

NHS Health Checks in County Durham: coverage and findings from the first 5 years of the programme, 2009 to 2013

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Introduction

The NHS Health Check programme aims to prevent heart disease, stroke, diabetes and kidney disease, and raise awareness of dementia both across the population and within high risk and vulnerable groups. The programme was introduced by the Department of Health in April 2009. In County Durham a pilot programme was started in October 2008 and was fully implemented in all GP practices in the following year.

The NHS Health Check programme invites eligible individuals aged 40-74 years once every five year cycle. Those who are excluded from having a Health Check are those with cardiovascular disease, diabetes, high blood pressure, chronic kidney disease and those already identified as having a 20% or higher risk of developing CVD over the next 10 years.

The aim of this study was a retrospective review of data recorded on GP practice systems to determine the coverage of the NHS Health Check programme in County Durham over the first 5 years. The specific objectives were:

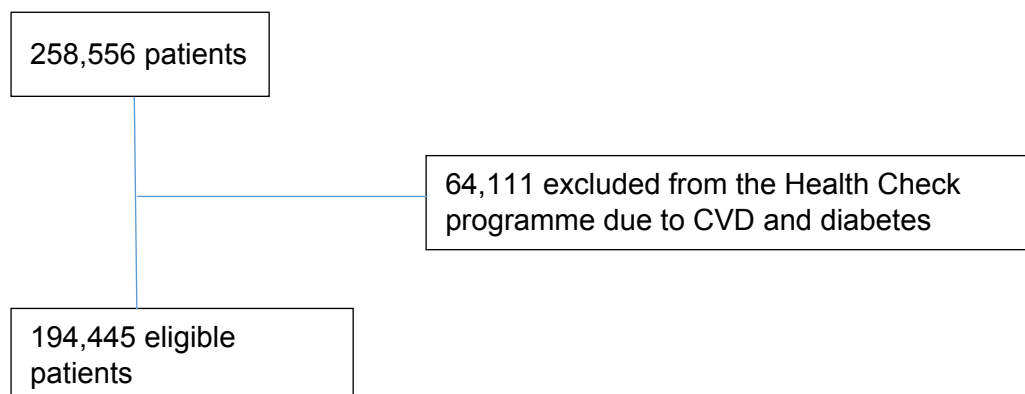
- To evaluate the coverage of the Health Check programme in County Durham for the first five year cycle following its implementation
- To determine the prevalence of cardiovascular risk factors among those who received a Health Check.

Methods

Data was extracted from the information systems of 71 practices in County Durham. The data included a specified data set on everyone registered with these practices, between the ages of 40 and 74 years old at any time in the first 5 completed years of the programme. This was from January 2009 to December 2013 therefore included patients with a date of birth between January 1st 1933 and March 31st 1974 when the data was extracted on December 31st 2013. The data set included demographic information on each patient with clinical information recorded on the practice system using Read codes¹.

The data set included records for 258,556 patients in the eligible age group. Of these, 64,111 were excluded from the Health Check programme because of a diagnosis of cardiovascular disease, hypertension, diabetes and kidney disease (CKD) as defined by the NHS Health Check Exclusion Read Codes. This left 194,445 patients eligible for a Health Check (Figure 1).

Figure 1 Number of patients included in the study



To assess the primary objective of Health Check coverage, the definition used in this study is the proportion of the total population who received a Health Check and recorded on the practice

system. The definition of a Health Check was based on the Read Codes set out in the Best Practice Guidance for the programme¹.

The measures for the secondary objective of assessing the prevalence of risk factors included blood pressure, body mass index, cholesterol, and smoking status. The risk factor levels were for systolic blood pressure ≥ 140 mm Hg, a body mass index of ≥ 30 kg/m² for obesity, and ≥ 5 mmol/l for raised total cholesterol. High CVD risk was defined as having a calculated CVD risk score of 20% or higher probability of developing CVD in the next ten years.

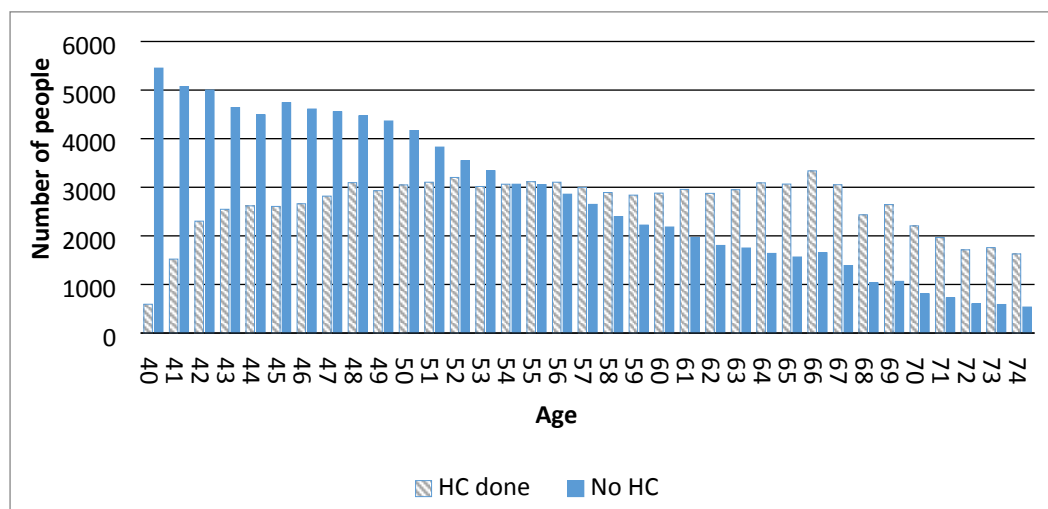
The data set for each patient included age, gender, ethnicity, the lower layer super output area code and name, ward name and the Index of Multiple Deprivation score for the Lower Super Output Area in which they live, GP practice code, practice locality and CCG. The data set also included a diagnosis of CVD or diabetes at any point during the study period. Patients were excluded from the study if the diagnosis was recorded before a Health Check had been carried out.

Results

Objective 1: Health Check coverage

Of the 194,444 patients who were eligible for a Health Check during this period, 95,179 received a Health Check. This gives an overall coverage of 49%. At the end of the 5 years period, 99,265 patients remained eligible for a Health Check. The coverage of the Health Check programme by patient subgroups is set out in Table 1. There is a small but significantly higher coverage for women. The coverage of the programme increases significantly with age increasing steadily by 5-10% for every 5 years age gained, starting at 35% at 40-44 years old and reaching 82% at 70-74 years old (Figure 2).

Figure 2 Health Check coverage by age



The coverage of the programme was higher among White British patients compared with any other ethnic group. The number of patients in the other ethnic groups was relatively small and in 23% of records the ethnicity was not reported making interpretation difficult. There was no discernible trend in coverage by the Index of Multiple Deprivation of the area where patients lived.

Table 1 Health Check coverage by population subgroup

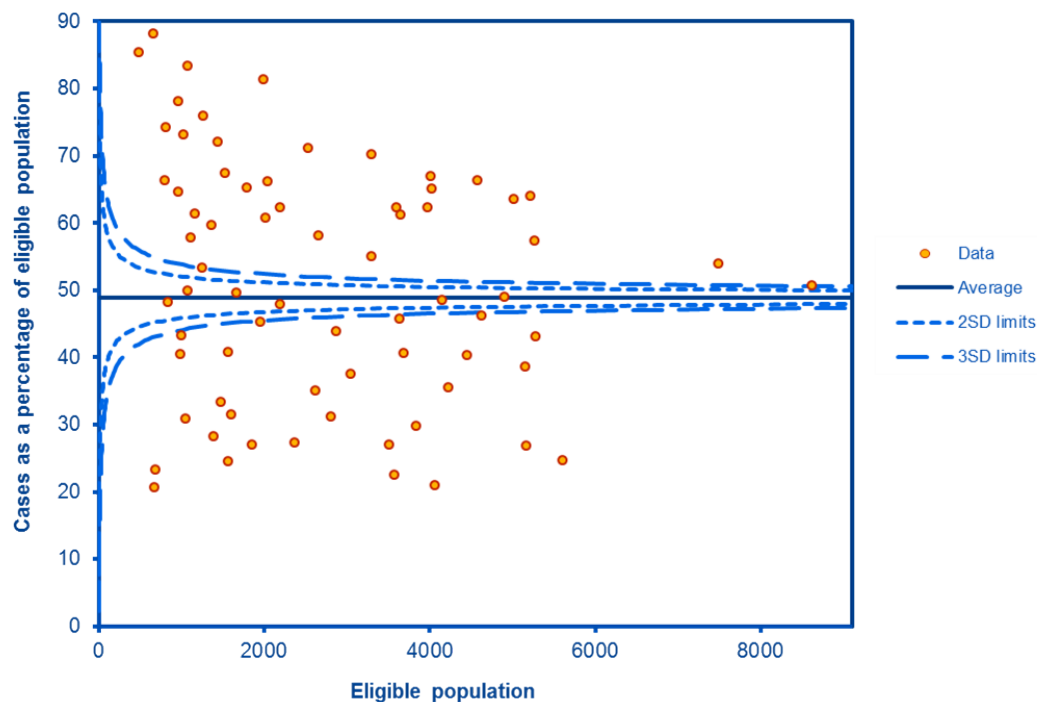
	HC done	No HC	Total	Coverage
	95,179	99,265	194,444	49%
<i>Gender</i>				
M	45,165	48,596	93,760	48%
F	50,014	50,670	100,684	50%
<i>Age group</i>				
40-44 years	12,837	23,379	36,216	35%
45-49 years	15,054	21,204	36,258	42%
50-54 years	15,482	15,633	31,115	50%
55-59 years	14,518	11,228	25,746	56%
60-64 years	15,453	8,382	23,835	65%
65-69 years	11,942	4,774	16,716	71%
70-74 years	7,259	1,615	8,874	82%
<i>Ethnicity</i>				
White British	81,892	64,735	146,627	56%
South Asian	211	270	481	44%
Black	296	566	862	34%
Other	875	1,495	2,370	37%
Not Stated	11,905	32,200	44,105	27%
<i>Index of Multiple Deprivation</i>				
1	16,170	16,648	32,818	49%
2	17,666	18,554	36,220	49%
3	19,748	18,190	37,938	52%
4	21,120	22,187	43,307	49%
5	20,363	23,368	43,731	47%
<i>Body Mass Index</i>				
Normal weight	25,966	30,845	56,811	46%
Overweight	37,705	30,300	68,005	55%
Obese	30,476	20,388	50,864	60%
<i>Smoking status</i>				
Smoker	16,906	23,417	40,323	42%
Non-smoker	50,434	52,975	103,409	49%
Ex-smoker	27,563	19,493	47,056	59%
<i>Locality</i>				
Derwentside	22,749	12,970	35,719	64%
Durham & CLS	23,536	30,546	54,082	44%
Durham Dales	17,743	17,541	35,284	50%
Easington	17,563	17,000	34,563	51%
Sedgefield	13,588	21,209	34,797	39%
<i>CCG</i>				
DDES	48,894	55,750	104,644	47%
North Durham	46,285	43,516	89,801	52%

There was a significant difference in coverage by the smoking status of the patient at the time of the Health Check. The coverage for non-smokers were 49%, and for smokers 42%. The group most likely to have a health check were ex-smokers at 59%. There was no difference in coverage according to smoking status by age or gender. Patients who were overweight were more likely to have a health check than those who were a normal weight. The highest coverage was among people who were obese. There was no significant difference by age or gender.

There was a marked difference in coverage by GP practice locality. Derwentside achieved the highest coverage (64%) and Sedgfield the lowest (39%). NHS North Durham CCG had a higher coverage for Health Checks (52%) compared with NHS Durham Dales, Easington and Sedgfield CCG (47%).

There was considerable variation in the coverage of Health Checks by GP practice ranging from 88% to 21%. Figure 3 is a funnel plot showing the distribution of Health Check coverage by the size of the eligible population in each practice. There is no discernible trend to explain the wide variation by practice size.

Figure 3 Health check coverage by size of the practice eligible population



The aim of the programme is to carry out a Health Check on those who are eligible every 5 years. The planning assumptions are that approximately 20% of the eligible population will be given a Health Check each year and 5% each quarter. At the start of the programme there were approximately 120,000 people eligible for a Health Check, giving a target of 24,000 Health Checks a year or 6,000 per quarter. The target figures fell over the 5 years of the programme as people were checked and others were excluded either by age or by developing long term conditions.

Figure 4 shows the number of Health Checks carried out by quarter compared to the quarterly target figure. It shows that the coverage of the programme varied over time. The quarterly target was achieved at the beginning and toward the end of the 5 year period.

Figure 4 Number of Health Checks carried out by quarter compared to the target figure

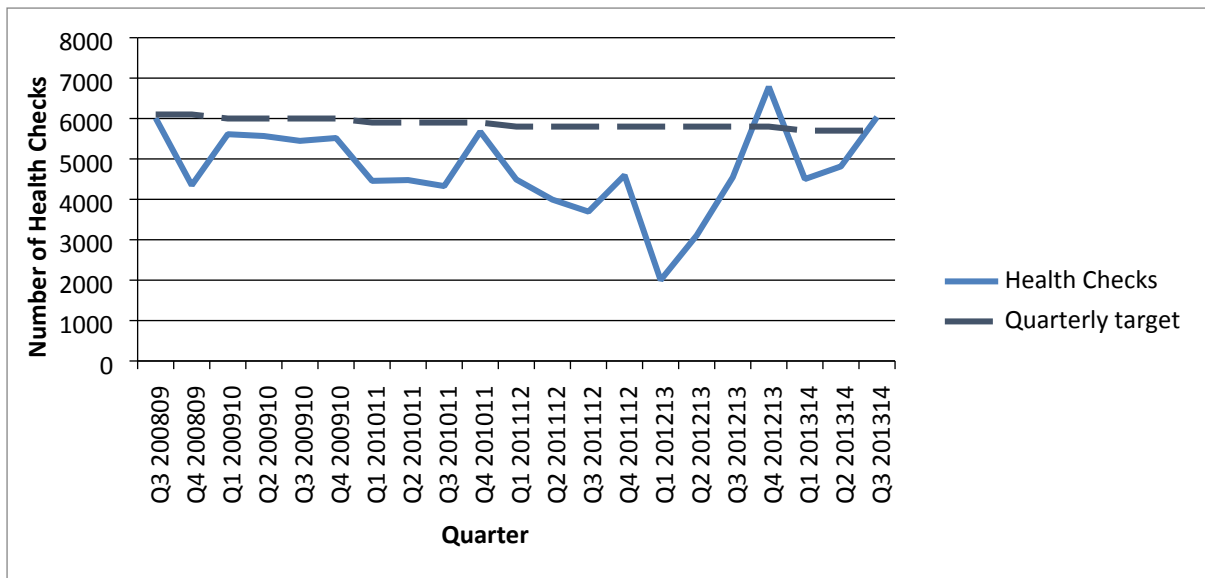
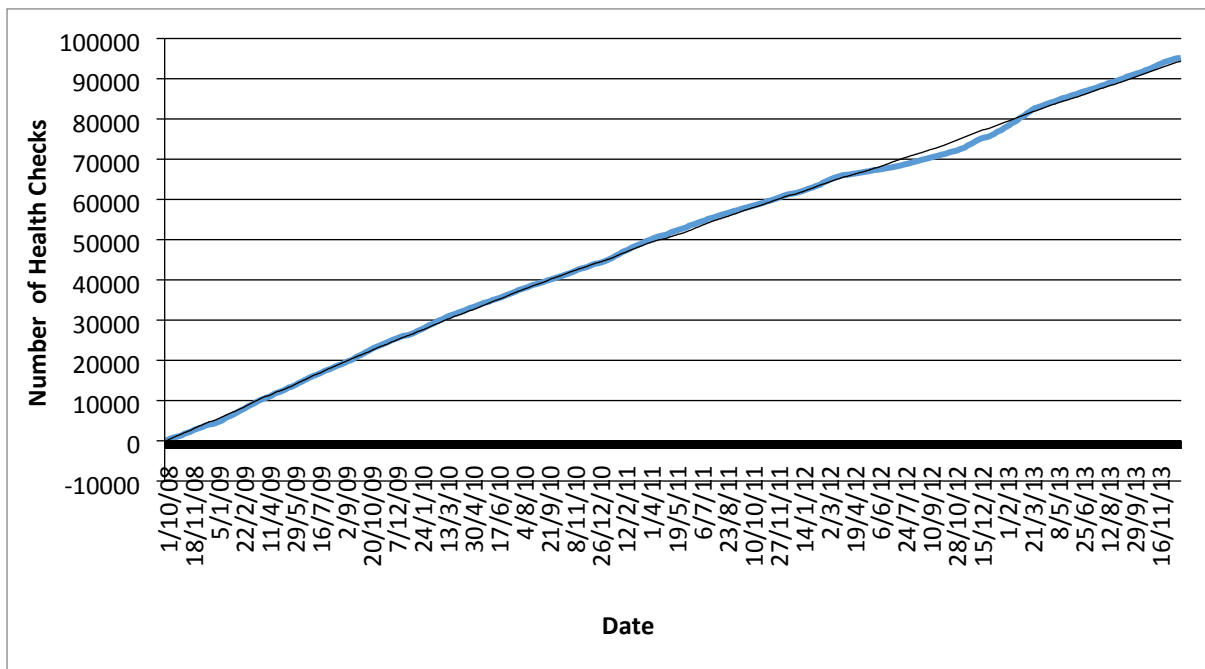


Figure 5 plots the cumulative number of Health Checks carried out by working day from the start of the programme. It shows that despite the variation in quarterly coverage figures, the number of Health Checks being conducted was constant over time.

Figure 5 Cumulative number of Health Checks by date



Objective 2 Prevalence of CVD risk factors found by Health Checks

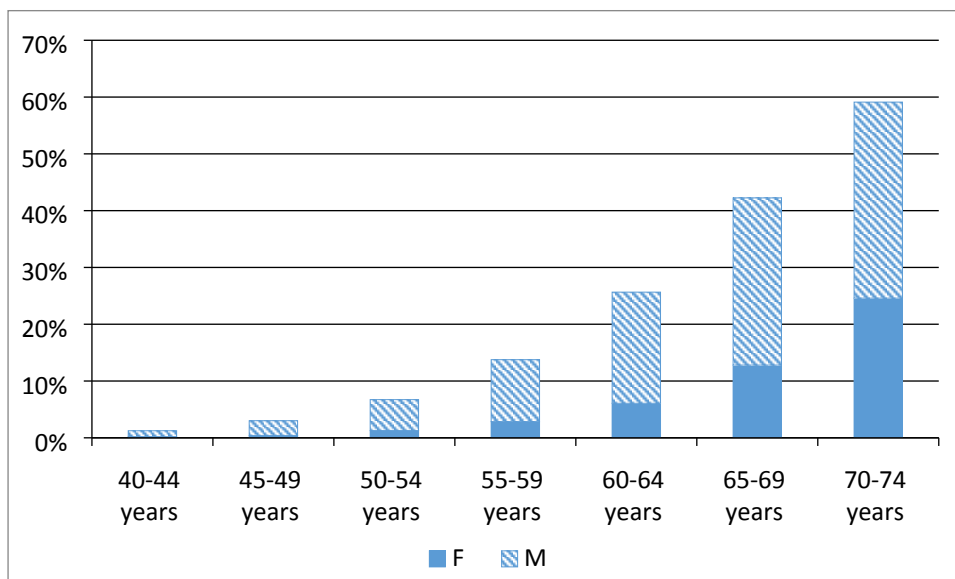
Of the 95,179 patients whose clinical records indicated that they had received a Health Check, 18,939 (20%) had missing data necessary for calculating a CVD Risk Score. Table 2 summarises the risk factor levels and CVD Risk Scores for the 76,240 patients with complete records. Nearly one third of patients (28%) had a systolic blood pressure ≥ 140 mmHg, 32% were obese (BMI ≥ 30 kg/m²) 64% had total cholesterol ≥ 5 mmol/l and 18% were current smokers. The Health Checks identified 21% of people at a high risk of CVD (20% or greater risk of CVD over 10 years).

Table 2 Risk factor level summary of those

Systolic blood pressure	
Mean	130.8
>=140 mmHg	28%
BMI	
Mean	28.4
>= 30 kg/m ²	32%
Total Cholesterol	
Mean	5.3
>=5 mmol/l	64%
Smoking status	
Current smoker	18%
CVD Risk Score	
Mean	13
<10%	48%
10-19%	31%
20% or more	21%

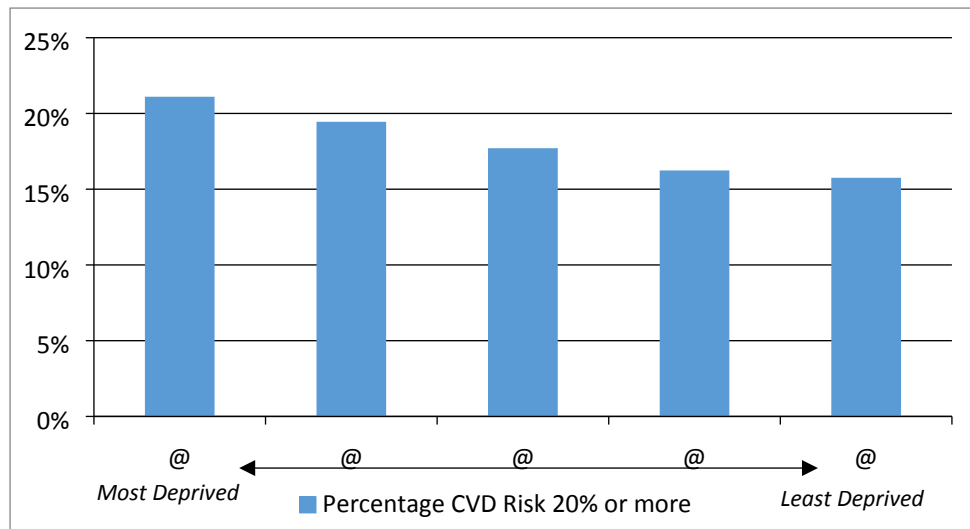
Figure 6 shows the proportion of those with a high risk of CVD ($\geq 20\%$) by age and gender. A lower proportion of woman have a high risk of CVD in every age group. Out of the 27,891 Health Checks carried out in people aged less than 50, only 612 (2%) were found to be at a high risk of CVD (Figure 18).

Figure 6 Percentage of Health Checks with Risk Score $\geq 20\%$ by age and gender



The association between the risk of cardiovascular disease and deprivation is well recognised. In addition to higher prevalence of risk factors in more deprived areas, deprivation has an independent influence on the risk of developing CVD. Figure 7 shows that there was a greater proportion of Health Checks with a high risk of CVD in more deprived areas.

Figure 7 Percentage of Health Checks with a CVD Risk Score $\geq 20\%$ by deprivation



Discussion

This study is a retrospective review of the implementation of the NHS Health Check programme in County Durham. It is the only study so far that provides data over the first 5 years of its implementation. It is also the only study looking at the implementation of the programme in all GP practices across a single administrative area. The only comparable studies are the national evaluation that looked at the implementation of the NHS Health Check programme over the first four years based on a random sample of GP records across England², and a review of the programme across three Primary Care Trusts in East London over a three year period³.

The overall coverage of the programme in County Durham was 49% in the first 5 year cycle. This compares with 21% during the first four years reported in the national evaluation. In the national study there was a marked regional variation with the North East achieving the highest coverage at 31% and Yorkshire and Humber the lowest at 9%. The East London study reported coverage of 33% over three years. This suggests that the coverage in County Durham is higher than expected when compared to the results of similar studies. However, this figure is based on data recorded in GP systems that a Health Check had been carried out. As 20% of these records had data missing or invalid for calculating a CVD risk score, if these records were excluded from the analysis then the coverage figure was reduced to 39%.

There was a small but significantly higher coverage among females. Age has a much greater impact on the uptake of Health Checks with coverage of 82% among those aged 70 to 74 compared to 35% among those aged 40 to 44. This age difference is much higher than reported in the national evaluation. The possible explanation for this difference is that the programme in County Durham gave a greater emphasis to inviting people with an estimated high risk of CVD. This means that older people were more likely to be invited for a Health Check.

There is a marked difference in coverage by ethnicity but no conclusions can be drawn from this due to the number of records with ethnicity not recorded.

There is no difference in the coverage of the programme across areas of deprivation. The same result was found in the national evaluation.

The number of Health Checks carried out over this time has varied to some extent when monitored by quarter but the number of Health Checks carried out each day has remained fairly constant over the five year period.

The modifiable risk factors for CVD that individuals will be aware of influenced the uptake of health checks. Those who were overweight or obese were more likely to attend for a health check than those with a normal BMI. In contrast current smokers were less likely to have a Health Check compared to non-smokers and ex-smokers.

There were marked differences in the coverage of Health Checks by CCG and by GP locality. The difference in coverage by practice ranged from 20% to over 80%. None of these differences can be explained by clinical factors and can only be accounted for by operational factors at a practice level. This is similar to the findings in the national evaluation in which they observed a strong 'practice effect' in coverage figures.

Comparing the clinical records of those who have and have not had a Health Check suggests that there is no difference in the recording of blood pressure, BMI or smoking status. The biggest difference is in the recording of a cholesterol test and a CVD Risk Score. Despite these being essential components of an NHS Health Check, a significant proportion of GP records did not record these details.

The identification of the main modifiable risk factors for CVD among those who have had a Health Check demonstrates the potential impact of the programme. The mean systolic blood pressure, BMI, total cholesterol levels and smoking status in this study is the same as that reported in the national evaluation. The mean CVD Risk Score of 13 is higher than reported in the national evaluation (7.6). The proportion identified with a CVD risk of $\geq 20\%$ in this study (21%) is higher than reported in the national evaluation (4.6%) and the East London study (10.5%). This could be explained by the emphasis given to inviting those with a higher estimated CVD risk in the County Durham programme. Another possible explanation is a systematic bias in the way CVD risk scores are recorded. Of those who had a Health Check, 13% had no recorded CVD risk score. The possible explanation for this is the two stage Health Check adopted by most practices. All of the data for the Health Check was collected and recorded at one appointment apart from the cholesterol results. When the cholesterol results were available, the risk score could be calculated. It is possible that the risk score is more likely to be recorded if it showed that the patient was at a high risk of CVD and needed to see the GP for a clinical assessment and possible prescription of statins. It is possible that the missing values are more likely to be for risk scores less than 20%.

This study shows that carrying out Health Checks among people aged less than 50 years of age will only detect those at a high risk of CVD in 2% of cases. If the sole purpose of the programme was limited to identifying those with a high risk of CVD then its effectiveness and cost-effectiveness is difficult to justify. To have a greater impact on reducing cardiovascular risk at a population level, different ways communicating risk to those with a risk score below 20% are needed. This study does show that the Health Check programme is more likely to detect people at a high risk of CVD among those living in more deprived communities.

The main strength of this study is that it is based on a complete data set of records from everyone registered with every practice in County Durham over its first 5 year cycle. The study reviewed data on everyone in the target age group allowing for a comparison between those who have or have not received a check. The weakness of the study is the high number of incomplete or invalid records on the GP clinical systems. This included a lack of consistency in the way CVD risk was calculated and

recorded. Another weakness of this study is the lack of data on the outcomes following a Health Check. Data on referrals to lifestyle programmes following a Health Check was incomplete and it was not possible to link data on Health Checks with statin prescribing for those identified at a high risk of CVD.

Conclusion

This study has highlighted the potential benefits and the weaknesses of the Health Check programme in County Durham. Health Checks are carried out in every practice but the coverage rate varies widely between practices, practice groups and CCGs. This review has highlighted the inconsistency in data recording in GP records. The overall coverage is similar to the national figures with a greater emphasis on Health Checks among people most likely to have a high risk of CVD, namely those in older age groups and living in more deprived communities. If the Health Check programme is to have a measurable impact on reducing the morbidity and mortality from CVD then more attention is needed on risk reduction interventions in those identified with low and medium levels of CVD risk. In addition, subsequent studies will need to analyse data on statin prescribing for those identified as having a high risk of CVD.

References

¹ NHS Information Centre for Health and Social Care, 2011b. NHS Health Check Data Set Read Code Mapping Guidance, Leeds.

² K.C.-M. Chang et al. Coverage of the national cardiovascular risk assessment and management programme (NHS Health Check): Retrospective database study. *Preventative Medicine*. 78 (2015) 1-8.

³ J. Robson et al. The NHS Health Check programme: implementation in East London 2009-2011. *BMJ Open*. 2015-007578