-13 against actions that have been taken forward. A complete list of recommendations from the first audit is provided in Appendix 2.

Table 1

2011-13 Recommendation	Subsequent actions
<p>1. Education to providers regarding the importance of identification and management of patients at high risk of diabetes, including use of coding, promotion of behavioural change and making referrals.</p>	<ul style="list-style-type: none"> • Half day training provided for GPs and nurses with academics. • GPs kept informed of diabetes prevention work being taken forward by Bromley, including a pilot programme which helped inform the roll out of the National Diabetes Prevention Programme. • Information cascaded on recommended READ coding to identify those at high risk of diabetes and enable follow up. • Motivational interviewing technique training rolled out to practitioners. • Regular quarterly updates sent to primary care practices regarding the numbers undertaking NHS health checks.
<p>2. Improvements to coding, templates and searches in the GP Practice computer system to facilitate easier high quality documentation.</p>	<ul style="list-style-type: none"> • A blood test reminder included on the NHS Health Check computer template in addition to new boxes that can indicate whether a blood test has been requested or declined. • Modifications have been made to support computer searches of use of the diabetes filter pathway plus identification of people at high risk. This information is provided in the

	NHS Health Check quarterly data submissions.
3. Using commissioning to improve performance	Quality outcomes indicators are in the NHS Health Check service specification with providers, with ability to withhold payment if no documentation of blood test status is included.
4. Joint working to promote and facilitate best practice	<p>The CCG and local authority has led a strong focus on diabetes prevention, including through the work of the Diabetes Network Group and participation in the National Diabetes Prevention Programme.</p> <p>An electronic 'pop-up' protocol has been developed to sit in the GP clinical system. When a patient with NDH is reviewed in General Practice, the protocol prompts the clinician to have the discussion with the patient and make the referral to available intensive diabetes prevention interventions.</p>
5. Re-audit	Re-audit carried out of NHS Health Check data from 1 April 2014 to 31 March 2015.

4. Outline of audit

Phase 1 – Preparation

Partners: The Public Health Vascular Team sought and gained support for the original audit project from the local diabetes network group, local CVD strategy group, local authority councillors and the Local Medical Committee (LMC) representing GP practices. This Re- audit will also be shared these key stakeholders

Audit Standards: Audit standards for the project were developed to measure recommendations in national and local guidelines with consideration to the local lifestyle services available at that time. Computer searches were designed to report on features from clinical records that would help inform measurement of the following audit standards:

Standard 1: Blood Test

If the individual has a BMI ≥ 30 (≥ 27.5 South Asian and Chinese population) or a blood pressure at or above 140mmHg systolic and/or 90mmHg diastolic, an HbA1c test or fasting plasma glucose (FPG) is required.

Standard 2: Repeat Blood Test

If patients have a raised HbA1c ≥ 42 - < 48 mmol/mol (6.0-6.4%) or FPG ≥ 5.5 – ≤ 6.9 mmol/l , they should have had a repeat blood test for HbA1c or Fasting Plasma Glucose (FPG) within 2 years of the NHS Health Check.

Standard 3: Coding

If patients have a raised HbA1c of ≥ 42 - < 48 mmol/mol (6.0 - 6.4%) or FPG ≥ 5.5 - ≤ 6.9 mmol/l they should be coded with an appropriate READ code indicating level of risk of diabetes and/or diagnostic code of pre diabetic state e.g. Impaired Fasting Glycaemia.

Standard 4: Intensive Lifestyle Intervention

If patients have a raised HbA1c of ≥ 42 - < 48 mmol/mol (6.0 – 6.4%) or FPG ≥ 5.5 - ≤ 6.9 mmol/l, they should receive **intensive** lifestyle intervention (this will be measured by assessment of number of consultations for lifestyle intervention and any referrals to exercise programme, weight management, dietician, smoking cessation).

Standard 5: Risk Factor Profiles

Patient identified as high risk of diabetes should have improved risk factor profiles at 1-2 years:

- Increased physical activity GPPAQ.
- Weight loss been achieved and maintained.
- Repeated blood test 1-2 yearly.

Phase 2 – Method and Implementation

Computer searches were developed in order to examine relevant data for patients who received a NHS Health Check from 1st April 2014 to 31st March 2015. Each of the GP Practices performed the computer search in their clinical system and exported the search results to excel worksheets and securely emailed to Public Health. The searches were performed in September 2016, to allow sufficient time for follow up to have been documented.

Phase 3 – Analysis and Review

The data collected was analysed and assessed against the audit standards. Data analysis was performed using a combination of Microsoft Access and Excel. Cleaning and sorting the data proved problematic owing to the following:

- Each patient follow up appointment created an additional line of data, resulting in multiple records per patient ID.
- The process of bringing together data from different practice surgeries resulted at times in the loss of information from mandatory fields, for example the NHS Health Check data and BMI recording at the NHS Health Check. This was related to the data submissions from different Practice being in different formats. Fortunately this was recognised early in the analysis period and was rectified

The results of the audit help compare results with the previous audit, and any impact of its recommendations that can be made. In addition it supports further quality improvement of the overall pathway.

Information Governance

To ensure patient confidentiality was maintained, data extracted was pseudonymised and the excel spreadsheets were sent to Public Health via secure nhs.net email system and stored in the Confidential folder only accessible by those involved in the audit.

For this re-audit, data collection only used computer searches, and did not include a comprehensive notes review as in the original audit. A notes review was considered unnecessary for the small additional benefits that would be obtained as the majority of data is linked to READ

codes which can be searched on. The additional workload to General Practice and cost involved in writing to patients to obtain their consent was not warranted in this reaudit.

Results

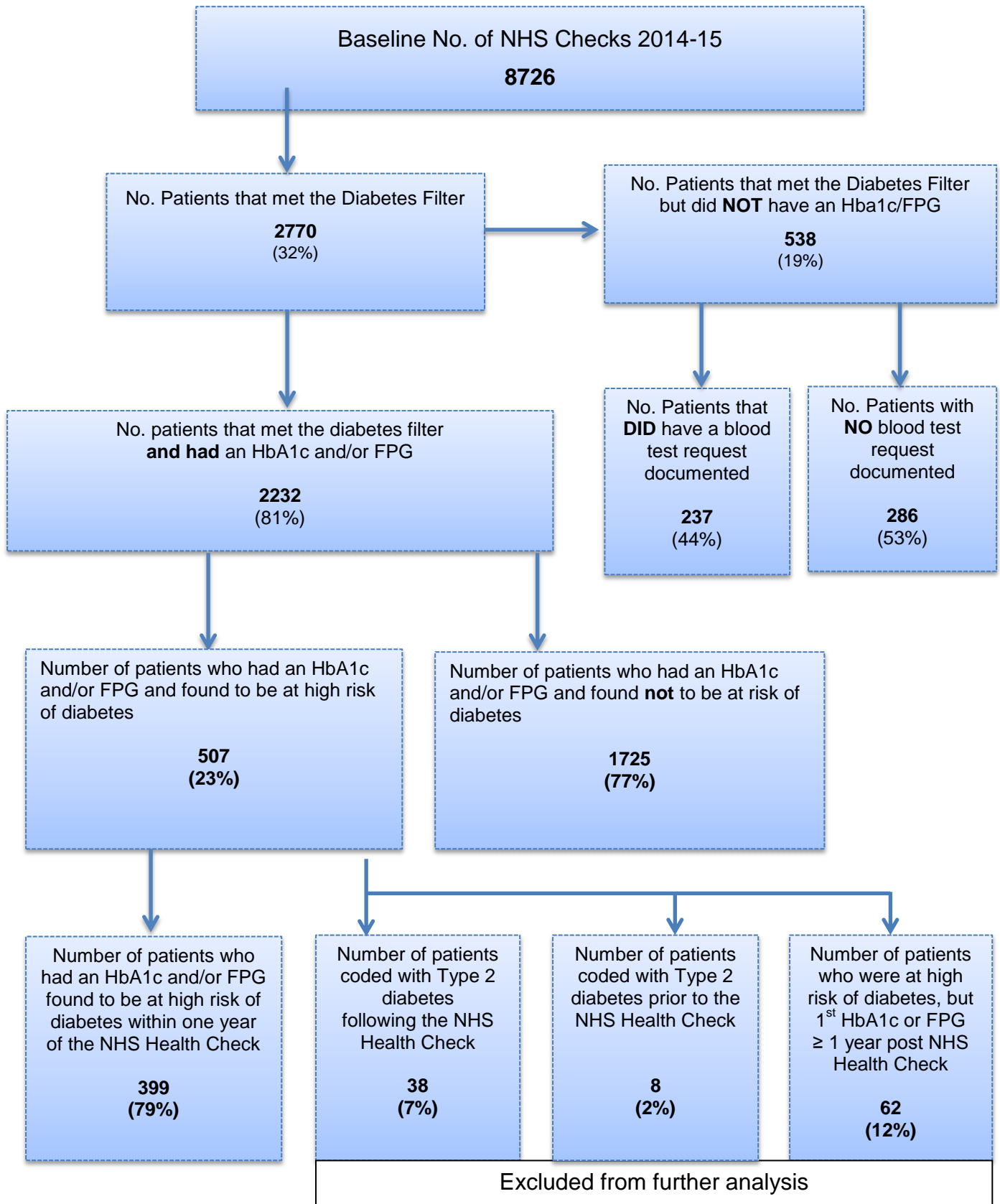
Initial findings from computer searches

44 out of 45 GP practices participated in the audit. Results of computer searches from the participating Practices produced the following initial findings:

- 8726 patients underwent an NHS Health Check in 2014-15
- Of this population, 2770 (32%) met the diabetes filter as described by standard 1 of this audit.
- 2232 (81%) of these patients underwent blood sampling for HbA1c and or FPG.
- 1725 (77%) of these patients who had a blood test were found not to be at high risk of diabetes mellitus according to their blood test result and not included in further analysis.
- 507 (23%) patients who had received a blood test had a result indicating high risk of diabetes.
- However not all the 507 patients were included in further analysis because:
 - 62 (12%) of these patients who had a blood test, were tested >1 year after the NHS health check; so were not included in further analysis as that blood test was assumed not to have been as a result of the NHS Health Check.
 - 8 (2%) patients had been coded with a diagnosis of Type 2 diabetes prior to having an NHS Health Check so were not eligible.
 - 38 (7%) patients were coded with a diagnosis of Type 2 diabetes following their NHS Health Check. This is a good outcome that patients with undiagnosed diabetes are being identified as part of the NHS Health Check. However it is assumed they will receive appropriate follow up which is not the subject of this audit project.
- Therefore 399 (79%) of patients who had a blood test <1 year post the NHS health check and were found to be at high risk of diabetes mellitus were included in further analysis.

This is further demonstrated in Figure 1.

Figure 1: Flowchart demonstrating number of patients in each stage of audit process



Standard 1: Blood Test

If the individual has a BMI ≥ 30 (≥ 27.5 South Asian and Chinese population) or a blood pressure at or above 140mmHg systolic and/or 90mmHg diastolic, an HbA1c test or fasting plasma glucose (FPG) is required.

The re audit allows for patients to be identified as high risk by either a raised HbA1c test or fasting plasma glucose (FPG). The number of patients who had an HbA1c and/ or FPG and found to be at high risk of diabetes and therefore eligible for further analysis was 507 (23%).

Comparing the flowchart demonstrating number of patients in each stage of the audit process from 2011-2013 and 2014-2015 shows the following:

- A far greater proportion of patients who met the diabetes filter then went on to have an HbA1c and/ or FPG test in 2014-15 (81%) compared to 2011-13 (39%).
- New information is included in the 2014-15 flow chart in terms of patient stage. This includes quantifying the number of that had a blood test request documented (44%) compared to the number of patients with no blood test request documented. This helps to understand why a patient did not receive a subsequent test (for example, the patient's decision or the lack of the appropriate documentation).
- The reasons why patients are excluded from further analysis is also set out, for example coded with Type 2 diabetes either prior or post the NHS Health Check.

Standard 2: Repeat Blood Test

If patients have a raised HbA1c ≥ 42 - < 48 mmol/mol (6.0-6.4%) or FPG ≥ 5.5 – ≤ 6.9 mmol/l, they should have had a repeat blood test for HbA1c or fasting plasma glucose within 2 years of the NHS Health Check.

Local and national guidelines¹ recommends repeat blood testing within one year of the initial blood test. This blood test should ideally occur after the patient has received intensive lifestyle intervention. We set an audit standard within 2 years to assess follow up. Of the 399 patients assessed at high risk of diabetes:

- 92 patients had a repeat blood test (23%). This is less than the proportion of patients who received a repeat blood test analysed through the comprehensive notes review in 2011-13 (54%). This reduction in number requires further investigation, for example whether this is a result of incomplete data or a lack of patient follow up on behalf of primary care.
- Out of the 92 patients who received a repeat blood test, 94% of them were within 2 years of the NHS Health Check. This is an improvement from 2011-13 figures, where 20% of repeat blood tests happened outside of the two year target period.

Table 2: Presence or absence of repeat blood test for diabetes risk in patient records

Blood test repeated	92 (23%)
Blood test not repeated	331 (77%)

Table 3: Time to first repeat blood test

Time to 1 st repeat blood test	Number (%) of patients
0-6 months	39 (45%)
6 months to 2 years	48 (53%)
> 2 years	5 (6%)

Changes in blood result

Of the 92 repeat blood tests only one had a different test in their repeat. This contrasts with the 2011-13 and reflects a potential trend in the use of the HbA1c blood measurement (used in the majority of patients analysed). Use of the same measurement tool allows changes in blood results and any subsequent improvement to be assessed.

At the point of the last blood test on the patient records, the following observations can be made:

- 30 (33%) improved their blood result
- 25 (27%) maintained the same blood level
- 36 (40%) showed a worse blood level that first recorded.

It is important to note that some of these changes in blood result are significant (for example, one patient moving out of the at risk group) but most of the changes are slight. For example, a patient worsening their blood level by 1 mmol/mol. Similar to 2011-13, nine patients (10%) had blood levels commensurate with Type 2 diabetes in one type of blood test (HbA1c and/ or FPG) however were not coded as having Type 2 diabetes.

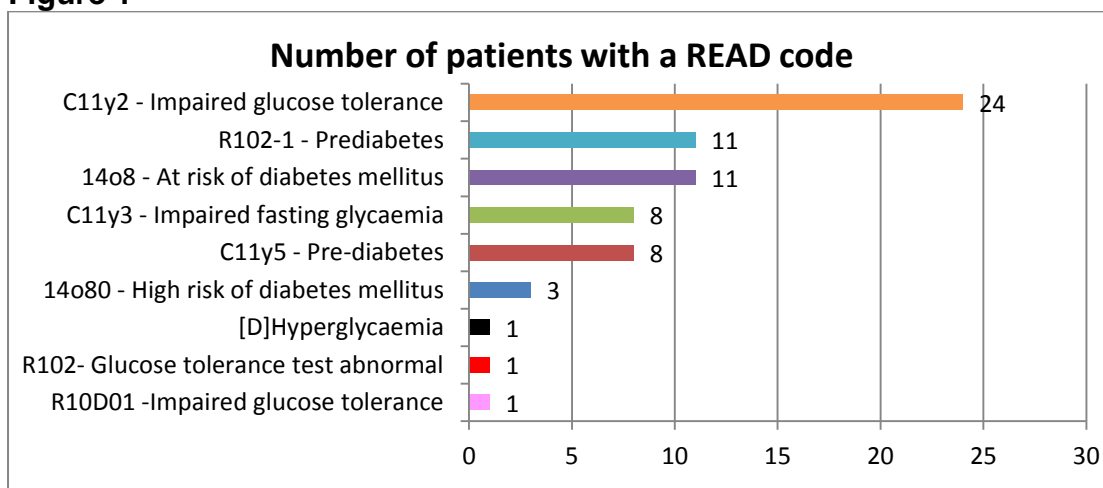
Standard 3: Coding

If patients have a raised HbA1c of ≥ 42 - < 48 mmol/mol (6.0%-6.4%) or FPG ≥ 5.5 - ≤ 6.9 mmol/l, they should be coded with an appropriate READ code indicating level of risk of diabetes and/or diagnostic code of pre-diabetic state. E.g. Impaired Fasting Glycaemia

68 (17%) of patients had a READ code indicating they were at high risk of diabetes. This is an improvement from the baseline audit which achieved 11.5%

A variety of coding is still being used. This included 14 patients using the recommended READ code at that time; 'at risk (or high risk) of diabetes mellitus'. This code was not identified during the 2011-13 audit; therefore this was considered an improvement and positive response to education.

Figure 1



Standard 4: Intensive Lifestyle Interventions

If patients' have a raised HbA1c of ≥ 42 - < 48 mmol/mol (6.0 – 6.4%) or FPG ≥ 5.5 - ≤ 6.9 mmol/l, they should receive **intensive** lifestyle intervention/s (this will be measured by assessment of number of consultations for lifestyle intervention and any referrals to exercise programme, weight management, dietician, smoking cessation).

Standard 5: Risk Factor Profile

Patients identified as high risk of diabetes should have improved risk factor profiles at 1-2 years:

- Weight loss been achieved and maintained.
- Increased physical activity measure through the General Practice Physical Activity Questionnaire⁴.
- Repeated Blood test 1-2 yearly.

Audit standards 4 & 5 relate to lifestyle interventions and improvements to risk factor profiles.

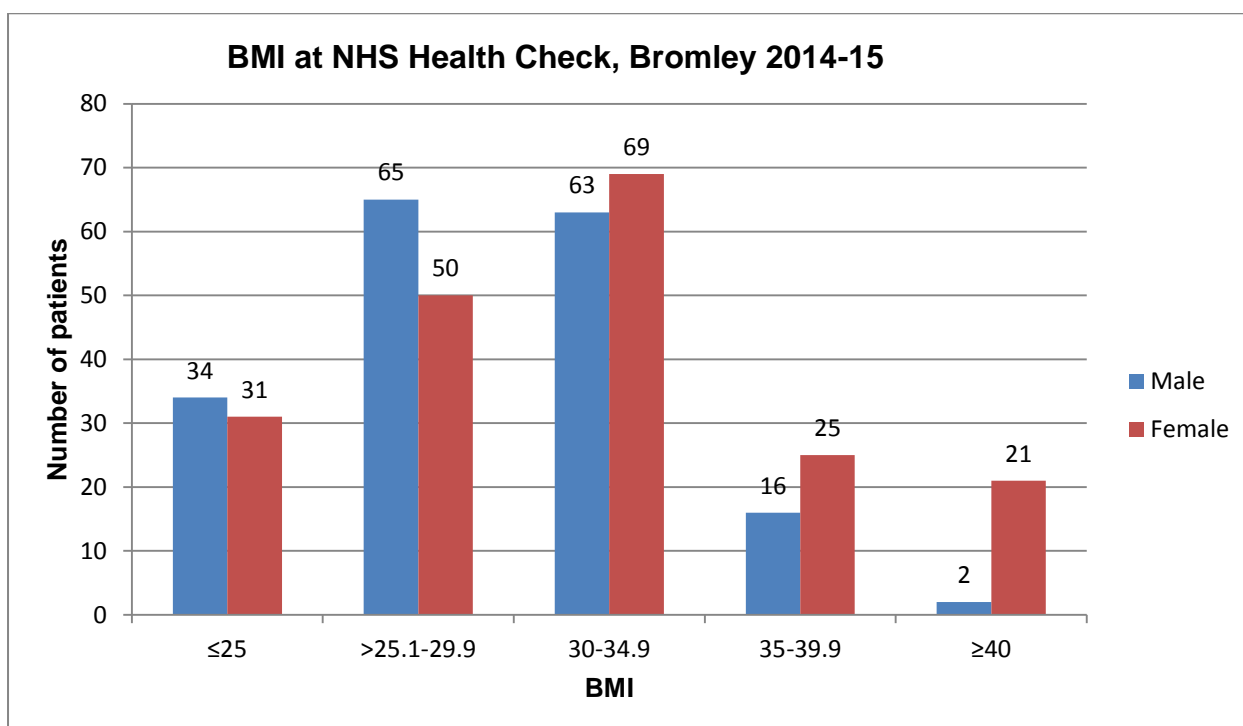
Body Mass Index (BMI)

Recording of body mass index is a mandatory component of the NHS Health Check.

394 (99%) of the 399 patients had their BMI calculated and recorded at the time of their NHS Health Check. This compares well with the 2011-2013 audit results where 98% of the patients had their BMI recorded.

311 (78%) of these patients had a BMI > 25 , a lower figure than the 2011-2013 audit (92%) (see **Figure 2**). Raised body mass index is a key risk factor for increased risk of diabetes. A 1kg/m^2 increase in BMI increases the risk of developing Type 2 Diabetes by 8.4%.¹ A greater number of women have a BMI of over 30 recorded at the NHS Health Check. However, the overall take up of NHS Health checks is higher for women. For example, out of the 8426 baseline number of NHS Health checks across 2014-2015, 60% were female (5065) compared to 40% male (3364).

Figure 2



Weight management – lifestyle interventions and change in risk factor profiles

Documentation that weight management was discussed was seen in 277 out of 394 records (70%). This is higher than the proportion in the 2011-13 audit (56%).

Following on from this, 28% (77 patients) were recorded to have been referred to a recognised weight management programme (an increase from 14% from the previous audit). Weight changes were recorded in 18 out of these 77 patients, with the following changes:

- 13 patients BMI went down at their next weight recording
- 5 patients BMI went up at their next weight recording.

The complexity of the data set meant there was not the time to further analyse the data in terms of quantifying the reduction in BMI (for example, the number of patients that moved down an interval). However this could be a useful area of further investigation. In addition it would be useful to understand how many people lose weight following an NHS health check regardless of whether they are referred to a weight management intervention.

Physical activity assessment

The NHS Health Check programme recommends the General Practice Physical Activity Questionnaire (GPPAQ) as the physical activity assessment tool. This is a mandatory element of the NHS Health Check.

353 (87%) patients had their GPPAQ completed at the time of their Health Check (**Figure 3**) with 196 (56%) who scored 'Inactive' or 'Moderately Inactive'. This is a similar profile to the 2011-2013 audit.

Exercise advice is documented as given to 244 patients, with 2 patients given advice but no GPPAQ score. **Figure 4** compares patient GPPAQ scores with the frequency of exercise advice given. Sixty-one per cent of the 'active' patients are given advice compared to seventy-one per cent of the 'inactive'. This is interesting in terms of thinking about targeted interventions, for example prioritising advice to the inactive over the active.

Figure 3

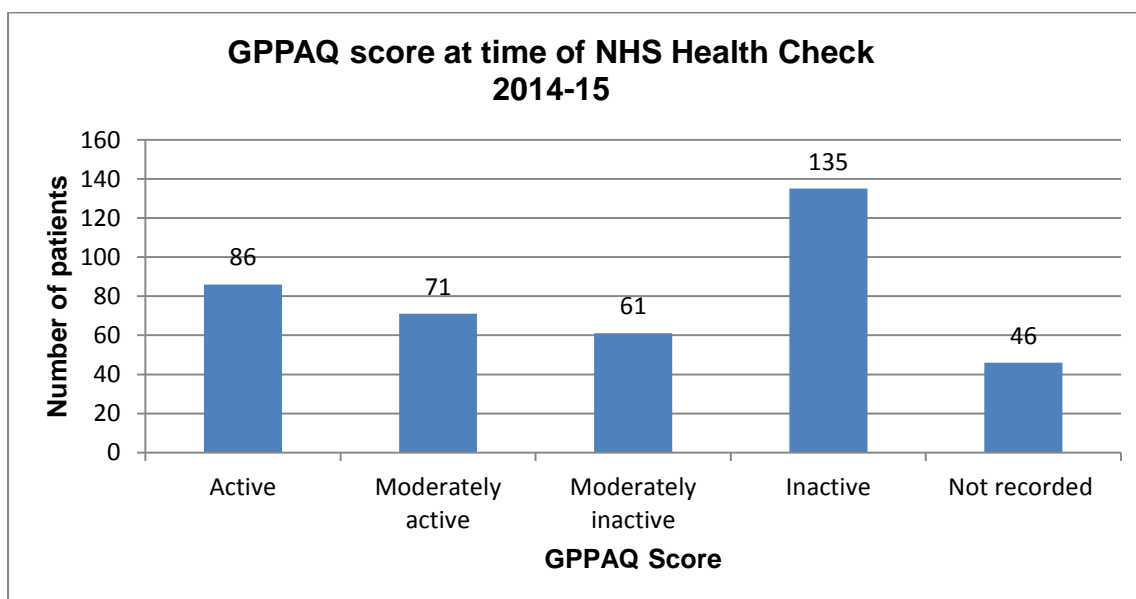
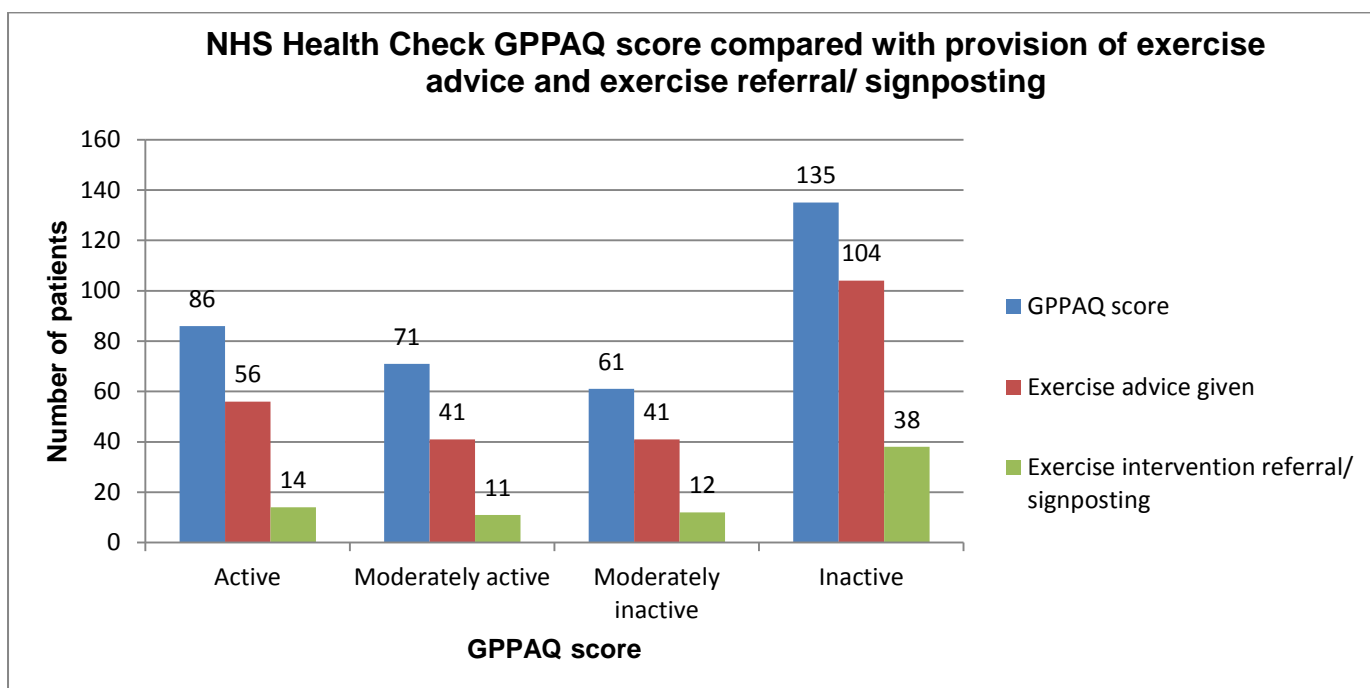


Figure 4

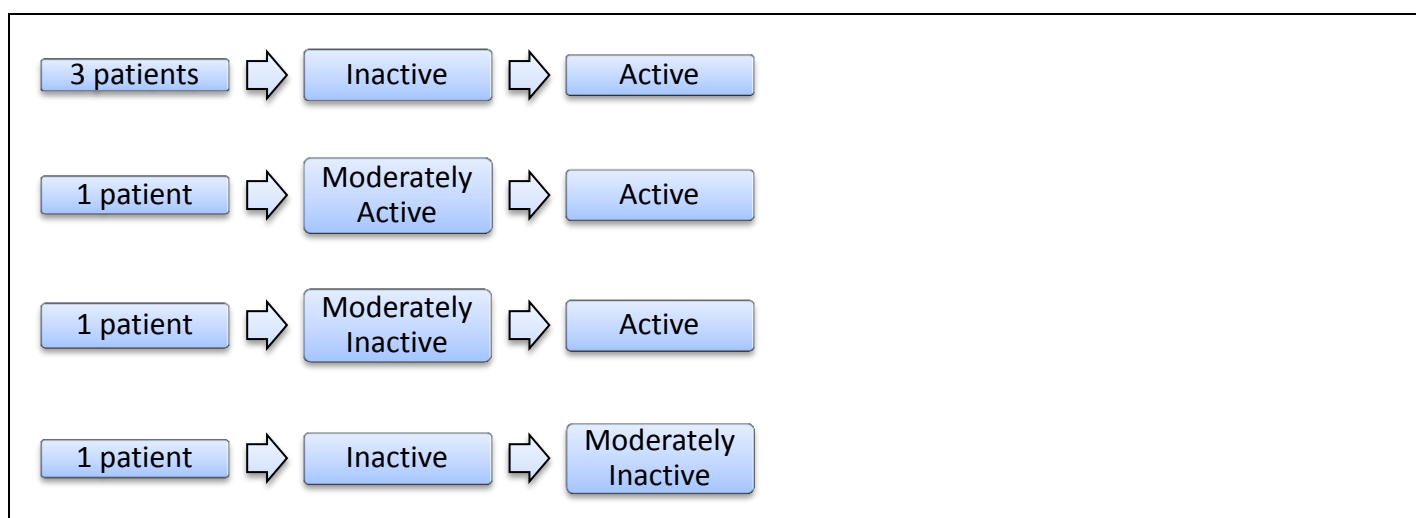


75 patients had the 'Exercise intervention term' completed, which varied from a date to text stating that a physical activity opportunity was signposted or that one was declined. 27% (38) of patients with an inactive GPPAQ were signposted/ offered an exercise referral compared to 15% of the patients with an active GPPAQ score.

10 patients (3%) had their GPPAQ recorded again within 1-2 years following their Health Check, with 6 patients showing an improvement in their GPPAQ score (**Figure 5**). This is lower than the number of patients with GPPAQ status re-recorded in 2011-13 (16%). The 2011-13 audit also recorded a small number of patients improving their overall score (5 in total).

3 patients had no change to their GPPAQ score and 1 patient became less active.

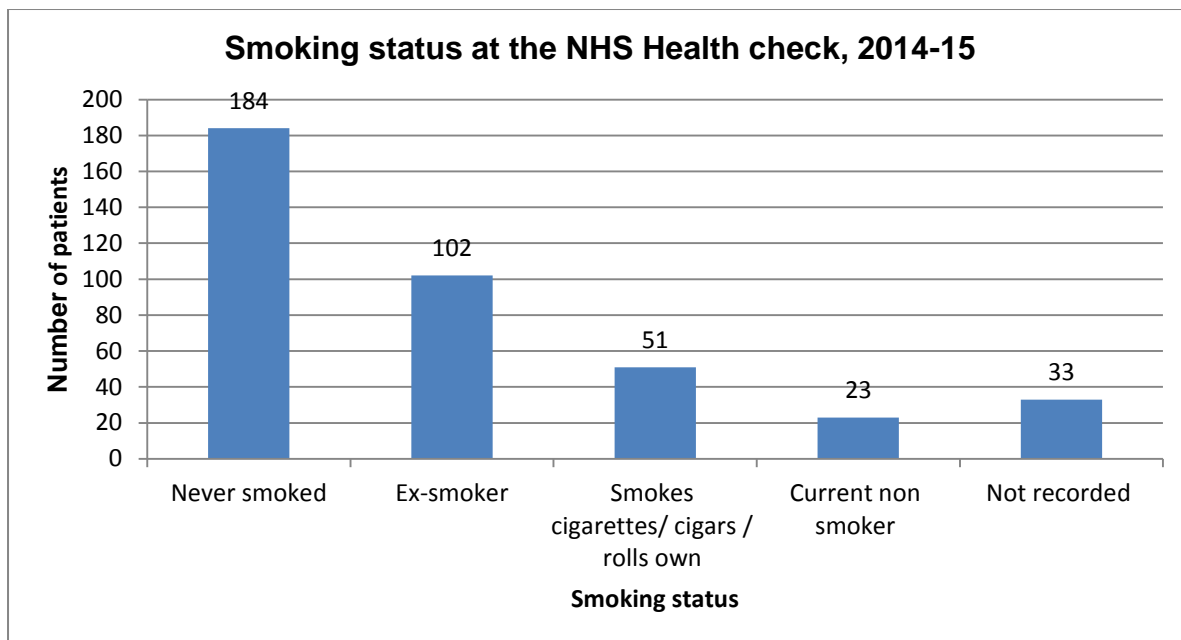
Figure 5: Patients with a positive change in GPPAQ score.



Smoking

393 (98%) of patients had their smoking status recorded at the time of the Health Check (**Figure 6**) of which 309 patients (79%) were current non-smokers.

Figure 6



A total of 51 patients (13%) were current smokers at the time of the NHS Health Check, which is slightly less than recorded in 2011-13 and lower than the Bromley average at 14%^{vi}. Of these, 22 (43%) had their smoking status recorded in the 1-2 years following the Health Check. This is less than shown in the 2011-13 audit (50%), though it might be that better documentation could be ascertained through a high notes review.

Nearly all current smokers (48 out of 51, 94%) were recorded as being offered smoking cessation advice, which is the same proportion as recorded in 2011-13. Of these, recorded data shows:

- 9 stated that they were not interested in smoking cessation advice
- 12 received a referral to a smoking cessation advisor or clinic
- 11 were signposted to a stop smoking service

Recorded evidence shows two people changing status from smokers to ex-smoker following a smoking cessation advice referral. An additional patient changed status from smoker to ex-smoker then smoker again. They had also received a smoking cessation advice referral.

Discussion

When comparing this re-audit with the original audit in 2011-13 there have been demonstrable improvements in the identification process and outcomes of people at high risk of diabetes. The recommendations made in the previous audit have undoubtedly contributed to this, from the increased support and education, the improvement of the template and identification of blood test

requesting and the commissioning strategies of non-payment for people who are not documented to have been offered a blood test.

However further improvements are still required for the recommended one year follow up reassessment of risk factors. Significant gaps exist in this area. Following discussion with colleagues it was felt the best way to make improvements in the follow up, is for it to be incorporated in the service specification GP Practice have with the diabetes service. It is proposed we introduce Key performance indicators into the GP contract to ensure patients with NDH are correctly coded and reassessed annually. It is possible there is some reluctance to 'label' people with a READ code on their medical records, with consideration to health insurance. However although there have been some improvements in percentage coded it is still low at 17%. Improved levels of READ coding is likely to improve the numbers of patients who are appropriately followed up. Other tools to facilitate the comprehensiveness of the follow up, ie the introduction of an NDH template for annual review.

The re-audit flags up the need for further investigation into patients that are at high risk of diabetes but are not responding to health advice of lifestyle interventions. For example, are the patients with improvements in blood results also the patients who are recording weight loss or other lifestyle improvement markers? If the patients who are showing a worse blood level at the repeat test, what sort of lifestyle interventions were they offered and are they receiving the appropriate level of support. This group might require a higher level of support, for example a more intensive intervention programme or a greater level of motivational support.

Questions around use of resource and targeting patients in most need of intervention advice. For example, the reaudit showed that 56 patients with an good physical activity score were given exercise advice (65% of the total patients for this category) compared to 77% in the inactive range. It might be a worthwhile trade off to aim for 100% activity advice in the inactive range at the expense of less advice to the already active.

Appendix 1: Recommendations for service improvement following the 2011-13 audit of the Prevention of Diabetes through NHS Health Checks

1.	Education to providers re:
	<ul style="list-style-type: none"> • Importance of identification and managing patients at high risk of diabetes • Understanding of recommendations of the South London NHS Health Checks Diabetes Filter Pathway and London Consensus Guidelines on the diagnosis of diabetes in the identification and management of people at high risk of diabetes. • Use of READ coding to identify those at high risk of diabetes enable follow up • Promoting behaviour change through the use of motivational interviewing techniques • Importance of making referrals and documenting lifestyle intervention referrals
2.	Improvements to coding, templates and searches in the GP Practice computer system to facilitate easier high quality documentation:
a.	<p>Template:</p> <ul style="list-style-type: none"> • Prompt reminder on NHS Health Check computer template to send patient for a blood test • Inclusion of a field to enable coding that blood test has been requested or declined
b.	<p>Coding of patients found to be at high risk of diabetes:</p> <ul style="list-style-type: none"> • Use of standardised READ codes for recording people to be 'At high risk of type 2 diabetes'. Current recommendation for London is Read code: 14O80
c.	<p>Develop computer searches to:</p> <ul style="list-style-type: none"> • Improve monitoring of the use of the diabetes filter pathway through the NHS Health Checks programme. • Enable identification of people at high risk of diabetes requiring annual follow up. • To facilitate re-audit
3.	Using commissioning to improve performance
	<ul style="list-style-type: none"> • Key performance indicators in NHS Health Check service specification with providers. • Withhold NHS Health Check payment if no documentation of blood test requested, declined or completed.
4.	Joint working to promote and facilitate best practice
	<ul style="list-style-type: none"> • Joint working with CCG and BHC to link with and develop diabetes prevention element of the Primary Care Diabetes Service • Discuss with Bromley, London and National stakeholders regarding the pros and cons of developing a specific template for managing those with high risk of diabetes. • If agreed then, work together with CCG, primary care and Bromley Healthcare and South London neighbours to ensure consensus agreement of template inclusions.
5.	Re-audit
	Reaudit to identify improvements in management of patients at high risk of diabetes is planned for December 2015.

ⁱ PHE, Diabetes Prevalence Model 2016

ⁱⁱ Bromley JSNA, 2016 <https://bromley.mylifeportal.co.uk/media/20397/final-report-jsna-2016.pdf>

ⁱⁱⁱ Bromley JSNA, 2016, <https://bromley.mylifeportal.co.uk/media/20397/final-report-jsna-2016.pdf>

^{iv} Bromley JSNA, 2016, <https://bromley.mylifeportal.co.uk/media/20397/final-report-jsna-2016.pdf>

^v NICE (2012) Preventing type 2 diabetes: risk identification and interventions for individuals at high risk PH38 www.nice.org.uk

^{vi} Bromley Joint Strategic Needs Assessment 2016

<https://bromley.mylifeportal.co.uk/media/20397/final-report-jsna-2016.pdf>