



Watch our weight for love
or money: user guide

About The NSMC

We are The NSMC, the international centre of behaviour change expertise.

We're dedicated to making change happen that improves people's lives.

We do this by supporting organisations to design cost-effective programmes that help people adopt and sustain positive behaviours – those that improve their lives. Eating healthily, being more active and saving energy are just some of the positive changes we have helped our clients achieve.

As well as programme support and strategic advice, we also provide professionals with the skills and resources to design and deliver their own cost-effective behaviour change programmes.

Originally set up by the UK Government, we now have a global reach, applying social marketing skills, knowledge and experience from around the world to solve behavioural challenges.

Introduction

The NSMC has worked with leading health economists and NICE to develop a suite of online tools. These will help practitioners and commissioners to calculate the value for money of their social marketing and behaviour change programmes. The obesity tool is one of those developed.

The tools have two important uses:

1. To help plan for proposed social marketing and behaviour change programmes by estimating the likelihood that they will provide value for money
2. To evaluate whether social marketing and behaviour change interventions were value for money upon completion.

The tools go beyond costs to the NHS, to include wider societal costs.

Using the tool

These notes are intended to help users and provide links to the relevant evidence used to prepare the tool. You may also wish to refer to the Glossary and the NICE Intervention Costing Guidelines available on The NSMC website.

Most users may choose only to use the Data Input and Results pages but advanced users can also make use of other pages to update the tool as further evidence becomes available.

The tool is intended to help you evaluate the Value for Money (VfM) of social marketing initiatives and other types of behavioural interventions to help children or adults achieve targets for weight management, improved diet and increased activity. It is intended to build upon and compliment the many other guidelines and research reports available in this field (see Other Sources of Help and Guidance).

It attempts to apply estimates, based on the best available evidence and to make reasonable assumptions where evidence is weak. It is hoped that these estimates and assumptions will be improved by the consensus view of experts and further research.

However, as it is unacceptable to leave local teams with no method of assessing cost effectiveness, a set of reasonable assumptions are proposed in this tool as a starting point: as John Maynard Keynes said, 'It is better to be roughly right than precisely wrong!'

While the tool was developed to apply to children, it could be applied to older target groups with some adaptation by changing assumptions about the extent and persistence of behaviour change and resulting health improvement.

NICE guidance says that weight management interventions with children should include elements to improve diet, increase physical activity and encourage long term behaviour change. Examples of improvements include: moving towards '5-a-day'

and improving activity (i.e. children moving toward the target of one hour of activity per day: 30 minutes a day, five days a week for adults).

However, there are many other targets that may be relevant. For this reason these elements are considered together in one tool. It is suggested that you should first consider impacts on encouraging weight management and then assess marginal benefits arising from improved diet or increased physical activity in addition to impacts on weight management.

It is also recognised that initiatives targeted at specific groups within society, such as schoolchildren, need to be set alongside measures to improve the social and physical health environment e.g. clubs and facilities for play, sport, walking and cycling, measures to reduce time using media, pricing, availability and marketing of foods and cooking skills.

The tool is intended to support multi-element programmes addressing weight management, diet and activity together for the target group, recognising the impact of the social health environment. It emphasises positive change towards targets rather than success or failure and recognises the importance of self efficacy and reinforcement, including from school, family and peer groups over the long term to maintain the persistence of health behaviour.

It may be surprising to address underweight (anorexia) and normal weight management in the same tool, but both require self-efficacy, social support and a positive health environment. Addressing weight, diet and activity management as an issue for all avoids stigma.

The tool shows a range of values reflecting uncertainty in estimates of achieving behaviour change by examining the impact of up to ten per cent more or less favourable assumptions about behaviour following the initial move towards healthier behaviour. It does not reflect the underlying uncertainty of health gain, NHS cost estimates or health outcomes, as these are regarded as matters on

which there should be some expert consensus as to the most reasonable basis for evaluation.

You can repeat the evaluation for a range of data to reflect their uncertainty. In all cases it is more appropriate to report a range of possible values than to give an over precise single estimate

Data input

Completing the data input sheet

The following section provides details of what data should be included in each section of the tool, and also what evidence has been used in the development of the tool.

Intervention costs

The tool can be used to evaluate costs and outcomes over one year or over a shorter period if this is relevant. For longer term projects it will allocate one off planning and start up costs over the lifetime of the intervention project.

Detailed advice on what costs should be included is provided in the NICE costing guidelines, available on The NSMC website (www.thensmc.com/resources/vfm/guidelines). Detailed below are further details of what should be included in each field.

Enter costs relating to one type of intervention for one year or period for which you have outcomes. As the tool can only evaluate one type of intervention at a time it may be necessary to divide the cost of an integrated programme to reflect its components.

Alternatively, a simplifying assumption may be to consider that interventions in diet and activity are reflected in weight management outcomes, in which case you can treat them as aspects of weight control. This will underestimate the total impact as evidence suggests that diet and activity add further health benefits, though evidence of the extent of their independent effect is far weaker. Further research and/or the consensus view of experts are required.

The tool can be used to evaluate costs and

outcomes over five or more years, one year or over a shorter period e.g. one school term. For longer term projects, it will allocate one-off planning and start-up costs over the lifetime of the intervention project.

Costs should be stated at a base year level, i.e. the year in which you are working out costs and benefits. Outcomes and cost impacts will be automatically inflated to this year's levels so that costs and outcomes or impacts on savings will always be in comparable terms.

1. In Table 1 please enter the:

a) Cost of planning and developing the intervention

The separation between intervention costs and NHS costs assumes that behaviour change support may be funded by a PCT, Clinical Commissioning Group or Local Authority separately from the provision of services such as School Health and GP services.

Aspects of the intervention might be funded by employers or give rise to costs to parents or participants in the programme. However, throughout this analysis all costs are mutually exclusive, so avoid any double-counting, except for incentives which are both a cost to the intervention and a negative cost (a payment) to clients.

Development and capital costs will be spread over the life of the intervention. These should include costs relating to the design and application of a specific behaviour change project for target children or adults.

General needs assessment, such as a JSNA, should be excluded. However, research conducted during the scoping phase for the specific project, should be included.

b) Annual revenue costs per year of supporting the intervention

Annual costs include management, monitoring and operating expenses. If the project or elements of it are contracted to private sector providers VAT

should be excluded (because this is a transfer to government).

Full public sector staff costs and on-costs should be included but not unavoidable central overheads, i.e. management and premises costs that are not changed by the project.

2. In the field entitled 'What are the...' (Table 1), the following costs should be considered and included when relevant:

a) NHS set up costs including capital, training and reorganisation

Capital or other one-off setup costs, such as retraining and reorganising staff and services, should be spread over the life of the project.

b) NHS annual revenue costs per year

Annual costs include additional staff time required for the delivery of the intervention (e.g. monitoring or advising additional children and parents).

Costs of supplies may include leaflets or other consumables. The cost of premises and/or equipment should be included only if they are specific to the project and would otherwise not be required or if they are in such high demand that other valuable activities must be curtailed.

3. Over how many years should development and training costs be spread?

Capital costs and project development costs should be spread over the life of the intervention project. These costs are assumed to be at the base year price level; this should be the same year as the year for which outcome results are reported.

If this is not the case, for example if the development and training costs relate to an earlier year, they should be inflated to the same price level. All other outcomes and savings will be automatically discounted or inflated to this base year level which should be entered here.

“Capital costs and project development costs should be spread over the life of the intervention project”

“Rewards or prizes to children or adults as incentives should be included as both an element of project cost and as a payment to clients”

4. Add in any other public sector costs, if relevant:

a) Project development and capital expenditure

School weight management, diet and activity programmes are likely to give rise to costs to the school budget. Capital and setup costs such as specialised training should be included here.

b) Annual revenue costs per year

Annual costs to schools or other public sector services should be included here. However, it is important to consider only additional costs above those already incurred by such services in the normal course of their work.

5. Charges, costs or incentive payments to clients (if relevant)

If clients (parents) pay for items such as activities and trips, or sports participation, or are charged for services, the aggregate annual cost should be recorded here.

Rewards or prizes to children or adults as incentives should be included as both an element of project cost and as a payment to clients (these are transfer costs). In this case, a negative value should be entered here representing total payments received by all clients per year.

6. Private sector partner costs (if relevant)

a) Project development and capital expenditure

If private sector partners: schools, charities, employers, health clubs, supermarkets or food producers, contribute to the cost of an intervention, this should be recorded as a social cost and this should reduce the public sector intervention costs.

In this box enter any capital or start up costs to these funders.

b) Annual revenue costs per year

Annual costs to private sector partners should be entered here if relevant.

Table 2: Clients and Outcomes

Enter information on the number and characteristics of children or adults and outcomes planned or achieved.

1) Which type of intervention are you planning or evaluating?

The WHO National Burden of Disease Tool applied to England and the associated WHO Global Health Risk Report (2009, p.33) notes that the method they employ avoids double counting where the risk factors act independently.

In its current version this tool can only estimate the VfM of one type of intervention at a time so you will need to select one option (see above).

It is suggested that you should first consider impacts on encouraging weight management and then consider any additional benefits arising from improved diet and/or increased physical activity. To do this first run select weight management and run the tool and then run the tool again inputting the marginal additional costs of diet and then activity improvement.

2) Total number of children or adults contacted per year

This should include all relevant targeted children or adults contacted by the behaviour change intervention, not just those who participated or agreed to change their behaviour.

This may also include multiplier-effects, e.g. where one contact also influences the behaviour of family and friends. The warning below should be noted in these cases.

3) Percentage of children or adults achieving their personal health target

This refers to the percentage of children (or, using different measures of impact, adults) who achieved personal targets for health improvement in relation to weight, diet or activity management.

The target may include a measure of self-efficacy to

indicate the extent that behaviour is likely to persist (see below).

This applies to all those targeted, not just the overweight or obese. For example, in a class of children it is assumed that some will have personal targets to maintain their healthy weight, or diet or activity level while others may have weight gain or weight loss targets.

The percentage of people achieving the behaviour change indicator may be increased if a family, school or community multiplier can be shown (i.e. if the initiative has encouraged others to participate in improving weight management, diet and activity, not only for the original target group for the intervention but for themselves and others).

However, it seems that simply relying on reported influence on others is very unreliable so clear evidence of this impact, such as attendance at parent/child health events or parenting skills classes would be desirable (and hopefully fun!). It would be essential to support this with survey data of baseline data and changes achieved.

4) What sort of personal health targets are applied?

The tool will accept any sort of personal target for weight management, diet improvement or increased activity that might demonstrate the child or adult's progress towards regaining the long term health risk of someone without weight management, diet or inactivity related health risks.

Targets should reflect the underlying exposure of the target audience to the relevant risks, their rate of increase and the likelihood of clients persisting in the behaviour change (see later). In practice, personal targets for health improvement are suggested as discussed below.

Setting appropriate personal health targets is difficult for weight management, particularly in relation to children because this varies with the age, sex and stage of development of the child.

BMI population reference charts for boys and girls are set out at pages 215 and 216 of The Department of Health's 2008 *Healthy Weight, Healthy Lives: A toolkit for developing local strategies*, and show the classification cut-offs for weight status used in the UK.

Further guidance on interpretation of these reference curves is available on the National Obesity Observatory website: www.noo.org.uk.

For adults, BMI can be calculated as weight in kilograms divided by the square of height in metres. A BMI score of 25 is classified as overweight and 30 is classified as obese.

Personal weight management targets should not stigmatise those who are overweight or reinforce feelings of failure. For some children, an appropriate target over the period of a one school year weight management intervention may be to achieve one BMI unit improvement (e.g. a boy of ten moving from a BMI of 22 at ten years to 21 at eleven years).

For other children, maintaining a BMI may be appropriate (e.g. a girl of 12 maintaining a BMI of 23 by the age of 13). Equally, for some children, increased BMI may be a target (e.g. a girl of 13 increasing her BMI from 16 to 17 by the age of 14).

In schools and communities, a social health environment target may be to increase 'health awareness', including support, inclusion and encouragement for those under and over their healthy weight.

Targets for diet are equally complex. One simple measure is to increase the portions of fruit and vegetables consumed per day. While '5-a-day' is a useful population goal, setting this as a 'succeed or fail' target for children may be counter-productive. Increasing portions by one per day (e.g. from two to three, three to four or even one to two), may be a more achievable initial personal target.

Perhaps 'eating a healthy breakfast' or 'avoiding junk

food' for one more day a week would be suitable personal targets for other children (or adults). For schools, a healthy eating environment policy would include both food provision at school (breakfast clubs, lunch, vending machines and lunch box contents) and awareness-raising for children and parents.

Similarly, while '60 minute of moderate activity per day' may be a desirable population target, personalised goals such as 'joining the walking bus to school', 'joining a sports team or dance group' or just 'joining in the games at break time' may be useful personal targets.

Commitment to inclusive activities at school in PE or other lessons and in social activity plus awareness-raising for children and parents may be school environment targets. Goals for adults may include using step-counters, walking groups or getting off the bus a stop earlier.

What is important is the growing sense of self-efficacy in these regards or the belief in the ability to control one's life (see *Glossary*).

This may lead to further progressive personal health targets adopted by children or adults in future years, ideally leading to lifelong self-management and improved self-respect. It may be appropriate for weight management programmes, diet and activity programmes to be supported by measures of self-efficacy for health, recognising that this is a personal development issue for children (and for many adults).

While there is some evidence on self-efficacy further research would be valuable.

5) Enter the persistence rate at the end of one year (year 0)

This is the percentage of participants who are still maintaining personal health and wellbeing targets one year after the intervention.

The aim of the National Obesity Observatory Standard Evaluation Framework is to improve the quality and number of evaluations of weight management interventions in England. This includes an 'essential' criterion to carry out follow-up at 12 months as per NICE guidelines.

Where such evidence is not available, an initial assumption for unsupported children or adults is that perhaps 30 per cent of children (five to 14), 20 per cent of young adults 15 to 29 and 15 per cent of adults 30 to 81) would maintain improved behaviour (i.e. continue to address weight loss, diet and or activity targets at the end of one year).

The level of persistence at one year reflects the level of self-efficacy invoked by the intervention. Experts suggest (on the basis of very limited evidence) that this may add five to seven per cent to one-year persistence. It is suggested that this can be increased by the social environment, for example, access to support and advice groups at school or in the community, membership of sports clubs, walking groups and other factors.

Depending on these factors, one-year persistence might be increased by five to eight per cent. Unfortunately, non-supportive environments which might include bullying or unemployment could reduce persistence by a similar amount.

6) Enter the persistence rate expected for years 1-10

Long-term persistence from year one to ten years again requires further research. Lacking evidence, a preliminary assumption is that without further support, 80 per cent of children (seven to 14) and 70 per cent of adults (15 to 81) who have persisted with personal health targets each year might be expected to maintain their behaviour.

Put another way, this suggests two out of ten children and three out of ten adults who have maintained personal health targets for a year or more fail to maintain their progress in each successive year. They therefore may need further stimulus to help

“It is assumed that after maintaining health improvement for ten years, people who have persisted to that point will continue with the level of improved health risk”

them restart their health improvement plan. This does not mean they reverse the level of health improvement they have gained up to that point. Long term persistence may be increased by the social and community environment, e.g. access to support, provision of facilities, urban design and pricing and marketing controls on food and alcohol, addressed by ‘community efficacy’. These assumptions need expert consensus review and research.

7) Enter the health recovery rate years 0-4 and years 5-10

In order to estimate the impact on long term health risk, it is also necessary to consider the rate of recovery from the health risk of lack of weight management poor diet or lack of activity. This indicates how long someone would need to be on a diet or continue to eat healthily or be active before attaining normal levels of health risk. A reasonable assumption is that the rate of recovery will vary with the age of the child or adult. The suggested starting points are:

- For children and young adults from five to 19: an average rate of 20 per cent for five years (then 0 per cent for the following five years)
- For adults 20 to 39: a rate of 15 per cent for five years (then 4 per cent for the following five years)
- For 40 to 59: 12 per cent for five years (then three per cent for five years)
- For 60 to 81 a rate of eleven per cent for five years (then two per cent for five years)

This reflects the observation that young people lose weight and recover their health more quickly than people in mid life, while older people may never recover full health risk.

Again, this is flagged as an area for expert review, research and consensus. It is assumed that after maintaining health improvement for ten years, people who have persisted to that point will continue with the level of improved health risk with regard to weight management, diet and activity for the rest of their lives.

8) Percentage of children or adults targeted in the most disadvantaged 20% or in a special hard to reach group

This provides a measure of the extent to which disadvantaged people are addressed by the intervention, thus contributing to government and local targets for reducing health inequality associated with disadvantage.

If there is no bias towards disadvantage, 20 per cent of respondents would be expected to be in this category. Disadvantage may be measured by the Index of Multiple Deprivation (IMD) (see *Glossary*) or other ways determined locally.

9) Enter the baseline comparator for weight management, diet or activity levels

NOO observe that there are a variety of methodologies for collecting data on weight status, diet and physical activity. Each has pros and cons and each have important caveats and limitations relating to their practicality, resource implications, validity and reliability. However, if you do not have survey data it should be possible to develop a reasonable comparator figure based on the following data:

Figures from the National Child Measurement Programme for England for the 2009/2010 school year show overweight and obesity rising from 23 per cent at reception (age four) to 33.5 per cent at school year six (age ten) with a about a three per cent difference between boys (higher) and girls.

In addition, underweight was identified for one per cent at reception and 1.3 per cent at year six (slightly higher for girls than boys). This suggests that about 25 per cent of children from five to nine and 35 per cent of children from ten to 14 have weight management issues and that this issue rises dramatically during school years. This means that only about 75 per cent of younger school children and 65 per cent of older children may be expected to maintain a healthy weight.

For adults NICE Guidance suggests that about 50 per cent of all adults are overweight, obese or have

other weight management issues, leaving only 50 per cent maintaining healthy weight.

This probably falls from about:

- 65 per cent of 14 to 19 year-olds
- 60 per cent of 20 to 29 year-olds
- 50per cent of 30 to 39 year-olds
- 45 per cent of 40 to 59 year-olds
- 40 per cent of 60 to 81 year-olds

It is recommended that users look up the latest available figures for the age/sex group.

The Health and Social Care Information Centre report, *National Statistics Physical Activity and Diet for England 2010*, says that only 32 per cent of boys and 24 per cent of girls aged two to 15 met the target of 60 minutes a day of moderate activity a day.

39 per cent of adult men and 29 per cent of adult women achieve 30 minutes per day of moderate activity five days a week. Activity level may be assumed to decline with age.

The same source reports that in 2008, around 20 per cent of children aged five to 15 meet government guidelines for eating 5-a-day, while for adults the 5-a-day target is met by 25 per cent of men and 29 per cent of women.

10) Which range does the average age of targeted children or adults fall into?

Several aspects of this tool depend upon the age range of the targeted clients. While this does not have to be accurate, it is necessary to give a general indication of the typical age of the people targeted.

At present, only one age range can be evaluated at a time, so if you are considering several different target groups you would need to run the analysis for each age group.

In general, since younger people have a longer period to enjoy good health and recovery their

health more quickly, the tool will show higher levels of benefit for younger age groups.

11) Which year's prices are you using?

The tool allows you to choose which year's prices you wish to work in (known as the base year for the analysis). Generally this should be the first full year of the intervention for which you have outcome data.

You have to input costs in terms of that year's prices, so you may have to adjust for inflation between the year in which the intervention was planned and developed, and the base year of the intervention. This is included to prevent the tool from becoming out of date.

12) Enter your weight for disadvantage (optional)

This allows you to give an extra value to impacts on disadvantaged and hard-to-reach groups. A value between 0 and 100 per cent can be used (but enter '0' if you do not wish to apply a weight), giving that percentage more value to interventions for disadvantaged people.

The tool does this by simply adding an extra value to the percentage of clients in the most disadvantaged 20 per cent using IMD scores or in some other way you may define. This means that, for example, if you chose a weight of 50 per cent and all the clients were in the most disadvantaged group, a value of the outcomes will be shown as 50 per cent more than the outcomes for a project which did not address disadvantaged people. While this value is shown in the Results page, the Social Return on Investment estimates are not weighted.

Giving an extra weight or 'utility value' to disadvantage is controversial. The Department of Health's policy is not to weight QALYs because everyone's health is equally valuable. However, it could be argued that addressing disadvantage is an important priority, due to the widening health inequalities gap, and that therefore addressing the needs of disadvantaged people is more valuable.

The results will also show the effect of weighting for disadvantage and a priority score from the HELP programme. This project surveyed the way 99 public health professionals prioritised projects. It then developed a formula to model their values (Utility) as a preference curve based on cost effectiveness (Cost per QALY, C), the reach of the project (what proportion of the population could benefit, R) and impact on disadvantage (percent of clients in most disadvantaged 20%, D).

This tool derives a weight for disadvantage by substituting values from the current project in this formula. It also replicates the utility score that would be given by the HELP formula.

$$\text{Utility} = e(-0.0000586x C + 0.0435987 x R + 0.119895x D)$$

For a detailed explanation of this see: <http://help.matrixknowledge.com>.

You may choose to ignore these methods of weighting outcomes and treat disadvantage as a separate issue. The Department of Health suggest using the Health Inequalities Intervention toolkit available from the London Health Observatory at: www.lho.org.uk/LHO_Topics/Analytic_Tools/Health-InequalitiesInterventionToolkit.aspx.

13) Enter the percentage of people employed.

The percentage of people who are employed is used to generate estimates of benefits to local employers. It can also be used to explore the benefits to one employer engaged in a workplace weight management, healthy eating and activity programme.

For children, employment prospects rather than current employment can be used to generate lifetime employment benefits.

14. Enter the Reach (optional)

The Reach of the project is a term used in the HELP system. If you want to apply their measure of the value placed on addressing equity and the priority of this project you need to include a value for Reach

to represent the percentage of people who could be eligible for the intervention if it were extended nationwide.

For example, if children aged between five and 15 represent about 12 per cent of the population, you might consider an intervention for one school year, i.e. 1.2 per cent, or for a number of school years. This does not need to be very precise as the formula used by HELP is not very sensitive to this factor.

For more information on the Health England Leading Prioritisation, visit:
<http://help.matrixknowledge.com>.

Interpreting the results

The results page reports a wide range of outcome measures that were requested by various local and national users during the piloting of the tools.

You need to choose which measures of Value for Money are most relevant, taking into account the priorities of decision-makers and the strength of the available evidence which varies for different outcomes.

Table 1: Net Local Public Sector Cost per Lifetime Health Gain

This table provides a range of outcome and VfM measures requested by users. In all cases, the health risk gains and future cost savings take into account the short and long term persistence expected of the behaviour change and rate of health recovery, i.e. how long it takes to recover to normal levels of health risk.

These health risk gains and predicted costs to stakeholders are discounted to reflect their current equivalent as recommended by *Methods for the Economic Evaluation of Healthcare Programmes* (Drummond et al 2005).

Sensitivity analysis

In general, it is more reasonable to report a range of possible outcomes rather than just reporting a single central estimate. The sensitivity analysis shows a high and low value range arising from different assumptions about behaviour, the extent of persistence and the rate of health recovery (see *Glossary*).

Sensitivity analysis in this tool does not consider the uncertainty in underlying estimates of health gain and costs which are treated as consensus estimates. Users can also vary the input data and other factors to generate other sensitivity analyses and to examine 'what if?' questions.

Lifetime Health Risk Impact

The value shown represents the estimated current value of the lifetime reduction in health risk arising from the project.

This is based on the attributable health burden due to overweight and obesity, physical inactivity and low fruit and vegetable intake taken from the WHO National Burden of Disease Tool (2009) applied to the UK and then adjusted for England (provided by NICE and WHO). This uses UK health outcome figures and Population Attributable Fractions (how much of each outcome is due to each cause) for High Income countries in the European Region in 2004.

The Burden of Disease Tool measures impacts in terms of Disability Adjusted Life Years (DALYs) Years of Life Lost (YLL) and Years Lived with Disability weighted for disability (YLD) and Deaths (see *Glossary*). Estimates of total UK DALYs are derived from Green and Miles (2007)¹.

The WHO Tool provides estimates of health impacts in terms of lifetime health risks. It is not possible to provide a timescale for resulting impacts on health or costs. However, because these factors are discounted to the base year, the equivalent health impact and cost burden can be estimated. The tool also takes into account the impact of different causal factors on similar health outcomes and hence avoids double counting.

In this case, it is clear that both low fruit and vegetable intake and lack of physical activity impact on overweight and obesity. Thus for this purpose, it is suggested users should first consider the impact of interventions on weight management and then consider additional impacts from diet and activity improvements.

QALYs impacts

Quality Adjusted Life Years (QALYs) are the most commonly used measure of health gain in the UK. Outcomes are reported in these terms by converting from Disability Life Years (DALYs) to Quality Adjusted Life Years (QALYs) using a conversion factor of 1/0.754 assuming disease onset at the age of 65 and duration of five years. This is taken from Franco Sassi 'Calculating QALYs, comparing QALY and DALY calculations' (2006)². While not perfect, this is the best

available estimate. Further research could improve this conversion factor.

Net cost to the public sector

This is simply the summary of public sector costs per year shown in the Data page resulting from the costs you reported.

Cost per QALY

This is derived by dividing QALY gain by public sector cost. This is shown as a central estimate and high and low values.

Cost Savings to the NHS

These are derived from figures provided by NICE drawn from the 2008 Foresight report, *Tackling Obesity: Future Choices*, adjusted for England and 2007/2008 expenditure levels.

Estimates of NHS expenditure relating to low physical activity are taken from the 2007 paper by Allender, Foster, Scarborough, and Mike Rayner, *The burden of physical activity-related ill health in the UK*. The estimates for 2002 have been updated and adjusted by population for England.

No reliable evidence was found of the additional impact of low fruit and vegetable consumption on NHS costs. But research appears to indicate that this may account for up to 20 per cent of cardiovascular disease, a smaller proportion of cancers (mainly relating to bowel cancers) and dental caries. To represent this, a preliminary estimate of one per cent of NHS costs is used pro tem. NHS expenditure estimates have been increased in line with House of Commons Library Standard Note SN/SG/724³.

Potential costs savings per person at risk per year are derived by dividing the total cost to the NHS by estimates of the numbers of people at risk in 1990. This is taken from data provided by ERPO 2006 *Health Survey for England: Estimated Prevalence of Obesity in Adults and Children 1993-2005*.

For risks arising from lack of weight management, obesity in 1990 was estimated to affect 12.1 per cent

“No reliable evidence was found of the additional impact of low fruit and vegetable consumption on NHS costs”

of the population (this was derived by extrapolating from figures for 1993 and 2000). For physical inactivity, it was noted that trends follow a similar path to obesity, thus 1990 levels of inactivity were assumed to be half the level of 2004 (18.5 per cent).

Low fruit and vegetable intake trends indicate that while fruit consumption has risen, vegetable consumption (excluding potatoes) has declined. Thus a 1990 level of 24 per cent of people consuming less than two portions of fruit and vegetables a day was assumed. These preliminary estimates could be improved by expert consensus and further research.

Cost Savings to Local Authorities Adult wellbeing and social care

These are estimated on the basis that adult social care costs will vary with Years Lived with Disability weighted for disability.

This is a reasonable basis for estimation but there has been insufficient research evidence to support the current estimate. National Statistics for the Department of Communities and Local Government reported total expenditure on Social Care in England for 2008/2009 was £20.1 billion. Of this, some £7.8 billion relates to adult social care and other adult services for adults with health related problems.

Because long term costs relate closely to the number of people requiring support 85 per cent of the full costs (assumed long run marginal cost of care services with respect to client needs) are taken into account in estimating potential savings. These savings are allocated on the basis of weighted years lived with disability.

Individual Outcome per personal health target

The outcomes for someone who achieves their personal health target and goes on to manage their weight, diet and activity level depends upon their age (which is key to their health recovery rate) and the social and community environment which determines their likely level of persistence on average. Though of course there are many other variables,

not least the nature of the personal target and the individual's baseline status.

In order to check what this would mean for someone succeeding and continuing to manage their weight, diet and activity over the long term, the input figure for short and long term persistence can be set to 100 per cent and the health recovery rate can be adjusted to reflect the age group.

Inputting these assumptions to the tool shows the outcomes captured in the table below for successful personal health management that is improving to their weight, diet and activity levels to the level of someone not at a higher risk in these regards:

Discounted QALY Risk Reduction for Achieving Long Term Change by Age

Av Age	7	12	17	25	35	50	70
Behaviour Management							
Weight	2.44	2.39	2.34	2.05	1.88	1.18	0.77
+Diet	0.40	0.40	0.39	0.34	0.31	0.20	0.13
+Activity	0.76	0.74	0.73	0.64	0.59	0.37	0.24
Total Potential	3.6	3.53	3.46	3.03	2.78	1.65	1.14

These outcomes may be compared with other estimates of long term health gains. For example, the evaluation of the BTCV Green Gym project uses an estimate of 0.0106768 QALY gains per weekly session of gym use per year⁴.

Over a period of 60 years, five sessions a week would produce undiscounted health gains of 3.2 QALYs. If these gains are discounted to reflect the current value of impacts, this would equate to a 1.4 QALY gain in lifetime health risk.

This is higher than the level of gain forecast by the tool as the additional gain due to achieving lifelong activity targets without weight management but it seems reasonable to suppose that someone who exercises five times a week would also manage their weight and perhaps their diet too. This is less than the combined effect estimated by the tool.

In practice, research evidence is scarce and difficult to interpret, for this reason a consensus panel of experts is required to arrive at a set of reasonable assumptions in this field. In reality, most people who try to achieve personal health improvement targets only succeed for a short period before they need further stimulus and support. While this may only reduce health risks to a limited extent, such interventions can nevertheless offer good value for money.

The assumptions used in the tool about persistence rates and health recovery are only suggested as a starting point but they will produce outcomes similar to those found by Wang et al (2003)⁵. This is suggested as a starting point for the development of more specific consensus estimates for England.

Total Deaths Averted

The tool also estimates the total numbers of deaths averted as a result of the intervention, based on figures from the WHO National Burden of Disease Tool. While the overall impact on health risks and hence likely future outcomes and costs can be assessed it is not possible to estimate when these will occur with any accuracy.

Most deaths avoided will be for people over 74. Since we all have to die some time, death is not a very useful way of assessing the value of an intervention – though it does have emotional impact.

Total Years of Life Added

This provides a more reasonable measure of value if this figure is divided by deaths it shows the average loss of years of life.

Total Years Lived with Disability

Weighted for Disability, this provides an indication of health and care needs that can be reduced by the intervention.

Odds Ratio

This is a commonly used measure of the effectiveness of an intervention. It compares the number of people changing their behaviour as a result of the intervention to the number who would have changed without intervention.

Numbers Needed to Treat

This is a measure used in primary care to assess the effectiveness of interventions, such as treatment with Statins, and is provided because users asked for it. In this case it has been applied to provide a measure of the number of people who would need to be contacted in order to avert one weight management/diet or inactivity related death.

Table 2a: Societal Impacts: Lifetime Benefits to Children or Adult Participants

The assessable benefits to children or adult participants include reduced informal care and employment and benefit impacts.

In order to estimate the impact of the intervention the relevant cost items are attributed to total health outcomes for each element of behaviour change in terms per year of remaining life and forecast of Years Lived with Disability weighted for disability.

The impact of the intervention is forecast for the remaining life of participant, taking into account the persistence and health recovery rates used and

assuming a life expectancy of 81 and a working life up to age 67.

Reduced Informal Care

The highest costs of care are incurred by families and other informal carers. An estimate of the total extent of care is provided by Buckner & Yeandle (2007)⁶. This is adjusted to provide an estimate of the total value of informal care for England at £70.5 billion in 2006/2007 values, based on a replacement cost of £14.5 per hour. For the evaluation tool it is assumed that carer time should be valued not at replacement labour cost but at a leisure cost of £5.5 per hour in 2008/2009, giving a total cost of £26.7 billion in that period.

Allocating this on the basis of Years Lived with Disability weighted for disability suggests a cost for overweight and obesity of some £1.8 billion, which has then been inflated to current values.

It is reasonable to assume these costs are reduced in proportion to the reduction in Years Lived with Disability weighted for disability as estimated by the tool. There is no more detailed research evidence available.

Increased Employment Income and Pension Less Benefits and Tax

Obviously children are not in employment, but a full economic analysis must consider the lifetime impact on their future employment.

Costs of lost employment are taken from the 2008 Foresight Review⁷. This quotes estimates of the total cost of lost earnings, absence and lost productivity for overweight and obesity ranging from £2.3 to £3.6 billion from the Health Select Committee report and up to £10 billion from other sources.

For this tool, a central estimate of £3 billion is used again allocated on the basis of years lived with disability weighted for disability with taxes at an effective rate of 12.5 per cent.

Losses of pension due to early deaths are based on

“The highest costs of care are incurred by families and other informal carers”

80 per cent of Years of Life Lost at £5,000 per year. Total sickness and disability benefits are estimated as £2.9 billion from Dame Carol Black's 2008 report, *Working for a Healthier Tomorrow*.

Costs to Clients

This is simply taken from the Data Input page and shows costs incurred by children (parents) or adults or the incentives offered as rewards or prizes provided (this would be a negative cost).

If there are specific costs to or incentives for clients these only apply during the intervention.

Social Value of avoiding obesity

It is important to recognise that there are many costs (or loss of value) arising from being obese. Estimates of the social value ascribed to avoiding overweight and obesity are difficult to find. There are studies that show that obese people are less successful in education, are less likely to find a life partner and earn less. They also die earlier and have more chronic illnesses. The loss of personal walking mobility, everyday personal care difficulties, social stigma and impact on self esteem, loss of social life and love are all hidden social costs.

Given the way EuroQols (EQ5D) are constructed, it should be possible to measure the impact of obesity in terms of the five dimensions of: mobility, self-care, usual activities, pain/discomfort and anxiety/depression and to establish a social value perhaps based on willingness to pay.

A recent US survey indicated that about half respondents would rather give up a year of life (one QALY) rather than become obese. This suggests that the discounted value of avoiding obesity could be about half a QALY. This would suggest a social value of avoiding obesity of about £275 per year.

However, as this is pure speculation no figure has been included yet. It would be helpful to establish an initial consensus value for the state of obesity from the perspective of those who endure it. In order to provide for this a facility is left open to allow the

entry of a relevant figure by advanced users (see social page of the tool).

Table 2b: Societal Impacts: Working Life Benefits to Employers

Total costs to employers arising from sickness and the need to replace and retrain workers who retire due to ill health are estimated by Dame Carol Black's report at £8.4 billion this may be divided between absence and lost productivity (note this does not include loss of earnings, see above). Allocating this according to Years Lived with Disability weighted for disability suggests a total cost to employers of £550 million due to overweight and obesity, £100 million due to low fruit and vegetable consumption and £400 for lack of activity.

More specific estimates should be made if the tool is applied to specific adult weight, diet and activity programmes in the workplace. The period of impact reflects remaining working life. Assuming this lasts until the person is 67, this applies to children who are future employees.

Table 2c: Societal Impacts: Lifetime Impacts on Government and Public Sector Costs

Impacts on Government include: reduced sickness payments, increased pension payments less tax and any increase or decrease in NHS, Local Authority or other public sector cost.

Sickness and Disability Benefits

These are taken from Dame Carol Black's 2008 report 'Working for a Healthier Tomorrow' which estimates the total cost of sickness benefits at £29 billion allocated according to Years Lived with Disability weighted for disability.

Pensions

Payment impacts are based on years of life lost at £5000 per year in 2007/2008 updated for inflation, assuming 80 per cent are pensionable years.

Income Tax

This is estimated on the basis of an effective tax rate of 12.5 per cent of estimated increased income (see

above) plus corporate tax income at an effective rate of ten per cent.

Table 2d: Societal Impacts: in terms of the Human Value of QALY gain

The Human value of a QALY unweighted can be regarded as the cost of pain and grief caused by death and illness.

In discussion with Robert Anderson, Economic Adviser to Department of Health in 2011, it has been pointed out that the Department of Health's official position is that a QALY can be valued at £60,000 as derived from Department of Transport willingness to pay survey of 1991/1992 (Highways Economics Note 1) in respect of fatal accidents updated to 2007 values. However, as NHS expenditure is limited, it is accepted that the marginal productivity of the NHS is four QALYs per £100,000 and for this reason a value of £25,000 can be applied.

While the Department of Health continue to refer to a survey carried out in 1991/1992 for the Department of Transport it should be noted that this willingness to pay survey focused on traffic accident outcomes. These include early death, which have a particular emotional value.

Another estimate of the value of a QALY gain can be based on the upper estimate of the value placed on non-fatal injury derived from the same survey, which gives an estimate of £27,000. This is close to the figure used by the National Institute of Health and Clinical Excellence of £30,000. Thus for this purpose, a value of £25,000 in 2007/2008 has been used updated for inflation in incomes but this can be varied if required.

Weighting for Disadvantage, Your Weights or Health England Leading Prioritisation (HELP)

The tool permits you to add an extra value to the percentage of clients in the most disadvantaged 20 per cent using IMD scores, or in some other way you may define or to apply a weight derived from the HELP project (see Data input section of this guide). It also provides a HELP utility score.

Table 2e: Societal Impact: Social Return on Investment

The calculation of Social Return on Investment (SROI) does not take into consideration any weighting applied to QALYs as above.

SROI is calculated in two ways: as the impact on all stakeholders divided by the total cost to stakeholders; and as the value of the QALYs increased by the intervention valued at £25,000 in 2007 prices and updated for inflation in NHS costs.

For more details of the SROI approach, see the *Glossary* and related links from The NSMC website.

Other pages of the tool

The other pages of the tool can be explored by users but these are basically working sheets. All references have been referred to in the *Data input* and *Results* sections of this guide.

Impacts

The Impacts page of the tool provides a mechanism for projecting future personal health target behaviour and the resulting impact on health.

It is based on estimates of short-term persistence – i.e. how many people managing their weight or improving their diet or increasing activity will still not be pursuing personal health targets after a year and estimates of the persistence over the subsequent ten year period.

It also takes into account estimates of the rate at which people recover their health as a consequence of health habit improvements which varies with the age at which they begin to follow health targets. Behaviour and health risk impacts are projected over the life of the child or adult and discounted back to the base year resulting in a so called Discounted Lifelong Impact Multiplier.

This is used to assess the impact on health risks and costs over the life of the quitters. The Impact page also provides high and low scenarios based on changes in behaviour outcomes.

The variable in this part of the tool can be changed at the Data entry page or by a more detailed updating of the tool, we suggest this only for advanced users.

National Data

The National Data page of the Tool is based on the WHO National Burden of Disease Tool.

It provides estimates of the health impacts of weight management, diet and activity improvement in terms of DALYs and Years Lived with Disability, Years of

Life Lost and Deaths. It also includes estimates of relevant behaviour in 1990 and 2008, and impacts on NHS and Local Authority Costs.

While this page can be updated, we suggest this should be done by advanced users to update the tool as further evidence becomes available.

Social

The Social Page provides the detailed working necessary to generate social impacts.

It includes an analysis of the cost savings to participants in both discounted and undiscounted terms. This is because it can be helpful to explain impacts to children or adults in undiscounted terms.

It also provides an estimate of the additional cost to the NHS of averting early deaths as this was requested by a user. However, for ethical reasons and because such estimates are not brought into other evaluations it has not been applied in the Results page.

Look Up Tables

This page provides details of the inflation factors and discount rates used in the tool.

It can be updated but again it is suggested that this should only be attempted by advanced users.

Inflation estimates for NHS costs are taken from official projections, wage and leisure time cost inflation is assumed to four per cent p.a. and the social discount rate is set at 3.5 per cent.

Other Sources of Help and Guidance

It is important to stress that this tool is intended to support evaluation alongside the application of qualitative guidance. It is not intended to replace or supplant any such guides.

Its main purpose is to try to translate the consensus on the costs and benefits of weight management, diet and activity improvement programmes developed by expert research teams into useable

mechanisms to help local social marketing teams evaluate behaviour support programmes that encourage better long term outcomes.

Research teams are invited to develop improved versions of such tools as more evidence becomes available.

Current guidance includes:

- Department of Health 2008 *Healthy Weight, Healthy Lives: A toolkit for developing local strategies* available at: www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_088967.pdf;
and 2009 *How to set and monitor goals for prevalence of child obesity: guidance for Primary Care Trusts (PCTs) and local authorities* available at: www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_094217.pdf
- NICE 2010 *Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children* available at: www.nice.org.uk/newsroom/guidanceinfocus/CG43
- The National Obesity Observatory 2011 website with links to many resources including a 2010 briefing paper, *The economic burden of Obesity* available at: www.noo.org.uk
- Summerbell CD, Waters E, Edmunds L, Kelly SAM, Brown T, Campbell KJ 2001 *Interventions for preventing obesity in children* The Cochrane Database of Systematic Reviews 2011 Issue 6 available at: www.cochrane.org/reviews/en/ab001871.html

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Any remaining errors and omissions remain the responsibility of the author.

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7 2008 Foresight Review *Tackling Obesities: Future Choices*

Further support from The NSMC

Practical advice and support

If you need some fresh thinking to improve your results, we'll carry out an **expert review** of your current approach to behaviour change. Practical recommendations on how to plan, manage, implement and evaluate your projects will ensure you're able to make progress.

Need help taking a behaviour change approach forward? We can develop a **behaviour change strategy** for your organisation – ensuring you're better placed to deliver effective future programmes.

We'll **support you through developing and managing** your project, with **mentoring** offered as and when you need it. Using our 'learning by doing' approach, we bring our tried and tested behaviour change planning process to your behavioural challenge.

To help make your project happen, we can also **bring your stakeholders together** and secure their involvement in achieving your objectives.

Our **tailored, interactive workshops**, delivered by The NSMC's expert behaviour change professionals, will explore how to take an audience-led approach to your challenge – using the latest thinking in behaviour change from your sector.

Implementing an effective behaviour change project

Whatever your behavioural

challenge, our experts' unrivalled experience in **delivering behaviour change programmes** will ensure it is addressed cost-effectively. Our network of consultants and suppliers means the **best specialists** will take your project forward.

Training and resources

To give you and your team the skills you need to run your own behaviour change projects, we provide both **classroom and e-learning training courses**. Devised and delivered by expert professionals, they draw on real experience of what works.

To help ensure your staff have the right tools and support when they need them, our **online planning guide and toolbox** provides everything they need to plan and implement a behaviour change programme. Tried and tested by a range of professionals and organisations, we can develop specialised versions, tailored to meet your organisational needs.

Supporting your organisation to keep your audiences at the heart of everything you do

We'll help you **develop and conduct research** that will give you a firm foundation for a behaviour change intervention. Our experts will help ensure you get the most from your research budget.

Our **One Stop Shop** database of unpublished market research gives you the means to quickly get to grips with your audience and behavioural challenge. It will

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If you're pushed for time, our **data synthesis** service will package up the most relevant research into your challenge held on the One Stop Shop for you.

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ShowCase is our **online case study database** of behaviour change initiatives. From smoking to active travel, young people to health professionals, it highlights honest learning and success from the real world on a wide range of issues and audiences.

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We have specialist experience of **evaluating behaviour change programmes** of all kinds. We'll help you demonstrate the impact of your projects to your stakeholders and capture lessons to improve future work

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