

# NHS England Impact Analysis of implementing NHS Diabetes Prevention Programme, 2016 to 2021

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## 1. Purpose

The purpose of this document is to describe both the estimated resource implications to NHS England of implementing the NHS Diabetes Prevention Programme in England over the next 5 years (2016-2021), and the expected return of the programme in the short and long run.

## 2. Scope

In the Five Year Forward View, NHS England committed to implement a national evidence-based diabetes prevention programme at scale. Plans for a national diabetes prevention programme have been developed in response to this commitment.

The NHS Diabetes Prevention Programme (NDPP) is a joint initiative with Public Health England and Diabetes UK which aims to deliver services, at a large scale, which identify those with non-diabetic hyperglycaemia (i.e those at high risk of developing type 2 diabetes) and offer them a lifestyle intervention encompassing group educational sessions subject to an evidence-based specification to reduce their weight and increase physical activity.

This impact assessment considers the impact of the NDPP on NHS resources and the extent to which the NDPP will improve health outcomes of people at high risk of developing type 2 diabetes.

## 3. Summary

This paper presents a range of estimates to describe the financial and health impacts of the NDPP. The estimates are based on the programme lasting five years with a three year gradual roll-out to expand the programme to 100,000 people per year by the third year of the programme. Any benefits which would be accrued by continuing the programme beyond five years are not included.

The estimates cover a range of scenarios, modelling the impact of a variety of provider costs for the intervention, and a series of effectiveness estimates for the programme. The results are all based on the detailed analytical model created by the University of Sheffield's School for Health and Related Research (SchARR). The intervention costs used in the analysis were based on an estimated range prior to

prices being finalised. A revised Impact Analysis incorporating actual provider prices will be produced before the end of the year to inform the business case for investment in 2017/18.

Based on a medium end average cost<sup>1</sup> of £270 per participant enrolled (equivalent to an estimated tariff (or core price)<sup>2</sup> of approximately £435 for each participant who completes the programme), and base case effectiveness assumptions (from the SchARR model), the total gross cost for a five year cohort of 390,000 participants, excluding implementation and support costs, is estimated to be £105 million<sup>3</sup> over five years. The programme would yield net positive economic returns (taking into account health gains) from year 8, and would financially break even (be cost saving) at year 14.

By the end of the 5th year of the programme, the model estimates that 18,000 cases of diabetes will have been prevented or delayed among this five year cohort of 390,000 participants. Out of those attending the first session of the programme this represents around 1 in 20 high risk cases of diabetes being prevented<sup>4</sup>. Assuming base case effectiveness, for every 100,000 people enrolled in the NDPP the cumulative impact over the following 5 years is approximately 4,500 diabetes diagnoses prevented or delayed.

Over a 20 year horizon the net cumulative financial impact of the NDPP is a saving in the region of £35 million<sup>3</sup> (excluding implementation, support, and local costs). Over this 20 year horizon the cumulative direct health benefits of the programme are estimated to be 18,000 Quality Adjusted Life Years (QALYs) saved relative to the do-nothing (undiscounted and not taking into account additional QALY gains from NHS savings).

Taking the example of a £270 average cost over 20 years, valuing any estimated cost savings to reflect the additional benefits of health care expenditure in terms of saved lives made possible by the reduced demand for NHS resources, the overall undiscounted economic net benefit estimated is £1.2bn (£967m discounted) for the 5 year cohort. A £1.2bn net benefit (£967m discounted) implies that the programme modelled in this assessment will be more cost effective at saving QALYs than other NHS services (at the margin).

Using the lowest average cost estimate (£155) and the highest effectiveness assumption (the 'best case' scenario), the programme would yield net positive

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<sup>1</sup> Average cost = the actual cost that the commissioner would pay to the provider taking account of the expected drop-off rate. The actual cost to NHS England would vary dependent on the success of providers in retaining participants: low success/retention = lower average cost; and success/high retention = higher average cost.

<sup>2</sup> Tariff or "core price" = the theoretical cost per person that the provider is paid for every participant who completes the intervention. This does not take account of the expected drop off rate.

<sup>3</sup> Assuming constant prices, undiscounted

<sup>4</sup> This includes participants who drop out of the intervention before completion hence will understate the actual treatment effect of the whole programme.

economic returns (taking into account health gains) from year 6, and would be cost saving at year 9.

Using the highest average cost estimate (£350) and the lowest effectiveness assumption (the 'worst case scenario'), the programme would yield net positive economic returns (taking into account health gains) from year 11, but would not reach a point at which it would be cost saving.

If the higher effectiveness estimate is applied the number of cases of diabetes prevented or delayed among the cohort of 390,000 participants would be 24,000. Given that the NDPP will be closely aligned to NICE guidelines it may be possible for the programme to achieve this higher level of effectiveness. Furthermore, if the effectiveness rates seen in the Finnish Diabetes Prevention Study [1] are applied to the anticipated NDPP cohort of 390,000 participants, an estimated 29,000 cases of diabetes would be prevented or delayed.<sup>5</sup>

#### **4. What is the problem under consideration and why is government intervention necessary?**

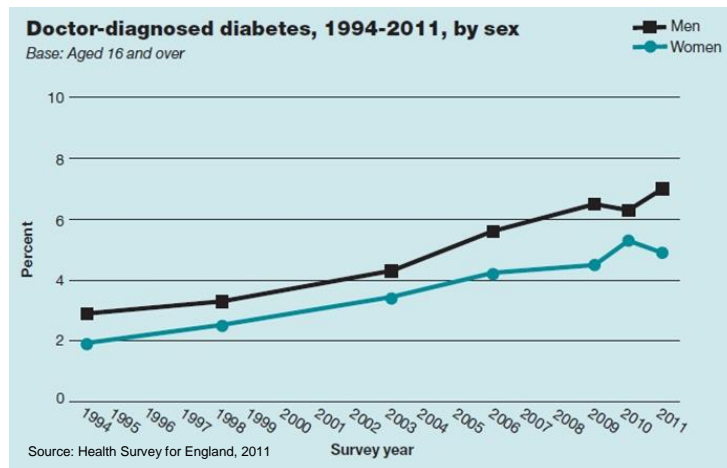
In 2013, 2.7 million or 6% of the adult population in England had diagnosed diabetes [2], of whom approximately 90% had type 2 diabetes [3]. In addition an estimated 500,000 people had type 2 diabetes but were undiagnosed [4], and a further 5 million people were at high risk of developing type 2 diabetes [5].

The prevalence of diagnosed diabetes has increased significantly over the past two decades from 2.9% of men in 1994 to 7.0% in 2011, and from 1.9% of women in 1994 to 4.9% in 2011 [6]. The prevalence of undiagnosed diabetes has followed a similar trend (Figure 1) [6]. These rising trends are expected to continue with the number of adults with diabetes projected to rise to 4.6 million by 2030 [2].

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<sup>5</sup> Based on retention assumptions of 50% of the cohort being retained for at least 75% of the intervention programme and therefore receiving maximum benefit from the intervention, and absolute risk reduction of 15% reported in the Finnish Diabetes Prevention Study.

Figure 1:



The costs of treating diabetes are significant, estimated at over £8 billion a year in the UK, with approximately 80% of these costs associated with the treatment of complications, including cardiovascular disease, amputations, renal failure and sight loss [7].

- In 2012-13 there were 50,000 hospital admissions in England with a main diagnosis of diabetes [7]
- People with diabetes are five times more likely to have heart disease or a stroke than someone without [2]
- Diabetic retinopathy is the leading cause of preventable sight loss in people of working age in England and Wales [2]
- Diabetes is the single most common cause of end-stage renal (kidney) failure, requiring dialysis or a transplant [8]
- Depression is nearly twice as high among people with Type 2 diabetes than those without the condition [2]
- There were 4,974 deaths in England and Wales in 2013 for which diabetes was the underlying cause [9]
- There were 236 avoidable deaths in England and Wales in 2013 for which diabetes was the primary cause [10]
- In 2013 there were 23,986 premature deaths in England and Wales due to diabetes [18]

Non-diabetic hyperglycaemia, also known as pre-diabetes or impaired glucose regulation, refers to raised blood glucose levels, but not in the diabetic range. People with non-diabetic hyperglycaemia are at increased risk of developing type 2 diabetes. They are also at increased risk of other cardiovascular conditions.

Recent analysis for the NDPP by the National Cardiovascular Intelligence Network has estimated prevalence of non-diabetic hyperglycaemia in England at 10.7%.

Risk factors for type 2 diabetes and non-diabetic hyperglycaemia include genetic factors, age and ethnicity (Figure 2), however a large proportion of cases are associated with modifiable risk factors, particularly obesity (Figure 3).

Figure 2: Prevalence on non-diabetic hyperglycaemia and type 2 diabetes in Health Survey for England (2009-2013) population by age and ethnicity

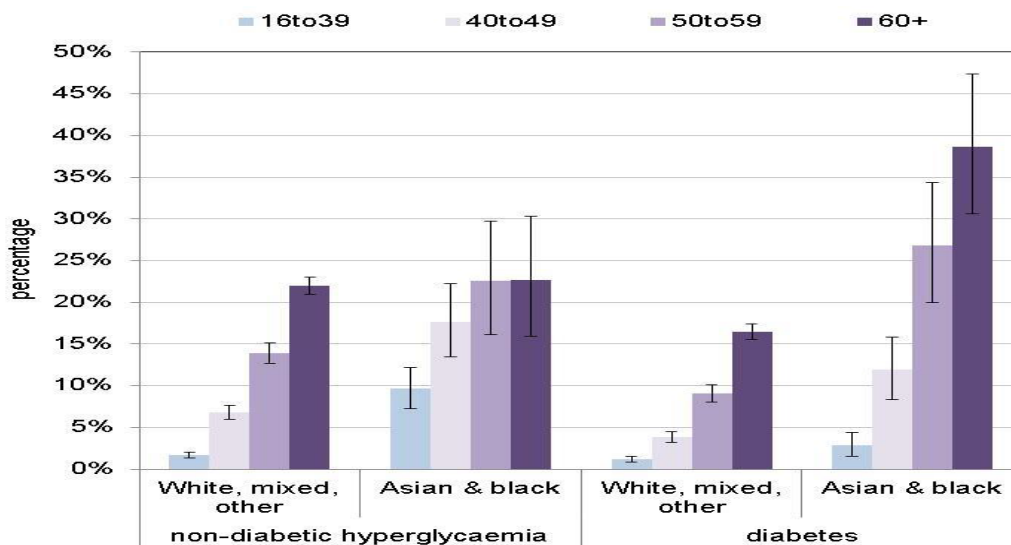
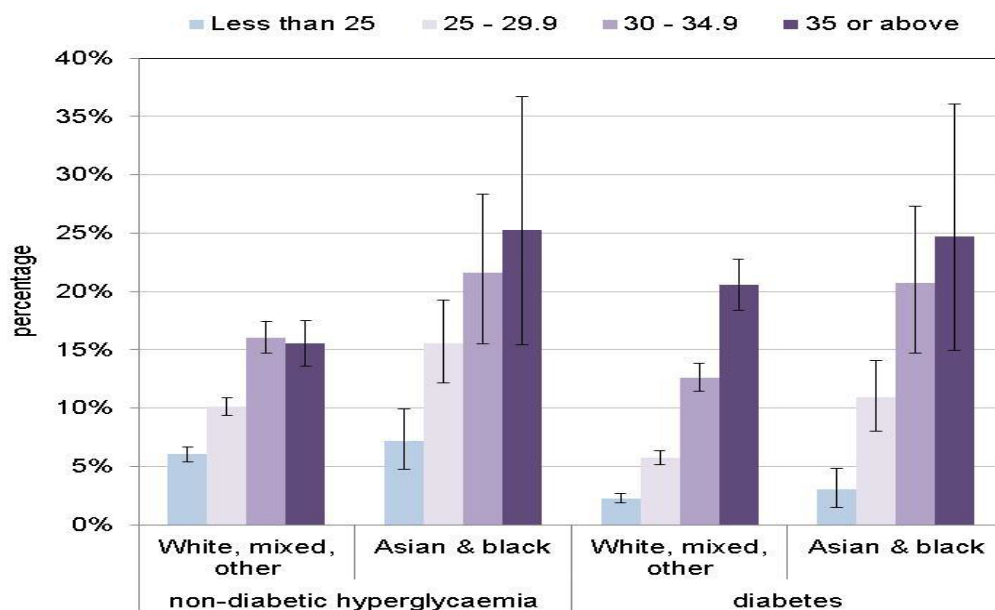


Figure 3: Prevalence on non-diabetic hyperglycaemia and type 2 diabetes in Health Survey for England (2009-2013) population by body mass index and ethnicity



90% of people aged 15-54 with diabetes are overweight or obese [2]. The risk of developing diabetes is seven times greater for people who are obese, and three

times greater for those who are overweight, compared to those of a healthy weight [8].

There is therefore potential to prevent or delay a large number of cases of diabetes by addressing modifiable risk factors such as overweight and obesity, before people develop the disease.

The risk of developing type 2 diabetes is far greater among some groups in the population. People from Black African and Caribbean backgrounds are three times more likely, and people of South Asian heritage are six times more likely, to develop type 2 diabetes, compared with white Europeans [2]. Type 2 diabetes affects people from these backgrounds a decade or more earlier than white Europeans [9].

As the increased risk of type 2 diabetes associated with obesity is so great, the rising prevalence of obesity has led, and will continue to lead, to a rise in the prevalence of non-diabetic hyperglycaemia and diabetes [2]. The proportion of people who were categorised as obese increased from 13% of men in 1993 to 24% in 2012 and from 16% of women in 1993 to 25% in 2012. It has been estimated that if current trends continue, by 2050 obesity will affect 60% of adult men and 50% of adult women [2]. The number of adults with diabetes is projected to rise to 4.6 million by 2030. Approximately a third of this increase is attributable to obesity, whilst the rest is due to aging and the changing ethnic structure of the population [2].

There is good international evidence from multiple randomised control trials for the effectiveness of intensive lifestyle intervention programmes to prevent or delay type 2 diabetes in at risk populations. Despite this evidence, such programmes have not been systematically implemented in England. The NDPP is seeking to ensure that such interventions are available throughout England in order to slow the rising trend in incidence of type 2 diabetes.

## **5. What are the objectives and intended effects of the NDPP?**

The objectives the NDPP is aiming to achieve are:

- More people at high risk of developing diabetes will receive lifestyle interventions to support them to lower their risk
- The increase in incidence of type 2 diabetes will slow down compared with current predictions, and
- The incidence of heart, stroke, kidney, eye and foot problems (and associated mortality) related to diabetes will reduce compared with current predictions

The key measures of success for the programme will be:

- Retention of people on the programme
- Weight reduction in participants of the programme
- Risk reduction in participants of the programme measured via blood test

- Reduction in the incidence of type 2 diabetes

## **6. Evidence base for this type of programme/intervention**

There is strong evidence, from randomised control trials and systematic reviews, of the effectiveness of lifestyle intervention programmes (comprising diet and physical activity interventions) in preventing or delaying the development of type 2 diabetes in people at high risk of developing the condition.

A 2007 systematic review and meta-analysis of randomised control trials (RCTs) by Gilles et al. [10] demonstrated a 49% relative reduction in risk of developing type 2 diabetes in trial intervention arms compared with control arms. This systematic review, which informed the NICE guideline on preventing type 2 diabetes, also reported results for a small number of RCTs which included longer term follow up of participants. These studies demonstrate the potential longer term impact of NDPP-style interventions. For example, the Finnish RCT reported that at the 6 year follow up point the cumulative incidence of diabetes was 38% in the control group, and 23% in the intervention group; an absolute reduction in risk of type 2 diabetes of 15% [1].

The effectiveness of lifestyle intervention programmes has also been reported in systematic reviews and meta-analyses of translational studies, exploring whether such programmes are effective in real world settings. For example, Dunkley et al. [11] found that translational diabetes prevention programmes significantly reduced body weight among participants in their intervention arms by a mean 2.3 kg at 12 months of follow-up. In addition, in the more limited number of studies where these data were available, significant reductions were reported in other diabetes and cardiovascular risk factors, including blood glucose, BP, and some cholesterol measures. This study was used to in the economic model of the NDPP undertaken by SchARR, which has informed this impact assessment.

A further rapid review [12] commissioned in 2015 to inform the NDPP concluded that programmes similar to the NDPP can reduce incidence of type 2 diabetes among those who receive a diabetes prevention programme by 26% compared with those receiving usual care. People supported by diabetes prevention programmes lose on average 1.57kg more weight than those not on a programme aiming to significantly reduce diabetes risk. NICE guidelines [13] recommend that people at high risk of developing type 2 diabetes are offered referral to a local, evidence-based, quality-assured intensive lifestyle-change programme. Such programmes should offer ongoing tailored advice, support and encouragement to help people increase their levels of physical activity, improve diet and gradually lose weight to reach and maintain a BMI within the healthy range.

## 7. Procurement, provider payment and tariffs

### 7.1. National procurement

The provision of evidence based intensive lifestyle interventions is central to the implementation and delivery of the programme. A proposal for a national procurement was approved in principle by the Prevention Board on 10th March 2015, on the basis that there is currently only limited provision of services providing evidence-based lifestyle interventions. These interventions are more intensive than existing Tier 2 weight management services and designed specifically to reduce diabetes risk, rather than primarily to deliver weight loss. A national procurement enables NHS England to directly manage the development of the market, to ensure consistently high standards of quality and to deliver the new service at pace.

The procurement will put in place a framework agreement that will set the ceiling price for the delivery of diabetes prevention services against the national specification. NHS England will work with CCGs or groups of CCGs to run competitive mini competitions to procure the services to deliver locally specific diabetes prevention programmes.

### 7.2. Provider payment

The framework contract will incorporate the payment mechanism setting the ceiling (i.e. maximum) rate of payment for the delivery of a course of interventions to an individual. The rationale for this approach to pricing is that it introduces competition at the point where a contract is awarded for a particular area and enables local market forces requirements to be taken into account. Therefore the actual cost for delivery of a course in any given area may be lower than the ceiling price.

Providers will be paid according to their tariff (core price) (per participant) for complete delivery of a course. The tariff is the theoretical cost per person that the provider is paid for every participant who completes the intervention. This does not take account of the expected drop off rate. It is expected these tariffs may vary year by year as the provider learns and introduces efficiencies.

A key objective of the payment mechanism is to incentivise providers to retain participants on the programme of intervention and to encourage as many as possible to complete the full programme. This objective will be incorporated into the payment mechanism in two ways:

Staged Payments: it is proposed to make staged payments for those participants who complete defined milestones on each course. The desire is to weight the payments to be made at each milestone to encourage providers to actively engage participants to keep them attending the course. A number of profiles of staged payments were considered but the data to assess the implications of different



profiles is not available and it was therefore decided to propose a flat weighting across the programme milestones, as shown in *Figure 4*.

*Figure 4: Expected payment stages*

Milestone	Registration	25% of interventions complete	50% of interventions complete	75% of interventions complete	100% of interventions complete
% of payment per milestone	20%	20%	20%	20%	20%

During the selection of the framework providers, bidders will have the opportunity to modify the payment made at each stage, potentially taking on more commercial risk in relation to the retention of participants.

Participant Retention: The retention of the participants will be an important driver to the success of the service and the payment mechanism needs to account for the number of participants that the providers are able to retain through-out the programme and complete the course of interventions. The following milestones will be used to determine when a stage is completed and payment made:

Milestone 1: An appropriate referral has been accepted onto a course (registered) and attended the first (face to face) meeting.

Milestone 2: 25% of the planned course time will have passed (eg. 3 months if a 12 months course length is proposed).

Milestone 3: 50% of the planned course time will have passed (eg. 6 months if a 12 months course length is proposed).

Milestone 4: 75% of the planned course time will have passed (eg. 9 months if a 12 months course length is proposed).

Milestone 5: 100% of the planned course time will have passed (eg. 12 months if a 12 months course length is proposed).

A participant will be deemed to have achieved a milestone, if that participant has attended 75% of the planned interventions due to have been delivered by that time. This permits participants to miss a few interventions due to other personal commitments but still meet a milestone. This also allows the provider of the service to recover milestone payments if they encourage an individual to return to the course and complete at least 75% of the activities by the next milestone.

Retention evidence is limited but expert opinion, drawn from experience of delivering similar services, indicates the overall retention from registration to the completion of intervention programmes is expected to be around 20%, with the following profile over a 12-18 month period, as shown in Figure 5.

Figure 5: Retention evidence to date for intervention programmes

Milestone	Registration	25% of interventions complete	50% of interventions complete	75% of interventions complete	100% of interventions complete
Participant Retention Rate	100%	75%	65%	50%	20%

In call-off contracts and throughout the service delivery, the agreed tariff rates in addition to the actual participant volumes, retention and payment stages will form the amount that the NHS England need to pay providers.

The tariff (core price) is the cost of a single participant completing the whole course. This is converted to average cost per participant by taking into consideration the assumed retention rate and the profiling of staged payments. This effectively means that the actual cost to NHS England will be dependent on the success of providers in retaining participants. Low success in participant retention implies a lower average whereas more success in ensuring high retention of participants implies a higher average cost.

## 8. NDPP financial assessment

The financial modelling estimates the **additional** financial costs and the **additional** savings of the NDPP compared with no intervention. These costs are calculated 20 years into the future. Whilst this enables us to observe the longer term impacts, it is worth noting that the level of uncertainty in our estimates increases with the forecast period. The financial modelling assumes that the NDPP is implemented with a three-year roll out with full roll-out achieved at the end of year 3 of the programme, and sustained for the following 2 years **only**, as follows: Year 1, 30,000 enrolled; Year 2: 60,000 enrolled; Year 3, 100,000 enrolled; Year 4, 100,000 enrolled, Year 5 100,000 enrolled.

### 8.1. Rationale for overall programme capacity (100,000 enrolled/year)

Initial modelling undertaken for the programme estimated that if the NHS Health Check programme is offered to 20% of the population aged 40-74 each year, and 49% take up the offer of a Health Check, then, based on the Impact Assessment for the NHS Health Check (undertaken for Department of Health in 2010), 136,000 people could be identified as eligible for the programme each year. Using an estimate of the likely uptake rate for the intervention of 37% (of those identified as being at risk via the NHS Health Check), the number of people who could be enrolled on the intervention through this route was estimated to be approximately

50,000 people per year by 2019/20. This assumes a 10% year on year growth in uptake of the NHS Health Check, based on PHE projections, and the introduction of validated identification tool for diabetes risk in place of the current NHS Health Check diabetes filter. It is now believed that these assumptions may over-estimate the numbers identified via the NHS Health Check as the diabetes filter has not yet been changed and there is uncertainty about whether the projected growth in uptake will be achieved.

Many people at high risk of type 2 diabetes will not be eligible for an NHS Health Check due to pre-existing cardiovascular conditions. However, these people may be identified as part of routine care in general practice, and in some cases may be on a general practice register for people with non-diabetic hyperglycaemia. If each CCG was able to identify 250 people who could be enrolled on the programme each year, this would secure an additional 50,000 participants in the programme per year.

Data from NDPP demonstrator sites suggest that across the demonstrator sites where GP registers for non-diabetic hyperglycaemia have been established the mean rate of patients on GP registers per 1000 population aged 40-74 is 50. Based on an average CCG population aged 40-74 of 104,000 [14], an average-sized CCG could potentially have 7,000 people on GP registers for non-diabetic hyperglycaemia; therefore, the expectation that an average sized CCG could identify 500 people per year (through the NHS Health Check or GP registers) to be enrolled on the programme seems reasonable. We will revise these figures as more data is received from the demonstrator sites.

Uncertainty about uptake and retention rates, due to a lack of available data from similar programmes, is a limitation in modelling the likely impacts of the programme, and is a key risk to the implementation of the programme. A further route through which it may be possible to recruit people to the programme is through providers being able to recruit the public directly (rather than via an NHS Health Check or GP referral). Providers have been asked to provide costs for delivering the programme in this way in their tender submissions, however direct recruitment approaches are not covered by this impact assessment due to lack of information about costs and benefits.

## **9. NDPP modelling**

### **9.1. Previous NDPP modelling**

At the start of the NDPP programme, a model was developed to calculate the costs and impacts of the programme based on the RCT evidence that NDPP interventions could delay the onset of diabetes. It assumed that one in ten people who attended a NDPP lifestyle intervention had some benefit, and that, based on RCT evidence, onset of disease was delayed by 4 years on average. Estimates of the annual cost of

treating diabetes were taken from the published evidence and from Department of Health modelling undertaken for the NHS Health Check impact assessment in 2010. The cost of the intervention was based on the NICE guideline on diabetes prevention published in 2012 [9], which gave an upper limit for the unit cost of a NDPP programme of £310 (for the NDPP programme the cost of the intervention will be determined through the procurement process).

This initial modelling provided a basic estimate of the scale of cost savings for the programme. The savings were initially calculated using the average cost of diabetes, however, the first years of treatment of diabetes are likely to be well under average cost. The initial savings estimates are therefore likely to be an over estimate. In addition, the cost savings depend on whether the delay in onset of disease delays all further stages of diabetes progression as patient ages or whether disease progression “catches up” as a person ages. Given the simplified assumptions and uncertainties in the initial modelling, a more robust model, based on changes in metabolic risk rather than an average delay in disease progression only, was commissioned.

## **9.2. Commissioned analysis**

NHS England commissioned a financial model from the University of Sheffield School of Health and Related Research (SchARR) to forecast the financial costs and health impact of the NDPP. This analysis was based on an existing disease progression and cost-effectiveness model for type 2 diabetes that had been extensively peer-reviewed and widely published by the research team and used by NICE. The analysis used NDPP-specific inputs and assumptions based on the best available evidence and on evidence-based projections for the programme.

## **9.3. Brief description of the model and the analysis used to inform the NDPP Impact Assessment**

The SchARR model is a disease progression and cost-effectiveness model for type 2 diabetes, which was specifically developed to be capable of evaluating a wide range of prevention interventions within a single framework. The model is a patient simulation model of individual risk of developing diabetes based on metabolic factors including body mass index (BMI), systolic blood pressure (SBP), cholesterol and measures of blood glucose (including HbA1c). The baseline population consists of a representative sample of the English population without pre-existing diabetes.

The model assumes that the eligible population for the NDPP matches the eligible population for the NHS Health Check. NHS Health Checks are targeted at all individuals aged between 40 and 74 without pre-existing cardiovascular disease and not already treated with anti-hypertensives or statins. It is assumed that each year 20% of individuals in the eligible group are invited for a Health Check and risk of diabetes is assessed. Those assessed as high risk are offered a blood test and

confirmatory blood test if diabetes is suspected. Those confirmed to be at high risk are offered a diabetes prevention lifestyle intervention. If they take up the intervention, their risk factors (BMI, blood pressure, cholesterol and HbA1c) reduce and they are less likely to develop diabetes or the complications associated with diabetes.

The full effectiveness of the intervention is applied in the first year only, then assumed to decline linearly, reaching zero effect after five years.

### **9.3.1. Estimates of intervention effectiveness**

The estimates for reduction in BMI, blood pressure, cholesterol and HbA1c in the SchARR model were based on data published in a systematic review and meta-analysis of pragmatic studies of interventions similar to the NDPP [11]. The majority of the studies included in this review were undertaken on an intention-to-treat basis meaning that these studies estimated the average effectiveness of the intervention for all participants in the intervention groups who started the intervention, regardless of whether or not they completed it<sup>6</sup>. Therefore the base case analysis undertaken for the NDPP programme assumed that the model estimated the average health benefits and cost savings for all participants who started a NDPP intervention, including those participants who dropped out before the end of the programme.

The same study reported an average weight loss of 2.32kg across all included studies. A sensitivity analysis was undertaken that assumed no change in weight for those with missing data (i.e. those who had not completed the programme) in studies that were not performed on an intention to treat basis. This analysis suggested that average weight loss could be 0.5kg lower than average weight loss in the primary analysis. This suggests that the effectiveness data used in the SchARR model may overestimate the effectiveness that would be expected for the NDPP. To take account of this, a second scenario was modelled that assumed a 25% lower effectiveness rate than the base case scenario. This assumes that there is a reduction equivalent to the weight reduction in the other metabolic factors modelled (blood pressure, cholesterol and HbA1c).

The systematic review also reported analysis showing that adherence to published guidelines on NDPP interventions increased effectiveness<sup>7</sup>. As the NDPP will be

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<sup>6</sup> Twenty-two of the twenty-five studies reported in the systematic review were rated + or ++ on the intention-to-treat quality criteria, and three were not rated. None of the studies were given a minus rating. (Dunkley, Bodicoat et al 2012)

<sup>7</sup> The systematic review assessed the extent to which the interventions in the included studies adhered to evidence-based guidance (Dunkley, Bodicoat et al 2012) The authors reported that fourteen of the 25 included studies attained an overall score of  $\geq 9$  out of a possible 12 in relation to meeting NICE guideline recommendations. Adherence to guidelines was significantly associated with a greater weight loss (an increase of 0.4 kg per point increase on a 12-point guideline-adherence

based on a service specification that adheres closely to NICE guidelines, it is possible that the base case may underestimate the effectiveness of the intervention since the effectiveness estimates were derived from a meta-analysis that included studies that did not adhere closely to NICE guidelines. To take account of this, a third scenario was modelled that assumed a 25% higher effectiveness rate than the base case estimate.

In summary, we provide the following sensitivity estimates around the effectiveness of the intervention:

1. Base case
2. 25% less effective
3. 25% more effective

#### **9.4. Setting the tariff and calculating the average cost for the intervention**

Section 7 describes the procurement, provider payments and tariffs for the NDPP. The tariff (core price) is the cost of a single participant completing the whole course. The average cost per participant takes into consideration the assumed retention rate and the profiling of staged payments. The SCHARR modelling requires the average cost as an input to the model. We have not yet received bids from providers so we do not yet know what the tariff or average cost will be, however we have modelled three scenarios based on the evidence available to us which represent a low, medium and high scenarios for the cost of the programme. When the bids have been submitted, further analysis will be undertaken to present the impact of costs based on the prices submitted. We anticipate that these will lie within the range of costs presented in this paper.

## **10. Costs and benefits**

### **10.1. Costs associated with programme implementation**

In addition to the intervention costs described above, there will be additional costs associated with implementing the NDPP at scale across England. The estimated cost of implementing the programme over the 3 year roll out period (2016/17 – 2018/19) is £8,350,000. Beyond the first 3 years it is estimated that the ongoing cost of supporting the programme will be £1,300,000/year. The breakdown of these costs is summarised in Table 1, and outlined below.

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scale). A 25% increase in effectiveness of the NDPP would equate to an average weight loss of 2.9kg (baseline 2.32kg)

**Table 1: NHS NDPP Implementation Costs (excluding intervention costs)**

	Costs (000s)(£) 2016 - 2021					
	2016/17	2017/18	2018/19	2019/20	2020/21	Total cost
Contract management and coordination	500	500	500	500	500	2500
Quality assurance	150	300	500	500	500	1950
Regional support	300	300	300	300	300	1500
Funding to support local implementation	1,500	1,500	2,000			5,000
<b>Total</b>	<b>2,450</b>	<b>2,600</b>	<b>3,300</b>	<b>1300</b>	<b>1300</b>	<b>10,950</b>

### **10.1.1. Contract management and quality assurance**

Robust monitoring of the programme will be important to ensure

- The contracted provider(s) are delivering the service according to the service specification
- Local health economies are identifying and referring into the programme appropriately
- The programme is meeting the needs of the target population

We envisage that contract management for the programme will be provided by a Commissioning Support Unit. This will include day-to-day management of contracts with providers, overseeing the submission of management data by providers, and providing collated data for assurance and evaluation purposes. The estimated cost of this contract management function is £500,000 per year.

In addition, we anticipate that quality assurance of providers will cost £150,000 in year 1, and £500,000 per year at full roll out. This is based on the assumption that a random sample of 5% of all cases enrolled by a provider will be subject to review to verify participant engagement and outcomes, and that the cost to the contract management function of undertaking or arranging a review will be up to £100 per case.

### **10.1.2. Support for local delivery of the programme**

Regional Support : Implementation support at regional level will be needed to support the implementation of the programme in local health economies. The estimated cost of this support is £1.5m<sup>8</sup> over 5 years. This is based on four regional

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<sup>8</sup> £75,000 per NHS England region per year

leads being appointed within NHS England regions to support liaison between the central programme team and lead partner CCGs and local authorities.

Support for local health economies: Local health economies were invited to express an interest in delivering the first wave of the programme. More than 60 expressions of interest were received (many from groups of CCGs and local authorities collaborating together) and around 27 of these are expected to join the programme in 2016/17. The areas selected to work with the programme cover just over 1/3 of the England population. It is envisaged that by the end of 2017/18 the programme will be available in areas covering 2/3 of the population, and that 100% coverage will be achieved by the end of 2018/19. Local health economies participating in the programme will need to put systems in place to ensure that people identified through these mechanisms can be referred to the programme and followed up. This will include:

- Establishing referral mechanisms including safe transfer of data between local referrers and the national provider.
- Establishing practice registers for people with non-diabetic hyperglycaemia.
- Auditing practice databases and offering referral to people who already have a blood glucose reading in the relevant range.

Local Authorities (as NHS Health Check commissioner) and Clinical Commissioning Groups (as co-commissioners of primary care, and in their quality improvement role) will be responsible for putting these arrangements in place. To support implementation additional funding will be provided for each area (or group of areas where a joint expression of interest has been submitted) to support this work in the year that they join the programme. It is proposed that in 2016/17 £1.5 million will be made available to support implementation across the areas joining the programme. Estimated costs assume that this cost would only be incurred in the first year of participation in each area.

### **10.1.3. Evaluation**

Whilst there is good evidence from randomised control trials for the effectiveness of intensive lifestyle interventions to prevent type 2 diabetes, it is essential that the programme is evaluated to demonstrate the outcomes achieved when such programmes are made available at scale, for all members of the population who are at high risk of type 2 diabetes. Evaluation costs will be met by other organisations, rather than NHS England, and are therefore not included in this Impact Assessment.



## 10.2. Financial costs and benefits of the NDPP

We present three scenarios for the NDPP financial assessment. Each scenario represents a different average cost (and tariff) paid to providers per participant. These are as follows:

Scenario 1 – a low end average cost of £155 (equivalent to an estimated tariff of approx. £250)

Scenario 2 – a medium end average cost of £270 (equivalent to an estimated tariff of approx. £435).

Scenario 3 - a high end average cost of £350 (equivalent to an estimated tariff of approx. £560)

Each scenario table presents the following key estimates:

- Number of individuals enrolling on the programme
- Programme intervention costs (i.e. average cost paid to provider per participant x No of participants)
- Impact on NHS costs depending on effectiveness of programme
- Implementation and support costs of programme (these are specified in more detail in the previous section)
- The overall net financial cost of the programme, both excluding and including implementation and support costs

Negative figures represent savings. Tables 2-4 show detailed breakdowns of costs for each year of the programme, which assume that all intervention costs (ie payments to DPP providers) are incurred in the year in which a participant is enrolled in the programme,<sup>39</sup> In reality participant involvement in the programme may span multiple years, however we do not yet have information on provider payment schedules or retention rates which would allow more detailed annual cost calculations to be undertaken.

### **Scenario 1: Average cost of £155/Tariff price of £250, 3 year roll-out**

We take the low end average cost of £155 (equivalent to tariff £250) and apply it to the 3-year roll-out. The annual and cumulative cost/savings projections for the next 20 years can be seen in Table 2.

The gross financial cost of the NDPP (undiscounted, constant prices and excluding implementation costs), assuming an average cost of around £155, for a planned five year cohort of 390,000 participants in total was estimated to be just over £60m (£70m including estimated implementation and support costs).

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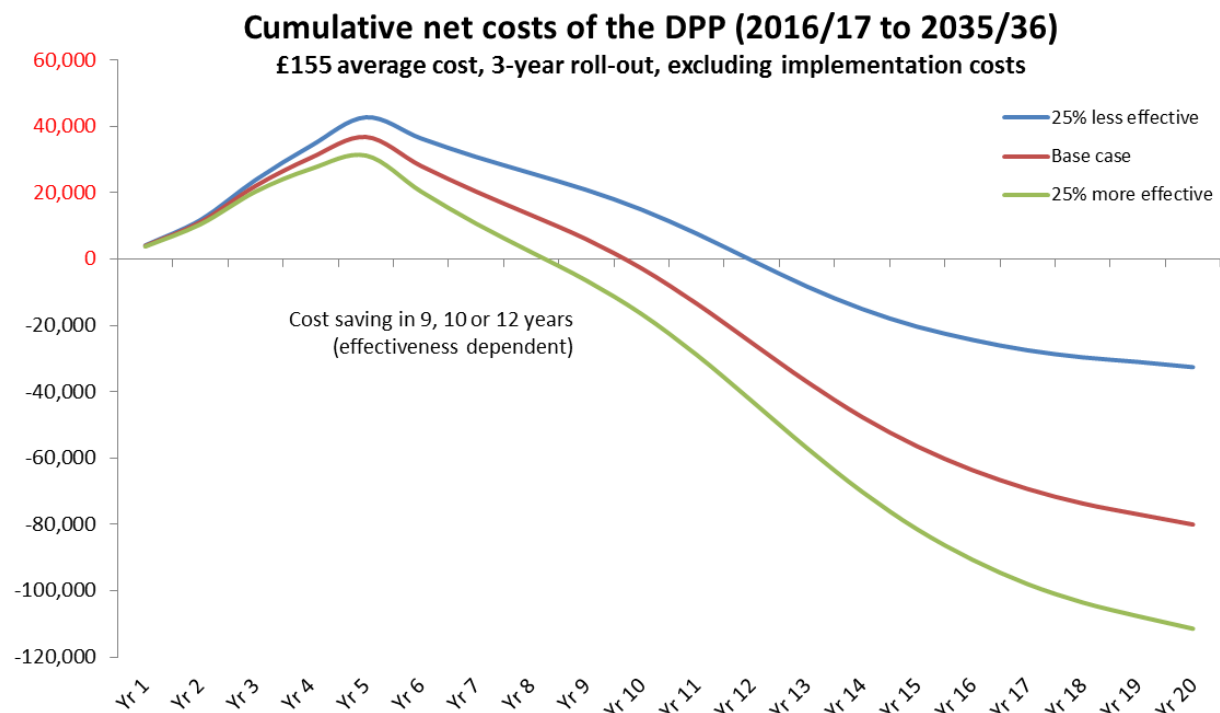
<sup>9</sup> For discounted costs and savings please look in Appendix 2

The gross anticipated savings to the NHS from improved outcomes during this period lie in the range £18m-£29m depending on programme effectiveness.

The net cost to the NHS over five years is, therefore, anticipated to be £31m - £43m (£41m-£53m including implementation and support costs).

Figure 6 shows the cumulative financial impact over 20 years. Over this period this scenario is cost saving as the impact of reduced NHS resource use extends further than 5 years. Total net savings lie in the range £33m-£111m over this period depending on programme effectiveness (£24m – £103m including estimated implementation and support costs). Depending on programme effectiveness, the intervention achieves a cumulative cost saving position in years 9-12 of the NDPP.

Figure 6: Scenario 1 - cumulative cost/saving profile of £155 average cost excluding implementation costs



**Scenario 2: Average cost of £270/Tariff price of £435, 3 year roll-out**

Under scenario 2 providers are paid medium end average cost of £270 (equivalent to an estimated tariff of £435). This is the average cost required to achieve break-even in 10-15 years under a three year roll-out. The annual and cumulative cost/savings projections for the next 20 years can be seen in Table 3.

The gross financial cost of the NDPP (undiscounted, constant prices and excluding implementation costs), assuming an average cost of around £270, for a planned five year cohort of 390,000 participants in total was estimated to be just over £105m (£115m including estimated implementation and support costs).

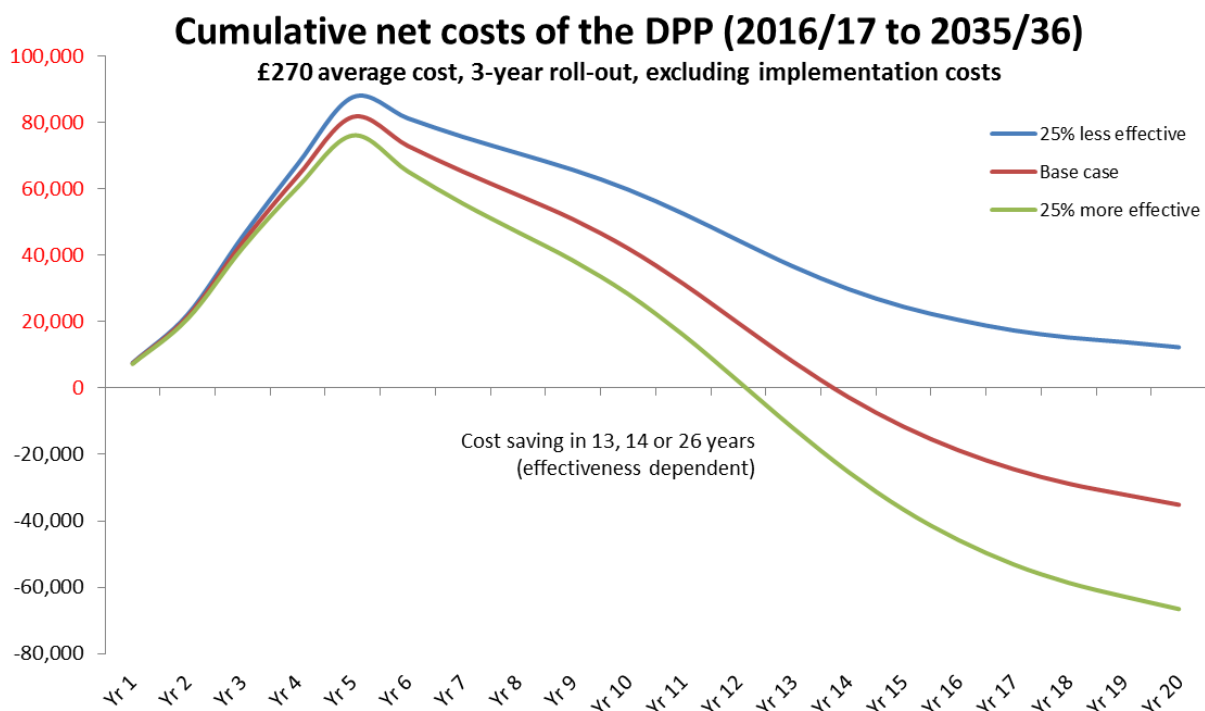
The gross anticipated savings to the NHS from improved outcomes during this period lie in the range £18m-£29m depending on programme effectiveness.

The net cost to the NHS over five years is anticipated to be £76m - £88m (£86m-£97m including implementation and support costs).

Figure 7 shows the cumulative financial impact over 20 years. Over this period this scenario is cost saving in both the base and higher effectiveness cases. Cost saving is achieved in years 14 and 13 respectively. In the lower effectiveness case, a cumulative cost saving position is reached in the 26<sup>th</sup> year.

Total net savings lie in the range -£12m (i.e. a net cost) to £67m over this period depending on programme effectiveness (-£22m to £57m including estimated implementation and support costs).

Figure 7: Scenario 2 - cumulative cost/saving profile of £270 average cost excluding implementation costs



### **Scenario 3: Average cost of £350/Tariff price of £560, 3 year roll-out**

As a high end scenario, providers are paid £350 as an average cost (equivalent to an estimated tariff of £560). This is the average cost required to achieve break-even in 15-20 years under a three year roll-out. The annual and cumulative cost/savings projections for the next 20 years can be seen in Table 4.

The gross financial cost of the NDPP (undiscounted, constant prices and excluding implementation costs) assuming an average cost of around £350, for a planned five year cohort of 390,000 participants in total was estimated to be £137m (£146m including estimated implementation and support costs).

The gross anticipated savings to the NHS from improved outcomes during this period lie in the range £18m-£29m depending on programme effectiveness.

The net cost to the NHS over five years is anticipated to be £107m-£119m (£117m-£129m including implementation and support costs).

Figure 8 shows the cumulative financial impact over 20 years. Over this period this scenario is cost saving in both the base and higher effectiveness cases. Cost saving is achieved in years 19 and 15 respectively. In the lower effectiveness case, a cumulative cost saving position is never reached based on the model.

Total net savings lie in the range -£43m (i.e. a net cost) to £35m over this period depending on programme effectiveness (-£53m to £25m including estimated implementation and support costs).

Figure 8: Scenario 3 - cumulative cost/saving profile of £350 average cost excluding implementation costs

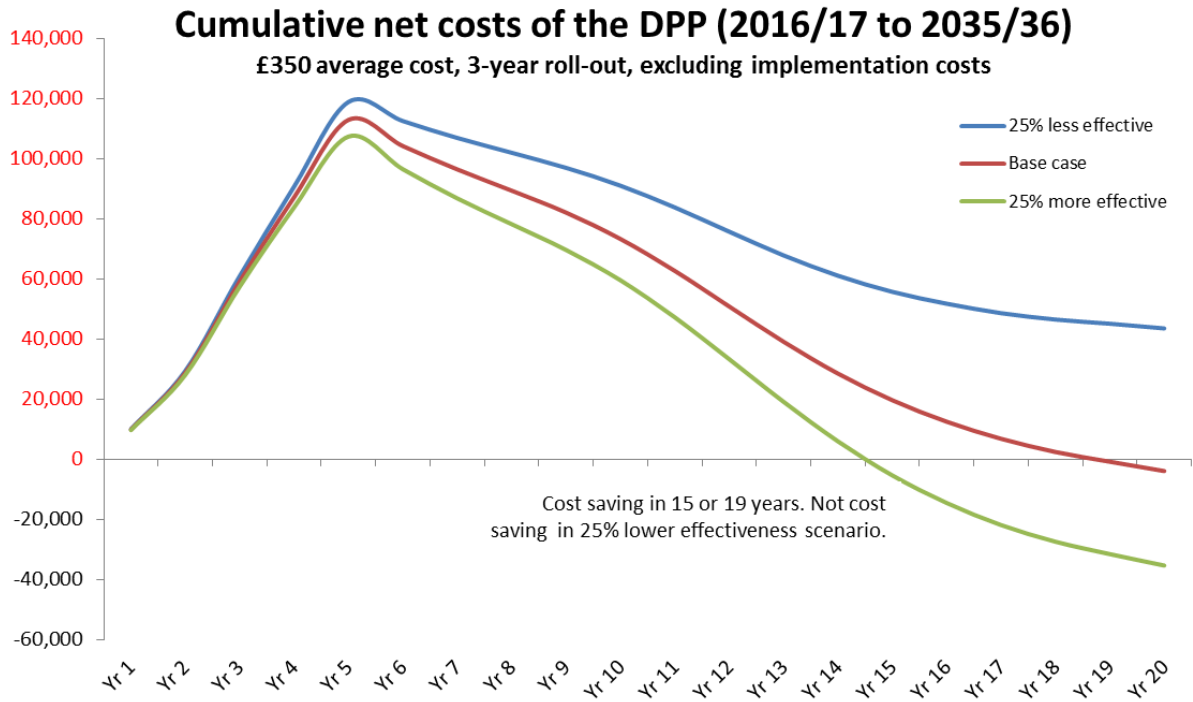


Table 2 – Scenario 1 - Annual cost/savings profile assuming £155 average cost (£250 tariff)

Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36
No. of interventions	30,000	60,000	100,000	100,000	100,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intervention Costs (£'000)	4,650	9,300	15,500	15,500	15,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>NHS Costs (£'000)</b>																				
25% less effective	-525	-1,618	-3,452	-5,251	-6,841	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	-684	-2,135	-4,575	-7,040	-9,210	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	-846	-2,612	-5,629	-8,686	-11,442	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
<b>Annual net costs exc. implementation (£'000)</b>																				
25% less effective	4,125	7,682	12,048	10,249	8,659	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	3,966	7,165	10,925	8,460	6,290	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	3,804	6,688	9,871	6,814	4,058	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
Implementation and support costs (£'000)	2,450	2,600	3,300	1,300	1,300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Annual net costs inc. implementation (£'000)</b>																				
25% less effective	6,575	10,282	15,348	11,549	9,959	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	6,416	9,765	14,225	9,760	7,590	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	6,254	9,288	13,171	8,114	5,358	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
<b>Cumulative net costs exc. implementation (£'00)</b>																				
25% less effective	4,125	11,807	23,855	34,104	42,763	36,387	30,803	25,867	20,854	14,917	7,678	-379	-8,276	-15,037	-20,392	-24,347	-27,488	-29,614	-30,993	-32,573
Base case	3,966	11,132	22,056	30,517	36,807	28,080	20,334	13,251	5,960	-2,810	-13,426	-25,263	-36,994	-47,604	-56,462	-63,610	-69,282	-73,667	-76,914	-80,005
25% more effective	3,804	10,492	20,363	27,177	31,235	20,381	10,696	2,091	-6,474	-16,548	-28,870	-42,794	-56,979	-70,135	-81,467	-90,639	-97,972	-103,515	-107,636	-111,424

Table 3 – Scenario 2 - Annual cost/savings profile assuming £270 average cost (£435 tariff)

Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36
No. of interventions	30,000	60,000	100,000	100,000	100,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intervention Costs (£'000)	8,100	16,200	27,000	27,000	27,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>NHS Costs (£'000)</b>																				
25% less effective	-525	-1,618	-3,452	-5,251	-6,841	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	-684	-2,135	-4,575	-7,040	-9,210	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	-846	-2,612	-5,629	-8,686	-11,442	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
<b>Annual net costs exc. implementation (£'000)</b>																				
25% less effective	7,575	14,582	23,548	21,749	20,159	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	7,416	14,065	22,425	19,960	17,790	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	7,254	13,588	21,371	18,314	15,558	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
Implementation and support costs (£'000)	2,450	2,600	3,300	1,300	1,300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Annual net costs inc. implementation (£'000)</b>																				
25% less effective	10,025	17,182	26,848	23,049	21,459	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	9,866	16,665	25,725	21,260	19,090	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	9,704	16,188	24,671	19,614	16,858	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
<b>Cumulative net costs exc. implementation (£'00)</b>																				
25% less effective	7,575	22,157	45,705	67,454	87,613	81,237	75,653	70,717	65,704	59,767	52,528	44,471	36,574	29,813	24,458	20,503	17,362	15,236	13,857	12,277
Base case	7,416	21,482	43,906	63,867	81,657	72,930	65,184	58,101	50,810	42,040	31,424	19,587	7,856	-2,754	-11,612	-18,760	-24,432	-28,817	-32,064	-35,155
25% more effective	7,254	20,842	42,213	60,527	76,085	65,231	55,546	46,941	38,376	28,302	15,980	2,056	-12,129	-25,285	-36,617	-45,789	-53,122	-58,665	-62,786	-66,574

Table 4 – Scenario 3 - Annual cost/savings profile assuming £350 average cost (£560 tariff)

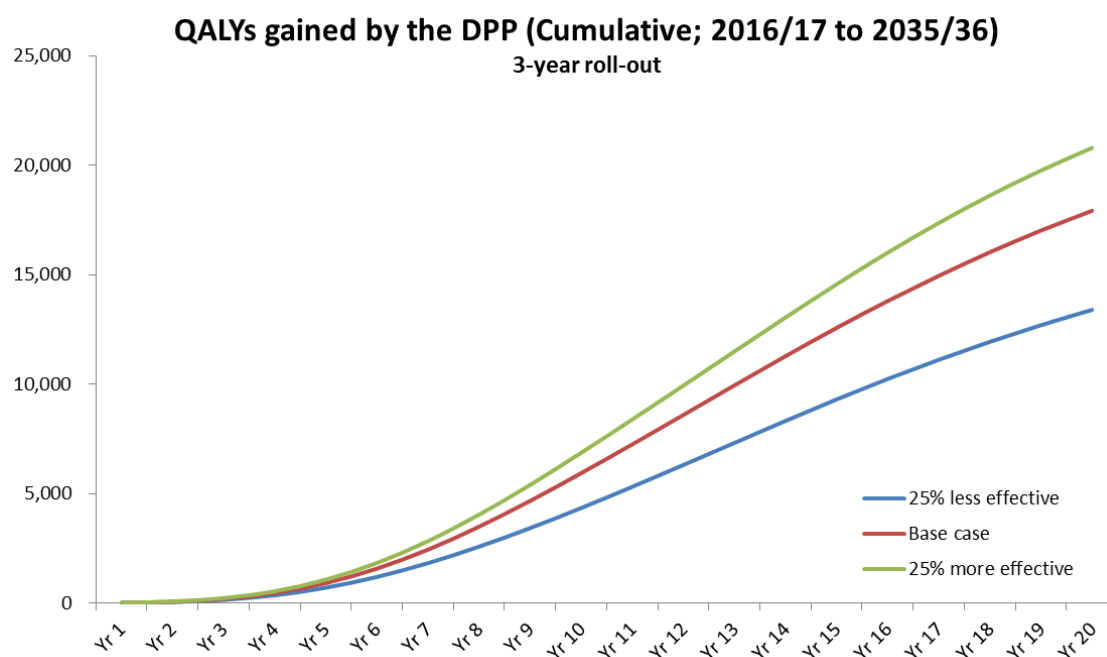
Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36
No. of interventions	30,000	60,000	100,000	100,000	100,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intervention Costs (£'000)	10,500	21,000	35,000	35,000	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>NHS Costs (£'000)</b>																				
25% less effective	-525	-1,618	-3,452	-5,251	-6,841	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	-684	-2,135	-4,575	-7,040	-9,210	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	-846	-2,612	-5,629	-8,686	-11,442	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
<b>Annual net costs exc. implementation (£'000)</b>																				
25% less effective	9,975	19,382	31,548	29,749	28,159	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	9,816	18,865	30,425	27,960	25,790	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	9,654	18,388	29,371	26,314	23,558	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
Implementation and support costs (£'000)	2,450	2,600	3,300	1,300	1,300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Annual net costs inc. implementation (£'000)</b>																				
25% less effective	12,425	21,982	34,848	31,049	29,459	-6,376	-5,584	-4,937	-5,013	-5,936	-7,239	-8,057	-7,896	-6,761	-5,355	-3,955	-3,141	-2,126	-1,380	-1,579
Base case	12,266	21,465	33,725	29,260	27,090	-8,727	-7,747	-7,083	-7,291	-8,769	-10,616	-11,838	-11,730	-10,611	-8,858	-7,148	-5,672	-4,385	-3,247	-3,091
25% more effective	12,104	20,988	32,671	27,614	24,858	-10,854	-9,685	-8,605	-8,564	-10,074	-12,322	-13,925	-14,185	-13,156	-11,333	-9,171	-7,333	-5,543	-4,121	-3,788
<b>Cumulative net costs exc. implementation (£'00)</b>																				
25% less effective	9,975	29,357	60,905	90,654	118,813	112,437	106,853	101,917	96,904	90,967	83,728	75,671	67,774	61,013	55,658	51,703	48,562	46,436	45,057	43,477
Base case	9,816	28,682	59,106	87,067	112,857	104,130	96,384	89,301	82,010	73,240	62,624	50,787	39,056	28,446	19,588	12,440	6,768	2,383	-864	-3,955
25% more effective	9,654	28,042	57,413	83,727	107,285	96,431	86,746	78,141	69,576	59,502	47,180	33,256	19,071	5,915	-5,417	-14,589	-21,922	-27,465	-31,586	-35,374



### 10.2.1. Overall health benefits

Figure 9 shows the cumulative number of QALYs gained for the different levels of intervention effectiveness over the next 20 years compared with no intervention (assuming three year roll-out).

Figure 9: 20 year cumulative impact of NDPP on QALYs



QALYs are gained from the first year of the NDPP with the largest annual gain of 1,000-1,600 QALYs occurring in the thirteenth year of the programme. Subsequently, the annual QALY gains reduce as the population ages and dies, and individuals succumb to delayed disease. Please see table 9 for the table corresponding to this figure.

### 10.2.2. Diabetes cases delayed

Figure 10 shows the cumulative impact on the number of diabetes diagnoses over the next 20 years compared with no intervention (assuming three year roll-out).

Figure 10: 20 year cumulative impact of NDPP on diabetes diagnoses

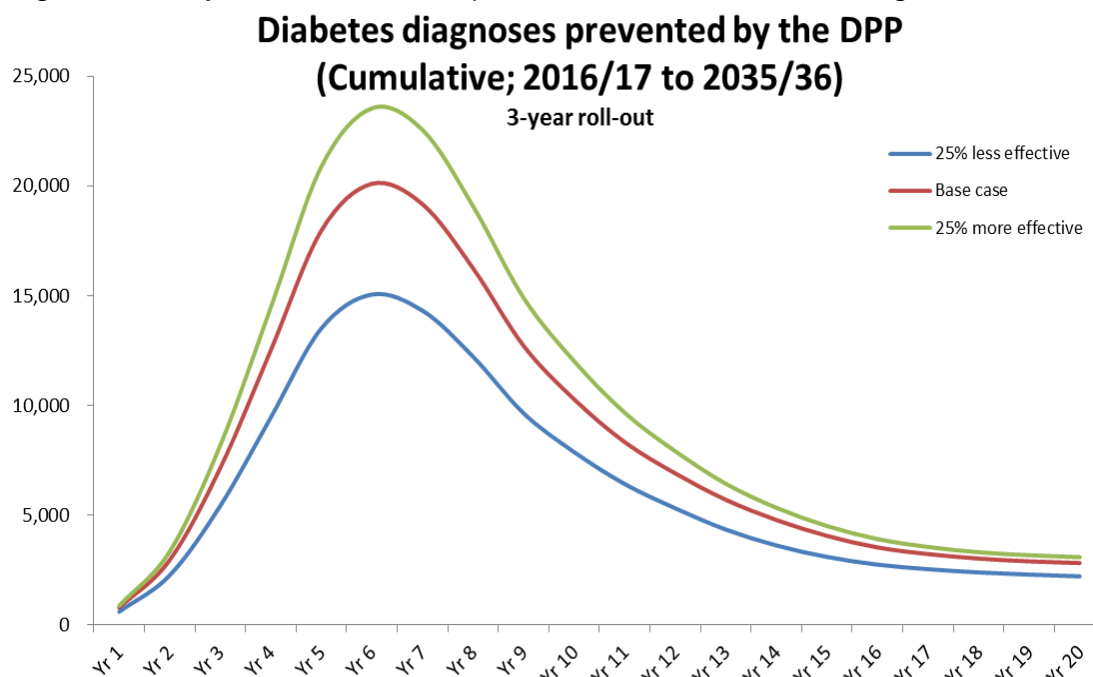


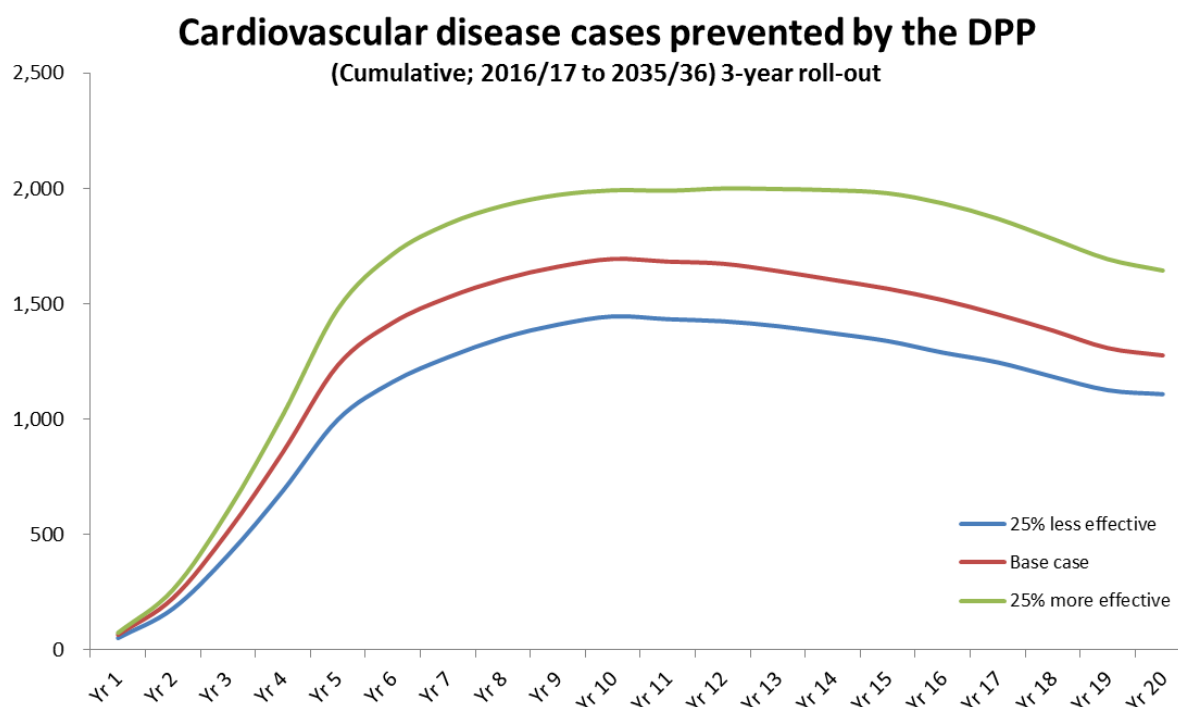
Figure 10 shows that the lifestyle intervention reduces diabetes risk with an increasing number of prevented diabetes diagnoses during the first few years of the programme. When the programme finishes (assuming the programme ends after 5 years), the number of diabetes diagnoses is less than it would have been with no intervention for several years, under the assumption that there is a diminishing duration of effect that lasts 5 years. This effect is counteracted by an increase in diabetes diagnoses as the patient ages due to individuals succumbing to delayed disease. The cumulative peak overall reduction in diabetes diagnoses occurs in the 6th year of the programme with 15,000-24,000 cases reduced. By the 20<sup>th</sup> year of the programme, the cumulative net reduction in diabetes falls to 2,200-3,000 (that is, it was delayed rather than prevented altogether).

Assuming base case effectiveness, for every 100,000 people enrolled in the NDPP the cumulative impact over the following 5 years is approximately 4,500 diabetes diagnoses prevented or delayed. If the programme continued beyond five years benefits, such as further cases of diabetes being delayed or prevented, would continue to accrue for new participants on the programme.

### 10.2.3. Cardiovascular disease cases avoided

Figure 11 shows the cumulative impact on the number of cardiovascular disease cases over the next 20 years compared with no intervention (assuming three year roll-out).

Figure 11: 20 year cumulative impact of NDPP on cardiovascular disease cases



The model estimates that 1,000-1,500 cumulative cases of CVD could be avoided in the first 5 years. The peak annual reduction in CVD cases occurs in the 5<sup>th</sup> year of the programme when 160-240 cases are prevented in that year. After this, there is a slow increase in the number of net CVD cases as individuals succumb to delayed CVD and as the population ages.

Additional information about modelling assumptions, sensitivity analysis and modelling limitations are presented in the appendix.

### 10.3. Economic assessment

We can extend the financial assessment to take into account the economic costs and benefits of the programme. There are 2 key components to this calculation:

1. We value estimated savings (costs) to reflect the additional benefits of health care expenditure (opportunity cost of health care expenditure) in terms of saved lives made possible by the reduced demand (additional demand) for NHS resources. This is done by translating any net financial costs/savings into the number of Quality Adjusted Life Years (QALYs) lost/gained using a cost-effectiveness threshold of £20,000 (i.e. taking the bottom end of the NICE estimated threshold of the cost of saving a QALY in the NHS at the margin). The number of QALYs lost/gained is then multiplied by the value-per-QALY. Current estimates find a QALY to be valued at around £60,000.

2. We supplement this calculation with the QALYs gained directly from the programme (i.e. not through any additional costs/savings). For example, the number of diabetes diagnoses prevented directly as a result of the NDPP are converted into equivalent QALY gains and valued at £60,000 per QALY.
3. The net economic impact is the sum of (1) and (2) above.

Table 5 summarises the economic assessment over 5 and 20 years after taking these factors into account – note that the figures are undiscounted. Table 5.1 provides the undiscounted financial costs and savings position for comparison.

Table 5: Economic assessment of NDPP programme

**Base-case effectiveness, 3yr roll-out, undiscounted**

		5 years	20 years
Average cost	Year cumulative benefits > costs	Net economic benefit (£'000)	Net economic benefit (£'000)
£155	6	-55,355	1,315,917
£270	8	-189,905	1,181,367
£350	9	-283,505	1,087,767

Table 5.1

**Financial costs/savings:**

**Base-case effectiveness, 3yr roll-out**

		5 years	20 years
Average cost	Year cumulative savings > costs	Net financial costs (£'000)	Net financial costs (£'000)
£155	10	36,807	-80,005
£270	14	81,657	-35,155
£350	19	112,857	-3,955

Assuming a three year roll-out, by the end of the fifth year of the NDPP, the model estimates 14,000-21,000 cases of diabetes will have been prevented and 1,000-1,500 cases of cardiovascular disease depending on intervention effectiveness (note that variations in tariff prices are not dependent on variation in effectiveness). Out of those attending the first session of the programme this represents around 1 in 20

high risk cases of diabetes being prevented<sup>10</sup>. It is estimated that 700-1,000 QALYs will be gained within 5 years of the programme.

Taking the example of a £270 average cost over 20 years, the overall undiscounted economic net benefit estimated is £1.2bn (£967m discounted) for the 5 year cohort. The economic assessment takes into account the opportunity cost of diverting funds away from other NHS services in terms of quality and quantity of life. A £1.2bn net benefit implies that the programme modelled in this assessment will be more cost effective at saving QALYs than other NHS services (at the margin).

## **11. Equality and Health Inequalities**

The NHS England Equality and Health Inequalities Key Lines of Enquiry Assessment has been undertaken and is included in Appendix 3. Data is not available to complete a full Equality Impact Assessment at this stage of the programme, however differences in uptake and completion of the programme will be closely monitored and adjustments made to the programme if needed to ensure the programme is meeting NHS England's legal duties in promoting equality and reducing health inequalities. As some ethnic groups have an increased risk of type 2 diabetes and non-diabetic hyperglycaemia, contracts will include key performance indicators to encourage providers to ensure that participants recruited to the programme reflect the ethnicity and non-diabetic hyperglycaemia risk profiles of the local population in which the programme is being delivered.

## **12. Conclusions**

Under most of the scenarios modelled in this impact assessment the NDPP is likely to be cost saving, based on a five year cohort being enrolled in the programme, with a gradual roll out of the programme over a period of three years. The level of cost savings and the year in which the programme becomes cost saving or achieves a net economic benefit is primarily determined by the average cost of the intervention per participant and the overall effectiveness of the programme.

A range of effectiveness levels have been modelled to take account of limitations of the model and uncertainties in how the outcomes observed in research studies and will be translated into a real-world national programme. A variety of average costs and tariffs have been modelled, as the actual tariffs proposed by providers are not yet known. The actual average cost per participant paid by NHS England will also be affected by retention rates which are uncertain.

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<sup>10</sup> This includes participants who drop out of the intervention before completion hence will understate the actual treatment effect of the whole programme.

With an average cost range of £155-£350 (equivalent tariff range approx. £250-£560), the net cumulative financial impact over 5 years of the DPP is a cost between £37m-£113m. This excludes implementation costs and assumes a base case effectiveness.

Over a 20 year horizon the net cumulative financial impact of the DPP is a saving between £4m-£80m depending on final average costs (excluding implementation costs).

During the first 5 years the DPP is estimated to save a cumulative 700-1,100 QALYs depending on programme effectiveness. Over the long term, the 20 year horizon estimates between 13,000-21,000 cumulative QALYs saved. This translates to 14,000-21,000 cases of diabetes prevented or delayed in the first 5 years of the programme, for an initial five year cohort of 390,000 participants enrolled in the programme. Assuming base case effectiveness, for every 100,000 people enrolled in the NDPP the cumulative impact over the following 5 years is approximately 4,500 diabetes diagnoses prevented or delayed.

In order for the programme to break even (be cost saving) within 15 years, the average cost paid to providers should not exceed £270 per participant, based on base case effectiveness. Under current assumptions about retention rates this equates to a maximum tariff of £435 per participant completing the programme.

In order for the programme to break even (be cost saving) within 10 years, the average cost paid to providers should not exceed £155 per participant, based on base case effectiveness. Under current assumptions about retention rates this equates to a maximum tariff of £250 per participant completing the programme.

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# Appendix 1: Additional information to accompany the Impact Assessment

## 1. ScHARR financial modelling

### 1.1. Overview of the existing SchARR diabetes model

The model runs in annual cycles. For each person, their BMI, cholesterol levels, SBP and HbA1c fluctuate from year to year, representing natural changes as people age and depending upon personal characteristics such as gender, ethnicity and smoking status. Every year in the model, an individual may visit their GP or undergo a Health Check, depending on their personal characteristics, and be diagnosed with and treated for hypertension, high cardiovascular risk, or diabetes. All individuals in the model are at risk of developing cardiovascular disease (CVD), congestive heart failure, osteoarthritis, depression, breast and colon cancer, or of dying. Further details of methodology, assumptions and data sources are available elsewhere (9).

Health-related quality of life of each individual in each year of the model is dependent on their age, gender, BMI and medical conditions. Each condition is associated with a quality of life decrement and a cost. Costs are from an NHS and Personal Social Services perspective. Costs are estimated for 2014/2015. Almost all costs in the model are NHS costs. The only exception is costs for care in the years following a stroke. These costs were put into an individual category for easy visualisation of NHS costs versus social care costs.

### Detail of the model inputs in the SchARR model and sources of evidence applied to the NDPP model:

Model input	Value	Evidence and additional notes
Assumes target population is identified through NHS Health Check. Population has no pre-existing cardiovascular disease and not treated with anti-hypertensives or statins	40 to 74 years	National recommendations indicate that Health Checks should be available to all individuals within this age group apart from those who are already having regular checks as part of their care for a variety of long-term conditions.
% of individuals in the eligible group are invited to Health Checks each year	20%	in line with national guidelines which say that individuals should receive a Health Check every five years.
% people invited for a Health Checks who attend	48.8%	in line with national reports for 2014-2015.

		<b>Additional note:</b> Whether or not someone attends their Health Check is determined on a random basis.
Cut-off for high risk of type 2 diabetes assessed during the Health Check by the Leicester Risk Assessment (LRA)	>=16 (medium to high risk)	A recent feasibility study indicated that this is a more specific and sensitive method for detecting high risk people than current NHS Health Check filters.
% assumed to consent to HbA1c testing after completing the LRA	95%	This figure was estimated in a recent Health Technology Assessment.
HbA1C test cut-offs for diagnosing IGT and type 2 diabetes	IGT: HbA1c 6-6.4  Diabetes HbA1c ≥ 6.5	This was based on data from a recent Health Technology Assessment.  <b>Additional note:</b> People with suspected diabetes are given a second HbA1c test to confirm this, but people with IGT are not given a second test.
% uptake and complete an intensive lifestyle intervention (the NDPP).	32% or 55%	The two uptake/completion figures represent two different estimates from NICE and a recent Health Technology Assessment respectively, and are compared in the sensitivity analysis.
Mean reduction in BMI, systolic blood pressure, total cholesterol and HbA1c is implemented in all individuals who take up the intervention.	BMI: -0.96;  SBP: -4.3;  Chol: - 0.18;  HbA1c: -0.13	The mean estimates obtained from a recent meta-analysis.  <b>Additional note:</b> Two alternative scenarios were modelled in which the intervention was either 25% more or 25% less effective than expected
Duration of effectiveness of the intervention	Effective in year 1 only, then assumed to decline linearly, reaching zero effect after five years	No evidence identified to inform the model.

## **2. Model assumptions and limitations**

These assumptions and limitations are in addition to the assumptions that have been made about intervention effectiveness, uptake and cost discussed in the paper.

### **2.1. NHS Health Check uptake and diabetes risk assessment**

Uptake rates for NHS Health Checks, diabetes testing and the lifestyle intervention have been assumed to be the same across the population; however they are likely to differ by personal characteristic. Good data about risk assessment and intervention uptake in different socioeconomic groups (and by other personal characteristics) would allow differential uptake to be incorporated into the model and may impact significantly upon outcomes (if for example the intervention tends to be taken up by only the more healthy IGT individuals, it may be less effective).

The model assumes that all IGT individuals are identified through the NHS Health Check programme, but assumes that the Leicester Risk Assessment is used as part of the NHS Health Check, rather than the current NHS Health Check diabetes filter. Using the Leicester Risk Assessment tool at the medium risk threshold has improved sensitivity over the NHS Health Check diabetes filter, and would therefore identify more individuals for HbA1C testing. Changing the existing NHS Health Check diabetes filter to a validated risk tool and diagnostic testing for people at medium to high risk was recommended in a feasibility study conducted for Public Health England in 2014, however this has not yet been adopted. The assumption in the model that the Leicester Risk Assessment tool is used as part of the NHS Health Check pathway, rather than the current diabetes filter, is likely to over estimate the numbers that would be identified through the NHS Health Check, however as other forms of identification will be used in the NDPP (as described below), this limitation is not likely to have a significant effect on the outcomes compared with no intervention.

### **2.2. Identification of the eligible population**

It is likely that many individuals who are at risk of type 2 diabetes are not currently eligible for NHS Health Checks, either due to age or to pre-existing health conditions, but who would be eligible for the NDPP. Initial modelling undertaken for NHS England, projected that approximately 136,000 individuals could be identified through the NHS Health Check programme each year, and that approximately 50,000 of these could be successfully engaged in the intervention.

Work with the NDPP demonstrator sites has highlighted that in these areas where NDPP interventions are already available, the numbers referred to interventions through NHS Health Checks is relatively small. However, demonstrator areas have identified that many people are already identified on GP practice registers or on GP practice database as having an HbA1c test in the eligible range for the NDPP. Initial internal modelling undertaken by NHS England estimated that approximately 50,000 people could be identified through routes other than NHS Health Checks for the programme each year (equating to an average of 250 people per CCG). This

estimate is supported by work in the demonstrator sites which suggests that 50 patients per 1,000 population aged 40-74 are likely to be on a GP register for non-diabetic hyperglycaemia. This equates to 7,000 patients in an average CCG population.

Whilst the additional throughput from these other referral sources is included in the SchARR model, the model does not take account of the fact that people referred through these routes may be more likely to have other long term conditions (which would make them ineligible for an NHS Health Check). It is unclear whether intervention effectiveness would be the same for individuals with pre-existing conditions. If these individuals are more likely to develop diabetes or cardiovascular disease, and the effectiveness of the intervention is similar to the general population, then the SchARR model may underestimate potential benefits of the programme.

### **2.3. Variations in current care**

The model assumes that individuals identified with non-diabetic hyperglycaemia are currently not given any treatment, intervention or lifestyle advice that impacts upon metabolic risk factors. The only advantage of being identified with non-diabetic hyperglycaemia in the current care scenario of the model is that individuals are more likely to be identified opportunistically for diabetes at a later date. However, in reality there are currently a variety of interventions being offered to individuals at high risk of diabetes, with high BMI or fulfilling other criteria, which would impact upon metabolic risk factors, and therefore model outcomes. Whether or not individuals are offered such an intervention currently depends upon their local authority of residence and CCG and GP practice of registration, so is extremely difficult to account for thorough modelling. For individuals living in areas, or registered with practices, where diabetes prevention interventions or intensive lifestyle interventions tackling weight, diet and physical activity are already available, the model may overestimate the effects of the NDPP compared with current care.

## Appendix 2: Further scenarios and QALYs

For additional information, we present financial estimates on two further scenarios:

- (i) Discounted results of the original three year roll-out results
- (ii) Undiscounted results of a four year roll-out (as opposed to three year)
- (iii) Discounted results of a four year roll-out

### Discounted results

As an illustration we focus on the base case effectiveness for the three different tariffs (three year roll-out). We apply a 3.5% discount rate to the costs and benefits to estimate the present value of the programme. Table 6 summarises the results for the three different price scenarios assuming a base case effectiveness of the intervention.

Since the financial gains of the NDPP are realised in the future, and future gains are worth less after discounting, the financial returns appear slightly weaker. For example, with an average price of £270 the NDPP is expected to generate cumulative undiscounted cost savings by year 2029/2030. After discounting, however, this is delayed by four years to 2033/34.

### Four year roll-out

Tables 7 and 8 summarise the financial results of the NDPP intervention at the different tariff prices assuming a four year roll-out and base case effectiveness (Table 7 shows undiscounted figures and Table 8 shows discounted figures).

There is no significant impact on the financial costs and savings in the long run compared to the three year roll-out. In the short run the NDPP is less costly as there is a more gradual increase in enrolled participants. This is offset in the medium-to-long term since fewer participants (compared to the three year roll-out) creates less opportunity to gain from disease prevention.

**Table 6 – Financial profile of NDPP discounted at 3.5%, 3 year roll-out, base case effectiveness, variation in tariff prices,**

Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36
No. of interventions	30,000	60,000	100,000	100,000	100,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intervention Costs (£'000)																				
£155 average price	4,650	8,986	14,469	13,980	13,507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
£270 average price	8,100	15,652	25,205	24,352	23,529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
£350 average price	10,500	20,290	32,673	31,568	30,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NHS Costs (£'000)																				
Base case	-684	-2,062	-4,271	-6,349	-8,026	-7,348	-6,302	-5,567	-5,537	-6,434	-7,526	-8,108	-7,763	-6,785	-5,472	-4,266	-3,271	-2,444	-1,748	-1,608
<b>Annual net costs exc. implementation (£'000)</b>																				
£155 average price	3,966	6,923	10,198	7,631	5,482	-7,348	-6,302	-5,567	-5,537	-6,434	-7,526	-8,108	-7,763	-6,785	-5,472	-4,266	-3,271	-2,444	-1,748	-1,608
£270 average price	7,416	13,590	20,934	18,003	15,503	-7,348	-6,302	-5,567	-5,537	-6,434	-7,526	-8,108	-7,763	-6,785	-5,472	-4,266	-3,271	-2,444	-1,748	-1,608
£350 average price	9,816	18,227	28,402	25,219	22,475	-7,348	-6,302	-5,567	-5,537	-6,434	-7,526	-8,108	-7,763	-6,785	-5,472	-4,266	-3,271	-2,444	-1,748	-1,608
Implementation and support costs (£'000)	2,450	2,512	3,081	1,173	1,133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Annual net costs inc. implementation (£'000)</b>																				
£155 average price	6,416	9,435	13,279	8,803	6,614	-7,348	-6,302	-5,567	-5,537	-6,434	-7,526	-8,108	-7,763	-6,785	-5,472	-4,266	-3,271	-2,444	-1,748	-1,608
£270 average price	9,866	16,102	24,014	19,176	16,636	-7,348	-6,302	-5,567	-5,537	-6,434	-7,526	-8,108	-7,763	-6,785	-5,472	-4,266	-3,271	-2,444	-1,748	-1,608
£350 average price	12,266	20,740	31,483	26,391	23,608	-7,348	-6,302	-5,567	-5,537	-6,434	-7,526	-8,108	-7,763	-6,785	-5,472	-4,266	-3,271	-2,444	-1,748	-1,608
<b>Cumulative net costs exc. implementation (£'000)</b>																				
£155 average price	3,966	10,889	21,088	28,719	34,200	26,852	20,551	14,983	9,446	3,012	-4,514	-12,622	-20,385	-27,169	-32,642	-36,908	-40,179	-42,622	-44,370	-45,978
£270 average price	7,416	21,006	41,940	59,943	75,446	68,098	61,797	56,229	50,692	44,258	36,732	28,624	20,861	14,077	8,604	4,338	1,067	-1,377	-3,125	-4,732
£350 average price	9,816	28,044	56,446	81,664	104,139	96,791	90,489	84,922	79,385	72,951	65,425	57,317	49,554	42,769	37,297	33,031	29,760	27,316	25,568	23,961

**Table 7 – Financial profile - 4 year roll-out, base case effectiveness, variation in tariff prices, undiscounted**

Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36
No. of interventions	20,000	40,000	60,000	100,000	100,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intervention Costs (£'000)																				
£155 average price	3,100	6,200	9,300	15,500	15,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
£270 average price	5,400	10,800	16,200	27,000	27,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
£350 average price	7,000	14,000	21,000	35,000	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NHS Costs (£'000)																				
Base case	-456	-1,423	-2,898	-5,283	-7,582	-7,365	-6,661	-5,912	-5,732	-6,718	-8,330	-9,633	-9,840	-9,060	-7,566	-6,118	-5,043	-3,777	-2,728	-2,641
<b>Annual net costs exc. implementation (£'000)</b>																				
£155 average price	2,644	4,777	6,402	10,217	7,918	-7,365	-6,661	-5,912	-5,732	-6,718	-8,330	-9,633	-9,840	-9,060	-7,566	-6,118	-5,043	-3,777	-2,728	-2,641
£270 average price	4,944	9,377	13,302	21,717	19,418	-7,365	-6,661	-5,912	-5,732	-6,718	-8,330	-9,633	-9,840	-9,060	-7,566	-6,118	-5,043	-3,777	-2,728	-2,641
£350 average price	6,544	12,577	18,102	29,717	27,418	-7,365	-6,661	-5,912	-5,732	-6,718	-8,330	-9,633	-9,840	-9,060	-7,566	-6,118	-5,043	-3,777	-2,728	-2,641
Implementation and support costs (£'000)	2,450	2,600	3,300	1,300	1,300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Annual net costs inc. implementation (£'000)</b>																				
£155 average price	5,094	7,377	9,702	11,517	9,218	-7,365	-6,661	-5,912	-5,732	-6,718	-8,330	-9,633	-9,840	-9,060	-7,566	-6,118	-5,043	-3,777	-2,728	-2,641
£270 average price	7,394	11,977	16,602	23,017	20,718	-7,365	-6,661	-5,912	-5,732	-6,718	-8,330	-9,633	-9,840	-9,060	-7,566	-6,118	-5,043	-3,777	-2,728	-2,641
£350 average price	8,994	15,177	21,402	31,017	28,718	-7,365	-6,661	-5,912	-5,732	-6,718	-8,330	-9,633	-9,840	-9,060	-7,566	-6,118	-5,043	-3,777	-2,728	-2,641
<b>Cumulative net costs exc. implementation (£'000)</b>																				
£155 average price	2,644	7,421	13,823	24,040	31,958	24,593	17,931	12,019	6,287	-431	-8,760	-18,393	-28,233	-37,292	-44,859	-50,977	-56,020	-59,797	-62,525	-65,166
£270 average price	4,944	14,321	27,623	49,340	68,758	61,393	54,731	48,819	43,087	36,369	28,040	18,407	8,567	-492	-8,059	-14,177	-19,220	-22,997	-25,725	-28,366
£350 average price	6,544	19,121	37,223	66,940	94,358	86,993	80,331	74,419	68,687	61,969	53,640	44,007	34,167	25,108	17,541	11,423	6,380	2,603	-125	-2,766

**Table 8 – Financial profile - four year roll-out, base case effectiveness, variation in tariff prices, discounted at 3.5%**

Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36
No. of interventions	20,000	40,000	60,000	100,000	100,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intervention Costs (£'000)																				
£155 average price	3,100	5,990	8,682	13,980	13,507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
£270 average price	5,400	10,435	15,123	24,352	23,529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
£350 average price	7,000	13,527	19,604	31,568	30,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NHS Costs (£'000)																				
Base case	-456	-1,375	-2,705	-4,765	-6,608	-6,201	-5,419	-4,647	-4,353	-4,929	-5,905	-6,598	-6,512	-5,793	-4,674	-3,652	-2,908	-2,105	-1,469	-1,374
<b>Annual net costs exc. implementation (£'000)</b>																				
£155 average price	2,644	4,615	5,976	9,216	6,900	-6,201	-5,419	-4,647	-4,353	-4,929	-5,905	-6,598	-6,512	-5,793	-4,674	-3,652	-2,908	-2,105	-1,469	-1,374
£270 average price	4,944	9,060	12,417	19,588	16,921	-6,201	-5,419	-4,647	-4,353	-4,929	-5,905	-6,598	-6,512	-5,793	-4,674	-3,652	-2,908	-2,105	-1,469	-1,374
£350 average price	6,544	12,152	16,898	26,803	23,893	-6,201	-5,419	-4,647	-4,353	-4,929	-5,905	-6,598	-6,512	-5,793	-4,674	-3,652	-2,908	-2,105	-1,469	-1,374
Implementation and support costs (£'000)	2,450	2,512	3,081	1,173	1,133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Annual net costs inc. implementation (£'000)</b>																				
£155 average price	5,094	7,128	9,057	10,388	8,033	-6,201	-5,419	-4,647	-4,353	-4,929	-5,905	-6,598	-6,512	-5,793	-4,674	-3,652	-2,908	-2,105	-1,469	-1,374
£270 average price	7,394	11,572	15,498	20,760	18,054	-6,201	-5,419	-4,647	-4,353	-4,929	-5,905	-6,598	-6,512	-5,793	-4,674	-3,652	-2,908	-2,105	-1,469	-1,374
£350 average price	8,994	14,664	19,979	27,976	25,026	-6,201	-5,419	-4,647	-4,353	-4,929	-5,905	-6,598	-6,512	-5,793	-4,674	-3,652	-2,908	-2,105	-1,469	-1,374
<b>Cumulative net costs exc. implementation (£'000)</b>																				
£155 average price	2,644	7,259	13,236	22,451	29,351	23,150	17,731	13,084	8,731	3,802	-2,103	-8,701	-15,213	-21,006	-25,680	-29,332	-32,240	-34,345	-35,814	-37,188
£270 average price	4,944	14,004	26,421	46,009	62,931	56,729	51,310	46,663	42,310	37,381	31,476	24,878	18,367	12,574	7,900	4,248	1,339	-765	-2,234	-3,608
£350 average price	6,544	18,696	35,594	62,397	86,290	80,089	74,670	70,023	65,670	60,741	54,836	48,238	41,726	35,934	31,259	27,607	24,699	22,594	21,126	19,752



**Table 9 – QALY gains from the DPP (excluding further QALY gains from reallocated NHS savings to other treatments)**

<b>Health gains</b>	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12	Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20
<b>Annual QALYs</b>																				
25% less effective	10	40	104	206	348	489	632	754	848	919	970	996	1,009	1,006	982	934	877	821	760	701
<b>Base case</b>	13	50	132	266	457	660	868	1,048	1,179	1,266	1,319	1,343	1,349	1,334	1,294	1,227	1,152	1,076	993	903
25% more effective	16	60	157	311	530	760	999	1,209	1,363	1,465	1,522	1,548	1,561	1,553	1,517	1,447	1,356	1,255	1,142	1,032
<b>Cumulative QALYs</b>																				
25% less effective	10	50	154	360	708	1,197	1,829	2,583	3,430	4,349	5,319	6,315	7,324	8,330	9,312	10,246	11,122	11,943	12,703	13,404
<b>Base case</b>	13	63	195	460	918	1,578	2,447	3,495	4,674	5,939	7,258	8,601	9,951	11,285	12,579	13,807	14,959	16,035	17,028	17,932
25% more effective	16	76	233	543	1,074	1,834	2,834	4,043	5,406	6,871	8,393	9,941	11,502	13,055	14,572	16,019	17,375	18,629	19,771	20,803

### Appendix 3: NHS England Equality and Health Inequalities Key Lines of Enquiry Framework

Key questions	To be completed by lead officer	Actions and updates
Name of the Directorate	Medical	
National Director Lead	Sir Bruce Keogh	
Name of the Team	Reducing Premature Mortality	
Name of the policy lead?	Matt Fagg	
<p>How does your work link to the NHS England Business Plan corporate and business priorities?</p> <p>Please identify which corporate priority/business your work aligns to.</p> <p>The <a href="#">NHS England Business Plan 2015/16</a></p>	<p>NHS England's Business Plan states that:</p> <p>I. 'During 2015/16 [we will] have the new Diabetes Prevention Programme up and running and available to 10,000 at risk individuals' and that</p> <p>II. 'By March 2016 [we will] develop a comprehensive plan for the roll-out of the Diabetes Prevention programme in 2016/17'</p> <p>The NHS Five Year Forward View announced that England would become the first country to implement at scale a national evidence-based diabetes prevention programme modelled on proven UK and international models, and linked where appropriate to the NHS Health Check.</p>	

<p>Brief narrative on the area of work?</p>	<p>The Diabetes Prevention Programme is a joint initiative with PHE and Diabetes UK which aims to deliver at a large scale services which identify those at high risk of developing Type 2 diabetes.</p> <p>The primary objectives of the NHS DPP are:</p> <ul style="list-style-type: none"> <li>- To support people with non-diabetic hyperglycaemia to lower their risk of progression to Type 2 diabetes and/or to delay the onset of disease and its complications by:</li> <li>- Promoting weight loss (and thereby maximize the health gain associated with prevention of disease attributable to obesity, including heart disease, depression, stroke, liver disease, respiratory disease, musculoskeletal conditions and certain cancers); and</li> <li>- Reducing glucose parameters (Hba1c/fasting glucose levels) of those at high risk.</li> </ul> <p>Secondary objectives are to:</p> <ul style="list-style-type: none"> <li>- reduce calorie intake;</li> <li>- increase physical activity;</li> <li>- move towards a healthier diet;</li> <li>- ensure that people identified in local health communities via a general practitioner (GP), the</li> </ul>	
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	<p>NHS Health Check, or another healthcare professional as having non-diabetic hyperglycaemia are offered a place on a behavioural intervention;</p> <ul style="list-style-type: none"> <li>- ensure consistent and equitable provision nationally of behavioural interventions</li> </ul>	
Date of completion of KLOE self-assessment process?	20/1/2016	
Is an Equality and Health Inequalities Analysis Template required?	Not applicable	
Who is the Equality and Health Inequalities client manager linking to your team/Directorate? See list below	Ray Avery	
Actions, issues and Risks identified	See section 4: case finding and first wave population representation.	
Monitoring and reporting updates	See section 3: Minimum Data set. Section 5: evaluations and measuring performance.	

<b>Equality and Health Inequalities KLOEs</b> <b>Key questions:</b>	<b>Please can you insert your information to each question with the appropriate evidence? (insert as a document)</b>
NHS England has Public Sector Equality Duties to meet under the Equality Act 2010 and legal duties to have regard to reduce health	The NHS DPP commissioned an analysis of non-diabetic hyperglycaemia. This analysis was carried out using Health Survey for England (HSE) data. The HSE is an annual survey of adults aged 16 and over living in

inequalities (NHS Act 2006 as amended by the Health and Social Care Act 2012). These apply to all our functions. A guide to these duties is available [here](#)

1. How have you considered equality and health inequalities and the need to give due regard to NHS England's legal duties under the Public Sector Equality Duty (Equality Act 2010) and the NHS Act 2006 as amended by the Health and Social care Act 2012. (see link above)

private households in England.

Five years of HSE data were combined in the analyses, 2009 to 2013, giving a combined dataset size of 54,644. Non-diabetic hyperglycaemia was defined as an HbA1c value between 6.0% (42mmol/mol) and 6.4% (47mmol/mol), excluding those who had already been diagnosed with diabetes with an HbA1c value in this range.

A prevalence in England of 10.7% (95% confidence interval: 10.2% - 11.1%) was calculated for non-diabetic hyperglycaemia from the weighted data.

The prevalence of non-diabetic hyperglycaemia did not significantly vary by sex: 10.5% for men and 10.8% for women

Prevalence significantly varied by age group with a prevalence of less than 3% for people aged between 16 and 39, 8% for people aged between 40 and 49, 16% for ages 50-69 and 26% for ages 70 and over.

Asian and black ethnic groups compared to white, mixed and other ethnic groups; 14.2% and 13.1% compared to 10.4% respectively (although only the Asian ethnic group has a significantly higher prevalence

In the first phase of the NDPP referrals into new diabetes prevention services will come from 2 main sources:

- Health Check. The NHS Health Check programme aims to improve the health and wellbeing of adults aged 40-74 years through earlier awareness, assessment, and management of the major risks factors and conditions driving premature death, disability and health inequalities in England. The check is made up of three key components: risk assessment, risk awareness and risk management. During the risk assessment

standardised tests are used to measure key risk factors including diabetes risk. The outcome of the assessment is then used to raise awareness of cardiovascular risk factors, as well as inform a discussion on, and agreement of, the lifestyle and medical approaches best suited to managing the individual's health risk.


- GP Registers. There are a significant number of Individuals who have had a blood test taken previously (not necessarily via the Health Checks), that identifies them as having non-diabetic hyperglycaemia and therefore eligible for the service. Some GP systems enable a register to be created of these patients, but it is not known to what extent practices have established such registers, or how comprehensive they are. The programme is seeking to publish a standardised business rules set to assist General Practice in running system audits to generate lists of eligible patients that would be eligible for the NHS DPP

The programme will have a phased roll-out over 3 years. This will mean some inequality in access to services over this year however roll-out is dependent on available funding and it is expected there will be full coverage across England at the end of this roll-out period

#### Principles

The NDPP is underpinned by a number of principles including:

- All individuals must be treated with courtesy, respect and an understanding of their needs;
- All those participating in any of the services provided through the programme must be provided with

	<p>adequate information on the benefits and risks, in a format which is accessible to them, to allow an informed decision to be made before participating;</p> <ul style="list-style-type: none"> <li>- Access to behavioural interventions should be matched to the needs of the target population in terms of availability, accessibility and location, as far as possible;</li> </ul> <p><u>Equality Statement</u></p> <p>The ITT for NDPP contains the following equality statement that will be part of the selection criteria for successful bidders:</p> <ul style="list-style-type: none"> <li>- Give due regard to the need to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations between people who share a relevant protected characteristic (as cited under the Equality Act 2010) and those who do not share it; and</li> <li>- Give regard to the need to reduce inequalities between patients in access to, and outcomes from healthcare services and to ensure services are provided in an integrated way where this might reduce health inequalities.</li> </ul>
<p>2. What action will you take to address the identified Equality and Health Inequalities priorities?</p>	<p>A Health Inequalities question has been raised in the Consultation Guide published for providers, stakeholder organisations, and public to provide insight into design of new services.</p> <p>  NDPP Consultation Guide - Final .pdf</p> <p>Demonstrator sites have been chosen to reflect different populations and contexts – rural and urban. As well as BME populations who have a 5-6% greater chance of developing Type 2 diabetes – In particular 40% of funding has gone to Bradford who are</p>

	<p>piloting case-finding amongst younger adults from BME communities.</p> <p>We will ensure through the national procurement process that equality and health inequalities criteria are used to shortlist and award contracts. The PQQ (Pre-Qualification Questionnaire) asks for information on Provider experience and knowledge of delivering services in respect of promoting equality of access for people using services and the need to reduce health inequalities between individuals in access and outcome.</p> <p>The ITT (Invitation to Tender) specifies the need to promote equality and address health inequalities and this forms part of the selection criteria. We will ensure that service contracts allow for proper oversight and accountability for equality and health inequalities.</p> <p>An innovation component of the ITT will help to mitigate risk of health inequalities by encouraging innovative responses to identifying, raising interest in, and improving enrolment onto new behavioural interventions for seldom seen seldom heard cohorts.</p> <p><u>Service Specification</u></p> <p>The service specification is clear in its requirement for equality of access. For example, delivery of a service that is patient-centred, culturally sensitive and flexible to diverse needs of service users; delivering sessions in an appropriate for service users format with a range of days, times and venues ;Provider compliance with the NHS Act 2006 and Equality Act 2010 in respect of reducing inequalities and Providers undertaking an Equality and Health Inequalities Impact</p>
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	<p>Assessment.</p> <p>As part of the evaluation of the service we will explore how results-based payment can be incorporated into contracts to ensure equality and health inequalities are addressed by providers of behavioural interventions.</p> <p>The programme will also explore the scope for introducing case-finding for younger people from minority ethnic groups, and inclusive services for individuals with mental illness.</p>
<p>3. How will you know what progress you are making in addressing Equality and Health Inequalities?</p>	<p>The Minimum Data Set (MDS) for the NHS DPP requires the provider to collect demographic data on individuals' that are referred and take part in the programme. This includes information on the prescribed protected characteristics. The MDS includes:</p> <ul style="list-style-type: none"> <li>LSOA (Lower Super Output Area)</li> <li>Age</li> <li>Sex</li> <li>Ethnicity</li> <li>Religion</li> <li>Employment status</li> <li>Housing Tenure</li> <li>Disability Status</li> <li>Learning Difficulty</li> <li>Serious Mental Illness</li> </ul> <p>This will allow the programme to monitor uptake and outcomes for different sub-populations.</p>
<p>4. What are the key risks/opportunities for achieving your Equality and Health Inequalities priorities?</p>	<p>There are a number of Health inequalities risks associated with the NDPP, which we are considering in order to give due regard to our duties:</p>

	<p><u>Case finding/Eligibility</u></p> <p>The NDPP Procurement only covers the behavioural intervention service, not case finding (identification and referral of at risk individuals). There is a risk that by using Health Checks as a key source that populations under 40 and those who have pre-existing conditions will not be identified. Also that those who are not registered with a GP or who have not accessed Health Checks services will not benefit from them.</p> <p>Identification and take-up needs to be tailored to different populations to address potential health inequalities in both access and outcomes.</p> <p>The programme has the potential for direct to consumer approaches specifically targeted at younger age groups in South Asian communities that are outside of the NHS Health Check eligibility or who may not routinely engage with primary care. This forms part of the service specification.</p> <p><u>First wave</u></p> <p>By only providing new services in areas that express an interest, populations who can benefit in the first phase of procurement may not be representative. However the prevalence of non-diabetic hyperglycaemia is reasonably equal across the country. The programme has phased roll out over 3 years to achieve national coverage.</p>
<p>5. What evidence is there of improved outcomes? How will you record this?</p>	<p>In addition to outcomes being performance measured through provider contracts the NDPP will also undertake the following evaluations:</p> <ul style="list-style-type: none"> <li>- Demonstrator Evaluation- to provide learning on the most effective mechanisms for improving uptake among different populations</li> <li>- Phase 1 Procurement - an evaluation</li> </ul>

	<p>of the performance and outcomes achieved by 4 national providers in 2016/17. An independent academic evaluation of the NDPP is planned and this will use the MDS to analyse uptake and outcomes for specific sub-populations in addition to qualitative evaluations of the service.</p>
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