Department of Health

Putting prevention first
Vascular Checks: risk assessment and management

Impact Assessment

NHS

Putting prevention first

Vascular Checks: risk assessment and management

Impact Assessment

Summary: Intervention & Options

Department /Agency:	Title:	
Department of Health	Impact Assessment of Vascular Checks Programme	
Stage: Final	**Version:** 1	**Date:** 5 November 2008

Related Publications: Putting prevention first – vascular checks: risk assessment and management http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndG

Available to view or download at:

http://www.dh.gov.uk/vascularchecks

Contact for enquiries: vascular.checks@dh.gsi.gov.uk **Telephone:**

What is the problem under consideration? Why is government intervention necessary?

Vascular diseases include heart disease, stroke, diabetes and kidney disease. A significant amount of vascular morbidity and mortality could be prevented through primary prevention and early detection of these diseases. Some vascular checks and disease testing are already done in primary care; but it is patchy and biased to the more affluent areas despite there being a higher need in the less affluent ones. A universal risk assessment and management programme could significantly increase uptake of the preventative interventions, and offers a real opportunity to reduce health inequalities.

What are the policy objectives and the intended effects?

To promote the prevention or early identification of vascular disease by introducing a universal risk assessment and management programme. Vascular checks would lead to a higher uptake of primary prevention interventions (including statins, anti-hypertensives, brief exercise interventions, weight management, intensive lifestyle management for impaired glucose tolerance, and smoking cessation), reduce risk of vascular disease and earlier detection and treatment of kidney disease and diabetes. The intended effect would be a reduction in vascular disease morbidity and mortality.

What policy options have been considered? Please justify any preferred option.

The eight options considered are i) status quo – do nothing; ii) checks for 40 – 74 year olds every five years; iii) checks for 40 – 74 year olds every ten years; iv) checks for 45 – 74 year olds every five years; v) checks for 45 – 74 year olds every 10 years; vi) checks for 50 – 74 year olds every five years; vii) checks for 50 – 74 year olds every ten years; and viii) checks for 40 – 74 year olds high risk only.

Option ii) is the preferred option as it has the highest net present value

When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects? The vascular checks programme will be subject to subervision by the vascular programme board who will implement a review following full roll out of the programme.

Ministerial Sign-off For Impact Assessments:

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister:

Date: 13-11-08

Summary: Analysis & Evidence

Policy Option: ii	Description: Vascular Checks for 40–74 year olds every 5 years

COSTS

ANNUAL COSTS

One-off (Transition)	Yrs
£ 9 m	3

Average Annual Cost (excluding one-off)

£ 332 m

Description and scale of **key monetised costs** by 'main affected groups' Average annual costs are costs incurred each year by the NHS to deliver additional checks and interventions arising from programme. Total costs (PV) are the costs of the checks and net lifetime costs of interventions given to the cohort of individuals checked in the first 20 years

Total Cost (PV) **£ 4506 m**

Other **key non-monetised costs** by 'main affected groups'

BENEFITS

ANNUAL BENEFITS

One-off	Yrs
£	

Average Annual Benefit (excluding one-off)

£ 3678 m

Description and scale of **key monetised benefits** by 'main affected groups' Benefits measured as quality adjusted life years to patients and monetised on the basis of an estimate of social value of a QALY of £50,000.

Total Benefit (PV) **£ 64315 m**

Other **key non-monetised benefits** by 'main affected groups'

Key Assumptions/Sensitivities/Risks Analysis is rooted in research findings on the cost-effectiveness of the interventions; Proportion of individuals who accept an invitation for an appointment; Level of activity and resource currently directed to vascular checks and intervention

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) **£ 49853 m – £60881 m**	**NET BENEFIT** (NPV Best estimate) **£ 55304 m**

What is the geographic coverage of the policy/option?			England	
On what date will the policy be implemented?			Commence April 2009	
Which organisation(s) will enforce the policy?			PCT	
What is the total annual cost of enforcement for these organisations?			£ N/A	
Does enforcement comply with Hampton principles?			Yes	
Will implementation go beyond minimum EU requirements?			N/A	
What is the value of the proposed offsetting measure per year?			£ N/A	
What is the value of changes in greenhouse gas emissions?			£ N/A	
Will the proposal have a significant impact on competition?			No	
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	No	No	N/A	N/A

Impact on Admin Burdens Baseline (2005 Prices) (Increase – Decrease)

Increase of £ Decrease of £ **Net Impact** **£** N/A

Key: **Annual costs and benefits: Constant Prices** **(Net) Present Value**

Summary: Analysis & Evidence

Policy Option: iii	Description: Vascular Checks for 40–74 year olds every 10 years

COSTS

ANNUAL COSTS

One-off (Transition)	Yrs
£ 9 m	3

Average Annual Cost (excluding one-off)

£ 229 m

Description and scale of **key monetised costs** by 'main affected groups' Average annual costs are costs incurred each year by the NHS to deliver additional checks and interventions arising from programme. Total costs (PV) are the costs of the checks and net lifetime costs of interventions given to the cohort of individuals checked in the first 20 years

Total Cost (PV) **£ 3211 m**

Other **key non-monetised costs** by 'main affected groups'

BENEFITS

ANNUAL BENEFITS

One-off	Yrs
£	

Average Annual Benefit (excluding one-off)

£ 2580 m

Description and scale of **key monetised benefits** by 'main affected groups' Benefits measured as quality adjusted life years to patients and monetised on the basis of an estimate of social value of a QALY of £50,000.

Total Benefit (PV) **£ 44810 m**

Other **key non-monetised benefits** by 'main affected groups'

Key Assumptions/Sensitivities/Risks Analysis is rooted in research findings on the cost-effectiveness of the interventions; Proportion of individuals who accept an invitation for an appointment; Level of activity and resource currently directed to vascular checks and intervention

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) £	**NET BENEFIT** (NPV Best estimate) £ 38388 m

What is the geographic coverage of the policy/option?			England	
On what date will the policy be implemented?			Commence April 2009	
Which organisation(s) will enforce the policy?			PCT	
What is the total annual cost of enforcement for these organisations?			£ N/A	
Does enforcement comply with Hampton principles?			Yes	
Will implementation go beyond minimum EU requirements?			No	
What is the value of the proposed offsetting measure per year?			£ N/A	
What is the value of changes in greenhouse gas emissions?			£ N/A	
Will the proposal have a significant impact on competition?			No	
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	No	No	N/A	N/A

Impact on Admin Burdens Baseline (2005 Prices) (Increase – Decrease)

Increase of £ Decrease of £ **Net Impact** £ N/A

Key:	Annual costs and benefits: Constant Prices	(Net) Present Value	

Summary: Analysis & Evidence

Policy Option: iv	Description: Vascular Checks for 45–74 year olds every 5 years

COSTS

ANNUAL COSTS

One-off (Transition)	Yrs
£ 9 m	3

Average Annual Cost (excluding one-off)

£ 291 m

Description and scale of **key monetised costs** by 'main affected groups' Average annual costs are costs incurred each year by the NHS to deliver additional checks and interventions arising from programme. Total costs (PV) are the costs of the checks and net lifetime costs of interventions given to the cohort of individuals checked in the first 20 years

Total Cost (PV) **£ 4015 m**

Other **key non-monetised costs** by 'main affected groups'

BENEFITS

ANNUAL BENEFITS

One-off	Yrs
£	

Average Annual Benefit (excluding one-off)

£ 3203 m

Description and scale of **key monetised benefits** by 'main affected groups' Benefits measured as quality adjusted life years to patients and monetised on the basis of an estimate of social value of a QALY of £50,000.

Total Benefit (PV) **£ 56075 m**

Other **key non-monetised benefits** by 'main affected groups'

Key Assumptions/Sensitivities/Risks Analysis is rooted in research findings on the cost-effectiveness of the interventions; Proportion of individuals who accept an invitation for an appointment; Level of activity and resource currently directed to vascular checks and intervention

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) £	**NET BENEFIT** (NPV Best estimate) **£ 48044 m**

What is the geographic coverage of the policy/option?			England	
On what date will the policy be implemented?			Commence April 2009	
Which organisation(s) will enforce the policy?			PCT	
What is the total annual cost of enforcement for these organisations?			£ N/A	
Does enforcement comply with Hampton principles?			Yes	
Will implementation go beyond minimum EU requirements?			No	
What is the value of the proposed offsetting measure per year?			£ N/A	
What is the value of changes in greenhouse gas emissions?			£ N/A	
Will the proposal have a significant impact on competition?				
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	No	No	N/A	N/A

Impact on Admin Burdens Baseline (2005 Prices) (Increase – Decrease)

Increase of £ Decrease of £ **Net Impact** **£** N/A

Key:	**Annual costs and benefits: Constant Prices**	**(Net) Present Value**	

Summary: Analysis & Evidence

Policy Option: v	Description: Vascular Checks for 45–74 year olds every 10 years

COSTS

ANNUAL COSTS

One-off (Transition)	Yrs
£ 9 m	3

Average Annual Cost (excluding one-off)

£ 203 m

Description and scale of **key monetised costs** by 'main affected groups' Average annual costs are costs incurred each year by the NHS to deliver additional checks and interventions arising from programme. Total costs (PV) are the costs of the checks and net lifetime costs of interventions given to the cohort of individuals checked in the first 20 years

Total Cost (PV) **£ 2867 m**

Other **key non-monetised costs** by 'main affected groups'

BENEFITS

ANNUAL BENEFITS

One-off	Yrs
£	

Average Annual Benefit (excluding one-off)

£ 2446 m

Description and scale of **key monetised benefits** by 'main affected groups' Benefits measured as quality adjusted life years to patients and monetised on the basis of an estimate of social value of a QALY of £50,000.

Total Benefit (PV) **£ 42278 m**

Other **key non-monetised benefits** by 'main affected groups'

Key Assumptions/Sensitivities/Risks Analysis is rooted in research findings on the cost-effectiveness of the interventions; Proportion of individuals who accept an invitation for an appointment; Level of activity and resource currently directed to vascular checks and intervention

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) £	**NET BENEFIT** (NPV Best estimate) £ 36544 m

What is the geographic coverage of the policy/option?			England	
On what date will the policy be implemented?			Commence April 2009	
Which organisation(s) will enforce the policy?			PCT	
What is the total annual cost of enforcement for these organisations?			£ N/A	
Does enforcement comply with Hampton principles?			Yes	
Will implementation go beyond minimum EU requirements?			No	
What is the value of the proposed offsetting measure per year?			£ N/A	
What is the value of changes in greenhouse gas emissions?			£ N/A	
Will the proposal have a significant impact on competition?				
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	No	No	N/A	N/A

Impact on Admin Burdens Baseline (2005 Prices) (Increase – Decrease)

Increase of £ Decrease of £ **Net Impact** **£** N/A

Key:	**Annual costs and benefits: Constant Prices**	**(Net) Present Value**	

Summary: Analysis & Evidence

Policy Option: vi	Description: Vascular Checks for 50–74 years olds every 5 years

COSTS

ANNUAL COSTS

One-off (Transition)	Yrs
£ 8.75m	3

Average Annual Cost (excluding one-off)

£ 245 m

Description and scale of **key monetised costs** by 'main affected groups' Average annual costs are costs incurred each year by the NHS to deliver additional checks and interventions arising from programme. Total costs (PV) are the costs of the checks and net lifetime costs of interventions given to the cohort of individuals checked in the first 20 years

Total Cost (PV) **£ 3312 m**

Other **key non-monetised costs** by 'main affected groups'

BENEFITS

ANNUAL BENEFITS

One-off	Yrs
£	

Average Annual Benefit (excluding one-off)

£ 2524 m

Description and scale of **key monetised benefits** by 'main affected groups' Benefits measured as quality adjusted life years to patients and monetised on the basis of an estimate of social value of a QALY of £50,000.

Total Benefit (PV) **£ 44204 m**

Other **key non-monetised benefits** by 'main affected groups'

Key Assumptions/Sensitivities/Risks Analysis is rooted in research findings on the cost-effectiveness of the interventions; Proportion of individuals who accept an invitation for an appointment; Level of activity and resource currently directed to vascular checks and intervention

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) £	**NET BENEFIT** (NPV Best estimate) £ 37580 m

What is the geographic coverage of the policy/option?			England	
On what date will the policy be implemented?			Commence April 2009	
Which organisation(s) will enforce the policy?			PCT	
What is the total annual cost of enforcement for these organisations?			£ N/A	
Does enforcement comply with Hampton principles?			Yes	
Will implementation go beyond minimum EU requirements?			No	
What is the value of the proposed offsetting measure per year?			£ N/A	
What is the value of changes in greenhouse gas emissions?			£ N/A	
Will the proposal have a significant impact on competition?				
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	No	No	N/A	N/A

Impact on Admin Burdens Baseline (2005 Prices) (Increase – Decrease)

Increase of £ Decrease of £ **Net Impact** **£** N/A

Key:	**Annual costs and benefits: Constant Prices**	**(Net) Present Value**	

Summary: Analysis & Evidence

Policy Option: vii	Description: Vascular Checks for 50–74 year olds every 10 years

COSTS

ANNUAL COSTS

One-off (Transition)	Yrs
£ 9 m	3

Average Annual Cost (excluding one-off)

£ 170 m

Description and scale of **key monetised costs** by 'main affected groups' Average annual costs are costs incurred each year by the NHS to deliver additional checks and interventions arising from programme. Total costs (PV) are the costs of the checks and net lifetime costs of interventions given to the cohort of individuals checked in the first 20 years

Total Cost (PV) **£ 2371 m**

Other **key non-monetised costs** by 'main affected groups'

BENEFITS

ANNUAL BENEFITS

One-off	Yrs
£	

Average Annual Benefit (excluding one-off)

£ 1847 m

Description and scale of **key monetised benefits** by 'main affected groups' Benefits measured as quality adjusted life years to patients and monetised on the basis of an estimate of social value of a QALY of £50,000.

Total Benefit (PV) **£ 32028 m**

Other **key non-monetised benefits** by 'main affected groups'

Key Assumptions/Sensitivities/Risks Analysis is rooted in research findings on the cost-effectiveness of the interventions; Proportion of individuals who accept an invitation for an appointment; Level of activity and resource currently directed to vascular checks and intervention

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) £	**NET BENEFIT** (NPV Best estimate) **£ 27287 m**

What is the geographic coverage of the policy/option?			England	
On what date will the policy be implemented?			Commence April 2009	
Which organisation(s) will enforce the policy?			PCT	
What is the total annual cost of enforcement for these organisations?			£ N/A	
Does enforcement comply with Hampton principles?			Yes	
Will implementation go beyond minimum EU requirements?			No	
What is the value of the proposed offsetting measure per year?			£ N/A	
What is the value of changes in greenhouse gas emissions?			£ N/A	
Will the proposal have a significant impact on competition?				
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	No	No	N/A	N/A

Impact on Admin Burdens Baseline (2005 Prices) (Increase – Decrease)

Increase of £ Decrease of £ **Net Impact** **£** N/A

Key:	**Annual costs and benefits: Constant Prices**	**(Net) Present Value**	

EVIDENCE BASE: VASCULAR RISK ASSESSMENT PROGRAMME

Introduction

1. This document sets out the evidence base in support of implementing a national vascular risk assessment programme, including reasons for policy intervention, the options considered and details of a cost–benefit analysis. Having outlined the possibilities, the document makes a recommendation for a preferred option: **the phased implementation of a risk assessment programme for people aged 40–74**.

What is the problem under consideration?

2. Vascular diseases include heart disease, stroke, diabetes and kidney disease. There is a significant amount of vascular morbidity and mortality that could be prevented through primary prevention and early detection of these diseases. Some vascular checks and disease testing are already done in primary care, but it is patchy and biased to the more affluent areas despite there being a higher need in the less affluent ones. A universal risk assessment and management programme could significantly increase uptake of the preventative interventions, and offers a real opportunity to reduce health inequalities.

Policy objectives and intended effects

3. The objective is to promote the prevention or early identification of vascular disease by introducing a universal risk assessment and management programme. Vascular checks would lead to a higher uptake of primary prevention interventions (including statins, antihypertensives, brief exercise interventions, weight management, intensive lifestyle management for impaired glucose tolerance, and smoking cessation), would reduce the risk of vascular disease and allow earlier detection and treatment of kidney disease and diabetes. The intended effect would be a reduction in vascular disease morbidity and mortality.

Policy options

4. The eight options considered are:

   i) the status quo – do nothing;

   ii) checks for 40–74-year-olds every 5 years;

   iii) checks for 40–74-year-olds every 10 years;

   iv) checks for 45–74-year-olds every 5 years;

   v) checks for 45–74-year-olds every 10 years;

   vi) checks for 50–74-year-olds every 5 years;

   vii) checks for 50–74-year-olds every 10 years; and

   viii) checks for 40–74-year-olds (high risk only).

5. In option viii), the people invited for a check each year would only be those aged 40–74 who have a cardiovascular disease (CVD) risk of greater than 20% in the next 10 years.

Status quo – do nothing

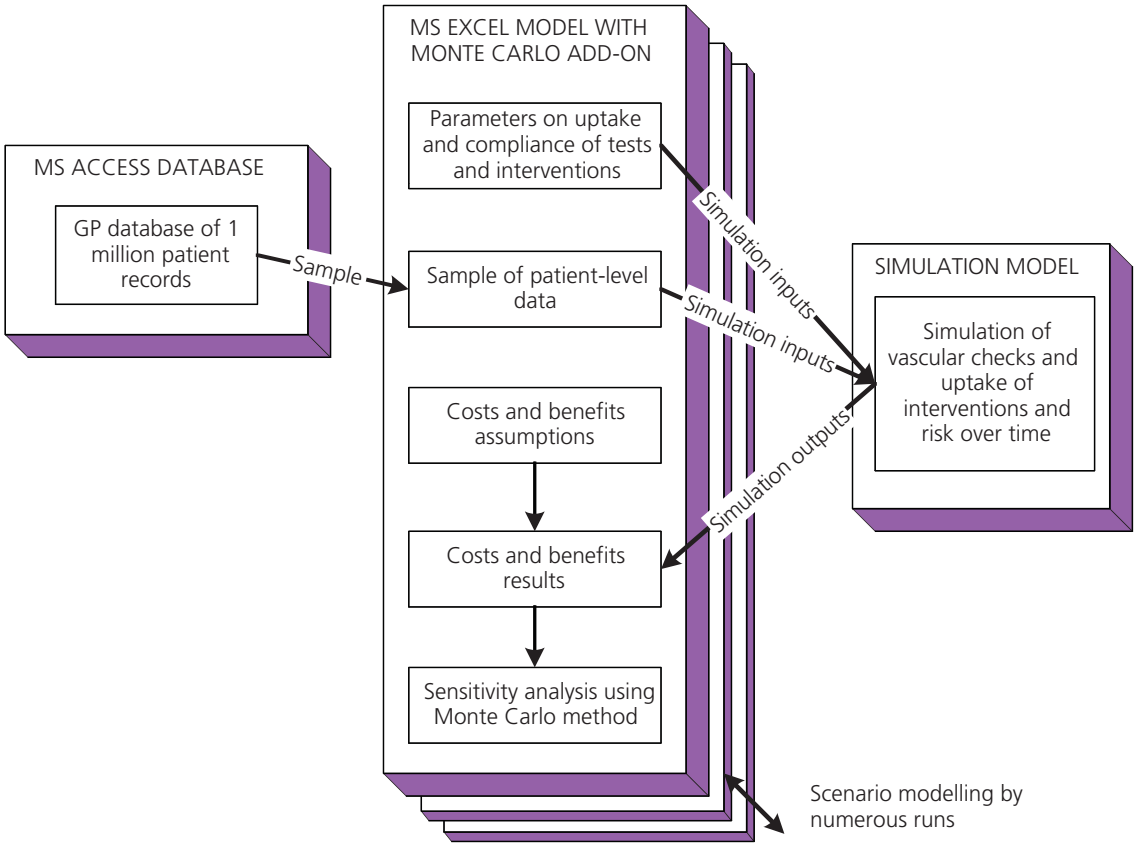
6. At present, some vascular disease is detected in primary care, and primary interventions are taken up to reduce risk factors of those in danger. However, a considerable amount of vascular disease goes undetected and those at risk are not identified. If the status quo is maintained then the rates of non-detection and unassessed risk factors will continue, leading to high levels of disease as the age groups get older.

Vascular checks programme

7. The aims of the vascular checks programme are to reduce the risk factors of those vulnerable to developing vascular disease, and to detect those already suffering in order to reduce the mortality and morbidity of the disease.

8. A model has been developed to determine the cost-effectiveness of a risk assessment programme. The model's architecture is represented in Figure 1, below.

Figure 1: Vascular risk assessment model architecture



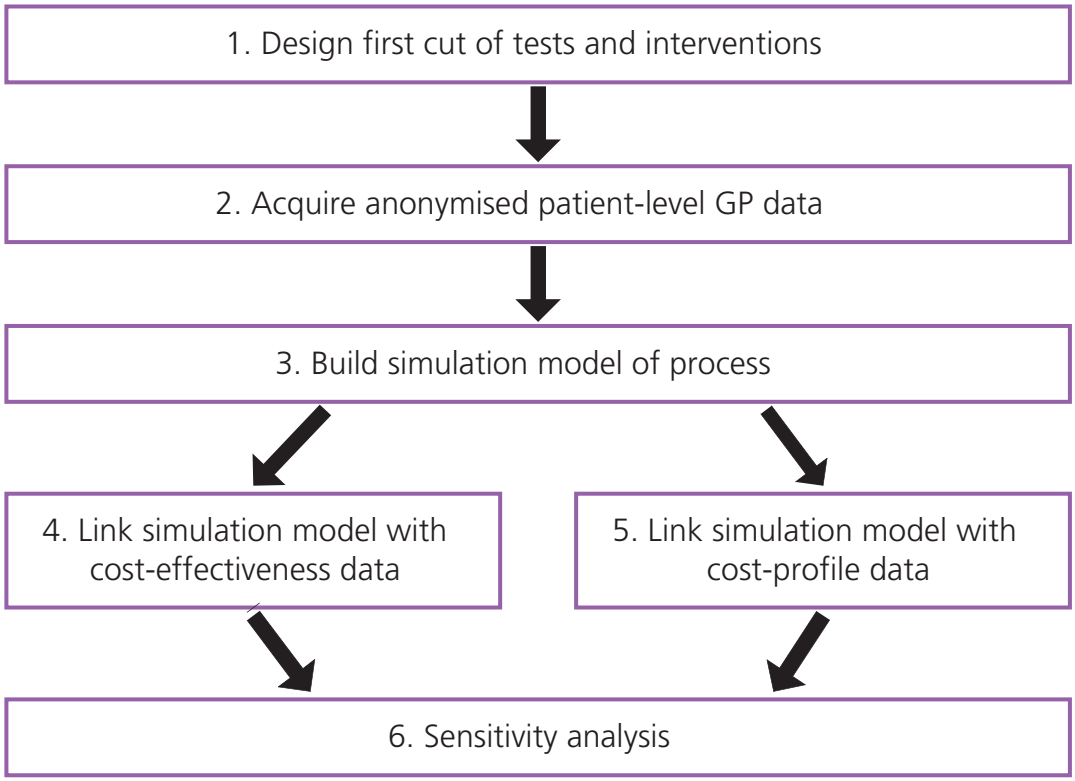
9. There are three sections to the model:

   - A Microsoft Access database of GP data – this holds patient-level (anonymised) data that is sampled for each run of the model to give the characteristics of individuals receiving vascular checks.
   - A Microsoft Excel model of assumptions, calculations and a Monte Carlo simulation – a set of Excel files contains a number of key elements:
     - Parameters used by the simulation model
     - Samples of patient-level data used by the simulation model
     - Costs and benefits assumptions
     - Calculation of overall costs and benefits, using outputs from the simulation model.
   - Simulation model – this simulates individual patients being invited for vascular checks and their outcomes over time, including take-up of the interventions available and incidence of vascular disease.

10. Scenario modelling is done by carrying out multiple runs of the model and comparing the results. Sensitivity analysis is then undertaken on the Excel results using Monte Carlo simulation techniques.

11. The figure below shows the steps undertaken to build the model.

Figure 2: Steps in model build



12. A diagram giving details about the modelling of the tests and interventions in step 1 can be found in Annex 5. In step 2, a dataset from QRESEARCH is used to sample the risk factors of patients. Where the dataset had missing data, we filled the gaps using random sampling from the age/gender distributions of the recordings of risk factors consistent with *Health Survey for England* data. Other datasets were considered, e.g. THIN data, and were used as part of the sensitivity analysis. Step 3 of the process was run using a SIMUL8® software package, parameters for which can be found in Table A2.1 of Annex 2. Steps 4 and 5 were built from National Institute for Health and Clinical Excellence (NICE) guidance and academic literature. The model and the parameters were subject to a technical consultation, which led to amendments of the values where appropriate. In step 6 we undertook some sensitivity analysis to understand which parameters and assumptions were the drivers of the model. More information about the modelling process can be found in the technical consultation. Further details about steps 4, 5 and 6 can be found in other sections of this document.

Cost–benefit analysis

13. This section describes the analysis undertaken to understand the costs and benefits likely to emerge from the policy options. Key assumptions, risks and consequential uncertainties are discussed. Table 5 shows the cost-effectiveness of the options in terms of cost per quality-adjusted life year (QALY) and total net benefit. Annex 3 details the in year costs to the NHS.

Status quo – do nothing

Costs

14. The costs of doing nothing (i.e. continuing with the current ad hoc opportunistic approach to vascular risk assessment) are assumed to have a zero baseline. The costs of primary interventions and treatments may increase over time as the population, in general, ages. However, in line with impact assessment guidance on best practice, costs not directly attributable to the policy options under consideration are not incorporated in this analysis, as they would apply to all options.

Benefits

15. The benefits of the status quo are also assumed to have a zero baseline. As with costs, benefits not directly attributable to the policy option under consideration are not incorporated in this analysis, as they would apply to all options.

Vascular checks programme

16. The different policy options under the vascular checks programme offer identical checks and interventions. The differences between the policies come from the age group on which the programme is concentrated and the frequency with which the checks are repeated. The basis of the modelling for all of the options is the same. The model assumes a phased introduction of the programme, as shown in the table below. This is only an assumption, and precise phasing may differ.

Table 1: Implementation profile

Implementation profile				
Year	1	2	3	4 onwards
%	55	80	90	100

17. There are approximately 15 million people in the 40–74 age group. As the programme operates on a rolling five-year cycle, in any one year up to 20% of the population could be invited for an appointment, i.e. up to 3 million people. Those who are already receiving statins or antihypertensives or who have already been diagnosed with CVD, chronic kidney disease (CKD) or diabetes are assumed to be receiving ongoing monitoring of their vascular risk and will not be invited for an appointment. In the model we assume that 75% of those offered an appointment will take up the offer. This equates to 2.2 million appointments. The model further assumes that resources are in place to undertake 48% of the total number of checks (based on the number of people who currently are diagnosed with the diseases and receive statins and antihypertensives).

18. Therefore in addition to current activity, the model predicts that an additional 150,000 checks are required to meet the 55% phased implementation scenario. The cost of these extra checks covers resources to provide the additional checks themselves, and the resulting additional interventions. In the second year, if 80% implementation is achieved, then 710,000 additional checks are required, followed by 930,000 (90%) in the third year and 1.15 million in the fourth year (full implementation).

19. The model of the costs and benefits arising from the vascular checks programme is run for a 20-year period. The costs and benefits accrue to the cohort of people who receive a vascular check and intervention during that period. The costs and benefits within the model refer to the lifetime costs and benefits relating to that cohort, even though for some the costs and benefits will occur after the 20-year time horizon.

Costs

20. The costs of the vascular checks programme fall into three areas: the cost of providing the risk assessment checks; the cost of providing the resultant interventions; and the cost of providing the supporting IT system. Discussions with NHS Connecting for Health relating to the IT system are ongoing at the time of this impact assessment and costs are unknown. The potential cost of the IT system falls outside the scope of this impact assessment.

Cost of risk assessment checks

21. The diagram in Annex 5 depicts the risk assessment process and the resulting interventions. The risk assessment process may be split into two 15-minute appointments or performed in a single appointment. The model allows for 20 minutes to perform the first appointment, so as to allow for up to one in three individuals not attending, or for some appointments to overrun.

22. A number of delivery paths for the vascular checks are envisaged. They could be carried out by a healthcare assistant (HCA) or practice nurse at a GP surgery, or by GPs themselves. In addition, HCAs and nurses could provide checks in community settings. Alternatively, the checks could be provided through pharmacies by pharmacists and other qualified staff members. Where further investigation is needed to assess impaired glucose tolerance, diabetes or kidney disease, the patient may be invited back for an additional appointment for relevant tests or may be referred to their GP, as appropriate. Primary care trusts (PCTs) will be encouraged to commission checks from the providers that best meet the needs of their population.

23. Costs of the checks break down into two main areas: costs of the personnel who perform the assessments and costs of various testing procedures. Effective unit costs have been taken from *Unit Costs of Health and Social Care 2007* (published by the Personal Social Services Research Unit (PSSRU)) and rebased to 2008 prices. The costs of the tests themselves were also modelled: unit costs of lab tests were provided by the Salford Royal NHS Foundation Trust (SRNFT), and costs for point-of-contact testing (POCT) were derived following discussion with the Pharmacy Service Negotiating Committee (PSNC) to give an indicative cost that includes the cost of equipment.

Table 2: Unit cost estimates

Cost element	Effective cost (£)	Source
Admin time: cost per hour	£15	Estimate
HCA: cost per hour of patient contact	£22	PSSRU
Practice nurse: cost per hour of patient contact	£28	PSSRU
General practitioner: cost per hour of patient contact	£138	PSSRU
Pharmacist: cost per hour	£95	PSSRU
Cholesterol test: lab costs per test	£4.20	SRNFT
Cholesterol test: POCT costs per test	£8	PSNC
Fasting blood glucose test: lab costs per test	£6.20	SRNFT
Fasting blood glucose test: POCT costs per test	£8	PSNC
Serum creatinine test: lab costs per test	£0.70	SRNFT
Oral glucose tolerance test: lab costs per test	£12.30	SRNFT

24. The resource implications of performing the checks can be calculated as follows:

    Total cost = (number of appointments x time allocated for appointment x unit cost of staff time) + (number of tests x unit cost of test)

25. However, many individuals currently receive risk assessments including checks on blood pressure and cholesterol levels, glucose tests etc. This activity must be taken into account and netted of the cost of providing the checks, so that the net cost represents the cost of providing additional activity within the NHS.

Cost of providing interventions

26. We only included interventions for which there is good evidence of their cost-effectiveness. The lifetime costs (and QALY gains) are derived from a variety of sources and evidence, and are used in the cost–benefit analysis process. The table below gives the values for each intervention that was used in the model. The reference number against each intervention relates to the data sources as they appear in Annex 1. These figures were used to calculate the cost–benefit analysis and derive the net benefit of the programme.

Table 3: Lifetime costs and QALYs for each intervention

Intervention	Age	Gender	Lifetime cost (£)	Lifetime QALYs
IGR lifestyle intervention[8]	25–44	All	-398	0.63
	45–54	All	493	0.63
	55–64	All	1,821	0.53
	65–74	All	2,637	0.39
Statins[9]	40–49	Male	2,374	0.47
	50–59	Male	2,241	0.30
	60–69	Male	2,092	0.18
	70–79	Male	1,695	0.08
	40–49	Female	2,658	0.35
	50–59	Female	2,633	0.27
	60–69	Female	2,517	0.17
	70–79	Female	2,113	0.08

Intervention	Age	Gender	Lifetime cost (£)	Lifetime QALYs
Antihypertensives[10]	40–49	Male	1,020	0.79
	50–59	Male	894	0.71
	60–69	Male	815	0.60
	70–79	Male	641	0.57
	40–49	Female	1,047	0.88
	50–59	Female	899	0.74
	60–69	Female	826	0.60
	70–79	Female	605	0.45
Smoking cessation[11, 12, 13]	All	All	177	0.39
Exercise intervention[14, 15]	All	All	33	0.17
Weight management[16]	All	All	51	0.01
Earlier detection of diabetes[2]	40–49	All	452	0.12
	50–59	All	-296	0.17
	60–69	All	-111	0.18
	70–75	All	-111	0.18

27. The table above outlines the lifetime costs of the programme used for the cost–benefit analysis. These are the net costs of the checks and net lifetime costs of the interventions given to the cohort of individuals over the 20 years of the programme. In addition, a year-by-year profile of costs to primary care was estimated to show the resource implication to the NHS. In order to estimate the annual profile of costs, it was necessary to estimate the profile of costs over time for each intervention. The methodologies and sources used are provided in Table 4, below.

Table 4: Cost profile of interventions

Intervention	Sources and methodology of cost estimates
IGR lifestyle intervention	These figures are taken from a health technology assessment on obesity interventions[18] and modified to 2008 prices (see Table A2.14, Annex 2)
Statins	We costed the following components: Average annual drugs cost at £60.52 (assuming that 80% of new statin prescriptions are for simvastatin) based on the NHS Drugs Tariff[19] Liver function tests at baseline, 3, 6, 12 months, annual Cholesterol tests at baseline, 6, 12 months, annual Serum creatinine test at baseline and annual if required (10%) Practice nurse time for monitoring (4 visits in the first year plus 1 visit a year in subsequent years, at 15 minutes each) GP time for monitoring (one appointment per year) HCA time of 10 minutes per year We also factored in the average mortality rates by age to get expected cost profiles for 20 years from initiation of treatment
Antihypertensives	We assumed that individuals receive appropriate ACE inhibitors and/or calcium-channel blockers at a combined annual cost of £99.64 For diagnosis of hypertension, and for subsequent annual monitoring of hypertension, we assumed the following tests were required: blood glucose, TC:HDL, liver function, U and Es. For diagnosis of hypertension this would require 15 minutes of practice nurse time and 20 minutes of HCA time. For monitoring of hypertensive patients, each would require on average 30 minutes of practice nurse time, 10 minutes of HCA time and 10 minutes of GP time per year

Intervention	Sources and methodology of cost estimates
Smoking cessation, brief exercise intervention and weight loss programme	For these three interventions, the costs used in Table 3 for lifetime costs were actually the total gross costs incurred within the first year following referral
Earlier detection of diabetes	The cost components are taken from the School of Health and Related Research (ScHARR) report[2] and are: two GP appointments, 10 minutes' HCA time, two HBA1c tests, one proteinuria screening and one retinopathy screening per year, plus drug costs for antihypertensives, insulin and statins. It is estimated that screening results in diabetes being identified seven years earlier than it would be clinically diagnosed
Earlier detection of CKD	We assumed that cases of CKD diagnosed through the vascular check were diagnosed an average of five years before they would otherwise be diagnosed. We estimated that each such patient would require two GP visits, 20 minutes' HCA time and two serum creatinine tests per year in addition to the care they would otherwise have received

28. A literature review of clinical and cost-effectiveness studies including NICE guidance, and references therein, and published academic research, was conducted. Clinical experts were also consulted. The assumptions were based on this evidence and then published in a technical consultation in July 2008. Responses to the consultation were considered, the evidence was reviewed and appropriate amendments were made. Relevant documents can be found in Annex 1.

29. The combined costs of the risk assessment checks and the interventions are calculated (a) year-in-year to reflect the resource requirement to the NHS and (b) over the lifetime of health benefits to produce a cost–benefit analysis. The year-in-year costs are given in 2008 prices and can be found in Annex 3. The lifetime costs are discounted at 3.5% and can be found in Table 5, below.

30. The additional activity of the checks and the interventions will have an impact on workforce requirements. If the programme roll-out is phased, the impact is modest in 2009/10, requiring the whole-time equivalent (WTE) of an extra 10 GPs, 34 nurses and 47 HCAs. Once the programme is fully implemented, the impact will be larger, typically requiring an extra 800 GPs, 470 nurses and

750 HCAs per year. The figures for each year of the programme can be found in Annex 4. The majority of the extra GP resource is required to oversee and manage the interventions. The extra workforce requirements, in general, are quite modest. However, the increase in the number of WTE GPs is significant once the programme is fully implemented, and this has the potential to put upward pressure on input costs.

Benefits

31. The model estimates the benefits by calculating the lifetime QALY gains from patients reducing their cardiovascular risk factors as a result of primary prevention and treatment interventions. This data was sourced from the same references as the costs and is shown in Table 3 above.

32. In the model, the lifetime QALY gain is attributed to the year in which the intervention commences, so that it is consistent with the NICE guidance. The QALY gain is discounted at 1.5% (3.5% less 2% to account for the increased value of life years gained across time). The QALYs have been monetised on the basis of an estimate of social value of a QALY being £50,000. Total discounted benefits are shown in Table 5.

Summary of costs and benefits

33. The table below sets out the total programme costs and benefits of the policy options. Details of the annual costs to the NHS can be found in Annex 3.

Table 5: Cost per QALY for each scenario

Option	Total cost (present value) (£m)	Total benefit (present value) (£m)	Total benefit (QALYs)	Cost per QALY (£)	Net benefit (NPV) (£m)
Check 40–74-year-olds every 5 years	4,506	64,315	1,286,309	3,505	55,304
Check 40–74-year-olds every 10 years	3,211	44,810	896,207	3,583	38,388
Check 45–74-year-olds every 5 years	4,015	56,075	1,121,500	3,580	48,044
Check 45–74-year-olds every 10 years	2,867	42,478	845,550	3,390	36,544
Check 50–74-year-olds every 5 years	3,312	44,204	884,083	3,746	37,580
Check 50–74-year-olds every 10 years	2,371	32,028	640,569	3,701	27,287
Check 40–74-year-olds (high risk only)	4,339	34,766	695,313	6,241	26,087

Preferred option

34. The first test of cost-effectiveness is to compare the overall cost per QALY of each scenario with the NICE lower cost-effectiveness threshold of £20,000 per QALY. We use the lower NICE threshold because there is some uncertainty inherent in our estimates. Scenarios i) – vii) have a similar average cost per QALY of between £3,390 and £3,746. Scenario viii) has a much higher cost per QALY of £6,241. As all scenarios have a cost per QALY that is less than the threshold, they all pass this test.

35. A second test of value for money is to look at the net benefit, which has been calculated using departmental guidelines so that it is derived by subtracting twice the total cost from the net benefit. Option ii) has the highest net benefit at £55,304m and is therefore the preferred option.

Sensitivity analysis

36. The sensitivity analysis has been conducted to identify which variables and assumptions are the drivers of the model.

37. The base case model is run using a patient record dataset from QRESEARCH. An alternative dataset from THIN was used for the sensitivity analysis. Similarly, the algorithm in the base case to assess CVD risk is QRISK and for the sensitivity analysis this is replaced by Framingham. THIN data and Framingham predict higher prescribing of statins but lower take-up of smoking cessation interventions. These two effects more or less cancel each other out, resulting in a small overall increase both in costs and benefits.

38. The parameter that estimates the proportion of individuals who accept an appointment when offered one is set at 75% in the base model. This was varied from 65% to 85%. The results are shown in the table below.

Table 6.1: Variation in total costs, benefits and cost per QALY

	% attending appointment		
	65%	75%	85%
Total cost PV (£m)	3,814	4,391	5,048
Total benefit PV (£m)	56,660	64,315	73,405
Net benefit NPV (£m)	52,846	59,924	68,357
Cost per QALY (£)	3,457	3,507	3,532

Table 6.2: Variation in NHS resource costs, £m

Year	% attending appointment		
	65%	75%	85%
2009/10	19	29	39
2010/11	81	99	124
2011/12	133	157	189
2012/13	194	231	276
2013/14	239	282	332
2014/15	266	307	357
2015/16	278	319	372
2016/17	297	332	391
2017/18	304	344	396
2018/19	315	354	410
2019/20	329	369	432
2020/21	343	379	441
2021/22	345	385	449
2022/23	347	395	456
2023/24	348	400	459
2024/25	354	397	463
2025/26	355	404	467
2026/27	352	408	462
2027/28	354	406	469
2028/29	361	413	472

39. As shown in Table 6.1, increasing the proportion of people who take up the offer of an appointment will have an impact on the total lifetime costs and benefits. However, as the changes in costs and benefits are proportional to each other, there is little change in the cost per QALY. Similarly, decreasing the proportion reduces the total lifetime costs and benefits by a corresponding amount.

40. Table 6.2 shows that a higher take-up rate of 85% would have resource implications for the NHS. Costs would be 33%, 25% and 20% higher in years 1, 2, and 3 respectively. Such a high take-up rate is unlikely, however, as other screening programmes have not been that successful in the past. A lower level of

take-up would mean that costs would be lower. There is an additional risk: if the take-up rate turns out to be different than planned, there could be a resource mismatch. For example, if PCTs commit resources to the programme based on a take-up of 75%, but only 65% of the population attend risk assessment, some resource may go unused.

41. Further sensitivity analysis was carried out on the assumptions about QALY gains from the interventions in the programme and the costs relating to the risk assessment checks and the interventions. A full list of these can be found in Table A2.16 of Annex 2. In addition, the amount of estimated activity currently undertaken varied from 48% uniformly to a lower value of 32%.

42. As a result of the sensitivity analysis, the average net benefit figure of £55,304m has a 95% confidence interval range of £49,853m–£60,881m. The variation in net benefit is dominated by the input variation of the QALY gain in the model. With a +/– 10% variation in the QALY gain from interventions, the generated variation in the net benefit is almost directly proportional, at +/– 10%. This shows that even if the QALY gain turns out to be 10% less than assumed, the programme would still be highly cost-effective.

43. The sensitivity analysis around costs shows that the dominant variable is the proportion of the population already receiving a risk assessment. The base case of the model is for 48% of population to receive an intervention like statins or hypertensives, which involve some degree of vascular risk assessment and management. Performing a sensitivity analysis of current assessment between 32% and 48% results in a 95% confidence interval around costs in year 1 of the programme of £29m–£37m. In year 2, the confidence interval is £97m–£108m around a central point of £103m. By the time the programme is up and fully running, say in year 16, the range is £392m–£412m.

44. One would expect the costs to be higher in year 1 if the assumed volume of current activity falls. This is primarily because the model assumes a phased roll-out of the programme. Therefore the amount of new activity from the programme as a proportion of current activity is small, and varying the level of current activity has a big impact. As the programme is rolled out to full impact, the amount of new activity compared with current activity becomes much larger and so the impact of varying the level of current activity becomes smaller.

Health Impact Assessment

See Annex 6.

Equality Impact Assessment

See Annex 7.

SPECIFIC IMPACT TESTS: CHECKLIST

Use the table below to demonstrate how broadly you have considered the potential impacts of your policy options.

Ensure that the results of any tests that impact on the cost–benefit analysis are contained within the main evidence base; other results may be annexed.

Type of testing undertaken	Results in evidence base?	Results annexed?
Competition assessment	No	No
Small firms impact test	No	No
Legal aid	No	No
Sustainable development	No	No
Carbon assessment	No	No
Other environment	No	No
Health impact assessment	No	Yes
Race equality	No	Yes
Disability equality	No	Yes
Gender equality	No	Yes
Human rights	No	Yes
Rural proofing	No	No

ANNEXES

Annex 1: References of sources of evidence

Annex 2: List of assumptions and variable values

Annex 3: Details of NHS annual resource costs

Annex 4: Workforce impact

Annex 5: Risk assessment diagram

Annex 6: Health Impact Assessment

Annex 7: Equality Impact Assessment

ANNEX 1: REFERENCES OF SOURCES OF EVIDENCE

1 *The Handbook for Vascular Risk Assessment, Risk Reduction and Risk Management. A report prepared for the UK National Screening Committee by University of Leicester*. March 2008. UK National Screening Committee

2 *Modelling the Cost Effectiveness of Screening for Type 2 Diabetes*. Gillett M et al. 2005. School of Health and Related Research

3 Derivation and validation of QRISK, a new cardiovascular disease risk score for the United Kingdom: prospective open cohort study. *BMJ*, July 2007, 335, 136

4 Chronic kidney disease management in the United Kingdom: NEOERICA project results. Stevens P et al. *Kidney International*, 2007. On-line publication

5 *Tackling Obesities: Future Choices – Modelling Future Trends in Obesity and Their Impact on Health*. Foresight Tackling Obesities: Future Choices Project. Available at www.foresight.gov.uk

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9 *Statins for the Prevention of Coronary Events*. Ward S et al. 2005. School of Health and Related Research

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14 *Four Commonly Used Methods to Increase Physical Activity*. 2006. NICE. See www.nice.org.uk/PHI002

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18 An economic model of the cost effectiveness of lifestyle treatments for obesity. *Health Technology Assessment*, 2004, 8(21), 158

19 See www.ppa.org.uk

20 Review: smoking cessation reduces the risk of death and non-fatal myocardial infarction in coronary heart disease. Last A. *Evidence Based Medicine*, 2004, 9, 28

21 *Essential Hypertension – Managing Adults in Primary Care*. Centre for Health Services Research. Page 149

22 The Newcastle exercise project: a randomised controlled trial of methods to promote physical activity in primary care. Harland J et al. *BMJ*, 1999, 319, 828–832

23 Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Yusuf S et al. *Lancet*, 2004, 364, 937–952

24 The Finnish Diabetes Prevention Study

25 See NICE costing report for guidance at www.nice.org.uk/TA094

26 Prescription cost analysis data from the first quarter of 2006

27 MRC/BHF Heart Protection Study of cholesterol lowering with simvastatin in 20,536 high-risk individuals: a randomised placebo-controlled trial. Heart Protection Study Collaborative Group. *Lancet*, 2002, 360, 7–22

28 The effects on plasma lipoproteins of a prudent weight-reducing diet, with or without exercise, in overweight men and women. Wood P et al. *New England Journal of Medicine*, 1991, 325, 461–466

ANNEX 2: LIST OF ASSUMPTIONS AND VARIABLE VALUES

Table A2.1: Parameters within SIMUL8 model

Step	Question	Probability or label?	Value	Source
Invite	Does s/he attend (Y/N)?	For their first invitation, each individual is labelled as either: (1) always attends, (2) never attends, (3) has a 33% probability of attending. This is based on random probability	Overall 75% attend. (1) 70% always attend, (2) 15% never attend, (3) 15% have a 33% chance of attending	Uptake of national breast screening programme, with assumptions about proportion that never attend
Smoke	Does s/he smoke?	Smoking label (Y)	N/A	QRESEARCH data
	If a smoker, is s/he willing to be referred to smoking cessation services (Y/N)?	Probability	19%	See Table A2.17
	If referred to a smoking cessation service, does s/he quit?	Probability	5%	See Table A2.17

Step	Question	Probability or label?	Value	Source
Inactive	Does s/he do sufficient activity (5 x 30 minutes per week)?	Exercise label, assigned by probability based on age and gender	Table A2.3	*Health Survey for England 2004*
	If under-active, is s/he willing to take up brief exercise chat?	Probability	77%	See Table A2.17
	If given a brief exercise chat, will s/he increase his/her physical activity as a result?	Probability	5%	See Table A2.17
Obese	Is s/he obese?	BMI label (>30)	N/A	QRESEARCH data
	If obese, is s/he willing to take up weight loss programme?	Probability	85%	See Table A2.17
	If s/he takes up the weight loss programme, will s/he complete it?	Probability	68%	See Table A2.17

Step	Question	Probability or label?	Value	Source
High BP	Does s/he have high blood pressure (BP)?	Systolic blood pressure label (>140)	N/A	QRESEARCH data
	Does s/he go on to receive anti-hypertensives?	Probability based on age and gender	Table A2.17	See Table A2.17
	Does s/he go on to get a diagnosis of CKD?	Probability based on age and gender	Table A2.9	Reference 4
	If s/he is prescribed anti-hypertensives, will s/he comply with the medication?	Probability	83%	See Table A2.17
High choles-terol	Does s/he have high cholesterol?	TC:HDL ratio label (≥6)	N/A	QRESEARCH data
	If so, does s/he take up statins?	Probability	85%	See Table A2.17
Over 20% risk	Does s/he have ≥20% 10-year CVD risk?	CVD risk label	N/A	QRESEARCH data
	If so, does s/he take up statins?	Probability	85%	See Table A2.17
	If s/he is prescribed statins, will s/he comply with the medication?	Probability	70%	See Table A2.17

Step	Question	Probability or label?	Value	Source
Blood glucose testing	Does s/he have high FINDRISC score and hence have a blood glucose test?	Calculation of FINDRISC score from labels for individual factors	See Tables A2.3 – A2.7	QRESEARCH data/*Health Survey for England*; Reference 1
	Does s/he have a high blood glucose result and hence go on to have OGTT?	Probability	70%	Reference 1
	Does s/he go on to be diagnosed with IGR?	Probability based on age and whether obese or not	Table A2.8	Data on STAR Study provided by University of Leicester
	Does s/he go on to be diagnosed with diabetes?	Probability	Table A2.8	
	Does s/he take up IGR lifestyle intervention?	Probability	85%	See Table A2.17
	Compliance			
Feedback	Go to Model Exit	Label: whether diagnosed with CKD or diabetes	N/A	Model dynamics
	Go to high-risk area	Label: whether put on anti-hypertensives or statins	Note these all then go to Model Exit	Model dynamics
	Eligible for re-test	All other individuals	N/A	Model dynamics

Step	Question	Probability or label?	Value	Source
Low-risk waiting area	Go to Model Exit from low-risk waiting area	Annual probability of non-vascular mortality	Non-vascular mortality rate based on age and gender	ONS mortality data 2005
		Annual probability of vascular event	Risk based on CVD risk label divided by 10	QRESEARCH data
		Label age >75	N/A	Model dynamics
		Annual probability of being given anti-hypertensives outside vascular checks	10%	Annual chance of having blood pressure reading without cholesterol reading in QRESEARCH data
Re-test	Eligible for re-test	Label of time since last test	N/A	Model dynamics

Table A2.2: Workforce input for interventions

Staff	Intervention	Time required
GP	CKD management	30 minutes per year
	Diabetes management	30 minutes per year
	Hypertension management	10 minutes per year
	Statins	10 minutes per year
Practice nurse	Hypertension management	10 minutes per year
	Statins	60 minutes in 1st year, 15 minutes per year subsequently
HCA	Hypertension management	10 minutes in 1st year

Table A2.3: Proportion of people doing less than 5 x 30 minutes of intense exercise per week

Age	BMI	35–44	45–54	55–64	65–74
Male	Below 25	0.49	0.56	0.58	0.71
	25 and below 30	0.51	0.60	0.64	0.74
	30 and above	0.63	0.70	0.74	0.84
Female	Below 25	0.60	0.59	0.64	0.73
	25 and below 30	0.66	0.63	0.71	0.81
	30 and above	0.71	0.75	0.83	0.91

Table A2.4: Proportions of people in different waistline categories

Gender	BMI	AGE											
		35–44			45–54			55–64			65–74		
		< 94cm	94–102 cm	> 102 cm	< 94cm	94–102 cm	> 102 cm	< 94cm	94–102 cm	> 102 cm	< 94cm	94–102 cm	> 102 cm
Male	< 25	0.87	0.12	0.01	0.86	0.13	0.01	0.77	0.21	0.02	0.74	0.22	0.04
	25 – < 30	0.37	0.45	0.18	0.27	0.48	0.25	0.15	0.52	0.33	0.15	0.44	0.41
	> = 30	0.00	0.15	0.85	0.00	0.10	0.90	0.00	0.07	0.93	0.00	0.04	0.96
		< 80cm	80–88 cm	> 88 cm	< 80cm	80–88 cm	> 88 cm	< 80cm	80–88 cm	> 88 cm	< 80cm	80–88 cm	> 88 cm
Female	< 25	0.77	0.19	0.04	0.68	0.28	0.05	0.64	0.30	0.06	0.50	0.38	0.12
	25 – < 30	0.17	0.45	0.38	0.11	0.42	0.47	0.08	0.38	0.54	0.10	0.32	0.58
	> = 30	0.00	0.07	0.93	0.00	0.03	0.96	0.00	0.02	0.98	0.00	0.01	0.99

Table A2.5: Proportion of people who eat fruit and vegetables every day

Age	BMI	35–44	45–54	55–64	65–74
Male	Below 25	0.91	0.95	0.92	0.96
	25 and below 30	0.91	0.94	0.98	0.98
	30 and above	0.89	0.92	0.95	0.96
Female	Below 25	0.96	0.94	0.98	0.98
	25 and below 30	0.95	0.97	0.97	0.98
	30 and above	0.92	0.96	0.97	0.98

Table A2.6: Proportion of people with a family history of diabetes (type 1 or 2) – revise and extend to other FINDRISC factors

No	Yes: grandparent, aunt, uncle or first cousin (but not own parent, brother, sister or child)	Yes: parent, brother, sister or own child
0.80	0.10	0.10

Table A2.7: Proportion of people with a high blood glucose reading

Age	BMI	40–44	45–49	50–54	55–59	60–64	65–69	70–74
Male	Below 25	0.01	0.02	0.02	0.03	0.03	0.04	0.05
	25 and below 30	0.02	0.02	0.03	0.04	0.05	0.06	0.07
	30 and above	0.02	0.04	0.05	0.06	0.07	0.07	0.08
Female	Below 25	0.02	0.02	0.02	0.02	0.03	0.03	0.04
	25 and below 30	0.02	0.02	0.03	0.03	0.04	0.05	0.05
	30 and above	0.03	0.04	0.05	0.06	0.06	0.08	0.08

Table A2.8: Proportion of people with high FINDRISC and high fasting blood glucose whose results from OGTT indicate IGR or diabetes

Male and obese	40–44	45–49	50–54	55–59	60–64	65–69	70–74
Diabetes	0.20	0.21	0.21	0.22	0.23	0.24	0.25
IGR	0.21	0.29	0.37	0.45	0.54	0.62	0.70
Female and obese	**40–44**	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70–74**
Diabetes	0.00	0.04	0.08	0.12	0.17	0.21	0.25
IGR	0.16	0.24	0.32	0.40	0.48	0.56	0.65
Male not obese	**40–44**	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70–74**
Diabetes	0.06	0.07	0.07	0.07	0.08	0.08	0.08
IGR	0.13	0.18	0.23	0.28	0.33	0.38	0.44
Female not obese	**40–44**	**45–49**	**50–54**	**55–59**	**60–64**	**65–69**	**70–74**
Diabetes	0.00	0.01	0.03	0.04	0.05	0.07	0.08
IGR	0.10	0.15	0.20	0.25	0.30	0.35	0.40

Table A2.9: Proportion of people with one-off high blood pressure who go on to get CKD diagnosis

Age	40–44	45–49	50–54	55–59	60–64	65–69	70–74
Male	0.03	0.07	0.07	0.10	0.10	0.21	0.21
Female	0.18	0.09	0.09	0.21	0.21	0.32	0.32

Table A2.10: Annual chance of BMI increasing to over 30

Age	40–44	45–49	50–54	55–59	60–64	65–69	70–74
Male	0.001	0.001	0.000	0.000	0.000	0.000	0.000
Female	0.004	0.004	0.000	0.000	0.008	0.008	0.000

Table A2.11: Annual chance of systolic blood pressure increasing to over 140 mmHg

Age	40–44	45–49	50–54	55–59	60–64	65–69	70–74
Male	0.017	0.017	0.008	0.008	0.022	0.022	0.030
Female	0.009	0.009	0.015	0.015	0.028	0.028	0.031

Table A2.12: Proportion of people with one-off SBP>140 requiring antihypertensives

Age	40–44	45–49	50–54	55–59	60–64	65–69	70–74
Male	0.222	0.415	0.415	0.641	0.641	0.928	0.928
Female	0.283	0.321	0.321	0.373	0.373	0.508	0.508

Source: Based on modelling by Dr Tom Marshall, University of Birmingham, using *Health Survey for England* data

Table A2.13: Annual percentage increase in 10-year CVD risk

Age	40–44	45–49	50–54	55–59	60–64	65–69	70–74
Male	0.5	0.7	0.9	1.0	1.2	1.3	0.0
Female	0.3	0.5	0.7	0.8	1.0	1.1	0.0

Table A2.14: Cost of IGR lifestyle management intervention by year

Year	Year 1	Year 2	Year 3	Year 4	Year 5
(All ages, male and female)	461.56	253.57	253.57	253.57	253.57

Table A2.15: Cost of other interventions

Intervention	Cost in Year 1, £
Smoking cessation services	176.80
Weight loss	51.00
Brief exercise intervention	33.50

Table A2.16: Monte Carlo simulation parameters

Variable	Distribution
Multiplier for cost of statins	Uniform, 0.9 to 1.1
Multiplier for QALYs from statins	Uniform, 0.9 to 1.1
Multiplier for cost of antihypertensives	Uniform, 0.9 to 1.1
Multiplier for QALYs from antihypertensives	Uniform, 0.9 to 1.1
Multiplier for cost of smoking cessation services	Uniform, 0.9 to 1.1
Multiplier for QALYs from smoking cessation services	Uniform, 0.9 to 1.1
Multiplier for cost of exercise intervention	Uniform, 0.9 to 1.1
Multiplier for QALYs from exercise intervention	Uniform, 0.9 to 1.1
Multiplier for cost of IGR lifestyle intervention	Uniform, 0.9 to 1.1
Multiplier for QALYs from IGR lifestyle intervention	Uniform, 0.9 to 1.1
Multiplier for cost of weight loss intervention	Uniform, 0.9 to 1.1
Multiplier for QALYs from weight loss intervention	Uniform, 0.9 to 1.1
Nurse time per feedback appointment	Uniform, 10 to 25 minutes
HCA time per vascular check	Uniform, 10 to 25 minutes
HCA time per OGTT	Uniform, 15 to 30 minutes
Admin time per invitation	Uniform, 2 to 7 minutes
Admin time per appointment	Uniform, 2 to 7 minutes
Unit cost of cholesterol test	Uniform, £3 to £6
Unit cost of blood glucose test	Uniform, £4 to £8
Unit cost of serum creatinine test	Uniform, 20p to £1.20

Annex 2.2: Assumptions on uptake, compliance, attribution and relative risk reduction of CVD

For each intervention, we needed to make assumptions on the uptake, compliance, attribution and relative risk reduction (RRR) of CVD. The definitions of these are given below:

Uptake	Percentage of patients who take up an intervention for which they are recommended, including those who do not complete the programme or comply with the intervention, e.g. percentage of people who are obese who attend their first weight loss class.
Compliance	Percentage of patients who initiate an intervention and complete it. For pharmaceutical interventions this was taken to be the reported continuance on the therapy at one year. For smoking cessation it was the proportion of people who actually successfully quit smoking at one year. For the brief exercise intervention, IGR lifestyle intervention and weight loss programmes, this is taken to be the proportion of people who complete the programme compared with those who start it.
Attribution	The model does not factor in other opportunities for referral to the interventions except for the vascular check, whereas in reality these interventions are available at any time to those with an indication for them. Therefore, the attribution figure represents the proportion of the activity that happens only as a result of the vascular check policy and would not happen otherwise.
CVD RRR	This is the relative risk reduction of cardiovascular disease for each intervention.

Table A2.17 Compliance and RRR of interventions

Intervention	Uptake	Compliance	Attribution	RRR of CVD
Smoking	19%	5%	51%	0.36
Antihypertensives	*	83%	24%	0.24
Exercise	77%	5%	63%	0.14
Impaired fasting glucose (IFG) lifestyle intervention	85%	90%	90%	0.09
Statins prescribing	85%	70%	50%	0.31
Weight management	85%	68%	47%	0.36

* see note on antihypertensives below

Evidence on smoking cessation:

Uptake	25% of smokers will be willing to try to give up smoking at any point in time. Conservative estimate is 75% of this figure. Based on expert opinion
Compliance	Quit rate of 5% after eight years[13]
Attribution	GPs currently refer 8% of smokers they see each year to stop smoking services. This is 32% of the potential referrals. Therefore, the maximum attribution is 68%. However, we assume a conservative estimate is 75% of this figure, or 51%
CVD RRR	Based on academic literature[20]

Evidence on antihypertensives:

Uptake	Value varies by age and gender and is based on Health Survey of England data and modelled by Dr Tom Marshall, University of Birmingham (see Table A2.12)
Compliance	Adherence on multiple twice daily dosage at one year[21]
Attribution	30% estimate of undiagnosed hypertension based on ratio of QoF prevalence to Health Survey of England prevalence
CVD RRR	NICE hypertension guidelines report[10]

Evidence on exercise:

Uptake	Based on an RCT of methods to promote physical activity in primary care[22]
Compliance	Percentage of people with an increase in physical activity score at one year following a motivational interview[22]
Attribution	NICE assume that their guidance, which is based on brief exercise intervention being given opportunistically, will result in up to 50% of appropriate instances being used to give this advice. From their estimates of the proportion of visits that are appropriate, we estimate that each individual who is inactive has a 74% chance of having an appropriate instance of being given this intervention opportunistically. This leaves an estimated 63% of appropriate instances not being taken up
CVD RRR	INTERHEART study[23]

Evidence on IFG lifestyle intervention:

Uptake	Expert opinion
Compliance	From the Finnish Diabetes Prevention Study
Attribution	Expert opinion. This is particularly high compared with the other interventions because anecdotally we have found no evidence of this currently being offered systematically.
CVD RRR	From the Diabetes Prevention Program, US[24]

Evidence on statins prescribing:

Uptake	Expert opinion
Compliance	Five-year continuance for statins for primary prevention [9]
Attribution	This is derived from data that show that 5.4 million people are eligible for statins,[25] but only 2.7 million are on them.[26] However, as the model assumes no one already on statins enters the model, the attribution is 100% in Year 1 and reduces steadily to 50% by Year 6
CVD RRR	This is derived from the Heart Protection Study for prevention of MI and CVD death,[27] and from the NICE TA094 for prevention of stroke[9]

Evidence on weight management:

Uptake	Percentage of patients initially recruited who enrolled in Slimming on Referral programme
Compliance	Percentage of patients who completed the Slimming on Referral programme[16]
Attribution	Percentage of people eligible for checks who do not have a BMI measure in the last five years (source: QRESEARCH data)
CVD RRR	There was little evidence on this. The value we took is from a study from 1991[28]

ANNEX 3: DETAILS OF ANNUAL NHS RESOURCE COSTS

Year	Check 40–74-year-olds every 5 years	Check 40–74-year-olds every 10 years	Check 45–74-year-olds every 5 years	Check 45–74-year-olds every 10 years	Check 50–74-year-olds every 5 years	Check 50–74-year-olds every 10 years	Check 40–74-year-olds high risk only
2009/10	31	15	27	12	20	13	34
2010/11	104	56	89	47	74	41	58
2011/12	165	91	146	77	118	68	73
2012/13	241	133	212	109	176	98	99
2013/14	293	163	260	132	216	123	117
2014/15	320	190	281	155	238	139	140
2015/16	332	210	294	174	250	154	156
2016/17	345	234	311	194	265	170	156
2017/18	358	253	316	211	272	180	168
2018/19	368	267	329	231	284	195	193
2019/20	384	279	337	246	296	208	210
2020/21	395	289	352	257	302	213	212
2021/22	400	295	353	267	301	216	211
2022/23	411	297	358	268	303	222	231
2023/24	415	300	359	277	302	224	254
2024/25	413	303	363	278	301	225	241
2025/26	420	306	364	282	299	231	258
2026/27	424	305	361	283	299	230	298
2027/28	422	306	369	289	301	231	343
2028/29	429	307	366	290	303	231	323
Total	6,672	4,598	5,847	4,079	4,918	3,409	3,777

Annual NHS resource cost of additional vascular checks and interventions (all costs are in £m at constant 2008 prices)

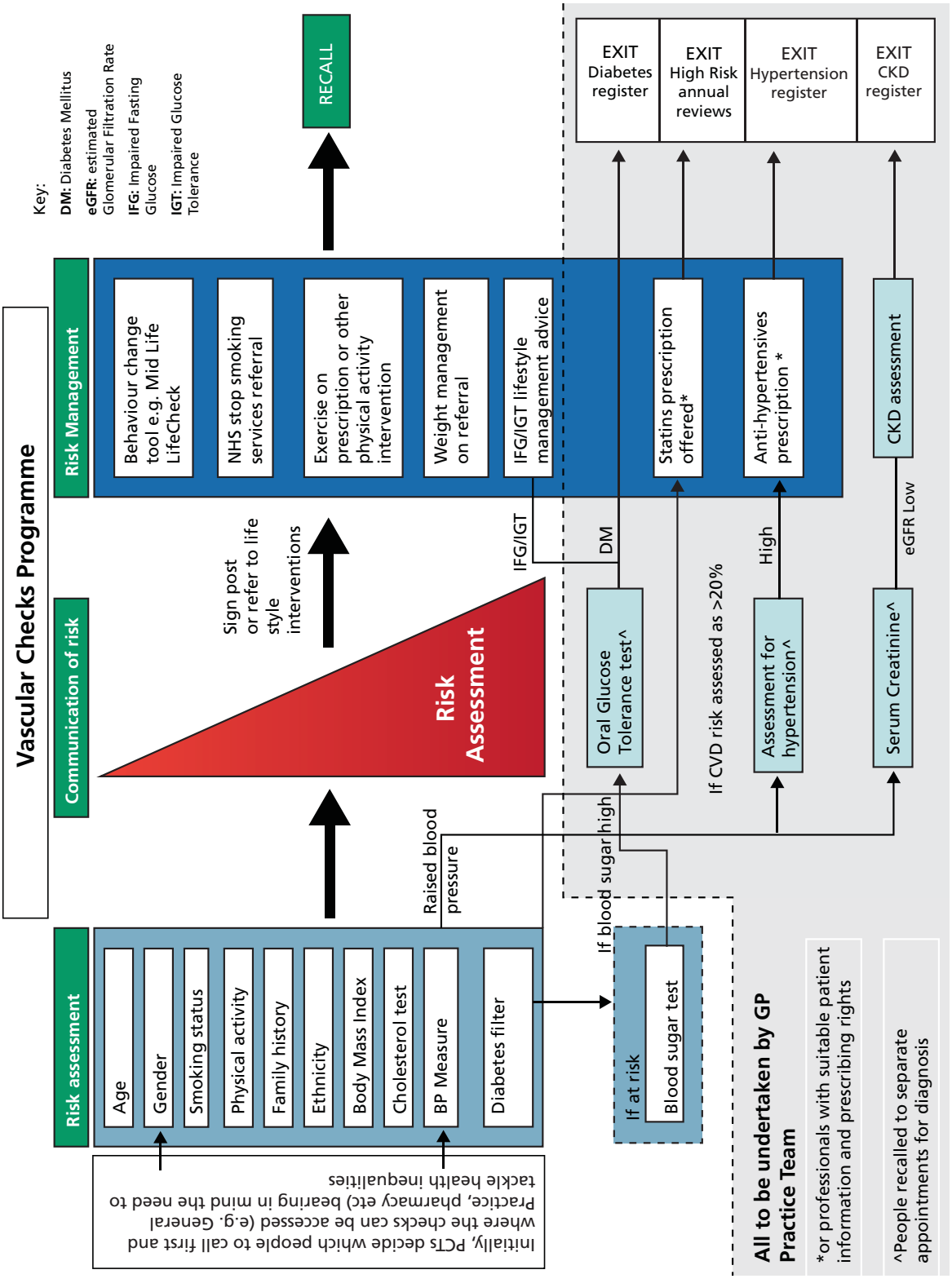
Transitional costs for PCTs

	2009/10	2010/11	2011/12
Constant 2008 prices (£m)	9.06	9.06	9.06
Discounted prices (£m)	9.06	8.75	8.46

ANNEX 4: WORKFORCE IMPACT

Year	GP WTEs	Nurse WTEs	HCA WTEs	Administrative
2009/10	10	34	47	25
2010/11	68	149	187	92
2011/12	141	238	302	136
2012/13	243	349	448	186
2013/14	336	380	504	187
2014/15	428	401	547	195
2015/16	510	402	576	188
2016/17	585	406	616	185
2017/18	654	419	660	184
2018/19	715	427	695	182
2019/20	769	461	740	195
2020/21	802	470	754	195
2021/22	820	479	760	193
2022/23	826	491	758	192
2023/24	814	501	747	192
2024/25	804	525	743	199
2025/26	793	538	735	200
2026/27	781	546	721	200
2027/28	775	553	714	199
2028/29	774	567	707	199

ANNEX 5:
RISK ASSESSMENT DIAGRAM



ANNEX 6: HEALTH IMPACT ASSESSMENT

An initial screening of the possible impact of the vascular checks programme showed that there is likely to be a significant impact on people's lifestyles in relation to their physical activity, diet and smoking. It also showed that a significant impact is likely on primary care. Significant, in the context of this Health Impact Assessment, refers to the whole population, a major sub-group of the population or the degree of severity of the impact. A full impact assessment was therefore undertaken to assess the impact and consider how the policy could be used to have a positive impact.

Are the potential positive and/or negative health and well-being impacts likely to affect specific sub-groups disproportionately compared with the whole population?

The proposed policy is thought likely to impact differently but positively on people on grounds of their race, gender and age. The proposed policy is also likely to impact differently, but positively, on people who are disabled and on people from lower socio-economic groups.

The risk factors affected by the policy that will have an impact on health and well-being are smoking, diet and physical activity. The management part of the vascular risk assessment and management programme will provide everyone undertaking the vascular check with individually tailored lifestyle advice in relation to smoking, diet and exercise. The programme is therefore likely to have a positive impact in relation to these modifiable risk factors and have a positive impact on people's health and well-being.

Although the vascular checks themselves are suitable for any setting, there may also be issues of access to transport, services and facilities for some groups, particularly for people with mental or physical disabilities. PCTs are responsible for ensuring that they make reasonable adaptations to overcome access issues for people with physical disabilities as well as those with learning disabilities and mental health problems. This responsibility has been drawn out in the Department of Health's *Next Steps Guidance for Primary Care Trusts*, along with the need for PCTs to consider how they will provide access for those in prison and in-patient mental health care as well as gypsies and travellers, and migrant and refugee populations.

Access to affordable healthy food may also be an issue in areas of deprivation. People may feel that they cannot afford to buy healthy food or it might be more difficult to physically access in some areas. A comprehensive strategy to promote healthy weight was published in January 2008. *Healthy Weight, Healthy Lives: A cross-government strategy for England* sets out a range of commitments, including a theme around promoting healthier food choices. This includes a commitment to work with the convenience store sector to increase access to fruit and vegetables in deprived areas. Weight management is an important part of the risk management aspect of the vascular checks programme. The Next Steps guidance has been used to emphasise how essential it is for PCTs to consider the full range of providers that can help to deliver the risk management side of the programme, ensure wide access and support people in changes to their lifestyle. The policy team responsible for vascular checks is also working closely with colleagues responsible for weight management and obesity, and is planning to consult commissioners responsible for implementing vascular checks on what support the Department can provide to help them to deliver appropriate risk management services.

The programme of vascular checks is unlikely to impact on the following risk factors which can have a wider impact on people's health and well-being:

- Financial security
- Community safety, safety of goods, services, workplaces and dwellings
- Environmental factors, such as noise, air or water pollution
- Housing conditions
- Opportunities for education and training
- Employment levels
- Stress at work or home
- Community cohesion and social inclusion
- Discrimination on the basis of age, gender, ethnic origin, sexual orientation or disability – see the Department of Health's Equality Impact Assessment for the vascular checks programme.

Type II diabetes mellitus is a growing public health concern. Its prevalence is increasing and diabetes contributes significantly to overall health inequalities within England. Vascular disease also makes up approximately a third of the difference in life expectancy between Spearhead areas and the rest of England. This programme will help to ensure greater focus on the prevention of coronary heart disease, stroke, diabetes and kidney disease and will help people to remain well for longer. It also

offers a real opportunity to make significant inroads in tackling health inequalities, including socio-economic, ethnic and gender inequalities, provided that PCTs ensure that their approach is appropriate for their own area and focused on reducing these inequalities.

Different ethnic groups experience different rates of vascular disease. In the UK, mortality from coronary heart disease is 46% higher for men and 51% higher for women of South Asian origin than in the non-Asian population. The occurrence of diabetes in individuals of South Asian origin is twice that of the general population and the occurrence of chronic kidney disease, which in turn also increases their risk of coronary heart disease, is six times that of the rest of the population. People of African descent are more likely to have hypertension than the white population in the UK, increasing their risk of vascular disease.

Additionally, stroke has a 2.2 times higher incidence (adjusted for age and gender) in people of African or Caribbean origin, and we know that men of South Asian origin are also disproportionately susceptible to stroke. Bangladeshi and Pakistani women are reported as having relatively high levels of stroke: 12% and 10% respectively in comparison with the general population equivalent of 9%. There is also evidence that people of different racial or ethnic groups respond unequally to public health campaigns.

Smoking is a significant factor in the development of vascular disease with a disproportionately high number of Bangladeshi, Irish and Pakistani men smoking: 29% of Pakistani, 30% of Irish and 40% of Bangladeshi men smoke compared with 24% of men in the general population. Additionally, 26% of Irish women smoke compared with 23% of women in the general population, again putting them at higher risk of developing vascular disease.

The Department is preparing guidance to support PCT implementation in a way that tackles their local health inequalities, including inequalities between people of different race. We are also planning to use health inequalities funding to set up and run test bed sites within Spearhead PCTs to look at the best ways of implementing parts of the programme, and to provide training for those who will be undertaking the checks.

The checks themselves are suitable for delivery in almost any setting. If approached sensitively by PCTs, checks are likely to be made available in places that will help maximise access, and therefore uptake, including pharmacies and other community settings such as mosques, the workplace, community centres and walk-in clinics. The guidance in preparation will include case studies showing how different settings

have been used to deliver vascular checks by PCTs and will encourage other PCTs to use a variety of approaches in their roll out.

The requirement will be for PCTs to introduce, over a period of four years, a systematic, integrated programme for their whole eligible population. Those eligible will receive a specific invite to attend a vascular check. The Department is currently developing marketing materials for use by PCTs when writing to high-risk ethnic groups. A research project, based on user groups from high-risk populations, is being run to develop these materials. This, coupled with multiple access points, will help to ensure that ethnic minority groups attend their checks.

How individuals are identified to be invited for their checks will be for PCTs to decide within the first few years of the programme. It is likely that they will do this through GP practice registers which will exclude unregistered populations such as gypsies and travellers, and some migrant populations. Departmental guidance will encourage PCTs to seek out ways of ensuring that these populations are offered a vascular check. NHS Primary Care Contracting is developing two Primary Care Service Frameworks – one on gypsy and traveller populations and one on migrant populations – which, when completed, will be cited to support PCTs in providing vascular checks for these hard-to-reach groups. In the longer term, the Department will need to explore whether it is practically possible for these populations to be incorporated into the national call and recall system as it is developed and, if not, what reasonable steps can be taken to offer these populations a vascular check.

In addition, the national publicity campaign 'Reduce your risk', which we plan to launch in 2009/10 to raise awareness of the checks and encourage uptake, is currently being developed and we are gathering evidence on how best to target ethnic minorities.

Overall, the aim of the vascular checks programme is to identify the risk of disease, such as diabetes, in high-risk ethnic groups earlier and help to manage and lower their risk through lifestyle interventions or earlier medical interventions. People from South Asian and African populations, who currently have higher levels of vascular disease and vascular risk, will therefore be more likely to benefit from the vascular checks programme, reducing the health inequalities between different racial groups.

People with severe mental health problems die on average 5 to 10 years younger than those without, and are more likely to develop vascular disease. Incidences of heart disease, stroke and diabetes are 44%, 88% and 280% higher, respectively, in this group.

The vascular checks themselves are suitable for almost any setting and no specific equipment is needed to adapt the checks for those with a disability. PCTs will be responsible for ensuring that those with disabilities can access their vascular checks when invited to attend and are already responsible for making conscious reasonable adaptations to facilitate this. This responsibility is in relation to those with physical disabilities and making changes to premises providing healthcare to help disabled access, and also to those with learning disabilities and mental health problems.

Mental and physical disabilities may limit access to some aspects of the risk management side of the programme. For instance, increasing physical activity to manage risk may be difficult for people who are housebound or unable to participate in group activities. The management of risk of vascular disease is evidence based and physical activity is important here. PCTs will need to consider how they support their disabled population to engage in physical activity where possible. Other aspects of risk management – such as smoking cessation and consumption of fruit and vegetables – are likely to be more accessible and again are important ways of individuals managing their risk.

Schizophrenia is associated with increased levels of vascular disease. However, people with schizophrenia often have less access to primary care services owing to their treatment and their mental health problem may take priority in any medical event over and above their vascular risk.

A systematic and universal roll out of the programme, with multiple access points, will ensure that those with a disability, including those at higher risk, are invited for their check. The Department will provide all of its publicity and educational materials on the vascular checks in other formats, such as audio or large font, upon request to help support people with disabilities to understand the importance of vascular checks and take up their invite. People with disabilities, some of whom currently have higher levels of vascular disease and vascular risk, will be most likely to benefit from the vascular checks programme, lowering the health inequalities between different groups.

Evidence suggests that men are more likely to experience vascular risk and vascular disease approximately ten years earlier than women. There are also slightly higher rates of vascular disease in men than in women. Stroke is commoner in men (10%) than in women (6%) by the age of 75, but more women (11%) who have strokes die from them in comparison with men (8.4%) (*The Atlas of Heart Disease and Stroke*. 2004. World Health Organization). Vascular checks may lower rates of vascular risk and vascular disease for men more quickly than for women.

Women will also benefit. Early identification and diagnosis of vascular disease can be overlooked in women who are particularly at risk post menopause. This is partly due to women presenting atypically but also due to greater focus on vascular disease in men. Women with gestational diabetes are at more risk of developing type II diabetes and women who develop pre-eclampsia are at greater risk of having a stroke. The vascular checks programme will help refocus attention on women's vascular risk, including their risk of developing diabetes or having a stroke.

Traditionally, women access primary care more than men. More women are registered with a GP practice than men, and women are more likely to use their pharmacy than men.

The Department is working with the Men's Health Forum to ensure that invitations, patient information leaflets and any publicity material take account of the wealth of knowledge regarding health messages, and how these are received by men and how to improve access. Discussions have again pointed to the importance of different venues such as football stadiums and the workplace to encourage access to healthcare services by men, and these messages will be reinforced in our guidance.

A universal roll out of national policy, but with local delivery tailored to population needs, and the use of campaign materials and venues sympathetic to the needs and preferences of men will help to ensure take-up by men so they have the opportunity to benefit from the vascular checks. This will improve the management of risk in men who tend to have higher levels of vascular disease and vascular risk, and develop the disease earlier. In doing so, men are more likely to benefit from the vascular checks programme and this will help narrow the health inequalities between the genders.

The economic modelling undertaken by the Department of Health shows clearly that the proposed programme and combination of tests and measurements are both clinically and cost effective for those aged between 40 and 74 years. Comparable evidence is limited in the older population and most people of 75 or older are likely to be in regular contact with their GP and having regular checks made similar to those provided by the vascular checks programme. Evidence exists that statins on their own are effective in older age groups and are likely to be prescribed by GPs when seeing their older patients.

The vascular checks programme sets out the tests that must be included for all those between the ages of 40 and 74. Departmental guidance will state that PCTs will want to consider the needs of their local population and whether to offer additional tests, particularly to high-risk groups. For example, some PCTs may wish to carry out blood glucose tests or a serum creatinine test on people younger than 40 in areas with a large South Asian or Afro-Caribbean population. Other elements that PCTs may wish to add could include taking the pulse in older groups to identify atrial fibrillation, the most common arrhythmia, which when identified and managed effectively reduces the incidence of stroke.

Evidence shows, however, that the population as a whole experiences higher levels of vascular risk and vascular disease with increased age. The older people get, the more support they need to manage and minimise their risk. Vascular checks are therefore likely to lower levels of vascular risk and disease more effectively in older people compared with younger ones.

Conversely, younger people within the selected cohort – although at a lower risk as a population as a whole – have higher levels of dissatisfaction with GP practice access and may be less likely to engage with primary care overall. Vascular checks will have multiple access points enabling people of different ages and with different commitments and preferences to access the checks in a way that is suitable for them.

Are the potential positive and/or negative health and well-being effects likely to cause changes in contacts with health and/or care services, quality of life, disability or death rates?

Vascular diseases, that is heart disease, stroke, diabetes and kidney disease, are the biggest cause of death in the UK and the vascular checks programme could on average prevent 1,600 heart attacks and strokes and save at least 650 lives each year. The vascular checks programme could prevent over 4,000 people a year from developing diabetes and detect at least 20,000 cases of diabetes or kidney disease earlier, allowing individuals to be better managed and improve their quality of life.

See the Impact Assessment for a detailed breakdown of the benefits likely from the vascular programme, the likely impact on primary care and a costs and benefits analysis.

The Impact Assessment is based on findings from economic modelling undertaken by the Department's analysts. In relation to smoking, the model estimates that 1.9 million people will be referred to stop smoking services as a result of the vascular programme over the first 20 years. For those who quit, this reduces the risk of

vascular disease by 36% (Review: smoking cessation reduces the risk of death and non-fatal myocardial infarction in coronary heart disease. Last A. *Evid. Based Med.* 2004, 9, 28).

In relation to exercise, the model estimates that 7.5 million people will receive a brief intervention on physical exercise as a result of the programme over the first 20 years. For those who comply with recommended levels, their risk of CVD is reduced by 14% (Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study); case-control study. Yusuf S et al. *Lancet* 2004, 364, 937–952).

The model also estimates that 3.7 million people will be referred to a weight management service as a result of the programme over the first 20 years. For those who comply, their risk is reduced by 36% (The effects on plasma lipoproteins of a prudent weight-reducing diet, with or without exercise in overweight men and women. Wood P et al. *New England Journal of Medicine* 1991, 325, 461–466).

Are there likely to be public or community concerns about potential health impacts of this policy change?

No. In January 2008, the Prime Minister announced the Government's intention to shift the focus of the NHS towards empowering patients and preventing illness. As part of this, he set out his ambitions to dramatically extend the availability of 'predict and prevent' checks to give people information about their health, support lifestyle changes and, in some cases, offer earlier interventions.

Putting prevention first (April 2008) set out plans for the NHS to introduce a systematic and integrated programme of vascular risk assessment and management for those aged between 40 and 74.

The introduction of vascular checks is also mentioned in the NHS Next Stage Review Final Report *High Quality Care For All*. The 'Our NHS, our future' NHS Next Stage Review actively engaged, involved and solicited the views of patients, public, staff and stakeholders. A variety of mechanisms were used to engage over 60,000 participants. The report setting out a summary of responses received makes clear that those consulted wanted to see a greater emphasis on 'staying healthy' and healthy ageing, and people being encouraged to become more responsible for their own health, by identifying and intervening earlier when problems arise.

Modelling work undertaken by the Department of Health has found that offering vascular checks to all people between 40 and 74, and recalling them every five or ten years, would be a cost-effective and clinically beneficial programme. A technical

consultation on the economic modelling was published in July. The consultation ended in August. Overall the responses were very constructive.

The Department of Health vascular checks team has spent the past few months working with stakeholders to develop an implementation and delivery programme for vascular checks.

A Learning Network has been set up with the support of NHS Improvement to ensure that we capture 'what works' in the delivery of vascular checks-type programmes. Over 100 representatives from PCTs around the country attended the first meeting of the Learning Network on 23 September. Three further meetings are planned. The Network is supported by a website (www.improvement.nhs.uk/vascularchecks) and an e-bulletin.

A number of stakeholder events have been held to gain the views of national stakeholder organisations and academics working in this area. The first stakeholder meeting took place in April and the second in October with around 30 key stakeholders attending each.

Two wider stakeholder workshops were also held in July and attended by over 200 stakeholders from PCTs and voluntary sector organisations.

A qualitative research project has been conducted to gain the views of higher-risk and hard-to-reach groups. The key research objectives were to explore:

- the most effective ways to describe the check, including specific names;
- key benefits and barriers to taking up the check; and
- the most appropriate settings for delivery of the checks, who should deliver them, and other practical issues such as timings.

The sample was 14 focus groups of men and women aged 40 to 74. We concentrated on those who were more at risk of developing vascular disease and included six groups from South Asian communities. The fieldwork was conducted in October 2008.

ANNEX 7: EQUALITY IMPACT ASSESSMENT

An initial equality impact screening revealed the need for an Equality Impact Assessment (EIA) for the forthcoming vascular checks programme. A full EIA has therefore been carried out.

Policy

In January 2008, the Prime Minister announced the Government's intention to shift the focus of the NHS towards empowering patients and preventing illness. As part of this, he set out his ambitions to dramatically extend the availability of 'predict and prevent' checks to give people information about their health, support lifestyle changes and, in some cases, offer earlier interventions.

Alan Johnson, Secretary of State for Health, launched the publication of *Putting prevention first* on 1 April 2008. This set out plans for the NHS to introduce a systematic and integrated programme of vascular risk assessment and management for those aged between 40 and 74, known as vascular checks.

These checks will be provided by PCTs to assess people's risk of heart disease, stroke, kidney disease and diabetes and will be based on straightforward questions and measurements such as age, sex, family history, height, weight and blood pressure.

Collectively, vascular disease – heart disease, stroke, diabetes and kidney disease – affects the lives of more than 4 million people and kills 170,000 every year. It also accounts for more than half the mortality gap between rich and poor. Type II diabetes mellitus is a growing public health concern. Its prevalence is increasing and diabetes contributes significantly to overall health inequalities within England. Vascular disease also makes up approximately a third of the difference in life expectancy between Spearhead areas and England. The vascular checks programme could prevent 4,000 people a year from developing diabetes and detect at least 20,000 cases of diabetes or kidney disease earlier, allowing individuals to be better managed and improve their quality of life. The vascular checks programme offers a real opportunity to address health inequalities and narrow these gaps.

Modelling work undertaken by the Department of Health has found that offering vascular checks to all people between 40 and 74, and recalling them every five or ten years, would be a cost-effective and clinically beneficial programme.

Consequently, from 2009/10, the NHS is being asked to start implementing vascular checks.

Everyone will receive a personal assessment, setting out the person's level of risk and what they can do to reduce it. For those at low risk, this might be no more than general advice on how best to stay healthy. Others may be assisted to join a weight management programme or a stop smoking service. Those at the highest risk might also require preventative medication with statins or blood pressure treatment.

This programme will help ensure greater focus on the prevention of coronary heart disease, stroke, diabetes and kidney disease and will help people remain well for longer. It also offers a real opportunity to make significant inroads in tackling health inequalities, and hence is aimed at promoting equality, provided that PCTs ensure that their approach is appropriate for their own area and is focused on reducing these inequalities and promoting equality.

Fit with departmental strategic objectives

In line with the Prime Minister's announcement, this programme will help to ensure greater focus on the prevention of coronary heart disease, stroke, diabetes and kidney disease and will help people to remain well for longer. It also offers a real opportunity to make significant inroads in tackling health inequalities, including socio-economic, ethnic and gender inequalities. The vascular checks programme is a key deliverable of the Next Stage Review and has the potential to substantially contribute to key delivery targets for PCTs. It provides an opportunity to strengthen and improve performance in the following areas:

- Better health for all (Public Service Agreement (PSA) 18)
- Reducing health inequalities (PSA 18.2)
- Improving life expectancy (PSA 18.1)
- Reducing mortality from circulatory disease (Spending Review 2004 PSA 1.1 and 6.1).

The programme also supports one of the Department's six strategic priorities for 2008/09 to reduce health inequalities and is a key deliverable of the Next Stage Review.

Not only are these departmental priorities for action, but they are also key Local Area Agreement indicators that many Local Strategic Partnerships have agreed to focus on, particularly in areas of deprivation, to improve the health of the population.

The vascular risk assessment and management programme will also contribute to a number of improving health and reducing health inequality vital signs such as:

- All-age all-cause mortality rate per 100,000 population
- The CVD mortality rate among people under 75 years of age
- Implementation of the stroke strategy
- Smoking prevalence among people aged 16 or over in routine and manual groups
- Healthy life expectancy at age 65
- Proportion of people where health affects the amount/type of work they do.

Intended outcomes

The proposed approach is designed to provide a more joined-up approach to the prevention of coronary heart disease, stroke, diabetes and kidney disease, given the shared risk factors and interventions for their management. The programme is a preventative programme and will help people to remain well for longer.

The programme will help delivery against PSA targets. In addition, in accordance with recent developments in the provision of health and social care, the programme takes a very person-focused approach. It will provide individual, tailored advice depending on the level of risk of developing CVD in the next ten years. For patients at medium levels of risk and above, smoking cessation advice, weight management and exercise programmes are all clinically effective in reducing risk factors, and are highly cost effective when targeted at the right individuals. For patients at higher levels of risk, medication such as statins and antihypertensives, and intensive lifestyle management for impaired glucose regulation, are also known to be clinically and cost effective.

The benefits of this approach would be to:

- offer a real opportunity to make significant inroads into health inequalities, including socio-economic, ethnic and gender inequalities;
- enable more people to be identified at an earlier stage of vascular change, with a better chance of putting in place positive ways to reduce substantially the risk of premature death or disability;
- enable the prevention of type II diabetes or delay onset in many of those at increased risk of this disease; and

- sustain the continuing increase in life expectancy and reduction in premature mortality that may be under threat from the rise in obesity and sedentary living.

Such a programme has the potential to prevent thousands of heart attacks and strokes and save thousands of lives. It could prevent around 4,000 people a year from developing diabetes and detect an estimated 20,000 cases of diabetes or kidney disease earlier, allowing cases to be better managed and improving outcomes. All of these outcomes avoid additional NHS acute services use and costs.

Assessment

Race

The proposed policy is thought likely to impact differently on people on grounds of their race. The differential impact is likely to be positive for ethnic minority groups.

Different ethnic groups experience different rates of vascular disease and, secondly, different racial groups may access different parts of primary care differently.

Wild et al. (2007)* show variations in mortality, particularly for ischaemic heart disease and stroke by country of birth in England and Wales:

"High ischaemic heart disease standardized mortality ratios were observed among men and women… born in Ireland, East Africa, Bangladesh, Pakistan or India, men born in Eastern Europe or the Middle East and women born in Scotland… Cerebrovascular disease mortality was statistically significantly elevated… for women born in Ireland, Scotland, West Africa, Bangladesh, India, Pakistan or the West Indies."

In the UK, mortality from coronary heart disease is 46% higher for men and 51% higher for women of South Asian origin than in the non-Asian population.

The occurrence of diabetes in individuals of South Asian origin is twice that of the general population and the occurrence of chronic kidney disease, which in turn also increases their risk of coronary heart disease, is six times that of the rest of the population. People of African descent are more likely to have hypertension than the white population in the UK, increasing their risk of vascular disease.

* Mortality from all causes and circulatory disease by country of birth in England and Wales 2001–2003. Wild S H, Fischbacher C, Brock A, Griffiths C and Bhopal R. *Journal of Public Health* 2007, 29(2), 191–198.

Additionally, stroke has a 2.2 times higher incidence (adjusted for age and gender) in people of African or Caribbean origin, and we know that men of South Asian origin are also disproportionately susceptible to stroke. Bangladeshi and Pakistani women are reported as having relatively high levels of stroke: 12% and 10% respectively in comparison with the general population equivalent of 9%. There is also evidence that people of different racial or ethnic groups respond unequally to public health campaigns (*Reducing Brain Damage: Faster access to better stroke care.* 2005. National Audit Office). It is also important to note that sickle cell anaemia puts young people of African decent at a higher risk of stroke.

Smoking is a significant factor in the development of vascular disease with a disproportionately high number of Bangladeshi, Irish and Pakistani men smoking: 29% of Pakistani, 30% of Irish and 40% of Bangladeshi men smoke compared with 24% of men in the general population. Additionally, 26% of Irish women smoke compared with 23% of women in the general population, again putting them at higher risk of developing vascular disease.

The Department is preparing guidance to support PCT implementation in a way that tackles their local health inequalities, including inequalities between people of different race. We are also planning to use health inequalities funding to set up and run test bed sites within Spearhead PCTs to look at the best ways of implementing parts of the programme, and to provide training for those who will be undertaking the checks.

The checks themselves are suitable for delivery in almost any setting. If implemented sensitively by PCTs, checks are likely to be made available in places that will help maximise access, and therefore uptake, including pharmacies and other community settings such as mosques, the workplace, community centres and walk-in clinics. The guidance in preparation will include case studies showing how different settings have been used to deliver vascular checks by PCTs and will encourage other PCTs to use a variety of approaches in their roll out.

The requirement will be for PCTs to, over a period of four years, introduce a systematic, integrated programme for their whole eligible population, i.e. those between 40 and 74 years. Those eligible will receive a specific invite to attend a vascular check. The Department is currently developing marketing materials for use by PCTs when writing to high-risk ethnic groups. A research project, based on user groups from high-risk populations, is being run to develop these materials. This, coupled with multiple access points, will help to ensure that ethnic minority groups attend their checks.

How individuals are identified to be invited for their checks will be for PCTs to decide within the first few years of the programme. It is likely that some will do this through GP practice registers that will exclude unregistered populations such as gypsies and travellers, and some migrant populations. Departmental guidance will encourage PCTs to seek out ways of ensuring that these populations are offered a vascular check. Part of this will be the recommendation to conduct effective needs assessments with their constituents to ensure that delivery models are developed jointly with patients and carers so that access and uptake are maximised. NHS Primary Care Contracting is developing two Primary Care Service Frameworks – one on gypsy and traveller populations and one on migrant populations – which, when completed, will be cited to support PCTs in providing vascular checks for these hard-to-reach groups. In the longer term, the Department will need to explore whether it is practically possible for these populations to be incorporated into the national call and recall system as it is developed and, if not, what reasonable steps can be taken to offer these populations a vascular check.

In addition, the national publicity campaign 'Reduce your risk', which we plan to launch next year to raise awareness of the checks and encourage uptake, is currently being developed and we are gathering evidence on how best to target ethnic minorities.

Overall, the aim of the vascular checks programme is to identify the risk of disease, such as diabetes, in high-risk ethnic communities earlier and help to manage and lower their risk through lifestyle interventions or earlier medical interventions. People from South Asian and African populations, who currently have higher levels of vascular disease and vascular risk, will therefore be more likely to benefit from the vascular checks programme, reducing the health inequalities between different racial groups.

Disability

The proposed policy is thought likely to impact differently but positively on people who are disabled.

People with severe mental health problems die on average 5 to 10 years younger than those without, and are more likely to develop vascular disease. Incidences of heart disease, stroke and diabetes are 44%, 88% and 280% higher, respectively, in this group (*A formal investigation into physical health inequalities experienced by people with learning disabilities and/or mental health problems.* 2006. Disability Rights Commission).

The vascular checks themselves are suitable for almost any setting and no specific equipment is needed to adapt the checks for those with a disability. PCTs will be responsible for ensuring that those with disabilities can access their vascular checks when invited to attend and are already responsible for making conscious reasonable adaptations to facilitate this. This responsibility is in relation to those with physical disabilities and making changes to premises providing healthcare to help disabled access, and also to those with learning disabilities and mental health problems. PCTs can refer to the Equality and Human Rights Commission website for further information (www.equalityhumanrights.com). When commissioning the checks and related services PCTs will need to ensure that, in developing provider contracts, they transfer to the contractor the general duty to ensure that there is no direct or indirect discrimination in the manner in which the services are offered and that the provider seeks to promote equality for the duration of the contract. The NHS will be bound independently by the equality duties, but PCTs may contract with private providers with whom they will need to negotiate the equality duties as part of the contractual conditions.

Mental and physical disabilities may limit access to some aspects of the risk management side of the programme. For instance, increasing physical activity to manage risk may be difficult for people who are housebound or unable to participate in group activities. The management of risk of vascular disease is evidence based and physical activity is important here. PCTs will need to consider how they support their disabled population to engage in physical activity where possible. For some disabled people, the increase in exercise possible may not be able to provide the cardiovascular risk reduction that is required. PCTs will need to consider this and ensure that appropriate action is taken. Other aspects of risk management – such as smoking cessation and consumption of fruit and vegetables – are likely to be more accessible and again are important ways of individuals managing their risk.

Schizophrenia is associated with increased levels of vascular disease. However, people with schizophrenia often have less access to primary care services owing to their treatment and their mental health problem may take priority in any medical event over and above their vascular risk.

A systematic and universal roll out of the programme, with multiple access points, will ensure that those with a disability, including those at higher risk, are invited for their check. The Department will provide all of its publicity and educational materials on the vascular checks in other formats, such as audio or large font, upon request to help support people with disabilities to understand the importance of vascular checks and take up their invite. People with disabilities, some of whom currently have higher levels of vascular disease and vascular risk, will be most likely to benefit

from the vascular checks programme, lowering the health inequalities between different groups.

Gender

The proposed policy is thought likely to impact differently, but positively, on people on grounds of gender.

Evidence suggests that men are more likely to experience vascular risk and vascular disease approximately ten years earlier than women. There are also slightly higher rates of vascular disease in men than in women. Stroke is commoner in men (10%) than in women (6%) by the age of 75, but more women (11%) who have strokes die from them in comparison with men (8.4%) (*The Atlas of Heart Disease and Stroke.* 2004. World Health Organization). Vascular checks may lower rates of vascular risk and vascular disease for men more quickly than for women.

Women will also benefit. Early identification and diagnosis of vascular disease can be overlooked in women who are particularly at risk post menopause. This is partly due to women presenting atypically or later than men but also due to greater focus on vascular disease in men. Women with gestational diabetes are at more risk of developing type II diabetes and women who develop pre-eclampsia are at greater risk of having a stroke. The vascular checks programme will help refocus attention on women's vascular risk, including their risk of developing diabetes or having a stroke.

The Department is working with the Men's Health Forum to ensure that Men's Health Week 2009 which this year will focus on risk management – includes the forthcoming vascular checks. We are also working with the Forum to ensure that invitations, patient information leaflets and any publicity material take account of the wealth of knowledge regarding health messages, and how these are received by men and how to improve access. Discussions have again pointed to the importance of different venues such as football stadiums and the workplace to encourage access to healthcare services by men, and these messages will be reinforced in our guidance.

A universal roll out of national policy, but with local delivery tailored to population needs, and the use of campaign materials and venues sympathetic to the needs and preferences of men will help to ensure take-up by men so they have the opportunity to benefit from the vascular checks. This will improve the management of risk in men who tend to have higher levels of vascular disease and vascular risk, and develop the disease earlier.

Transgender

The proposed policy is thought not likely to impact differently on people on grounds of transgender. The reasons for this are that there are not thought to be different levels of vascular risk or vascular disease, or differences in access to primary care and risk management services, between people of transgender and the general population. The risk, however, of those who have changed their sex from male to female may be the same as a male. Additionally, hormones to support those who have changed their sex from female to male may place them at a higher risk. Any calculation and communication of risk will need to be adapted accordingly. The Department is considering how this issue can be addressed in the core dataset that providers will need to collect.

There is some anecdotal evidence that access to GPs is affected by stigmatisation of transgender people. This is not the result of the vascular checks policy but a wider issue of attitudes and prejudice within healthcare, and is not something that can be addressed by this programme.

Age

The proposed policy is thought likely to impact differently on people on grounds of age. The impact is thought to be beneficial.

The economic modelling undertaken by the Department of Health shows clearly that the proposed programme and combination of tests and measurements are both clinically and cost effective for those aged between 40 and 74 years. Comparable evidence is limited in the older population and most people of 75 or older are likely to be in regular contact with their GP and having regular checks made similar to those provided by the vascular checks programme. Existing evidence shows that statins on their own are effective in older age groups and are likely to be prescribed by GPs when seeing their older patients.

The vascular checks programme sets out the tests that must be included for all those between the ages of 40 and 74. Departmental guidance will state that PCTs will want to consider the needs of their local population and whether to offer additional tests, particularly to high-risk groups. For example, some PCTs may wish to carry out blood glucose tests or a serum creatinine test on people younger than 40 in areas with a large South Asian or Afro-Caribbean population. Other elements that PCTs may wish to add could include taking the pulse in older groups to identify atrial fibrillation, the most common arrhythmia, which when identified and managed effectively reduces the incidence of stroke.

Evidence shows, however, that the population as a whole experience higher levels of vascular risk and vascular disease with increased age. The older people get, the more support they need to manage and minimise their risk. The vascular checks programme is therefore likely to have a bigger impact on older people.

Younger people within the selected cohort – although at a lower risk as a population as a whole – have higher levels of dissatisfaction with GP practice access and may be less likely to engage with primary care overall. Vascular checks will have multiple access points enabling people of different ages and with different commitments and preferences to access the checks in a way that is suitable for them.

Religion or belief – culture

The proposed policy is thought likely to impact differently on people on grounds of religion or belief. The reasons for this are that religion or belief may impact on accessibility to existing, informal risk management services.

Religion or belief may, to some extent, impact on the ability to take up certain lifestyle interventions for people with particular beliefs. For example, the advice to increase physical activity by swimming or joining a gym may not be appropriate for a woman following strict Islamic rules about clothing in public. Another example might be that advice to increase consumption of fish to lower cholesterol levels may not be appropriate for people wishing to live a vegetarian or vegan lifestyle.

The vascular checks will, however, provide individually tailored risk management advice that will be adapted depending on a person's religion or belief. For example, Islamic clothing would not prevent someone walking for 30 minutes, five times a week, as currently recommended by the Department of Health to reduce vascular risk.

The proposed policy is unlikely to help eliminate unjustifiable discrimination, eliminate harassment or promote good relations between people of different groups, given the purpose and focus of the programme.

Sexual orientation

The proposed policy is thought not likely to impact differently on people on grounds of sexual orientation. The reasons for this are that there are not thought to be different levels of vascular risk or vascular disease, or differences in access to primary care and risk management services, between people of different sexual orientation.

We have considered whether there are opportunities to promote equality of opportunity that could be taken if the proposed policy were adjusted. We have concluded that the answer is no, because poorer access to primary care and risk management services are not issues for people of different sexual orientation.

Action plan

In the light of the Equality Impact Assessment, we have identified the need to carry out the following further work:

- Collection and analysis of existing statistical data.
- Continue working with the Men's Health Forum to help ensure high uptake of the checks by men.
- Use case studies of different settings in implementation guidance to enhance uptake by people of different ages and ethnic groups and those with a disability.
- Progress plans on the use of health inequalities money.
- Consider transgender people when devising the dataset.
- When deciding which risk assessment tool to use for the vascular checks, we will take into account the factoring of sex and ethnicity in a final risk score.

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