



Cost-benefit analysis and social
impact bond feasibility analysis
for the Birmingham Be Active
scheme

Final Report

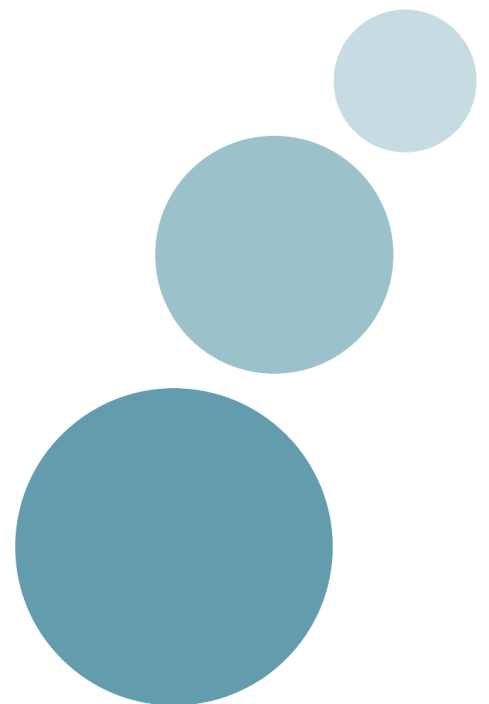
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This report has been prepared for the use of Birmingham's Be Active Scheme, Social Finance and the Barrow Cadbury Trust within the terms of our contract. Any enquiries about this report should be directed to enquiries@matrixknowledge.com

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List of abbreviations

CBA	Cost benefit analysis
DH	Department of Health
NICE	National Institute for Health and Clinical Excellence
QALY	Quality adjusted life year
SIB	Social impact bond
SWB	Subjective well being

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1.0 Executive summary

Aim of the research

Be Active is a scheme provided free of charge to all Birmingham residents who live within the Birmingham City Council. The aim of the scheme is to tackle health inequality and associated deprivation levels, by offering access to free physical activity sessions for all 1.1 million citizens of the city. Participants can take part in free swimming, exercise classes or the gym at any Council-run leisure centre during off-peak hours, which vary according to each centre and some community based activities.

The current economic climate means that demonstrating that Be Active represents value for money is an imperative if it is to continue to be funded. The purpose of this research was to provide answers to the following questions:

- ***Does Be Active represent value for money?***
- ***Would it be economically feasible to fund Be Active by means of a social impact bond (SIB)?***

Method

The economic case for Be Active was assessed by means of a cost benefit analysis (CBA). Following best practice, decision models were built to assess the costs and benefits, and estimate the net benefits derived from the scheme. Building these models required understanding the intervention and the nature of the expected benefits – i.e. the effect of the interventions and the logic of how these generate benefits.

The effects of the scheme captured in the analysis include: increased physical activity levels, reduced smoking and increased opportunity for shared experience.¹ The first two were expressed in monetary terms by estimating the resulting health care cost savings and gains in health-related quality of life and productivity. Quality of life was measured in terms of quality adjusted life years (QALYs).² The effect of the scheme in terms of shared experience was estimated through improvements in subjective well being (SWB).

Costs and benefits were estimated for different stakeholders and time periods. Data used to populate the models was drawn from multiple sources including Be Active records and previous economic models produced for the National Institute for Health and Clinical Excellence (NICE).

¹ Be Active may also generate other positive effects such as building people's confidence, helping people re-enter the labour market, and strengthening community cohesion. These effects are not captured in the analysis as the direct link with Be Active has not been measured and the indirect link via physical activity would require more sophisticated measures of the effect of Be Active on physical activity.

² A QALY is a standardised measure of health gain widely used in health economics. It comprises two dimensions: time and quality of life. The latter is measured on a scale between 0 (death) and 1 (perfect health). For instance, 1 year if perfect health is measured as 1 QALY. Following NICE's criteria to decide whether health interventions represent value for money, a value of £20,000 per QALY is assumed in the analysis.

Building on the CBA, a feasibility analysis of using a SIB to fund Be Active was undertaken. The feasibility of a SIB is partly a function of whether the commissioners of public services perceive sufficient value from the outcomes achieved – for instance, in terms of subsequent cash savings – to pay investors for establishing and delivering the service and taking a risk on whether it is successful.

Results

It is estimated that Be Active has nearly 140,000 active users per year. The benefits generated by the scheme exceed its cost by £445.2 million. The benefits included in this estimate are the health care cost savings, health related quality of life gains, and productivity gains associated with the improved physical activity and reduced smoking generated by Be Active. In addition, the scheme provides an increased opportunity for shared experience. It was estimated that, through this increase in shared experience highly active users of the scheme experience a 5.9 per cent increase in life satisfaction – a measure of SWB.

The benefit cost ratio indicates that every £1 invested in Be Active generates on average £21.3 in benefits. The returns vary for the different stakeholders, depending on the amount of costs incurred and benefits received:

- For every £1 spent on Be Active the return for the local NHS is £22.8 in terms of health care related benefits (primary and secondary care). The majority of these benefits relate to health-related quality of life gains. A smaller amount relates to health care cost savings (£2.6) – £0.5 are estimated to be cashable as medication cost savings.
- For every £1 spent on Be Active the return for the Local Authority is £2.3 in terms of improvements in quality of life among its residents.
- Both employers and the Treasury benefit from the scheme, without incurring in any cost, through reduced absenteeism resulting in productivity gains and tax payments,

The cost per QALY – an indicator used in economic evaluation to assess health interventions – is £1,164.6. This estimate is far below £20,000 – the threshold used by NICE to decide whether health interventions represent value for money.

The initial SIB feasibility analysis suggests that the benefits generated by Be Active measured by this study are insufficient to afford to pay investors for delivering better outcomes if only cost savings over the first few years (realisable and not) are considered. It is only possible to afford the outcome payments to investors if commissioners are prepared to pay for the QALYs gained as a result of Be Active.

Conclusion

The results of the economic analysis demonstrate that Be Active is cost-effective and represents an efficient use of public resources. These results are subject to some level of uncertainty given the nature of the data available. Despite this uncertainty, the estimates are

conservative thus providing comfort in the conclusion of the analysis. Moreover, Be Active may generate several other health and social outcomes other than those captured in the analysis.

The findings from the CBA suggest that:

- Only a small proportion of the public sector benefits are generated in the first five years.
- Local health authorities – particularly secondary care – enjoy the greatest benefits from Be Active.
- The vast majority of benefits are improvements in participants' quality of life.

A number of reasons suggest that a SIB does not present an attractive funding model for Be Active, namely:

- The distribution of the quantifiable benefits is aligned with the current funding structure – where the local NHS contributes with 85 per cent of the funding and the Local Authority covers the remaining 15 per cent.
- Insufficient cash and resource savings are available over the likely lifetime of a SIB to cover outcome payments.
- The programme is already well-established.
- A significant expansion of activity is not under consideration at present.

There may, however, be other opportunities to open up new income streams for the scheme and a SIB could be a good way of raising investment for Be Active if such opportunities arise. Be Active may have the potential to develop new pathways for dealing with other social issues, such as helping people back into work. This in turn could open up the opportunity to earn revenue – on an outcomes basis – from other public sector entities, such as commissioners of welfare to work services and those responsible for new public health and mental health funding streams. Payment on the basis of outcomes might also be of interest to health and local authorities' commissioners considering introducing a similar scheme in other parts of the country. It could help them transfer the implementation risk of replicating the scheme – only paying if similarly impressive increases in physical activity were delivered. In these scenarios, social investors may be able to help provide the working capital and risk capital required prior to outcome payments being received.

2.0 Introduction

Be Active is a scheme provided free of charge to all Birmingham residents who live within the Birmingham City Council area. The aim of the scheme is to tackle health inequality and associated deprivation levels, by offering access to free physical activity sessions for all 1.1 million citizens of the city. Participants can take part in free swimming, exercise classes or the gym at any Council-run leisure centre during off-peak hours, which vary according to each centre.

The scheme has been operating across the city since September 2009 and is funded through a partnership between Birmingham City Council and the local NHS primary care trusts. There are currently over 300,000 people registered in the scheme and the number of physically active adults has increased since the scheme was introduced.

The multiple benefits of undertaking physical activity have been widely documented elsewhere (e.g. DH, 2004). Despite this evidence, the current economic climate means that demonstrating that Be Active represents value for money is an imperative. Moreover, the reductions in the size of public sector budgets in the short- and medium-term imply that the scheme is limited in its ability to expand its reach. In this context, [Matrix Evidence](#) was commissioned by [Birmingham's Be Active Scheme](#) and [Social Finance](#), with the support of the Barrow Cadbury Trust, to answer the following questions:

- ***Does Be Active represent value for money?***
- ***Would it be economically feasible to fund Be Active with a social impact bond (SIB)?***

To answer the first question an evaluation of the effects and costs of Be Active was undertaken. The effects of the scheme were expressed in monetary terms and compared against the cost of delivery to obtain a measure of the net benefits derived from Be Active. The effects of the scheme captured in the analysis include changes in physical activity, smoking and shared experience. The first two were expressed in monetary terms by estimating the resulting health care cost savings, and the gains in health-related quality of life and productivity. Quality of life was measured in terms of quality adjusted life years (QALYs).³ Costs and benefits were estimated for different stakeholders and time periods. The effect of the scheme in terms of shared experience was estimated through improvements in subjective well being (SWB).

Building on the cost benefit analysis (CBA), a feasibility analysis of using a SIB to fund Be Active was undertaken. The first SIB was launched in 2010 to reduce re-offending among those leaving Peterborough Prison. A number of other SIBs are currently being developed and the concept has received significant interest from governments in the UK and internationally. This

³ A QALY is a standardised measure of health gain widely used in health economics. It comprises two dimensions: time and quality of life. The latter is measured on a scale between 0 (death) and 1 (perfect health). For instance, 1 year if perfect health is measured as 1 QALY. A value of £20,000 per QALY is assumed in the analysis as per the cost-effectiveness threshold used by NICE.

fits within a broader move to commission services on the basis of outcomes (Social Finance, 2011).

The remainder of this report is structured as follows. The next section describes the methods and results from the CBA. Section 4 presents the SIB feasibility analysis. Section 5 discusses the implications of the findings and concludes.

3.0 Cost benefit analysis

The first part of this section provides an overview of the method applied to undertake the CBA and the second part summarises the results.

3.1 Overview of the method

The effects of Be Active captured in the analysis include: increased levels of physical activity, quitting smoking, and increased opportunity for shared experience. Table 1 summarises the benefits included in the CBA.

Table 1
Benefits included in the cost-benefit analysis for each of the effects derived from Be Active

	Physical activity	Smoking	Shared experience
Health care cost savings	✓	✓	
Quality of life gains	✓	✓	
Productivity gains	✓	✓	
Subjective well being gains (*)			✓

(*) Not monetised.

Increased **physical activity** levels and reduced **smoking** were expressed in monetary terms by estimating the resulting health care cost savings, and gains in health-related quality of life and productivity. These benefits were estimated based upon previous analysis of the impact of Be Active on physical activity levels, using analysis previously conducted by Matrix for NICE to estimate the value of these changes.

Health care cost savings result from the avoidance of treatment costs for diseases associated with lack of physical activity and smoking, such as type II diabetes and lung cancer (see Appendix 1 for full list of diseases included). Improvements in health-related quality of life arise from the avoidance of the diseases themselves, measured in terms of QALYs gained and valued at £20,000 per QALY, following NICE’s criteria for valuing health outcomes. Productivity gains occur as a result of reduced absenteeism due to improved short-term and long-term health gains. These benefits only apply to employed individuals.

The impact of Be Active as a result of improved **shared experience** was estimated by the effect on SWB. In empirical terms this was measured by the improvement in SWB – more specifically, life satisfaction – resulting from being a highly active member of a sports club. Although measures of SWB are increasingly being used in economics, the literature is still in development and further research is needed before the monetary estimates attached to SWB gains can be treated with confidence. Therefore, the SWB gains of Be Active are presented in natural units.

Costs and benefits were disaggregated across a number of dimensions, including: perspective, timing and realisability.

Perspective. Table 2 outlines how costs and benefits were attributed to the different stakeholders. It is worth noting that the same benefit may be relevant to more than one stakeholder. For example, immediate health gains are considered to be the objective of both the NHS and the Local Authority (Birmingham City Council).

Table 2
Costs and benefits attributed to each stakeholder

	Local NHS		Local authority	Treasury	Employers
	Primary care	Secondary care			
Cost of Be Active	30%	55%	15%		
Benefits of Be Active					
Immediate health benefits	100%		100%		
Short- and long-term health benefits	35%	65%			
Productivity gains				15%	100%
Subjective well being gains			100%		

Timing. The model calculates benefits over the lifetime of individuals. In practical terms this means that benefits were calculated for a period of 50 years. Benefits were then grouped into: short-term (years 1 to 5), medium term (years 6 to 15) and lifetime (years 1 to 50).

Realisability. The benefits generated by Be Active were classified as realisable to the extent that they will translate into cash savings. The following criteria were used to estimate the proportions of benefits that are cashable:

- **Health care cost savings.** It was conservatively assumed that only avoided medication costs are realisable.
- **Productivity gains.** It was assumed that 100 per cent of productivity gains were realisable as they will translate into increased income for employers and, consequentially, increased corporate tax payments for the Treasury.

Detail on the data used to populate the models and the assumptions made in the calculation of costs, effects, and benefits are described in Appendix 1.

The models were run for all potential beneficiaries, given by the number of individuals currently registered in the scheme. All monetary figures are in 2011 prices. Where the costs and benefits of the scheme extend over more than one year, in accordance with Green Book guidance, a 3.5 per cent discount rate was applied to calculate their present value. The results from the CBA are presented using different return on investment metrics (see Box 1 for a definition of these metrics).

Box 1

Return on investment metrics

The **net benefit** is calculated as the total benefits attributed to the scheme minus the total costs of implementing the scheme.

The **net benefit per person** is calculated as the average benefit per person minus the average cost per person.

The **benefit-cost ratio** is calculated as the ratio of benefits to costs. The benefit-cost ratios show the potential return for every £1 investment.

The **cost per QALY** is calculated as the ratio of incremental cost to QALYs gained. The cost per QALY is the standard return on investment metric adopted by NICE.

3.2 Cost benefit analysis results

This section summarises the results of the CBA undertaken to determine whether Be Active is value for money.

Key messages

The key messages are synthesised in Box 2.

Box 2

Key messages from the cost benefit analysis of Be Active

Be Active represents an efficient use of public resources. It is estimated that Be Active has nearly 140,000 active users per year. Over five years, the aggregate cost is estimated at £22.0 million. The benefits generated by the scheme exceed its cost by £445.2 million. This net benefit includes “cash savings” (£28.7 million), cost savings and productivity gains to the public and private sector (£39.2 million), and improvements in quality of life (to the equivalent of £377.2 million).

When analysed per person, the benefits over the lifetime of an individual exceed the cost of the scheme by £3,202.7 per person.

Every £1 invested in Be Active generates on average £21.3 in benefits. The returns vary for the different stakeholders, depending on the amount of costs incurred and benefits received:

- For every £1 spent on Be Active the return for the local NHS is £22.8 in terms of health care related benefits (primary and secondary care). The majority of these benefits relate to health-related quality of life gains. A smaller amount relates to health care cost savings (£2.6) – £0.5 are estimated to be cashable as medication cost savings.
- For every £1 spent on Be Active the return for the Local Authority is £2.3 in terms of improvements in quality of life among its residents.
- Both employers and the Treasury benefits from the scheme without incurring in any cost.

The **cost of Be Active per QALY** gained is **£1,164.6**. This estimate is far below the threshold used by NICE (£20,000) to decide investment in public health interventions, suggesting that Be Active represents an efficient use of resources.

These results are subject to some level of uncertainty given the nature of the data available. Despite this uncertainty, the estimates are conservative thus providing comfort in the conclusion of the analysis – i.e. that Be Active represents an efficient use of resources.

Be Active

Be Active provides access to free physical activity sessions. There are currently over 300,000 people registered in the scheme. It is estimated that in 2010 nearly 140,000 individuals were active users. The scheme is funded through a partnership between Birmingham City Council and the local NHS primary care trusts (PCTs). The costs of running Be Active include the cost of the activity time purchased from the gyms participating in the scheme plus operational costs such as project staff costs and marketing budget. The results of the cost analysis indicate that:

- The unit cost of Be Active is £33.8 per person per annum. This was calculated by dividing the total cost of the scheme per year (£4.7m, personal communication with Be Active Lead Officer) by the number of Be Active users (139,000, Leisure Card data).
- It was assumed Be Active users stay in the scheme for five years. After discounting, the total cost of Be Active per person was calculated to be £158.0.
- The aggregate cost of Be Active was then calculated as £22.0m, of which £3.3m (15 per cent) are funded by the Local Authority and £18.7m (85 per cent) by the local PCTs.

The analysis estimates that Be Active has the following effects:

- 8 per cent increase in the likelihood of undertaking physical activity defined as at least three 30 minute sessions of moderate exercise per week⁴ (based on Lyon et al., 2011; Harland, 1999; York Health Economics Consortium, 2007).
- 3 per cent increase in the likelihood of quitting smoking (Lyon et al., 2011).
- 74 per cent increase in the likelihood of engaging in a “shared experience” (NHS South Birmingham, 2010).

Both participating in physical activity and quitting smoking result in an increased likelihood of obtaining a range of health related benefits. For example, being physically active results in a reduced long-term chance of having a stroke (8 per cent less) or developing type II diabetes (7 per cent less), whilst quitting smoking reduces the risk of lung cancer (2 per cent less) and myocardial infarction (5 per cent less). Avoidance of these diseases generates not only health gains for the individual valued at £20,000 per QALY gained, but also, thousands of pounds worth of treatment cost savings to the NHS (e.g. an avoided case of type II diabetes results in a 0.32 QALY gain, whilst the average annual treatment cost for a lung cancer patient is £5,992) (Matrix, 2011). (See Appendix 1 for a full list of diseases included).

There are also short-term benefits that may accrue such as a reduced likelihood of visiting a GP. For example, based on Health Survey for England (HSE, 1999) data, it was estimated that being physically active reduces the yearly number of visits by 29 per cent.

In addition to the benefits associated with increased physical activity and reduced smoking, the scheme generates an opportunity for shared experience. This was measured by the improvement in life satisfaction resulting from being an active member of a sports club. It was

⁴ One physical activity session was assumed to be equivalent to burning 90 MET (metabolic equivalent of task) or 3 MET per minute, a commonly accepted lower threshold for moderate activity (Matrix, 2011).

estimated that being an active member of a sports club increases life satisfaction by 0.04 points (0.05 significance level), on a scale of 0 to 1. Relative to the average level of life satisfaction, this effect represents a 5.9 per cent increase to people using Be Active with a sufficiently high frequency. This result suggests that the opportunity for shared experience offered by the scheme generates a relatively small⁵ but significant effect on SWB.

Aggregated benefits of Be Active

The aggregated benefits of Be Active in terms of health care cost savings, gains in health-related quality of life, and productivity are summarised in Table 3. This shows the estimated lifetime benefits by stakeholder and resource type.⁶ The results indicate that:

- The present value of the lifetime benefits is £3,360.8 per Be Active participant. This estimate refers to the average net benefit per Be Active participant and includes the monetary value of the effects of the scheme in terms of physical activity and smoking.
- These benefits are spread across different stakeholders and can be split into different categories depending on their realisability. For instance:
 - Local NHS *primary* care benefits by the amount of £1,102.6. The majority of these benefits relate to QALYs gained (to the equivalent of £977.4). Cost savings to primary care amount to £125.1, out of which £23.7 are realisable.
 - Local NHS *secondary* care benefits by the amount of £1,961.7. The majority of these benefits relate to QALYs gained (to the equivalent of £1,736.1). Cost savings to secondary care amount to £225.6, out of which £44.6 are realisable.
 - The Local Authority benefits include health-related quality of life gains equivalent to £54.9 per person. These do not translate into cashable savings.
 - Both employers and the Treasury benefits relate to reduced absenteeism and are realisable in the form of productivity gains (£296.5) and tax payments (£44.5).
- The present value of the total benefits generated by delivering the scheme to nearly 140,000 individuals is £467.1 million. As with the benefits per person, these are spread across different stakeholders: NHS secondary care (£272.7 million), NHS primary care (£153.3 million), employers (£41.2 million), the Local Authority (£7.6 million), and the Treasury (£6.2).

⁵ The effect of being an active member of a sports club is 10 -15 per cent the size of the effect on life satisfaction of being in good health and being employed.

⁶ Additional tables presenting benefits for different dimensions are available in Appendix 2.

Table 3
Lifetime benefits by stakeholder and resource type (in £2011 prices)

Benefit measure	Stakeholder					
	Total	Local NHS		Local Authority	HM Treasury	Employers
		Primary care	Secondary care			
Benefits per person (in £)						
Realisable benefits	364.84	23.71	44.63	0.00	44.53	296.50
All cost savings (incl. realisable) and productivity gains	647.22	125.14	225.59	0.00	44.53	296.50
QALYs gained	2,713.53	977.42	1,736.11	54.86	0.00	0.00
Total (*)	3,360.76	1,102.56	1,961.70	54.86	44.53	296.50
Total benefits (in £m)						
Realisable benefits	50.71	3.30	6.20	0.00	6.19	41.21
All cost savings (incl. realisable) and productivity	89.96	17.39	31.36	0.00	6.19	41.21
QALYs gained	377.18	135.86	241.32	7.63	0.00	0.00
Total (*)	467.15	153.26	272.68	7.63	6.19	41.21

(*) Total does not add up benefits as some benefits are relevant to more than one stakeholder.

Is Be Active value for money?

Table 4 shows different return on investment metrics for Be Active. These are presented by stakeholder and resource type.⁷ The results indicate that:

- The net present value of the lifetime benefits is £3,202.7 per Be Active participant. This includes the monetary value of the effects in terms of physical activity and smoking, minus the cost of delivering the scheme.
- The net present value of the benefits generated by delivering the scheme to nearly 140,000 individuals is £445.2 million.
- The benefit-cost ratio indicates that for every £1 invested Be Active generates on average £21.3 in return. The returns vary for the different stakeholders and resource type, depending on the amount of costs incurred and benefits received:
 - For every £1 the local NHS receives £23.7 in *primary* care related benefits. The majority of these benefits relate to health-related quality of life gains. A smaller amount relates to health care cost savings (£2.7), out of which £0.5 are realisable.
 - For every £1 the local NHS receives £22.4 in *secondary* care related benefits. The majority of these benefits relate to quality of life gains. Health care cost savings amount to £2.6 (of which £0.5 are realisable) for every £1 invested.
 - For every £1 the Local Authority receives £2.3 in terms of quality of life gains.
 - Both employers and the Treasury benefits from the scheme without incurring in any cost.
- The cost per QALY is £1,164.6 – i.e. far below the threshold used by NICE (£20,000).

The results demonstrate that ***Be Active is cost-effective and represents an efficient use of public resources.*** These results are subject to some level of uncertainty given the nature of the data available. These estimates were derived based on multiple sources of data including: the effectiveness of Be Active in terms of increasing physical activity and reducing smoking, the likelihood of experiencing diseases associated with these behaviours and the cost savings and quality of life gains associated with avoidance of these diseases. Despite this uncertainty, the estimates are conservative thus providing comfort in the conclusion of the analysis.

⁷ Additional tables presenting return on investment metrics for different dimensions are available in Appendix 2.

Table 4
Return on investment metrics by stakeholder and resource type (in £2011 prices)

Return on investment metric	Stakeholder					
	Total	Local NHS		Local Authority	HM Treasury	Employers
		Primary care	Secondary care			
Net benefit per person (in £)						
Realisable benefits	206.83	-22.89	-43.08	-23.70	44.53	296.50
All cost savings (incl. realisable) and productivity	489.21	125.14	225.59	-158.01	44.53	296.50
Total	3,202.75	1,055.95	1,874.00	31.16	44.53	296.50
Total net benefit (in £m)						
Realisable benefits	28.75	-3.18	-5.99	-3.29	6.19	41.21
All cost savings (incl. realisable) and productivity	68.00	10.92	19.17	-3.29	6.19	41.21
Total	445.18	146.78	260.49	4.33	6.19	41.21
Benefit-cost ratio						
Realisable benefits	2.31	0.51	0.51	0.00	-	-
All cost savings (incl. realisable) and productivity	4.10	2.69	2.57	0.00	-	-
Total	21.27	23.66	22.37	2.31	-	-
Cost per QALY	1,164.61	953.64	1,010.35	8,640.14	-	-

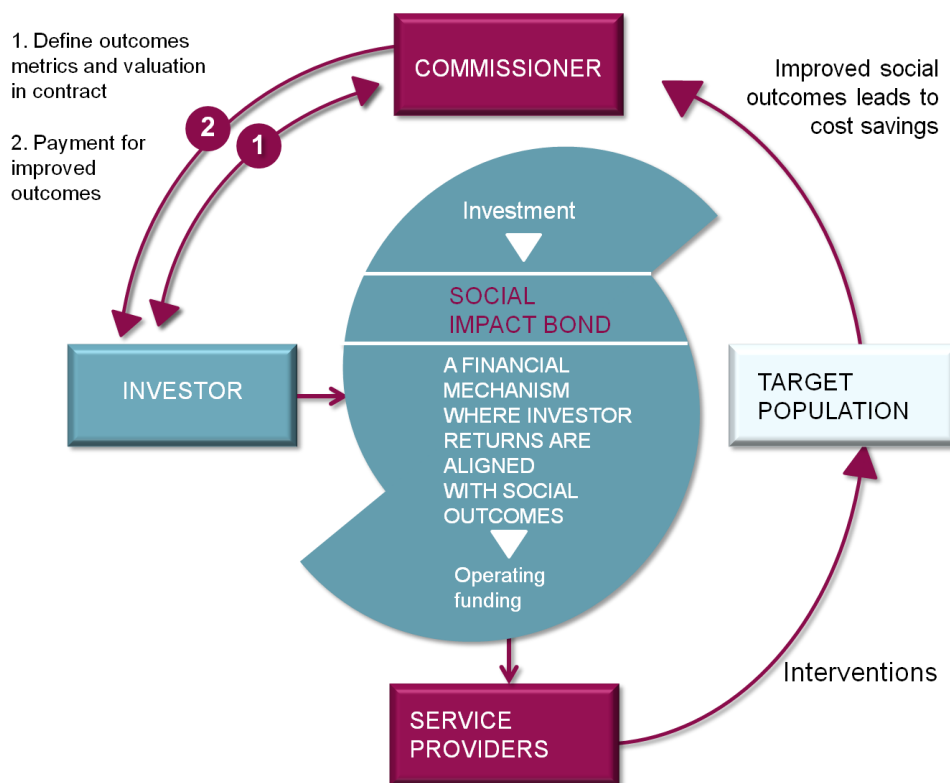
4.0 Social impact bonds feasibility analysis

This section introduces the idea of SIBs and describes the method used to assess the feasibility of supporting Be Active by means of a SIB.

4.1 SIBs: general introduction

What is a social impact bond? A SIB is a contract in which a public sector entity (or entities) commits to pay for a significant improvement in selected social outcomes for a target population (Figure 1, adapted from Corrigan, 2011). On the basis of this contract, private capital is raised from socially-motivated investors to fund interventions and preventative services that aim to deliver these outcomes. Financial returns to investors are dependent on the degree to which these interventions improve the target social outcomes. If the intervention succeeds, the public sector pays the investors a return based on pre-defined measures of social outcomes, which represents a proportion of the benefit to the public sector arising from these results. If the interventions fail and outcomes are not achieved, investors will lose money. In this way the public sector transfers to the investors financial risk associated with delivering the target social outcomes.

Figure 1
What is a social impact bond?



SIBs are a new financing mechanism that aims to bring benefits to all parties in the transaction. Whilst the target population benefits from the funding of innovative new service provision, the public sector benefits from the new private sector funding and the transfer of risk to those investors. Investors benefit from an opportunity to make a social as well as a financial return on their investment and also to deploy non-grant capital to achieve social impact.

The outcomes-based contracts underpinning SIBs enable long-term investment in complex issues with poor social outcomes and high costs to society, such as persistent criminal offending, young people in state care or drug rehabilitation. The focus on outcomes is designed to enable a more flexible approach to contracts, encouraging innovative approaches to emerge, driving, it is hoped, more-effective decision making.

4.2 A SIB in the context of Be Active

Introducing the SIB feasibility analysis

One important criterion in assessing the feasibility of a SIB is whether the commissioners of public services perceive sufficient value from the outcomes – for instance, in terms of subsequent cash savings – expected to be delivered. These payments for outcomes need to cover investors' costs of establishing and running the services and the return required to compensate investors risks associated with achieving the outcomes. A number of other criteria are also required for a successful SIB, such as the ability to measure the outcomes achieved and structure a contract on that basis (see *Social Impact Bonds, A Technical Guide*, Social Finance, 2011, for a full list). This analysis focused on assessing the value of outcomes as the first step in full feasibility.

In order to inform this initial assessment of the feasibility of a SIB to fund Be Active, a number of contract scenarios were tested. The terms of the contract were defined based on the following simplified parameters:

- **Service delivery.** Two options were considered: (i) Be Active delivered to 100,000 individuals with average socio-economic characteristics, or (ii) 50,000 individuals from a deprived socio-economic background. Individuals from a deprived socio-economic background vary from 'average' individuals in terms of the effectiveness of the scheme on physical activity levels. No additional costs for SIB management and capital raising were assumed given that this is an initial assessment.
- **Outcomes.** It was assumed that outcomes in the future would match past performance and that these could be measured effectively. External investment should stimulate greater innovation and better performance management, and so SIB outcomes should be higher in practice.
- **Rate of return paid to investors.** For illustrative purposes, two target annual real rates of return were considered: (i) 5 per cent; or (ii) 7 per cent.
- **Intervention period.** It was assumed that the funding would be available to deliver the intervention for up to 5 years and that it would be provided in yearly increments.

- **Payment point.** Returns on the investment are assumed to accrue annually, based on the amount drawn down at the start of the financial year, once outcomes have been verified. The total return then comprises an aggregation of the initial investment each year plus (compounded) return earned, throughout the intervention period..
- **Benefit to commissioners.** Although SIB contracts usually focus on realisable cost savings, a broader set of benefits to commissioners was considered. Three types of benefits were considered: (i) realisable cost savings, conservatively assuming that only avoided medication costs are realisable⁸; (ii) non realisable cost savings; and (iii) monetary value of QALY gains.
- **Commissioners' willingness to pay.** For each type of benefit considered, the amount that the commissioner would pay for the benefit was set as follows: (i) 80 per cent of *all* short-term (years 1 to 5) cost savings; and (ii) 20 per cent of *all* medium-term cost-savings (years 6 to 15). In the case of QALY gains, two alternatives were considered: (i) either zero (i.e. commissioners are not willing to pay for QALYs) or (ii) 80 per cent of the value that NICE place on a QALY (£20,000) for QALYs gained in the short term, and 20 per cent of this value for QALYs gained in the medium-term.

By combining the above options, the feasibility of the SIB was assessed in a number of contract scenarios. For each scenario, the following three outputs were produced:

1. Payments required to be made to investors to meet expected levels of return.
2. The value of the outcomes generated by investing in Be Active; specifically, the amount that commissioners would be willing to pay to investors for the benefits generated.
3. Whether (2) is greater than (1)

Results

Table 5 illustrates the results of the SIB feasibility analysis for two possible contract scenarios (additional scenarios are presented in Appendix 2). Both scenarios represent a situation in which: Be Active is delivered to 100,000 individuals for a period of five years, and investors seek a 7 per cent annual rate of return if successful outcomes are achieved. The difference between scenarios A and B is the percentage of benefits commissioners are willing to pay to investors, namely:

- **Realisable cost savings.** In both scenarios commissioners are willing to pay 80 per cent of short-term savings and 20 per cent of medium term savings.
- **Non realisable cost savings.** In both scenarios commissioners are willing to pay 80 per cent of short-term savings and 20 per cent of medium term savings.
- **Monetary value of QALY gains.** In scenario A commissioners are not willing to pay for QALY gains, whilst in scenario B commissioners are willing to pay 80 per cent of the value of the QALYs gained in the short-term and 20 per cent of the value of the QALYs gained in the medium term.

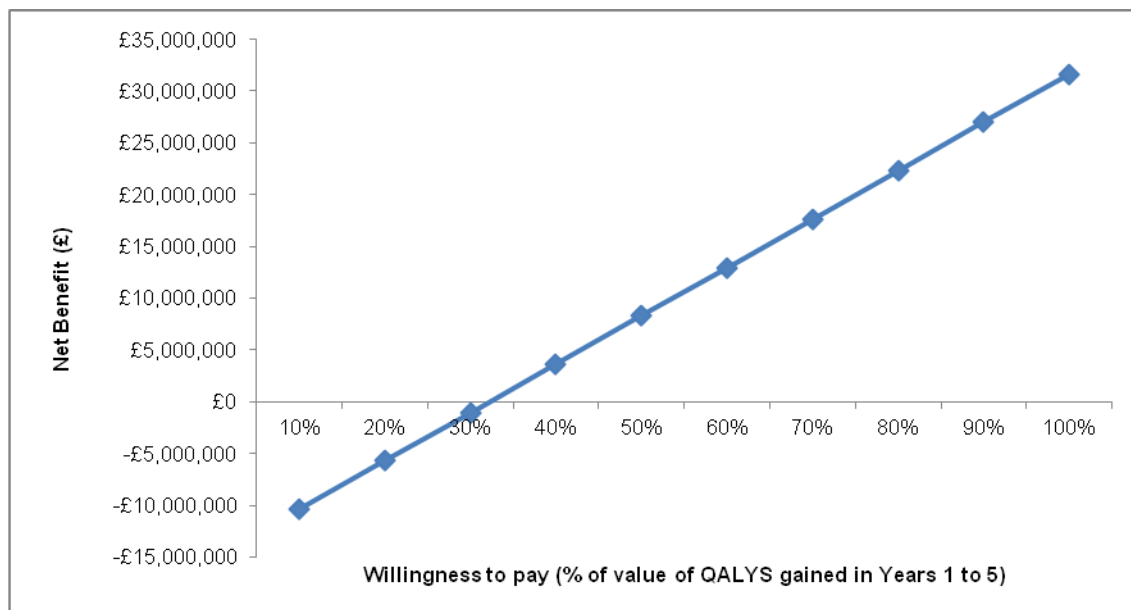
⁸ This means that realisable cost savings accruing from productivity gains were removed from the SIB analysis.

Table 5
Illustrative example of SIB contract feasibility analysis

Scenario	Total cost of successful SIB (£m)	Benefits available to pay investors (£m)			Total	Net benefit (£m)
		Realisable cost savings	Non-realisable cost savings	Savings from QALYs gained		
A	20.08	0.4	2.07	0.00	2.47	-17.61
B	20.08	0.4	2.07	39.91	42.38	22.31

The results in Table 5 show that the benefits generated by Be Active are insufficient to afford to pay investors if only cost savings (realisable and not) are considered. It is only possible to afford the payments to investors if commissioners are prepared to pay for the QALYs gained as a result of Be Active. Figure 2 illustrates this point in graphical terms. It shows that the SIB contract become feasible when commissioners are willing to provide outcome payments equivalent to at least 33 per cent of the value of the QALYs gained in the short term (£6,600 per short term QALY).

Figure 2
SIB contract scenario A: sensitivity analysis of net benefit to percentage of the value of QALYs gained paid to bond holders in the short term



Discussion

Three themes from the cost benefit analysis have particular bearing on the feasibility of a SIB:

A small proportion of the public sector benefits identified are available in the first five years. This means that SIB outcome payments cannot be made on the basis of shared cashable over the likely lifetime of a SIB.

The current evidence base identifies health services – particularly secondary care – as the public sector entities enjoying the greatest level of benefits from Be Active. On the basis of the evidence available, any SIB would need to be commissioned by health services. Other public sector bodies do not enjoy sufficient benefit to fully fund any outcome payments.

The vast majority of benefits associated with health services are quality of life benefits. The feasibility of a SIB would depend on the willingness of a health commissioner to pay out cash on the basis of QALY gains expected to accrue to the population, rather than distribute a share of cashable or resource savings.

The cost-benefit analysis showed that current funding arrangements (local NHS: 85 per cent; Local Authority: 15 per cent) are aligned with the distribution of identifiable benefits to public sector stakeholders. Together with the SIB feasibility analysis these findings identify a health sector commissioner as the most likely candidate and would require them to pay on the basis of quality of life benefits outside of the lifetime of the SIB. This, however, leaves unanswered the question as to whether such a SIB is the most suitable method of funding Be Active amongst the opportunity to explore other funding options.

At the heart of the SIB model is the raising of private capital (social investment) to provide financing for an outcomes-based contract. This method of financing is particularly useful where it can:

- Transfer implementation risk to the social investors from the public sector.
- Encourage innovation and drive performance in service delivery.
- Open up new income streams and sources of investment.

As the cost-benefit analysis showed, Be Active has been successful and the benefits that it provides to the health of the Birmingham population are well-evidenced. Whilst it would be possible to introduce outcome-based financing on this basis, there would seem to be little benefit in transferring implementation risk around this core activity of Be Active to private investors. Previous health and local authority commissioners of Be Active have already taken that risk.

Where such financing could be appropriate is to fund an expansion of activity, where commissioners might be unwilling to commit to pay for the service until additional benefits are demonstrated. Even given the success of Be Active in enrolling populations identified as “hard-to-reach”, target outcomes for any expansion could be set to incentivise a focus on higher risk

or more costly populations. However, from discussions with stakeholders to date it is clear that such an expansion of the Be Active programme is not under consideration at the present time.

A number of reasons thus suggest that a SIB does not present an attractive funding model for Be Active, namely:

- The distribution of the quantifiable benefits is aligned with the current funding structure.
- Insufficient cash and resource savings are available over the likely lifetime of a SIB to cover outcome payments.
- The programme is already well-established and therefore less risky than a new service.
- A significant expansion of activity is not under consideration at present.

This is not, however, to say that there are no other opportunities to open up new income streams for the programme in the future. Given its scale and ability to generate data on take-up and usage patterns, Be Active represents an opportunity to develop new pathways for dealing with other social issues and the evidence of the value that this provides to other commissioners. A SIB could be a way to bring in the investment required to develop such services, with social investors only paid once these wider outcomes are delivered.

This approach would be built upon the scale of success which Be Active has enjoyed to date; in being able to attract a wide range of diverse clients, Be Active will have contributed to a change in the perception of gyms in Birmingham, making them more accessible to more people and more viable for wider use.

Over time Be Active has a unique opportunity to develop the evidence base for positive outcomes associated with regular physical exercise in a number of social outcomes – areas such as employment or reduction in offending which could not be considered in this analysis due to a lack of such evidence. This in turn could open up the opportunity to earn revenue – potentially on an outcomes basis – from other public sector entities, having shown the value of Be Active membership to them in achieving their own goals.

This opportunity should be seen in the context of a trend towards payment by results (PbR) across the public sector. The potential exists to develop links with existing PbR schemes, such as those developed under the Welfare to Work programme, though there is a degree of complexity in developing evidence around impact. In the medium-term there is also the opportunity to link with the prospective health premium element of new public health funding, given the clear evidence around health benefits, the scheme's success in attracting users from "hard to reach" groups and its potential to contribute to reductions in health inequalities. Following the 2010 White Paper, a national mental health PbR project is underway. Changes in the NHS Tariff may also introduce greater incentives for achieving outcomes such as the re-enablement of people recovering from particularly health conditions. Funding Be Active on an outcomes-basis could allow local commissioners within these schemes, such as Welfare to Work providers, Health and Wellbeing Boards and Clinical Commissioning Groups to match liabilities for outcome payments to Be Active with their own outcomes-based funding from central sources.

If these opportunities for new revenue streams or PbR contracts develop, there may well be a need for working capital to establish and run the service prior to outcomes being delivered and Be Active may wish to share the risks of not achieving these outcomes with others. Social investors could play an important role in such a scenario by providing the working capital and risk capital required.

Careful consideration would need to be given to the implementation and testing of these referral pathways and contractual arrangements, including attribution issues. At the most basic level, stakeholders from interested public sector service providers (such as GPs, Work Programme agents, probation services) could help their clients access Be Active, and with Be Active monitor the impact that undertaking regular physical exercise has on their target social outcomes. The efficacy of the referral pathways in changing behaviour could be tested with the provision of small incentives to use the membership provided by particular agencies. Comparison groups could be built on the basis of selective roll-outs (some referring agencies rather than others) or randomised trials (selective referrals).

It is also worth noting that accommodating external investment in Be Active might bring additional requirements. For instance, some sort of structural separation of Be Active from public sector agencies would be required in order to provide necessary distance from commissioning bodies and enable investors to play a role in determining how their funding is used. Where Be Active's success in contributing to results along new referral pathways is being assessed or paid for, agreements around referral support from other agencies may also be required. The potential range of these requirements should be borne in mind when assessing the implementation of any project requiring external investment. However, external investment could also bring advantages: providing more flexible funding and stimulating greater rigour in the delivery of outcomes.

5.0 Conclusion

The purpose of this research was to answer the following questions:

- ***Does Be Active represent value for money?***
- ***Would it be economically feasible to fund Be Active with a SIB?***

The results of the economic analysis demonstrate that Be Active is cost-effective and represents an efficient use of public resources. The cost per QALY – an indicator used in economic evaluation to assess health interventions – is £1,164.6. This estimate is far below the threshold used by NICE (£20,000) to decide investment in public health interventions.

The benefits generated by delivering Be Active to nearly 140,000 people, in terms of health care cost savings, health related quality of life gains and productivity gains, associated with improved physical activity and reduced smoking, exceed the cost of delivering the scheme by £445.2 million. In other terms, for every £1 invested, Be Active generates £21.3 in return.

These results should be treated with caution given the uncertainty in the available data. The estimates were derived based on multiple sources of data including: the effectiveness of Be Active in terms of increasing physical activity and reducing smoking, the likelihood of experiencing diseases associated with these behaviours and the cost savings and quality of life gains associated with avoidance of these diseases. Despite this uncertainty, the estimates are conservative thus providing comfort in the conclusion of the analysis – i.e. that Be Active represents an efficient use of public resources.

Disaggregating the costs and benefits of Be Active into different dimensions suggests that:

- A small proportion of the public sector benefits identified are available in the first five years.
- Local health authorities – particularly secondary care – enjoy the greatest level of benefits from Be Active.
- The vast majority of benefits to health authorities are quality of life benefits.

The implications of these results from the point of view of the feasibility of funding Be Active with a SIB are that:

- Insufficient cost savings are realised to afford the SIB payments over the lifetime of the investment.
- Any SIB would need to be commissioned by health services, and would require them to be willing to pay for the future QALYs gains generated by Be Active.

These findings suggests that, whilst it would be possible to introduce outcome-based financing on this basis, there would seem to be little benefit in transferring implementation risk around this core activity of Be Active to private investors. The use of a SIB to fund an expansion of the

scheme would only be justified if this expansion was significant, which is not currently under consideration.

There are however other opportunities to open up new income streams for the scheme. Be Active represents an opportunity to develop new pathways for dealing with other social issues and the evidence of the value that this provides to other commissioners. Stakeholders from interested public sector service providers (such as GPs, Work Programme agents, probation services) could help their clients access Be Active, and with Be Active monitor the impact that undertaking regular physical exercise has on their target social outcomes. This in turn could open up the opportunity to earn revenue – potentially on an outcomes basis – from other public sector entities, having shown the value of Be Active membership to them in achieving their own goals. In this scenario, a SIB could be a useful way to fund some of the costs of Be Active prior to outcomes being delivered and payments being received.

A SIB may also be appropriate if other cities are considering introducing a scheme similar to Be Active, but wish to transfer implementation risks to external investors and only pay for health and other outcomes if the success of Be Active is replicated.

6.0 References

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7.0 Appendix 1: cost benefit analysis

7.1 Method

A CBA compares the costs and effects of an intervention, all expressed in monetary terms. Therefore, a CBA is built upon the following three elements:

- The **effects** of the intervention, expressed in natural units (e.g. number of cases).
- The **costs** associated with the intervention.
- The **benefits** of the intervention – i.e. the monetary value of the effects generated by the intervention.

Modelling the benefits of Be Active

The effects of Be Active captured in the analysis include: increased levels of physical activity, quitting smoking and increased opportunity for shared experience. Decision trees (Figures A1.1 to A1.3) were built to model the benefits associated with these effects. These occur through several different routes, namely:

- **Health care cost savings** occur via two main routes:
 - **Immediate health benefits** associated with improvements in physical activity levels and smoking cessation. These translate into reduced use of health care services (e.g. reduction in GP visits).
 - **Short- and long-term health benefits** due to reduced incidence of several diseases associated with physical activity and smoking. The diseases included in the model are: type II diabetes, stroke, CHD, colon cancer and depression from engaging in physical activity and lung cancer, MI and COPD from quitting smoking. The reduction in the incidence of these diseases translates into reduced use of health care services (e.g. through avoided treatment costs).
- **Health-related quality of life gains** also occur via immediate health gains and short- and long-term health benefits. These translate into improved health-related quality of life which was measured in terms of QALYs. The monetary value of the QALYs gained was estimated using the value associated with a QALY – £20,000. This corresponds to the lower end of the range of QALY values implicit in the decision making process followed by NICE and commonly used in economic evaluations valuing health outcomes.
- **Productivity gains** occur as a result of reduced absenteeism due to improved short-term and long-term health gains. These benefits only apply to employed individuals.⁹
- **Subjective well-being gains** occur as a result of the opportunity that Be Active generates in terms of shared experience. In empirical terms this was measured by the improvement in SWB – more specifically, life satisfaction – resulting from being an active member of a sports club.

⁹ Non-employed individuals may also experience productivity gains if, for example, physical activity leads to increased chances of employment. These potential benefits are not captured in the model.

Figure A1.1

Decision model structure: physical activity

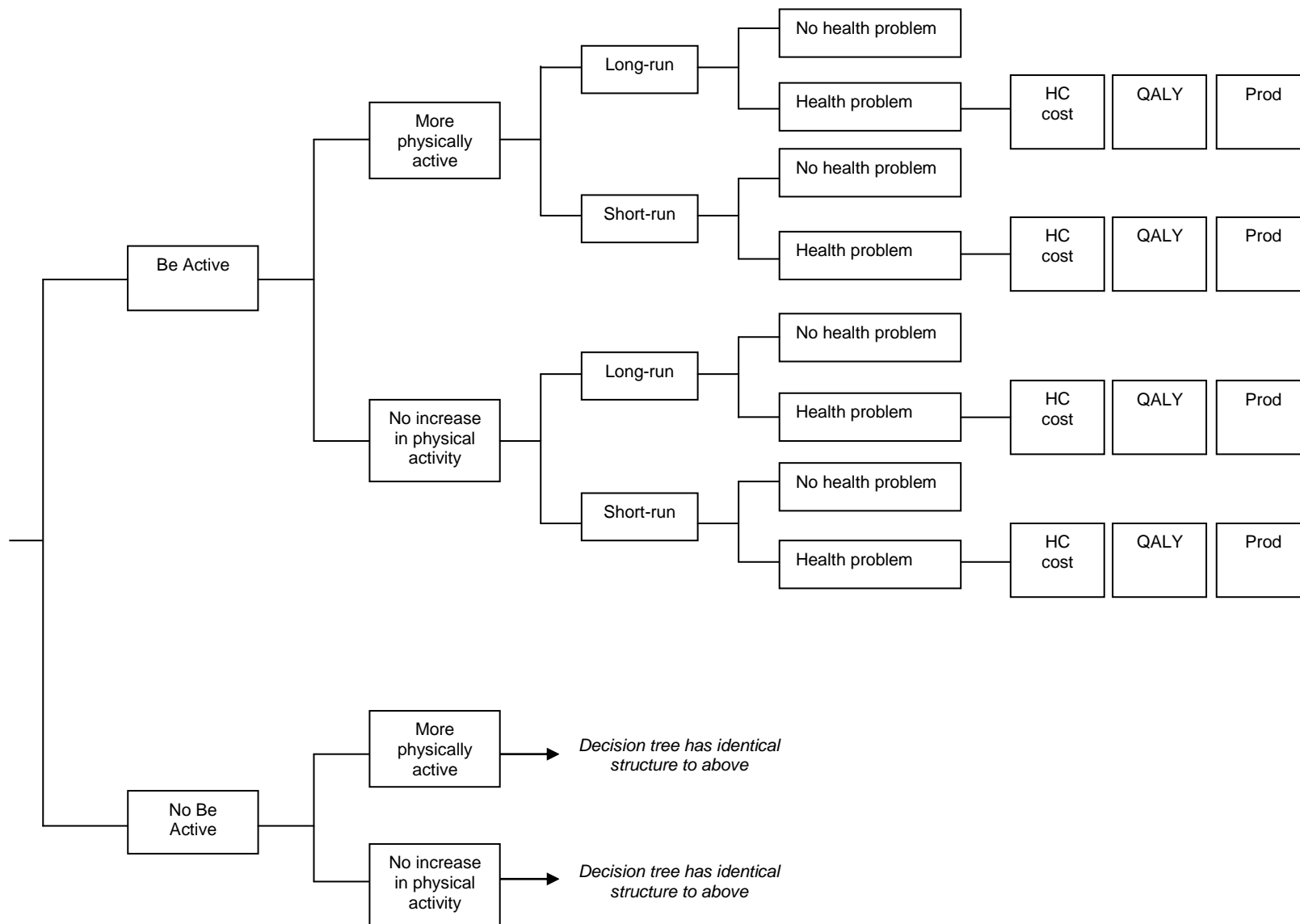


Figure A1.2
Decision model structure: smoking

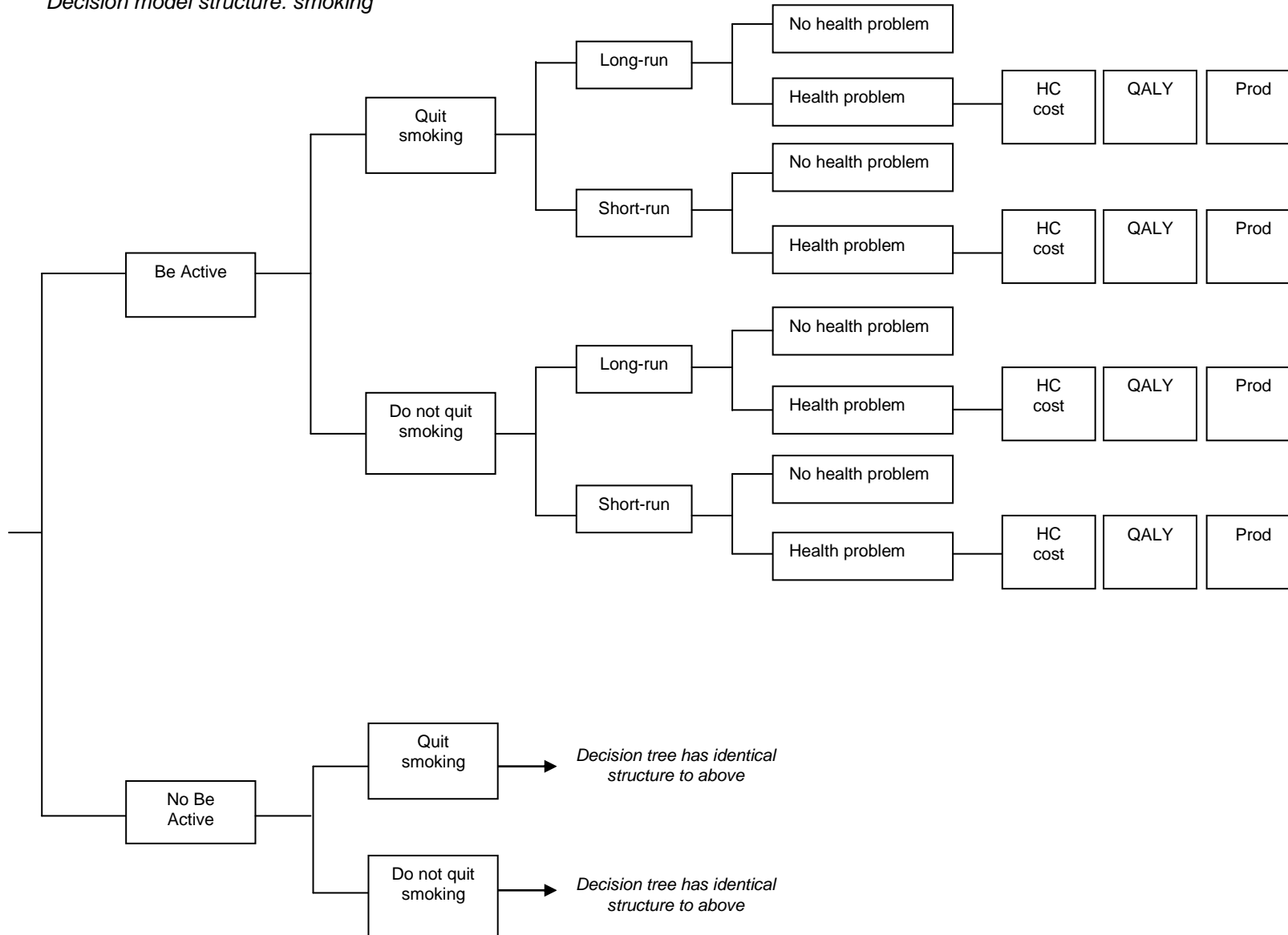
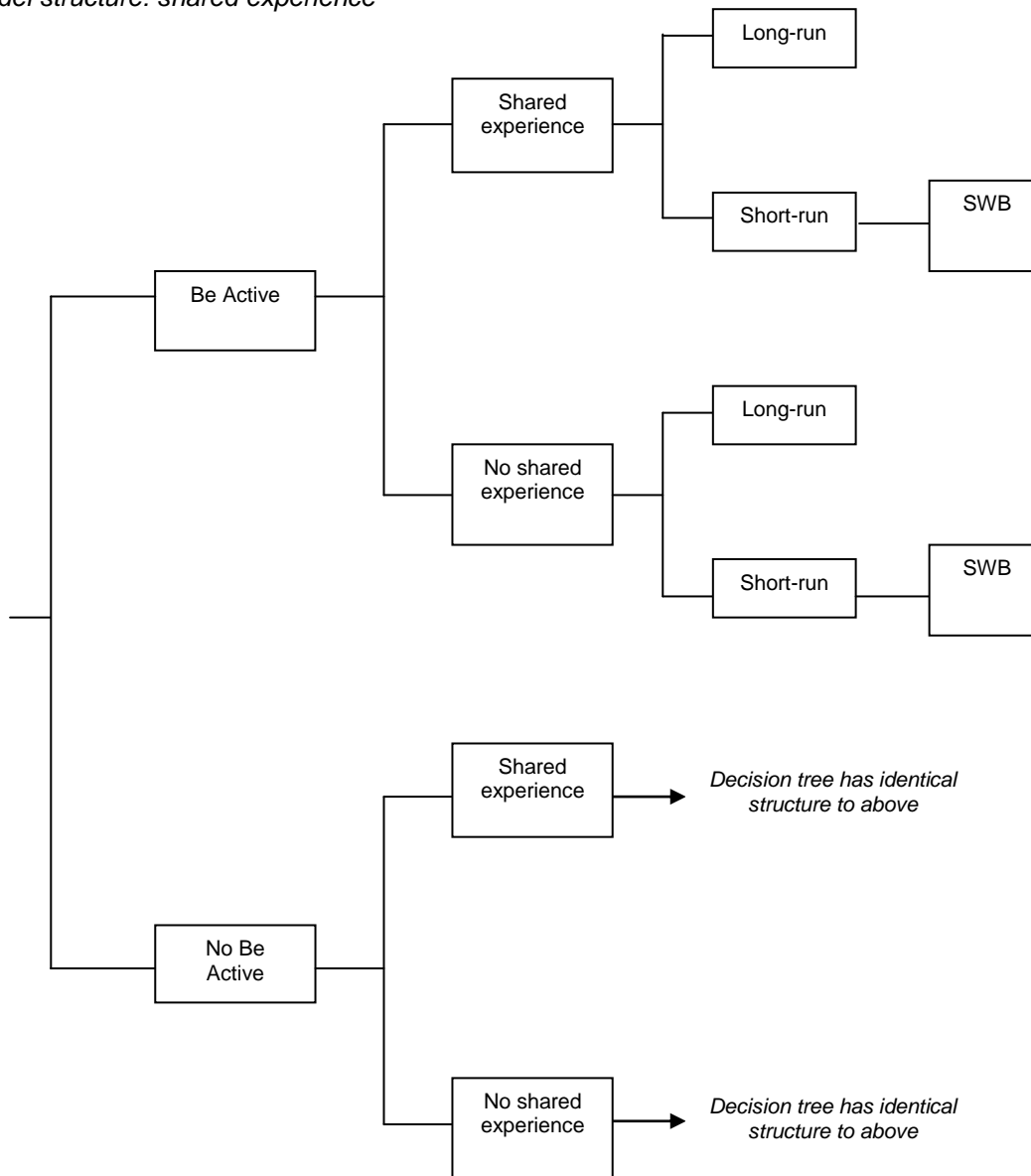


Figure A1.3

Decision model structure: shared experience



Data used to populate the models

Given the multiplicity of effects and benefits considered, data used to populate the models was collected from a wide range of sources. These are described below.

Population 'eligible' to the effects of the scheme (Table A1.1). For each sub-model the percentage of the population potentially benefiting from the effects of the scheme was calculated as follows:

- **Physical activity.** It was assumed that 100 per cent of individuals who take part in at least moderate activity obtain the short term benefits associated with physical activity. For the long term benefits, based on common practice, a 25 per cent drop-off rate was assumed. In other words, it was assumed that 75 per cent of the individuals maintain the increased levels of physical activity long enough to perceive its long-term benefits.
- **Smoking.** The baseline smoking rate among Be Active users was estimated at 24 per cent (Birmingham University, 2011; West, 2006). All of these individuals are assumed to benefit from the short-term health benefits associated with quitting smoking. For the long-term benefits, based on existing evidence (West, 2006) a drop-off rate of 50 per cent was assumed. In other words, 50 per cent remain as quitters long enough to perceive the long-term benefits of quitting smoking.
- **Shared experience.** It was estimated that 11 per cent of the Be Active population attend frequently enough (defined as 20+ attendances per year) to potentially benefit from the shared experience (Leisure Card data).

Effect data (Table A1.1). For each sub-model the effectiveness of Be Active was derived as follows:

- **Physical activity.** Data generated by a previous evaluation of Be Active undertaken by Birmingham University (2011) was used to calculate the percentage increase in the probability of being active due to Be Active. This was then adjusted based on Harland (1999) to control for the fact that some individuals may have become active even without the use of Be Active.
- **Smoking.** As with physical activity, data generated by Birmingham University (2011) was used to calculate the percentage decrease in the probability of being a smoker after participating in Be Active. This was then adjusted based on West (2006) to control for the fact that some individuals may have quit smoking even without participating in Be Active.
- **Shared experience.** The effect of shared experience was estimated based on the relationship between being an active member of a sports club and life satisfaction using data from the British Panel Household Survey (BHPS).

Table A1.1 summarises the data on population benefiting from the intervention and effect sizes.

Table A1.1

Value of parameters used to populate the model: 'eligible' population and effect sizes

Sub-model	'Eligible' population	Effect size	Source
Physical activity	100%	8%	Birmingham evaluation (2010), Harland (1999)
Smoking	24%	3%	Birmingham evaluation (2010), West (2006)
Shared experience	11%	74%	Leisure Card data (2010)

Costs. The cost of Be Active was calculated firstly by determining an annual unit cost per person using the scheme. This unit cost was then multiplied by the number of years for which Be Active users are assumed to stay in the scheme and the total number of users.

- The unit cost of Be Active is £33.8 per person per annum. This was calculated by dividing the total cost of the scheme per year (£4.7m, personal communication with Be Active Lead Officer) by the number of Be Active users (139,000, Leisure card data).
- It was assumed Be Active users stay in the scheme for 5 years. After discounting, the total cost of Be Active per person was calculated to be £158.0.
- The aggregate cost of Be Active was then calculated as £22.0m by scaling the unit cost up to a population of 139,000.

Benefits. For each sub-model the benefits of Be Active were calculated by firstly determining the likelihood of the benefit accruing due to engaging in Be Active, and secondly by the value attributed to each benefit. Specific parameters and data sources applied to each benefit domain are summarised in Tables A1.2 and A1.3.

- **Health care cost savings:**
 - **Immediate health benefits.** It was estimated that increased physical activity would lead to a lower utilisation of health care services. HSE (1999) survey data was used to measure the impact of physical activity on the frequency of GP visits per annum. The analysis controls for age, sex, employment status, ethnicity, education and income. The cost of each visit was calculated using PSSRU (2009) resource use costs.
 - **Short- and long-term health benefits.** Data on the reduced likelihood of contracting diseases, and consequent reduced utilisation of health care services was drawn from previous research undertaken by Matrix (2010). In addition, the increased likelihood of being healthy due to quitting smoking and subsequent cost saving was also calculated based on data available from Matrix (2010).

- **Health-related quality of life gains:**
 - **Immediate health benefits.** Data on the immediate health benefits from engaging in physical activity and quitting smoking were derived from YHEC (2007).
 - **Short- and long-term health benefits.** Data on the reduced likelihood of contracting diseases, and therefore quality of life gains due to longer life expectancy and fewer years of morbidity, were drawn from Matrix (2010). Likewise, data on the increased likelihood of being healthy due to quitting smoking and subsequent quality of life gain was derived from Matrix (2010). As mentioned in the previous section, quality of life gains were measured in terms of QALYs and valued in monetary terms using NICE's lower end of the range of QALY values: £20,000.
- **Productivity gains.** Short- and long-term productivity gains as a result of reduced absenteeism were calculated based on the following data:
 - It was estimated that productivity gains would apply to 46 per cent of individuals. This estimate was calculated based on the employment rate for Birmingham (Birmingham Economy, 2011; ONS, 2011) adjusted for the proportion of Be Active users over the age of 65 (Birmingham University, 2010).
 - It was estimated that engaging in physical activity would lead to an average yearly productivity gain of £499 based on an average number of days absent and wage rates (Matrix, 2010).
 - Similarly, the annual productivity gain from quitting smoking was estimated at £364 (Matrix, 2010).
- **Subjective well-being gains.** This benefit was estimated based on the following process:
 - Based on panel data from the BHPS regression analysis was applied to estimate the relationship between being an active member of a sports club and life satisfaction. It was estimated that being an active member of a sports club increases life satisfaction by 0.041 points (on a scale 0 to x1). The coefficient was found statistically significant at 95 per cent level.
 - The effect of being an active member of a sports club was not valued as the methods for converting SWB gains into monetary terms are still in development. Dolan et al (2011) discuss some of the theoretical and empirical issues.

Table A1.2

Value of parameters used to populate the model: probabilities

Sub-model	Outcome	Change in probability of occurring	Source
PA	Immediate QoL gain	100%	Assumption
	Productivity gain	46%	ONS (2011), Birmingham Economy (2011)
	Reduced GP visits	29.2%	Calculated using HSE (1999)
	Type II Diabetes	-7%	Matrix (2010)
	Stroke	-8%	Matrix (2010)
	CHD	-14%	Matrix (2010)
	Colon Cancer	-2%	Matrix (2010)
	Depression	-6%	Lyon et al. (2011)
Smoking	Immediate QoL gain	100%	Assumption
	Productivity gain	46%	ONS, Birmingham Economy (2011)
	Healthy	52%	Matrix (2010)
	Lung cancer	-2%	Matrix (2010)
	MI	-5%	Matrix (2010)
	COPD	-0.6%	Matrix (2010)
Shared experience	SWB gain	100%	Assumption

Table A1.3

Value of parameters used to populate the model: benefit values

Sub-model	Outcome	Metric	Value	Source
PA	Immediate QoL gain	QALY gain	0.03	YHEC (2007)
	Productivity gain	Cost saving	£499	Matrix (2010)
	Reduced GP visits (six per annum)	Cost saving	£210	PSSRU (2009)
	Type II diabetes	Cost saving	£3353	Matrix (2010)
		QALY gain (morbidity)	0.32	Matrix (2010)
	Stroke	Cost saving	£2290	Matrix (2010)
		QALY gain (morbidity)	0.46	Matrix (2010)
	CHD	Cost saving	£1577	Matrix (2010)
		QALY gain (morbidity)	0.38	Matrix (2010)
	Colon cancer	Cost saving	-	-
		QALY gain (morbidity)	0.33	Matrix (2010)
	Depression	Cost saving	£210	Matrix (2010)
		QALY gain (morbidity)	0.32	Matrix (2010)

Sub-model	Outcome	Metric	Value	Source
Smoking	Immediate QoL gain	QALY gain	0.04	YHEC (2007)
	Productivity gain	Cost saving	£364	Matrix (2010)
	Healthy	QALY gain	0.52	Matrix (2010)
	Lung cancer	Cost saving	£5992	Matrix (2010)
		QALY gain (morbidity)	0.42	Matrix (2010)
	MI	Cost saving	£2369	Matrix (2010)
		QALY gain (morbidity)	0.2	Matrix (2010)
	COPD	Cost saving	£1009	Matrix (2010)
		QALY gain (morbidity)	0.27	Matrix (2010)

7.2 Results

Benefits

Table A1.4 summarises the estimated lifetime benefits derived from increased physical activity, across stakeholders and resource type.

Table A1.4

Lifetime benefits derived from increased physical activity, by stakeholder and resource type (in £2011 prices)

Benefit measure	Stakeholder					
	Total	Local NHS		Local authority	HM Treasury	Employers
		Primary care	Secondary care			
Benefits per person (in £)						
Realisable benefits	359.32	23.43	44.09	0.00	43.82	291.80
All cost savings (incl. realisable) and productivity gains	634.65	122.40	220.44	0.00	43.82	291.80
QALYs gained	2,704.45	973.30	1,731.14	53.38	0.00	0.00
Total (*)	3,339.10	1,095.70	1,951.59	53.38	43.82	291.80
Total benefits (in £m)						
Realisable benefits	49.95	3.26	6.13	0.00	6.09	40.56
All cost savings (incl. realisable) and productivity gains	88.22	17.01	30.64	0.00	6.09	40.56
QALYs gained	375.92	135.29	240.63	7.42	0.00	0.00
Total (*)	464.13	152.30	271.27	7.42	6.09	40.56

(*) Total does not add up benefits as some benefits are relevant to more than one stakeholder.

Table A1.5 summarises the estimated lifetime benefits derived from reduced smoking, across stakeholders and resource type. The figures *per person* refer to the benefit per Be Active user perceiving the benefit – in other words, these benefits are not relevant to non-smokers and only apply to smokers.

Table A1.5

Lifetime benefits derived from increased physical activity, by stakeholder and resource type (in £2011 prices)

Benefit measure	Stakeholder					
	Total	Local NHS		Local authority	HM Treasury	Employers
		Primary care	Secondary care			
Benefits per person (in £)						
Realisable benefits	5.52	0.29	0.54	0.00	0.70	4.69
All cost savings (incl. realisable) and productivity gains	12.57	2.73	5.15	0.00	0.70	4.69
QALYs gained	9.09	4.12	4.97	1.48	0.00	0.00
Total (*)	21.66	6.85	10.11	1.48	0.70	4.69
Total benefits (in £m)						
Realisable benefits	0.77	0.04	0.07	0.00	0.10	0.65
All cost savings (incl. realisable) and productivity gains	1.75	0.38	0.72	0.00	0.10	0.65
QALYs gained	1.26	0.57	0.69	0.21	0.00	0.00
Total (*)	3.01	0.95	1.41	0.21	0.10	0.65

(*) Total does not add up benefits as some benefits are relevant to more than one stakeholder.

Return on investment metrics

Tables A1.6 to A1.8 present the return on investment metrics by stakeholder and timeframe.

Table A1.6

Cost-benefit analysis of Be Active: realisable benefits by stakeholder and timeframe (in £2011 prices)

Return on investment metric	Stakeholder					
	Total	Local NHS		Local authority	HM Treasury	Employers
		Primary care	Secondary care			
Net benefit per person (in £)						
Short- term	-62.26	-46.06	-86.68	-23.70	14.15	94.19
Medium-term	4.15	-41.03	-77.21	-23.70	21.94	146.08
Lifetime	206.83	-22.89	-43.08	-23.70	44.53	296.50
Total net benefit (in £m)						
Short- term	-8.65	-6.40	-12.05	-3.29	1.97	13.09
Medium-term	0.58	-5.70	-10.73	-3.29	3.05	20.31
Lifetime	28.75	-3.18	-5.99	-3.29	6.19	41.21
Benefit-cost ratio						
Short- term	0.61	0.01	0.01	0.00	-	-
Medium-term	1.03	0.12	0.12	0.00	-	-
Lifetime	2.31	0.51	0.51	0.00	-	-
Cost per QALY (in £)	-	-	-	-	-	-

Table A1.7

Cost-benefit analysis of Be Active: all cost savings and productivity gains by stakeholder and timeframe (in £2011 prices)

Return on investment metric	Stakeholder					
	Total	Local NHS		Local authority	HM Treasury	Employers
		Primary care	Secondary care			
Net benefit per person (in £)						
Short- term	-50.23	-38.46	-82.27	-23.70	14.15	94.19
Medium-term	69.79	-18.25	-34.34	-23.70	21.94	146.08
Lifetime	489.21	78.53	137.89	-23.70	44.53	296.50
Total net benefit (in £m)						
Short- term	-6.98	-5.35	-11.43	-3.29	1.97	13.09
Medium-term	9.70	-2.54	-4.77	-3.29	3.05	20.31
Lifetime	68.00	10.92	19.17	-3.29	6.19	41.21
Benefit-cost ratio						
Short- term	0.68	0.17	0.06	0.00	-	-
Medium-term	1.44	0.61	0.61	0.00	-	-
Lifetime	4.10	2.69	2.57	0.00	-	-
Cost per QALY (in £)	-	-	-	-	-	-

Table A1.8

Cost-benefit analysis of Be Active: cost savings, productivity gains and the monetary value of the QALYs gained by stakeholder and timeframe (in £2011 prices)

Return on investment metric	Stakeholder					
	Total	Local NHS		Local authority	HM Treasury	Employers
		Primary care	Secondary care			
Net benefit per person (in £)						
Short- term	416.50	159.33	186.68	31.16	14.15	94.19
Medium-term	218.50	33.35	62.77	-23.70	21.94	146.08
Lifetime	3,202.75	1,055.95	1,874.00	31.16	44.53	296.50
Total net benefit (in £m)						
Short- term	57.89	22.15	25.95	4.33	1.97	13.09
Medium-term	30.37	4.64	8.72	-3.29	3.05	20.31
Lifetime	445.18	146.78	260.49	4.33	6.19	41.21
Benefit-cost ratio						
Short- term	3.64	4.42	3.13	2.31	-	-
Medium-term	2.38	1.72	1.72	0.00	-	-
Lifetime	21.27	23.66	22.37	2.31	-	-
Cost per QALY (in £)	1,165	954	1,010	8,640	-	-

8.0 Appendix 2: social impact bond

8.1 Additional results

Table A2.1 present the key parameters of the contract scenarios used to test the economic feasibility of a SIB and Table A2.2 presents the estimated benefits and net benefits.

Table A2.1
SIB contract scenarios: key parameters

#	Population (subgroup)	Intervention period	Target annual rate of return	Benefits available to pay investors					
				Realisable cost savings		Non-realisable cost savings		Savings from QALYs gained	
				Yrs 1 to 5	Yrs 6 to 15	Yrs 1 to 5	Yrs 6 to 15	Yrs 1 to 5	Yrs 6 to 15
1	100,000 (average)	5	5%	80%	20%	80%	20%	0%	0%
2	100,000 (average)	5	7%	80%	20%	80%	20%	80%	20%
3	100,000 (average)	5	5%	80%	20%	80%	20%	0%	0%
4	100,000 (average)	5	7%	80%	20%	80%	20%	80%	20%
5	50,000 (deprived)	5	5%	80%	20%	80%	20%	0%	0%
6	50,000 (deprived)	5	7%	80%	20%	80%	20%	80%	20%
7	50,000 (deprived)	5	5%	80%	20%	80%	20%	0%	0%
8	50,000 (deprived)	5	7%	80%	20%	80%	20%	80%	20%

Table A2.2
SIB contract scenarios: results

#	Population (subgroup)	Intervention period	Target annual real rate of return	Cost of SIB (£m)			Benefits available to pay investors (£m)				Net benefit (£m)	Worthwhile Investment
				Capital	Risk Premium /Cost of Capital	Total	Realisable cost savings	Non-realisable cost savings	Savings from QALYs gained	Total		
1	100,000 (average)	5	5%	16.91	2.22	19.13	0.40	2.07	0.00	2.47	-16.65	NO
2	100,000 (average)	5	5%	16.91	2.22	19.13	0.40	2.07	39.91	42.38	23.26	YES
3	100,000 (average)	5	7%	16.91	3.17	20.08	0.40	2.07	0.00	2.47	-17.61	NO
4	100,000 (average)	5	7%	16.91	3.17	20.08	0.40	2.07	39.91	42.38	22.31	YES
5	50,000 (deprived)	5	5%	8.45	1.11	9.56	0.26	1.38	0.00	1.65	-7.92	NO
6	50,000 (deprived)	5	5%	8.45	1.11	9.56	0.26	1.38	21.52	23.16	13.60	YES
7	50,000 (deprived)	5	7%	8.45	1.59	10.04	0.26	1.38	0.00	1.65	-8.39	NO
8	50,000 (deprived)	5	7%	8.45	1.59	10.04	0.26	1.38	21.52	23.16	13.12	YES