Obesity – working with local communities

Cost effectiveness analysis in partnership working for reducing obesity and other long-term conditions

I Preamble

Guidance to tackle obesity at a local level using a whole system approach was initiated by NICE in 2009. The work was put on hold in November 2010 and reviewed as part of the Government's obesity strategy work programme. The revised scope has a stronger focus on local, community-wide best practice. Under the original scope, PenTAG produced a review of 'Whole system approaches to obesity prevention: a review of cost effectiveness evidence' (Anderson et al 2011, see http://www.nice.org.uk/guidance/index.jsp?action=download&o=55093) . This report is summarised briefly towards the end of this paper.

When development of the guidance was started in 2011 as Obesity: working with local communities, the new scope included the following circumstances in relation to obesity.

The following elements – and how they interact – may be considered:

- *locally implemented strategies, plans and initiatives, including initiatives run by community and NHS services*
- *partnership working (between, for example, primary care, local authorities, local community organisations and local businesses)*
- *local services and other local factors such as food, transport, education, planning and media*
- *training and development for those involved in local efforts to prevent obesity.*

Of the four dot points, the last (about training) is not readily amenable to cost effectiveness analysis and will not be considered here. The second dot point, about partnership working, is the subject of much of this paper. The first and third dot points overlap the NICE 2006 joint clinical and public health guidance on obesity (NICE guidance CG43) and other obesity guidance currently being developed by Public Health at NICE. They will also be considered by examining the cost effectiveness of several local initiatives.

An economics subgroup which began work under the banner of Whole Systems Approaches was reconstituted with similar membership. The health economist on the PDG and subgroup for Whole Systems Approaches was Prof Ron Akehurst, whose main suggestion was to concentrate on costs because benefits would be too difficult to measure. Prof Akehurst resigned from the PDG in 2011 due to work commitments and his place was taken by Prof Ceri Phillips, who gave advice on a number of papers on community engagement which had a bearing on partnership building. The economics subgroup also suggested a number of places where costs might be obtained, but crucially also advised on the difficulty in defining a comparator for partnership working.

A wide but non-exhaustive search was carried out of literature on the modelling of complexity, on the effects of obesity wider than that of health (stigma, effect on employment and on income, on school grades and absenteeism in schools and on greenhouse gases were found). Some of the grey literature on partnership working was examined (particularly that of Healthy Towns) to try to find relevant costings of partnership working, but without success.

It was realised that if costings for partnership working were not forthcoming, one way of proceeding would be to look at the relationship between weight loss (or not gained) at age X and outcomes later in life. For example, how many QALYs would be gained by an average reduction in weight (or a lower weight gain) of 14 year old children in the UK, and how much future cost would be saved as a result? This can be modelled, and related to the additional cost of partnership working. This report utilises the modelled relationship between weight loss (or not gained) in the short run and QALYs in the long run devised by Mike Gillett of ScHARR in a report to NICE on the prevention of diabetes (Gillett et al, 2010). Such analysis acts as a guide for decision-makers in determining whether the upfront costs of projects for preventing obesity could be recompensed by the eventual health gains and future cost savings.

II Introduction

In the broadest sense of the term, cost effectiveness analysis has proved extremely useful in helping to determine the allocation of resources in healthcare. Healthcare in modern economies is characterised by the coverage of most or all of the population in healthcare insurance. The existence of insurance effectively precludes the operation of a market for the allocation of resources within healthcare. In the absence of a market, it is difficult to decide what should be consumed. Since healthcare needs are practically limitless, how do insurers make decisions about which drugs should be paid for, who should have a hospital bed and how much money should be put aside to prevent ill-health rather than treat ill-health? How aggressively should we treat those at the end of life in an effort to prolong it? Since so-called ‘perfect’ markets are the most efficient allocators of resources, we attempt by analytical methods to replicate what a competitive market will do automatically.

The key question underpinning the assessment of cost-effectiveness is what are the additional benefits to be gained from the ‘intervention’ and at how much greater cost? So, in the case of a drug for a particular condition, the approach would be to determine the difference in effect between intervention and control and relate to the difference in costs between the two therapies. In such situations, the institutional details within which the study is carried out are usually relatively unimportant. Provided that biases and variance are minimised, the population in two separate studies of this intervention is more or less similar in terms of demographics, with the same specific condition of similar severity, taking the same dosage of the drug with the same timing should result in a similar range of outcomes in the two populations. The institutional structure governing the populations is usually of no concern; neither does the religion, culture, administrative arrangements or political system of a country normally cause a significant difference in the results of the two studies. Of course there are exceptions, but those institutional factors that are likely to matter are usually thought to be obvious enough and can be allowed for. Thus, the number of QALYs gained by the administration of the drug can be estimated. It should apply throughout the country, and in many cases will apply in different countries as well. Further, a similar cost per QALY is likely to apply in those countries of similar average income.

For the prevention of illness, however, the situation is less clear. At one end of the spectrum, an intervention may be so effective that the usual need for randomised trials is not required. Quarantine, provision of sewers and clean water for the control of infectious disease is an obvious example. Additionally, we know that exercise is on average good for a population, so we do not usually need an RCT to prove that a particular exercise delivery system is effective. The delivery system might not be cost effective, but that is another matter again. The same is true for various delivery systems for smoking cessation, healthy eating, safe sex, and for all public health interventions that have a behavioural aspect to them. In obesity prevention, reduction of obesity in children is carried out on the expectation that it will result in lower levels of obesity at later ages (Freedman, 2005; Guo 1994; Rolland et al, 1987; Francis and Susman 2009; Whitaker 1997; Allcock et al 2009), and subsequently, in people living longer and healthier lives. While we can usually assume that a delivery system for reducing obesity in children will be effective, we do not know whether that system will be cost effective.

It has reasonably been assumed that approaches to healthy eating in schools, for example, are an effective way of reducing childhood obesity and subsequent adult obesity (WHO, 2009), but without carrying out the calculations, we cannot be sure of its cost effectiveness in reducing adult obesity. To do this, we need to make assumptions about what will happen over the next 40 or 50 or more years. We are unable to second-guess future inventions: if we knew what they were, then they would already exist. To that extent, interventions that would be cost effective in the presence of today's technology might not be if they were to be superseded by alternative technologies in the future. In particular, a cheap and effective cure for obesity in the future may make current approaches to obesity prevention non-cost-effective.

While these issues present some difficulties for decision-makers, however, an additional layer of complexity is added when we consider partnership working. Partnership working is multi-faceted and nuanced. No two partnership schemes are the same. The nod of a head, the choice of words or the tone of voice can make or break a personal relationship at the heart of two people successfully working together. A successful working relationship between persons A and B does not mean that a similar relationship can be developed between C and D. In other words, if we establish that in working together, A and B work more cost effectively than by working apart from each other, we cannot say that it implies the same about C and D. If we were to determine the cost effectiveness of their partnership by conventional means, we would need to compare them with C and D, E and F, and perhaps another hundred or more pairs of people all working in similar kinds of circumstances in different sets of partnership. However, it is quite likely that in other organisational structures, A and B do not have a counterpart. And even if they did, the people with whom C and D have to work alongside in their organisation will be quite different from the ones that A and B also work alongside in theirs. This will mean that the outcomes determined by the (A, B) collaboration within their organisation as a whole may be very different from those determined by the (C, D) collaboration within their organisation. Determining the cost effectiveness of partnership working in (A, B)'s organisation thus says virtually nothing about partnership working in apparently similar organisations elsewhere.

That therefore severely limits the usefulness of standard techniques to estimate cost effectiveness, because the results cannot be generalised to similar organisational structures elsewhere.

Furthermore, what is the comparator of a particular partnership? Is it “no partnership”? That would be difficult to justify. Rarely would two organisations working in the same field in the same geographical area and with similar objectives have absolutely no contact with each other. We consider this point in more detail in the next section.

In what follows, we initially consider partnership working as an intervention in itself. We find considerable difficulties in trying to ascertain the cost effectiveness of a partnership as a whole, as this section shows. We then go on to consider a partnership as a delivery system for a range of ‘interventions’, each of which is aimed at either reducing the cost of delivering a given outcome or producing (positive) synergies which will improve outcomes for a given cost.

III A simple model of partnership working

When considering whether a partnership is likely to be cost effective, a comparator is required (because all cost effectiveness studies require a comparator). It is truly difficult to define a realistic comparator, because virtually no human activity, particularly activities of government agencies, can be carried out without some form of human interaction. It is not sensible to talk about “the absence of a partnership”, because the alternative will be some kind of human interface, even if it is of a less complicated form than the partnership under consideration. We know, therefore, that some forms of partnership must in the past have produced outcomes that were both effective and cost effective, because if they were not, humanity would have become extinct or be composed of a small number of hermits.

Figure 1: Additional costs and additional benefits of partnership

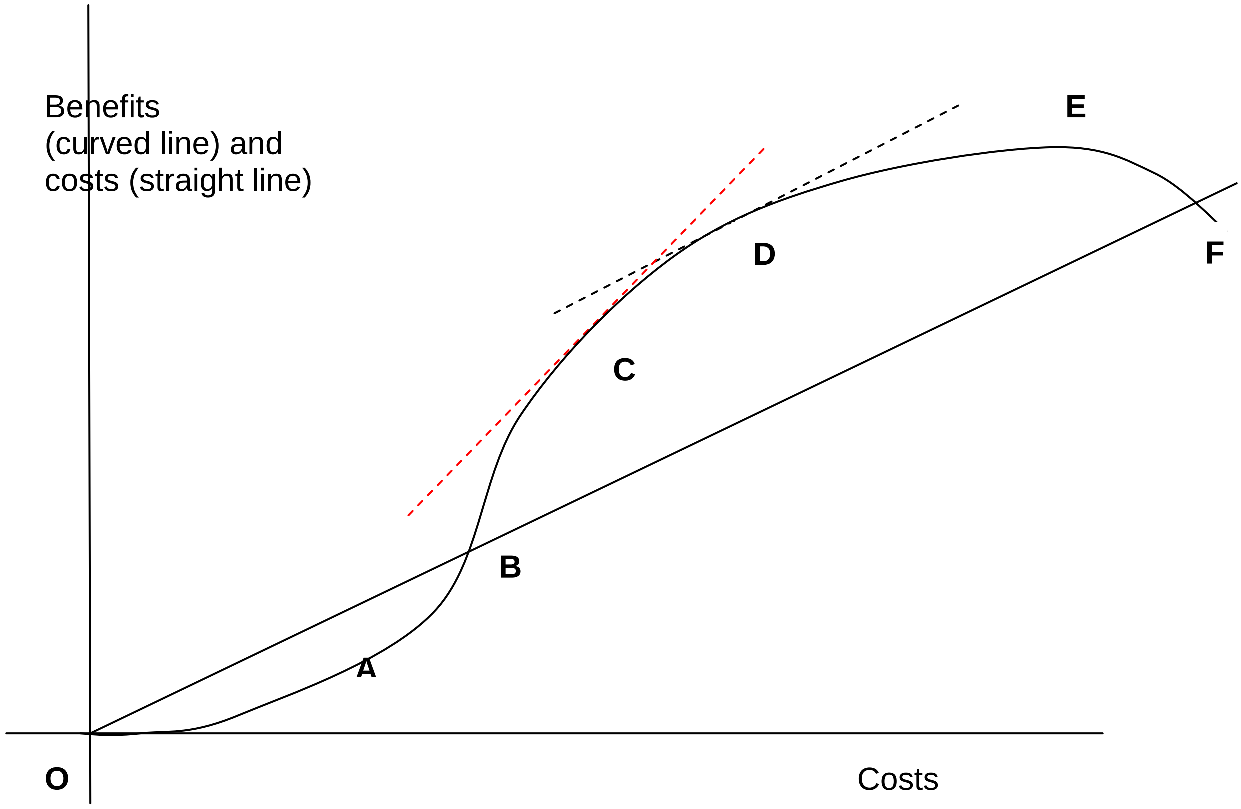
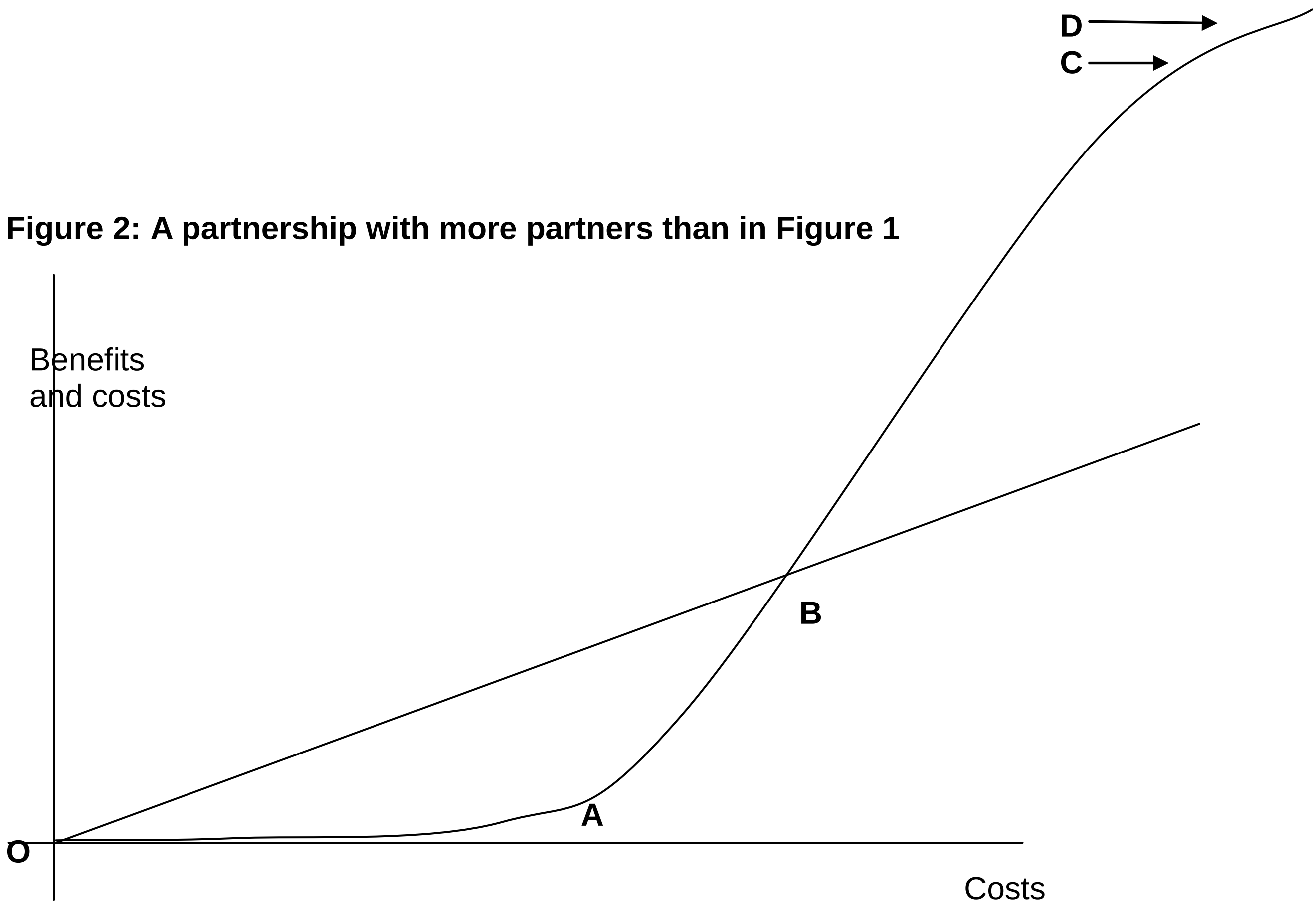


Figure 2: A partnership with more partners than in Figure 1



The curved line OABCDEF in Figure 1 shows the health benefits (expressed in monetary terms) derived from partnership working between two groups as more resources are put into it. The diagonal line starting at O and going through B and F shows the costs, and is a straight line because it is assumed that the cost items can be bought at the same price, regardless of scale. Between O and A on the benefits line, the benefits of a very small involvement do not meet the costs of that involvement, and it is not until B that the project breaks even. From B to F, the benefits exceed the costs. The difference (= benefits minus costs) is maximised at D, where the tangent to the benefit line is parallel to the cost line. Just below D, the benefits (as given by the slope of the tangent to the benefits line) are increasing faster than the costs, while above D the reverse occurs. At E, the benefits are maximised, but the intervention of that intensity should not be applied unless the marginal costs are zero. (At and near E, the additional benefits of an increase in partnership working are smaller than the associated additional costs.) It is still better to be at E than doing nothing, but it is even better to apply a lower intensity degree of collaboration at D than at E. At F, the costs have caught up with the benefits and it would be better not to start the project than to proceed beyond F.

We have omitted a discussion of the point C, which is meant to illustrate the optimal level of partnership working if there are more cost effective interventions elsewhere within the NHS. The slope of the tangent at C is equal to the slope of the next-best ‘intervention’ that is not being undertaken in the NHS, and where its cost-curve has been normalised to equal the cost-curve of the level of partnership working. If more is spent on partnership working than at C, the slope of the benefits line will be lower than the slope at C, the slope of the next-best intervention. That is, beyond C, lower additional benefits would be derived for an additional pound spent on enhancing partnership working than would from the next-best intervention. Thus it would be preferable to swap to the next-best intervention once C has been reached, which would mean spending less on enhancing partnership working than at D.

If the marginal benefits of the next-best intervention have a slope less than that at D (that is, we relocate C to the right of D) only then should partnership working be enhanced at the intensity of D.

In practical terms, what does all this mean? First, we should never seek to develop or enhance partnership working with such minimal resources that the benefits do not cover the costs. In the diagram, we should not enhance partnership working below B. Sometimes, of course, B will be at a very small cost. Second, we should not produce beyond the lower of points C and D. D maximises the value of a partnership, but if we are further constrained that there may be better things to do with our money before we reach point D, then we should put no more resources into the partnership than at C.

The difficulty is that in most situations, we will have incomplete and imperfect information about the location of either the cost curve or the benefits curve. For the cost curve, it is difficult to apportion the time spent in partnership working. Only a very rough estimate would be at all possible. Data like these are rarely if ever kept. If they were to be gathered, they would apply to that partnership alone, and would not be generally useful to any other partnership.

For the benefits curve, there are multiple problems. While it might just be possible to estimate the costs of conducting a partnership, just what benefits are likely to accompany that partnership? That is, what level of obesity would pertain in the presence and in the absence of the partnership? That is the greatest imponderable. Apart from the usual difficulties of measuring a public health intervention whose benefits accrue mostly into the distant future, we must also consider the time-path of obesity levels. One partnership might not have much to show after (say) a year, but may promote a situation where weight loss is maintained for the rest of life. Another might show large initial health gains which turn out to be transient ones, with weight being regained quickly. Unless we have actually waited some years in order to visit the future, we cannot divine whether the gains will be transient or more permanent, so we are necessarily hamstrung in any attempts to model the future. Even if we have waited until the future were to become known, we must also have the funds and the infrastructure to follow up people involved in such interventions.

For all of that, we have not said what the benefits of a reduction in population levels of obesity might be. The standard measure of benefit within health-care is the QALY, but it is clear that there are other benefits besides. We consider these later.

Before we leave the simple model, let us see how adding partners to the partnership would change the model and its conclusions, which we show in Figure 2. This shows that, in common with other more capital-intensive projects, it is assumed that many more resources need to be devoted before benefits begin to accrue. As drawn, the project barely breaks even with multiple partners (at B in Figure 2) when the same quantity of resource use with only two partners optimises the benefits (at D in Figure 1). The expectation of involving more partners is that the maximum net benefits would be greater in Figure 2 than in Figure 1, which indeed has been drawn to reflect that this is the case: the vertical distance between D and the cost line in Figure 2 is (as drawn) much greater than the corresponding distance in Figure 1.

Comparison of Figures 1 and 2 shows that the funding that would be ideal for a small number of partners would not be sufficient with a larger number of partners, but that greater resource use for the larger number of partners could result in larger net benefits than in the smaller partnership. Nevertheless, this is not an immutable rule, because further enlargement of partners would eventually lead to additional costs for no additional benefit.

Overall, the message from this section is that many partnerships will be both effective and cost effective. Knowing that one partnership is cost effective, however, does not imply that another partnership in almost identical circumstances may also be cost effective. The complexity and multiplicity of interactions within partnership working make it impossible to identify key factors in determining success or failure and hence its relative effectiveness and cost-effectiveness.

IV Partnerships as a delivery system for a range of 'interventions'

Partnership working may be regarded simply as a delivery system for interventions. This system would appear to have two main aspects. First, it promotes one or more process innovations. A (successful) process innovation by definition is a way of producing a product more cheaply and so by implication will be cost effective. In the case of partnership working the approach would be to determine which acts of co-operation could be carried out more cheaply than would be achieved without co-operation, for the same healthcare outcome. The sharing of data and information, of labour and/or of resources would come under this banner. If the health outcomes are also improved at the same time, it is a bonus in terms of cost effectiveness. Often, by assuming no changes in health outcomes by working as a partnership rather than independently, it would be possible to determine in advance whether such partnerships would be cost effective. However, the partnership as a whole should not be judged: rather, each facet of sharing resources within a partnership should be tested in the way described.

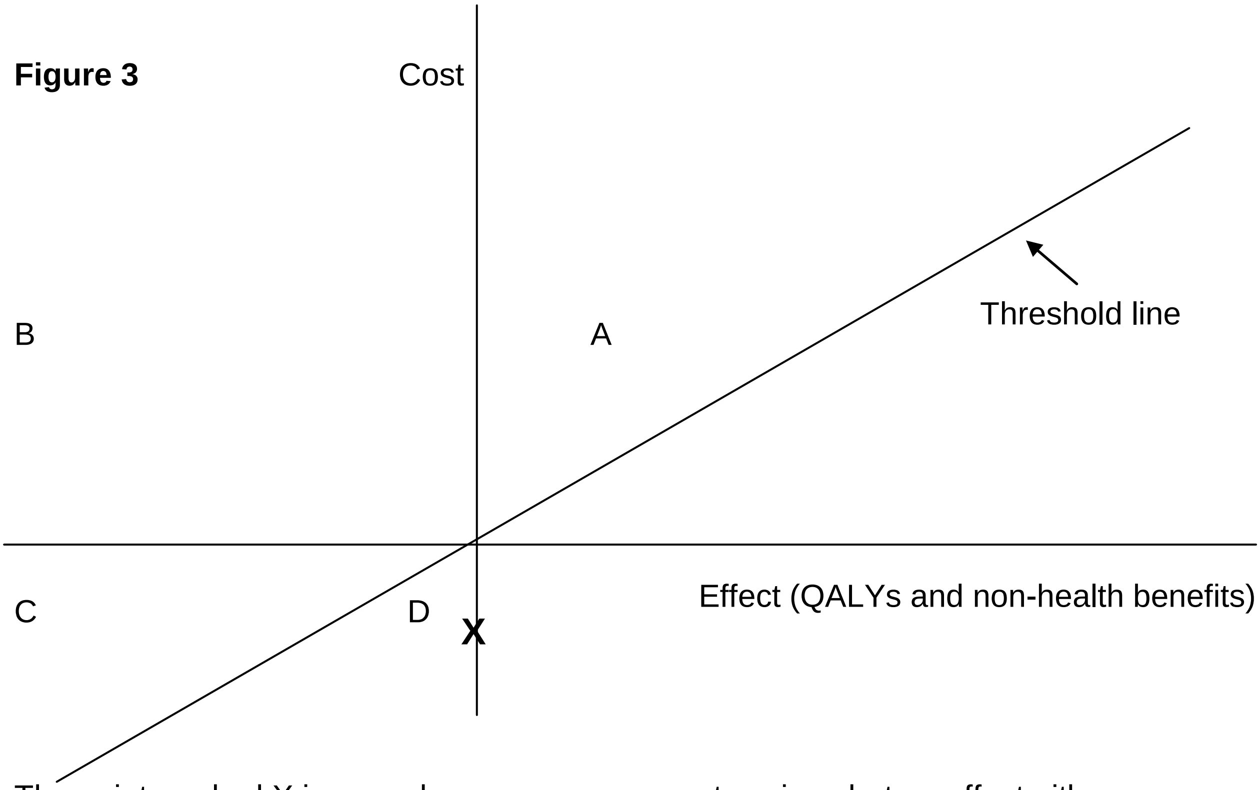
A second aspect of partnership working is synergy. For the same cost as acting independently, two organisations coming together may produce a health outcome that is greater than the sum of the parts (the organisations acting independently of each other). This is an altogether different situation to gauge in advance. Some obesity messages may, for instance, be most powerfully communicated by drama. Estimation of the effectiveness of the performing troupe as a group compared with individual performances by the same artists is something that cannot readily be tested in advance. Taken at a further stage of aggregation, a dance troupe acting alone and an NHS obesity programme acting without the dance troupe may achieve much less than a collaboration between the two groups. It is therefore not possible with current methodology to judge the cost effectiveness of the synergistic aspects of working together. Judging whether innovative approaches to obesity reduction will be worthwhile pursuing belongs to the field of the diffusion of innovations and is well beyond the scope of this paper.

We illustrate these concepts further by considering them in the cost-effect plane.

Scenario 1: Where partnership working is cost saving

Some partnerships will allow a pooling of resources or the avoidance of their overlap, resulting in the same outcomes (e.g. same reduction in obesity) for a lower cost. This is illustrated in Figure 3, which measures the effects of a partnership compared with no partnership (no partnership is situated at the origin) on the horizontal axis, and cost increases or decreases on the vertical axis. The threshold line shows the boundary between what is cost effective and what is not. Above the threshold, in the area marked A, the effect of partnership working is small and positive compared with the costs, which will be relatively large. In the area marked B, the benefits of partnership working are lower than those of not working in a partnership but cost more – a lose-lose situation. In the area marked C, costs are saved but so much health or other benefits are lost that the partnership is not cost effective. Thus above the threshold line, a programme will not be cost effective. On the other hand, a programme will be cost effective when its (effect, cost) pairing lies below the threshold line. In the area marked D, the partnership has less effect on reducing obesity than no partnership, but releases so many resources to the NHS or government that the total effect is either health-promoting (in net terms) or is so enhancing of other government aims that it compensates for a lower net health gain.

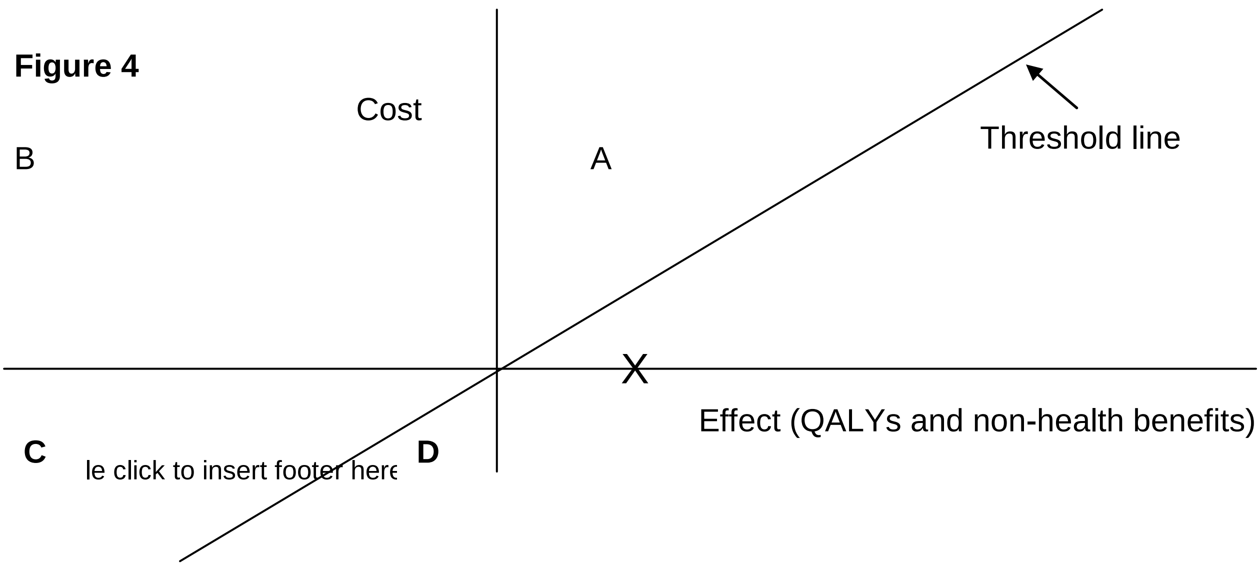
Figure 3



The point marked X is one where we assume cost savings but no effect either way on aggregate health and non-health benefits. Such a point is comfortably in the cost-effective region. If X were slightly to the left of its position on the vertical axis, it would still be regarded as cost effective, despite a smaller level of benefits than no-partnership-working, because of the extent of costs that would be saved. Provided that X does not stray any substantial distance to the left of the vertical axis, and provided we are sufficiently certain about costs being saved by the partnership, it should not be necessary to require cost effectiveness to be "proved" by more sophisticated methods such as modelling.

Scenario 2: Where partnership working gives net benefits in health and non-health without additional cost.

Figure 4



In Figure 4, we are concerned with a partnership that has no additional cost but gives benefits. Such a scenario will be characterised by a point on the horizontal axis to the right of the origin, such as point X. It is rather hard to imagine a case where the cost is zero: the initial cost of the partnership is exactly offset by the cost savings. However, it is possible to think of a number of interventions/programmes whose direction of change would be known in advance. Such an example is exercise, where the intervention/programme is a means of delivering exercise, for example an exercise referral class. If the class is costly, then the point marked X in Figure 4 will rise vertically, to reflect costs which are not cancelled by future cost savings. If X goes above the threshold, then the referral class will not be cost effective. However, if it has only a small net cost, or if the cost of the partnership is smaller than the future cost savings, then the referral classes will be cost effective, and in the latter case, will also be (net) cost saving. Such points, in the south-east quadrant of Figure 4, will automatically be cost effective. If the effect is already known to be positive, then it is only necessary to show net cost savings to ensure cost effectiveness.

There is another possibility that utilises Figure 4. Suppose that, *for a given budget*, one may utilise ‘usual practice’ or ‘best practice’. By definition, ‘best practice’ should yield more health gains than ‘usual practice’, as long as the intervention ‘best practice’ is generalisable to other circumstances. If there are no future cost savings (and no future cost increases) from changing from usual practice to best practice, then we finish at a point such as X in Figure 4. If there are cost savings, then we will finish below point X. In either case, it will be cost effective to switch to ‘best practice’.

However, the places where partnerships will be cost effective are so simple and so ubiquitous that no-one would think of characterising them or measuring them. Person A from a local obesity-reduction group meets B from another and they decide to share information. It is essentially costless in a society where information is computerised. Provided the information is useful, both A and B are at a point like X in Figure 4. If the information is not useful, it will not be used, so there is essentially no gain or loss. Only if the information is wrong can the receiver of the information be made worse off. Personal interaction among cooperative people will result in cost-effective improvements in what they do in an untold number of cases.

V Stopping and starting

For this and all other instances in this paper, the words “weight loss” is always with respect to a comparator, so it may mean “a smaller weight gain than without an intervention”. For people of a healthy weight, it therefore also refers to a maintenance of that weight rather than a drift into overweight and obesity. In that context, it is “weight not gained” rather than “weight loss”. This hides the possibility that it is likely to be preferable for a person never to become obese rather than becoming obese and then losing the weight, for several reasons. The first is that a period of obesity is likely to cause damage to a person’s body of a permanent nature (Asnawi Abdullah et al, 2011), the second is that it may be cheaper to intervene to prevent obesity among people of a healthy weight than it is to revert to a healthy weight after a period of obesity, and the third is that weight loss from a state of obesity is more likely to be regained than for a person of healthy weight to become obese. These possibilities would suggest that it should be more cost effective to prevent weight gain from a healthy weight to obesity than to intervene once obesity has occurred. However, this supposition depends on the proportion of people who are likely to become obese. If almost no-one were to become obese, it would cost a great deal per case prevented, while if obesity were in essence inevitable without intervention, then the cost per case of obesity averted would be comparatively small, other things equal. In the first situation (a sufficiently low obesity prevalence), it would not be as cost effective to intervene for those of a healthy weight as it would be to intervene once people had become obese; in the second situation (a sufficiently high prevalence) the reverse would apply. Additionally, preventing obesity in children, young people and ‘youngish’ people from occurring will give few benefits for a number of years, whereas for an older obese person, benefits from weight loss are likely to be more immediate, so the rate at which the future is discounted in the analysis is also important. In most cost effectiveness modelling, the two cases “weight lost” and “weight not gained” have not been distinguished.

It has often been observed that funding for the prevention of long-term conditions should be continuous, and should not keep stopping and starting. It is said that many health benefits will be lost when this occurs. It may be argued that while that might be so, the cost of the programme will also be reduced if the programme stops for a time. We now present a simple model which suggests that stopping and starting is not as cost effective as continuity of a programme. There appear to be two main reasons for the reduction in cost effectiveness. First is that start-up costs will be incurred each time that a programme re-starts. The second is that health gains are not linear in time, and that stopping and re-starting will produce smaller health gains for the same effort. Figure 3 below illustrates this.

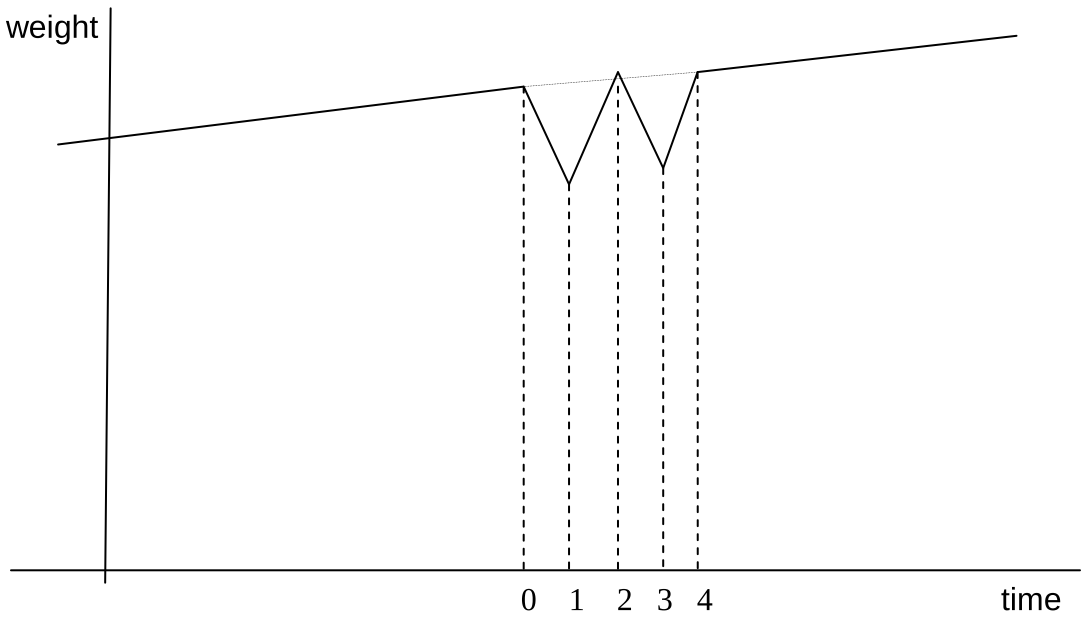


Figure 5: Start-stop-start-stop programme of total duration 2 years

In Figure 5, a programme operates between years 0 and 1, and the scheme is then put into mothballs for 12 months. During that time, the person regains the weight lost and returns to the original weight trajectory. At time 2, the programme begins again and lasts one year, and the same pattern emerges: the person loses weight between years 2 and 3, and then returns to the former trajectory at the end of year 4. The health gain is given by the area contained in the ‘W’ shape, assuming that the weight gain in the second period of weight loss is the same as in the first.

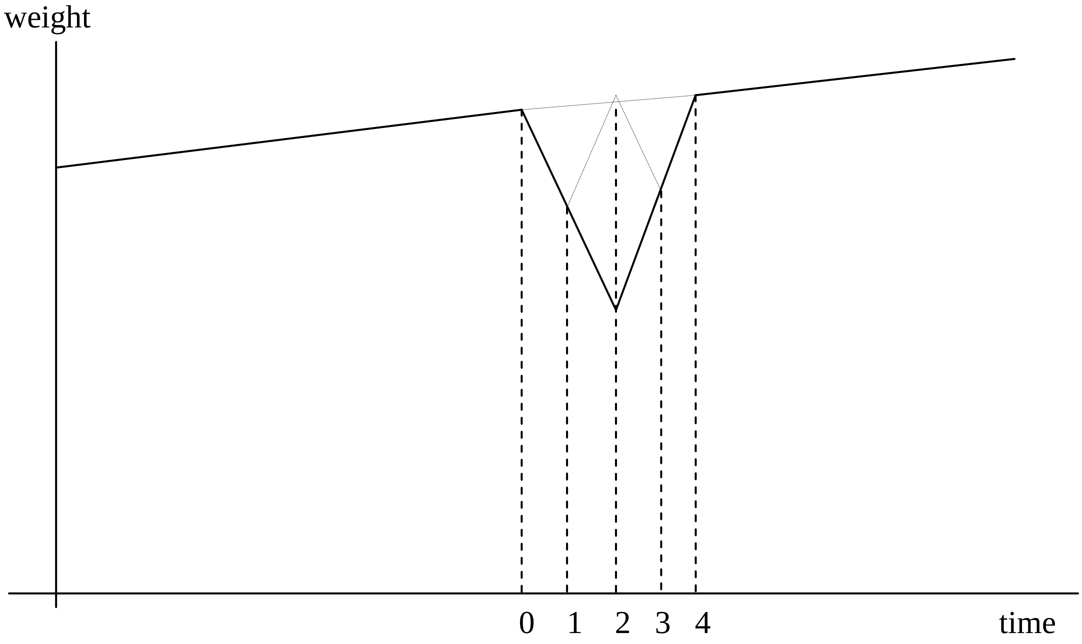


Figure 6: Continuous programme of 2 years

In Figure 6, the programme lasts for 2 consecutive years 0 to 2. Assuming that the same weight loss occurs in year 2 as in year 1, and that the weight is regained at the same rate as it was lost, the person regains trajectory weight after 4 years as before. The health gain is given by the area in the ‘V’ shape (under the trajectory weight dotted in between years 0 and 4) and is double that of the two separate benefits given in Figure 5. Both scenarios apply the programme for 2 years, but the continuous application of the programme gives double the health gain, assuming that double the weight loss will double the health gain.

However, for the continuous programme, suppose that the second year’s programme does no more than maintain the person’s weight, as is given in Figure 7. The weight trajectory is now given as a cross-section of a ‘canal’ or ‘log-cake-tin’ shape.

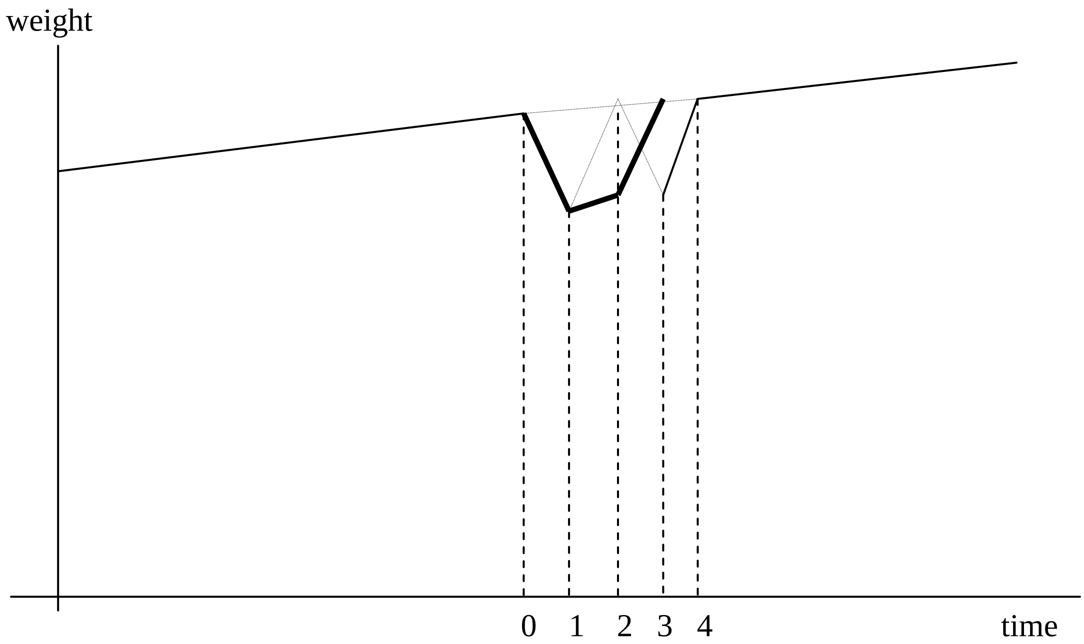


Figure 7: Continuous programme 'marks time' in second year

Even in this case (which is realistically likely to be the worst possible scenario) the health gain from the cake-tin shape is the same as that of the W shape of Figure 5.

Two caveats to the above are (a) doubling weight lost might not double the associated health gain as assumed above, so the health gains as given in Figures 4 and 5 may be a little less than modelled here, and (b) no additional start-up costs have been assumed in restarting the programme that has been mothballed, as in Figure 5, so Figure 5 is likely to be slightly optimistic in terms of cost per QALY gained.

Extending the analysis to a comparison of a go-stop-go-stop-go stop scenario of 3 funded years interspersed with two unfunded years, with an programme continuously funded for 3 years, leads to the V shape of the continuous-funding case gaining 3 times the health benefit of the three-armed-W of the stop-start case, while the cake-tin version of the continuous-funding case gains the same benefit as the three-armed-W.

Quantification of the importance of continuity of funding does not appear to have been carried out empirically, and a simple model such as this is a means of being able to get some idea of the order of magnitude of the effect. In round figures, it looks as if a stop-start policy could approximately add some 50% to 100% to costs for the same gain in QALYs.

VI Health and non-health benefits from reducing obesity

In terms of health, obesity is an intermediate outcome. We are really interested in heart disease, strokes, cancer and other conditions that shorten life and/or reduce its quality, and we know that a reduction in obesity will result at a population level in a reduction in these adverse events. To make simple decisions, we normally require a single eventual outcome, and in health economics we measure that by the QALY, which is an index derived from an amalgam of the length and quality of life. This is elicited as a trade-off between quality of life and the timing or the probability of death. The QALY is thus the ultimate outcome. The relationship between reductions in obesity and QALYs, however, is made uncertain because of the long time lags between a person becoming obese and their death, and the difficulty in attribution of a longer life span to a reduction in weight: something else might be responsible for any additional weeks or years of life.

However, some benefits from a reduction in obesity levels are not health benefits. One such benefit of reducing obesity levels is the reduction in stigma towards obese people, which for some obese people may have some mental health benefits. However, many obese people become deeply unhappy on account of stigma without suffering clinically from mental health problems: the QALY as is currently constructed does not consider an increase or a reduction in stigma as a health issue unless it is diagnosed as a mental health problem.

Further, obesity affects employment and also wages. (Some of this is health-related, some relates to mobility issues, and some is a product of our social circumstances.) There is a large literature on this: the references are by no means exhaustive (Cawley (2000, 2004, 2005), Pagan and Alberto (1997), Currie and Madrian (1999) Costa (1996) Puhl and Brownell (2001) Paraponaris, Saliba et al (2005) Laitinen, Power et al (2002), Lakdawalla, Bhattacharya et al (2004), Finkelstein, Ruhm et al (2005), Jebb and Moore (1999), Tunceli, Li et al (2006), Han, Norton et al (2009)

Obesity in children adversely affects their attendance at school and their school grades. In a study of the change to school meals in a number of schools in Greenwich, London, to counter obesity in children, Belot and James (2011) showed that educational grades improved compared with those of the surrounding schools, as did absenteeism. The present value of the grade changes was estimated, on average, to be between £2000 and £5000 in additional wage remuneration over the lifetime of each of the children after reaching working age. These changes, it was argued, could not be explained by a Hawthorne effect, a selection effect or other school policies. The intervention was the result of an unlikely partnership between celebrity TV chef Jamie Oliver and the local educational authority.

A reduction in obesity would reduce greenhouse gases in at least three ways: a smaller amount of food would need to be produced, the transport costs of bringing food to the market would be reduced, and the amount of methane produced by people who eat less would also be smaller (Michaelowa and Dransfeld (2008)). However, the total effect would be smaller than the direct effect, or even be in the opposite direction, because people who spend less on food would spend more on other consumption, which overall may add to the greenhouse gas effect.

The widespread effects of obesity and the equally widespread benefits from its reduction add further complexity in trying to determine whether partnership working to reduce obesity levels would be worthwhile.

VII Things we can do

Despite the conclusions reached about the difficulty of judging the cost effectiveness of partnerships as a whole, we outline two circumstances in which we may reasonably conclude that partnership working (or an increase in partnership working) may be cost effective. The first two scenarios might be quite widespread, so should not be ignored.

Case 1: Flood mitigation

Teignmouth, at the estuary of the River Teign, is prone to flooding from either high tides, high river levels caused by runoff, or a combination of the two. The Environment Agency (EA) proposed a flood mitigation scheme, but this was rejected by the population, largely, it appears, on aesthetic grounds. A similar scheme was subsequently proposed for the smaller community of Shaldon on the opposite bank, but on this occasion, fearing community rejection once again, the EA hired a specialist community engagement firm at the time the plan was released.

We compare two proposals: one without community engagement and the other with such engagement. The figures are approximate, and are meant to be illustrative only.

<u>Without engagement</u>

Present value of estimated cost of bouts of flooding over the next 100 years, discounted at 3.5% per year: £45 million. (Atkins pba (2006))

Estimated cost of engineering works for mitigation: £6 million.

Present value of the net benefits of the scheme = £45m - £6m = £39m.

<u>With engagement</u>

The scheme would be delayed by 12 to 18 months to allow for consultation and changes in design.

Present value of estimated cost of flooding over next 100 years: £45m less £1.5m due to the possibility of flooding in the interim.

Cost of engagement: £0.5m

Cost of engineering works: £6m + £1m (changes to the plan) = £7m

Present value of net benefits = £(45 – 1.5 – 0.5 – 7)m = £36m.

The value added by community engagement depends on the outcome: would the plan have been accepted without engagement, and would it have been accepted with engagement? Neither of these outcomes would be known before the event, but probabilities could be placed on the outcome in each case. Suppose the probability that the plan is accepted without consultation is p_1 and with consultation is p_2. In the above example, the consultation will have an expected positive net benefit if $36p_2 > 39p_1$. This has a maximum value of £36 million when $p_2 = 1$ and $p_1 = 0$ (that is, if we were absolutely sure that the plan would be rejected before consultation and accepted after it). More generally, the engagement will be worthwhile if $p_2/p_1 > 1.083$. If, for example, $p_1 = 12\%$ without consultation, then p_2 would have to be more than 13%, a very small difference, but if p_1 were to be 90%, then p_2 would have to exceed 97.5%. If p_1 were to exceed 92.3%, then p_2 would have to be over 100%, which implies that engagement would not be worthwhile if there is a sufficiently high probability of the project being accepted without engagement.

This exercise has not included future health costs, and has not counted EA time to arrange the engagement. On the other hand, the engagement is also claimed to have broadened social networks in Shaldon, solved long-running storm-water problems by bringing all the various agencies together and also settled other long-running problems with schools and the police.

This scenario is a special case of partnership working for three main reasons. First, there is a relatively accurate measure of benefits in the form of flood mitigation. That state of affairs (an accurate measure of benefits) is relatively unusual in many areas of public health. Second, there is a clear distinction between “no engagement” and “engagement”: in other words, there is either a full partnership or there is none. However, even this is stylised in this scenario, as it would have been possible for the EA to have contracted a smaller or a larger consultation. What should the optimal size (and quality) of the engagement have been? What level of engagement would maximise $B_2p_2 – B_1p_1$? (Here, p_1 is as before, B_1 is the expected net benefit without engagement, p_2 is the probability of accepting the project, but now varies with the level of engagement and B_2 is the expected net benefit with engagement, also varying with the level of engagement.) The EA might have engaged too much, but for good reason: it did not want community engagement to fail, because it would have reduced the likelihood of conducting similar engagement exercises in the future. The size of the net benefits from engagement is so high that the engagement only needs to work occasionally for it to be worthwhile. That, however, would not be the public perception, given that engagement more often than not might be likely to fail to change a decision that was in the long-term interests of the community. Third, the engagement was undertaken partly to improve the acceptability of the project by more appropriate engineering works, but mainly to influence the decision-outcome. Most partnership working, and particularly that in obesity, is not like that: it is more to do with tackling obesity than about changing a decision about whether to tackle obesity.

What is important is that we have described a case where the benefits of partnership working have been quantifiable and clearly could be very large under optimal conditions. We have shown also from this scenario that the benefits of the partnership are not a foregone conclusion – under some circumstances, the partnership might not be a worthwhile way of spending money.

Case 2: Community Partnerships

El Ansari and Phillips (2004) examined partnerships in five locations in South Africa from the point of view of the participants, for whom the benefits were not simply better health, but also involvement, commitment and ownership, which increased the benefits and appeared to reduce the cost of providing community resources. Very high levels of involvement were associated with decreases in satisfaction, but did not affect commitment and a sense of ownership. The value of the study is lessened to the extent that many of the variables observed were subjective. When applied to obesity control in the UK, it would seem that such a study may have a greater bearing on partnerships involving volunteers. The study shows that the success or otherwise of a partnership is not confined to the apparent official outcomes, but also involves the personal development of the people who take part in making the partnerships work. How this compares with the personal development from other kinds of activities is not known. If we have difficulty with measuring conventional cost and benefit outcomes from partnership working, the implications of the Ansari/Phillips paper are that that is only the starting point of our troubles, because personal outcomes of the participants should also be considered. That will usually complicate matters more, though if the latter outcomes are unambiguously in the same direction and overwhelmingly important, it would provide a direction of travel that would otherwise not be apparent.

VIII Whole systems approaches to obesity and its modelling

A report for NICE in 2011 by Rob Anderson et al of PenTAG, Peninsula Medical School, looked carefully at the world's literature on studies of whole systems approaches in obesity, and to obesity modelling. The literature search produced no studies, but with a more generous interpretation of the inclusion criteria, four studies were found. However, these studies compared partnership working with doing nothing, which is not the subject of this paper, which tries to compare partnership working with "going it alone".

Anderson et al's report considered two sorts of modelling: System Dynamics modelling and Agent-Based Modelling, and concluded that

> *Simulation modelling of obesity or obesity policies is still at a relatively early stage of development. However, in some cases the complexity of modelling outcomes in the area of obesity and obesity prevention policies or programmes has already become so complex and advanced that the usefulness (or even feasibility) of attempting to develop credible new models without significant modelling capacity, access to national data, and significant modeller time and other resources is questionable. Instead, with limited resources, any realistic modelling of alternative local community-wide obesity prevention policies should aim to make best use of one of the well-established and tested existing models (such as the National Heart Forum's micro-simulation model, or the ACE Obesity model framework).*

While the quotation shows the current limitations of our abilities to model complex situations, the prospect of our abilities to model partnership working as a phenomenon and to compare it with an absence of partnership working (as distinct from "doing nothing") would appear to be even more remote.

IX Other local approaches to obesity

We consider two projects that involve local approaches to reducing obesity. In each case, the local approach provides the costs of the intervention and the short-term effects in terms of reduction in aggregate weight compared with no intervention or 'placebo' intervention. These health gains (and costs of the intervention) are then put into a model that makes consequent predictions about changes in the length and quality of life, and about changes in NHS costs of future treatment. This second stage is based on Gillett et al (2010). Gillett's method is bound to be very uncertain, to the extent that it may not apply to an extrapolation from childhood, especially from very young childhood. The results must be thought of as indicative only, and must remain no more than a guide to decision-making.

None of these projects are ideally representative of a local approach, as they are mostly in one sector (either schools or clinical provision of weight loss). However, the economics in these cases would not be very different if these projects were more closely to approximate the ideal: it is the general approach that is important, and the results should transfer reasonably well to other local projects.

The following flowchart shows how partnership working fits into the total framework.

Stage 1: partnership working	Stage 2: short run	**Stage 3: long run**
Partnership working in a local project. Look at health benefits likely from small interventions within a partnership, costs of intervention and costs saved by intervention within the partnership. Look at each intervention singly but do not model. Strictly speaking, these changes should follow through into the next 2 stages, but as an approximation and simplification, the analysis may be self-contained.	Interventions within a p'ship lie within a larger intervention which aims to reduce obesity in the short run. Outcomes will be in terms of proportion of people in short run who do not become obese from overweight, or overweight from healthy weight.	This translates the gains from lowering obesity and overweight in the short term into QALYs in the long term. It will also give rise to cost savings.

The following projects refer to stage 2, or to stages 2 and 3

Project 1: Planet health

Wang et al (2003) undertook an analysis to assess the cost-effectiveness and cost-benefit of Planet Health, a school-based intervention designed to reduce obesity in children of middle-school age in Massachusetts, USA. Under base-case assumptions, at an intervention cost of $33,677 or $14 per student per year, the program would prevent an estimated 1.9% of the female students (5.8 of 310) from becoming overweight adults. As a result, an estimated 4.1 QALYs would be saved by the program, and society could expect to save an estimated $15,887 in medical care costs and $25,104 in loss of production. These findings translated to a cost of $4305 per QALY gained (healthcare provider perspective) and a net saving of $7313 to society (societal perspective). Results remained cost-effective under all scenarios considered and remained cost-saving under most societal-perspective scenarios. A discount rate of 3% was employed for both costs and benefits. However, no significant differences were found between intervention and control groups among boys of the same age.

Wang's analysis assumed that girls who (because of the intervention) either do not become obese from 12 to 14 years or who revert from obese to non-obese during this time have the same probability of becoming obese by the age of 21 as the rest of the girls who were not obese at the age of 14. Nevertheless, even when translated to UK costs and other differences in analysis are accounted for, it is reasonable to assume that the project would be cost effective in UK circumstances. Unfortunately, no figures for boys were given from which an economic analysis could be undertaken: Wang did not report whether the intervention was in the same direction for boys as for girls.

Gillett's (2010) translation of short-run health gains to long run gains, with some heavy caveats, has been used in an attempt to make the analysis comparable with the other projects of this section. The analysis was set up as an estimated number of girls who do not become obese, rather than a lowering of BMI as in the Gillett formulation.

To make the translation from a lower probability of becoming obese to Gillett's lowering of BMI, we assume that the distribution of BMI of the overweight girls is triangular with a range of 8 BMI points. Of the 80 overweight girls without intervention, 17 were prevented from becoming overweight (Wang's estimate), which is 21%, translating to 0.9 BMI points, given the distribution of overweight assumed. The cost of the intervention was $108 per girl in the programme, but would have been $54 per girl if the boys were to be excluded from future classes through lack of effect. In Table 1 (from Gillett 2010, Table 23) an intervention costing £100 per head and yielding a BMI change of -1.0 has an estimated cost per QALY of £1688. Assuming a US dollar in the late 1990s has about the same purchasing power as a UK pound in 2011 and adjusting to a BMI change of -0.9 would suggest a cost per QALY of the order of £2000 to £3000, of similar order to Wang's figure of $4300 per QALY.

Table 1 (from Gillett (2010) Table 23)

Incremental Cost-Effectiveness by Effect Size and by Cohort Assuming Direct Public Health Intervention Package Cost (including follow-up) per participant of £100

INTERVENTION A: Very small BMI=-0.1 , SBP=-0.3, TC:HDL =.998	Incremental Costs (Discounted)	Incremental QALYs (Discounted)	Incremental Cost per QALY Gained
1. England Average	£94	0.0012	£78,127
2. Deprived /Average BME	£93	0.0011	£87,986
3. Average Deprivation /High BME	£89	0.0018	£50,618
4. Deprived /High BME	£90	0.0005	£178,185
5. Deprived /High Asian	£82	-0.0004	-£217,655 (not cost-effective and dominated)
INTERVENTION B: Small effect BMI=-0. 3, SBP=-0.8, TC:HDL =.994			
1. England Average	£76	0.0043	£17,910
2. Deprived /Average BME	£63	0.0037	£16,957
3. Average Deprivation /High BME	£92	0.0052	£17,877
4. Deprived /High BME	£95	0.0029	£32,304
5. Deprived /High Asian	£84	0.0024	£35,719
INTERV'N C: Moderate effect BMI=-0. 5, SBP=-1.3, TC:HDL =.990			
1. England Average	£73	0.0077	£9,406
2. Deprived /Average BME	£54	0.0072	£7,415
3. Average Deprivation /High BME	£68	0.0084	£8,161
4. Deprived /High BME	£62	0.0051	£12,184
5. Deprived /High Asian	£56	0.0051	£11,025
INTERV'N D:Substantial effect BMI=-1.0 , SBP=-2.7, TC:HDL =.980			
1. England Average	£29	0.0172	£1,688
2. Deprived /Average BME	£0	0.0126	£37
3. Average Deprivation /High BME	£40	0.0153	£2,638
4. Deprived /High BME	£14	0.0141	£968
5. Deprived /High Asian	£24	0.0100	£2,423
INTERV'N E: Large effect BMI=-1.5 , SBP=-4.0, TC:HDL =.970			
1. England Average	£6	0.0261	£223
2. Deprived /Average BME	-£41	0.0206	-£1,980 Cost-effective and dominating
3. Average Deprivation /High BME	-£12	0.0215	-£553 Cost-effective and dominating
4. Deprived /High BME	-£37	0.0205	-£1,804 Cost-effective and dominating
5. Deprived /High Asian	-£12	0.0159	-£766 Cost-effective and dominating

Information provided to NICE by the National Heart Forum allows a further estimate of the relationship between an intervention to reduce obesity and the eventual health outcomes (given by QALYs) and future cost savings to be made. The main assumptions made in the model are:

- A cohort of people approximating the UK population in composition travels through time, with people aging, dying and being born for the next 35 years. The rates of dying and the birth rates are assumed to be current rates.
- When those within the cohort turn 40, they are subjected to an obesity intervention that reduces their BMI (for those over a BMI of 25) by 1.5 points (i. e. kg/m^2). For those between 40 and 80 years at the beginning of the simulation, the intervention begins immediately but all effects stop at age 80 (so a 78 year-old person gets 2 years of benefit from the intervention).
- Then four possibilities are entertained, compared with not intervening (‘No intervention’ is called Intervention 0 in what follows).
    - After intervention, BMI increases at the rate at which the BMI of the population of that age increases (that is, it remains at 1.5 points below what it would otherwise would have been) and this lasts for 4 years. At the end of 4 years half of the original BMI loss is instantly regained. This is called intervention 1.
    - As for intervention 1, but now BMI remains below the no-intervention trajectory for 8 years rather than 4, and after 8 years, half of the original decrease in BMI is regained (intervention 2).
    - As for intervention 1, but after 4 years BMI instantaneously reverts to the long-term pathway (intervention 3).
    - As for intervention 2, but after 8 years, BMI instantaneously reverts to the long-term pathway (intervention 4).
- The annual costs to the NHS of treating the following conditions are given in Table 1 below. (These costs will decline a little as a consequence of the relevant intervention. Health benefits of the intervention will also accrue due to lower or later incidence of the same conditions, and is captured by the consequent gain in QALYs.)
- Future costs and health benefits are discounted at 3.5% per annum.

Table 2: Input costs

Disease	Cost (£bn)	Cost year
arthritis	1.28	2008
breast_cancer	0.28	2008
chd	3.25	2008
colorectal_cancer	0.43	2008
diabetes	2.14	2008
endometrial_cancer	0.11	2008
gall bladder cancer	0.11	2008
hypertension	1.16	2008
kidney_cancer	0.11	2008
liver_cancer	0.49	2009
oesophageal_cancer	0.11	2008
stroke	3.17	2008
unspecified	0.00	2004
Total	12.64	

Figure 8: Total costs of BMI-related diseases [£million] by year 2010 to 2060; 5 Interventions. Intervention 0 is the status quo.

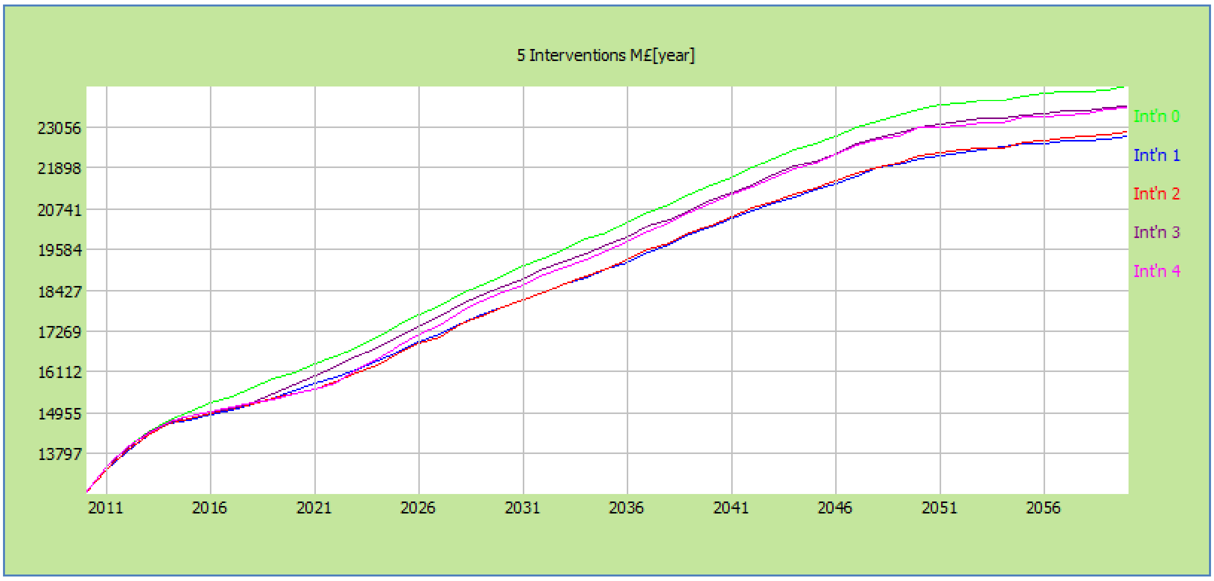


Figure 9: Total male QALYs by year: 5 Interventions

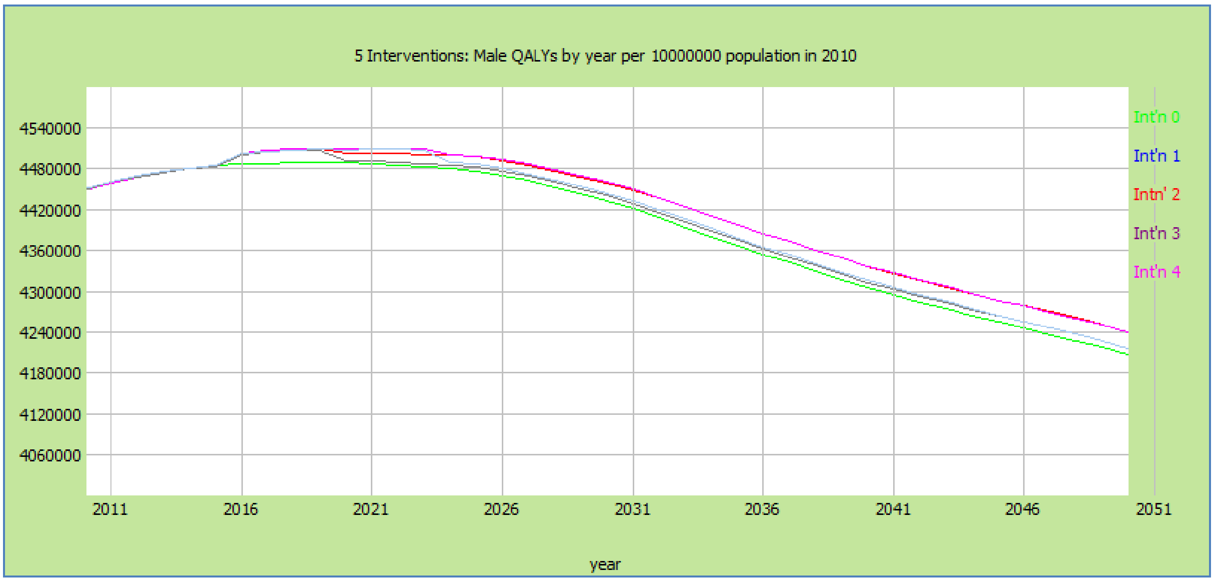


Figure 10: Total female QALYs by year: 5 Interventions

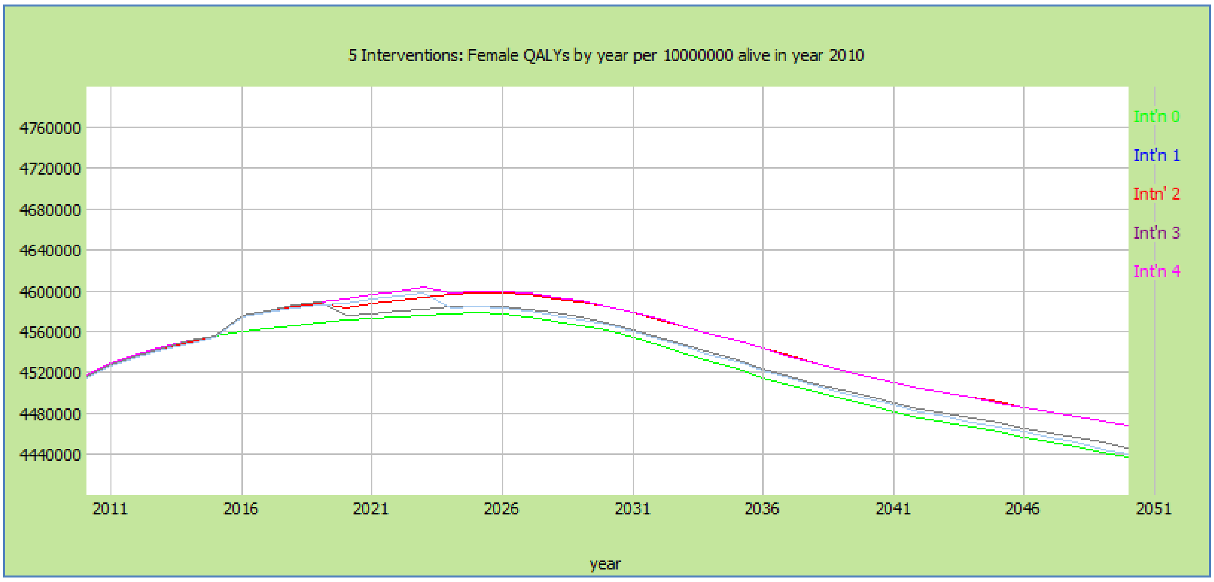


Table 3: Total discounted gains 2010 to 2050

Gains of intervention	Intervention			
	1	2	3	4
Total cost savings	14845m	15044m	6376m	9043m
Cost savings per head*	225	228	97	137
QALY gain per head	0.078	0.084	0.030	0.039
Value per head of QALY gain**	1553	1681	599	774
Value of total gain per head	1778	1909	696	911

* Assumes a population size of 66 million over the time-period.

** Assumes a QALY is valued at £20,000

From Table 3, the row "cost-savings-per-head" indicates the amount that could be paid per head for an intervention to be cost neutral. The penultimate row shows the value of the health gain per head by intervention. The sum of the cost-savings-per-head plus the value-per-head-of-QALY-gain shows how much an intervention can cost to be borderline cost effective when a QALY is valued at £20,000, and is given in the last row.

Taking the last two scenarios, where BMI returns to its no-intervention level after 4 or 8 years respectively, and assuming that BMI increases each year in a linear fashion to that level rather than jumps up at the end of the 4 or 8 year period, the benefits will be approximately halved, and will be of the order of £400 per head (adding the cost-saving and the value-of-QALYs-gained) which is the upper bound on the amount-per-head that a provider should be prepared to spend on an intervention for it to be cost effective. This figure is in a similar ballpark to that obtained by Gillett (2011), but is somewhat more optimistic.

NICE wishes to acknowledge the work of the NHF, which provided the modelling without charge, and in particular, to Martin Brown (who undertook the modelling task) and Tim Marsh (who facilitated the task). The model remains the property of the NHF.

Project 2: Cochrane review of trials for preventing obesity in children

Waters et al (2011) conducted a meta-analysis of weight loss in trials among children. In the 0 to 5 year group, the BMI lost was estimated to be 0.26 points (95% CI was 0 to 0.53); for 6 to 12, it was 0.15 (0.08 to 0.23) and for 13 to 18, it was 0.09 (-0.03 to 0.20); overall it was 0.15 (0.09 to 0.21). Using Gillett table 23 (Table 1 above) would suggest that if the cost per person in the programme were £100, the average intervention would have a cost per QALY of over £20,000 for all three groups, and for the 13-18 group, of about £80,000 per QALY. However, at a cost of £10 per head, the cost per QALY would have been about £6000 for the 13-18 group ranging to cost saving for the 0-5 group. This indicates that interventions should probably not cost more than somewhere in the order of £50 per head for children of 12 or below, and of a somewhat smaller amount per head for children and young people from 13 to 18 years.

X Discussion

This report attempts to show that conventional ways of determining the cost effectiveness of partnership working are unlikely to succeed. However, there will be circumstances as given by scenarios 1 and 2 above where it will be blindingly obvious that some aspects of a partnership will be cost effective. In such cases, decision-makers should not need to be guided by sophisticated modelling approaches to cost effectiveness, but allow themselves to be guided by their prior beliefs if these are widely held and not contentious. Such an approach has its dangers, because people may be self-delusionary. If such an approach is considered, care should also be taken to ensure that decision-makers are as free from biases as possible, and in particular, from monetary conflicts of interest.

The approach also highlights that a partnership itself should not be regarded as a single ‘intervention,’ but as the vehicle that allows a number of ‘partnership interventions’ (such as deciding to share knowledge, personnel or resources) to be undertaken. Each potential intervention undertaken within a partnership should be considered separately and the following questions asked:

1. Does this partnership intervention save resources by (for example) the joint use of facilities or staff, for the same or very similar outcomes? If yes, it is estimated to be cost effective by definition.
2. Does this partnership intervention improve health outcomes (over and above the outcomes achieved by working separately) for the same total cost that would be paid by the two organisations working apart? If on the balance of probabilities, the answer is “yes”, then it is estimated to be cost effective, again by definition.
3. Is the partnership intervention likely to be beneficial for one collaborating organisation but not for the other? If so, would the overall gain be positive? If so, how might the gaining organisation be prepared to compensate the losing organisation so that they both gain? Can it be done by money transfer, by lending staff, by some unspecified future compensation or by the loser accepting the loss in terms of increasing the overall good?
4. If a partnership intervention does not satisfy 1 to 3 above, it might still be cost effective. In these circumstances, consider this test: “Would it be better to carry out this item of potential cooperation or for your organisation to go it alone?” If the answer is clear-cut, then it is likely that a Yes answer will correspond to a cost effective partnership intervention, but a No answer would signify the reverse. If the answer is not clear-cut, then the decision must be made by deliberation within and between organisations. It will not be known whether the partnership intervention will be cost effective or not, but the decision to carry out a partnership intervention should not err on the side of conservatism, but neither should the decision not to form such an intervention. It will generally not matter whether items of potential cooperation that cost very little and are likely to have relatively small benefits are done in partnership or not, because there is little to gain or lose either way, so the decision should be made simply by the agreement of the parties to cooperate (or not, as the case may be).

5 Ideally, the number of difficult decisions about cooperation should be few.
6 Records should be kept of decisions taken, together with any analysis and reasons for the decisions. The decisions should be reviewed for accuracy after the partnership has had time to mature.
7 This analysis may apply by extrapolation to synergistic situations where, for a given cost, organisations working together provide more health benefits than working independently.
8 This analysis is likely to be less useful in situations of great complexity, because the simple tests described above will be increasingly difficult to apply as complexity increases. Interactions between parts of the organisation or organisations may be overlooked or might not even be apparent.

On partnership working in general, this report echoes the conclusion drawn from the report on partnership working in public health by Hunter, Perkins et al (2011) that states “.... there is no clear evidence of the effects of public health partnerships on health outcomes.” However, we see that it may be possible to present ground rules which could correctly identify which items of potential cooperation were likely to be cost effective within a partnership and which were not. Note that with respect to the obesity topic, the decision to work within a partnership or not is largely separable from whether the obesity intervention itself is worthwhile carrying out. It is only when working within a partnership is so much cheaper than not doing so that it might swing a partnership-wide intervention from being non-cost effective to cost effective, or when a partnership adds so many costs above going alone that it swings the obesity intervention the other way.

On local projects to counter obesity, this report makes it clear that relatively small average weight losses may well still be cost effective if applied to a population of obese people, even at a moderately high cost per head. When applied to people who are not already obese, the interventions are less cost effective, but that is because some or many of the people that the interventions are directed towards will not become overweight or obese in the absence of an intervention. However, even here, it is likely that most interventions that give rise to only moderate success will still be quite cost effective if the cost per person is low or moderate.

In all of the modelling, the great unknown is the extent that weight lost is then regained, and if so, how quickly. Weight lost and almost immediately regained is far less likely to generate a cost effective outcome than if it is put back very slowly, or not put back at all. A further unknown is the extent of the difference between weight loss and not gaining weight in the first place.

XI Addendum: about return on investment

This addendum is directed towards the whole cost effectiveness pathway, not simply stage 1. Return on investment (ROI) is a means of informing commissioners of health care what the costs within the commissioning period are, and comparing them with cost savings (and in some cases, health benefits) that will accrue within that same time-period. The nature of public health interventions is such that few if any will yield acceptable returns in short time periods. In the case of obesity prevention, there will be few costs saved and few health benefits within the commissioning period. Most of the cost savings and the health benefits will come at the end of a person's life. Standard health economic analysis maximises population health in the long run, which implies that all the health benefits and cost savings in the long run will be recognised (although events occurring further and further into the future will still be cumulatively discounted).

In times of economic stringency, there is an increasing tendency for commissioners to justify their decisions by recourse to carrying out only those interventions with a high ROI over short time horizons. That will satisfy patients with clear, urgent needs for treatment, for whom instant cost savings, extensions to life and improvements in quality-of-life can offset costly treatment. However, using an ROI criterion, public health interventions will all, or very nearly all, be crowded out.

Ringfencing public health financing would remove long-term prevention projects from direct competition with acute care projects with short payback times. However, the success of ringfencing prevention projects will depend critically on the generosity of providing finance for such projects.

Within a ringfenced budget, it may be assumed that some obesity projects will be financed. (If this were not to occur, then there would be no point in discussing partnership working on non-existent projects.) It is likely that the decision about which parts of a project should be carried out as partnerships would be made after the project has been financed, so would become an independent decision. (That is, the question of the extent of partnership working is unlikely to determine whether the project should be funded.)

XII Evidence Statements

1 Where partnership working is recognised to be effective and is carried out at low incremental cost, or when partnership working is known to save costs (especially where resources are shared) then the establishment or continuation of a partnership can generally be regarded as cost effective. In other cases, establishing or maintaining a partnership cannot be judged to be cost effective or not-cost-effective because conventional cost effectiveness methods cannot be applied in such complex situations.

2 A simple model would suggest that it will generally be more cost effective to secure long-term funding rather than stop-start funding or short-term funding which is not secured for the longer term. Security of funding for obesity projects is therefore likely to be cost saving compared with the equivalent projects where longer-term funding is not secured from the outset.

3 If the cost effectiveness or otherwise of a particular partnership could be determined, this conclusion should not be generalised to any other partnership.

4 Rather than look at partnership working as a single intervention, it should be more productive to examine interventions that may occur either as part of a partnership or by the parties working alone. In cases where the intervention is cost saving and results in non-negative health benefits, or where it results in a health gain with no increase in costs, such interventions can be regarded as cost effective by definition.

5 Understanding the cost effectiveness of engagement can be complicated in the context of health behaviour interventions. Engagement can be important in terms of whether an intervention occurs or not, for example construction of a new cycle route where residents could object to planning consent, but it can also be important in terms of uptake of an intervention in the context of social ‘norms’, i.e. there is a difference between a community accepting the construction of a cycle route and a community accepting and taking up cycling as a viable form of transport.

The evidence base regarding the cost effectiveness of engagement is limited and is focussed primarily on examples of built environment construction interventions where the costs can be estimated against the cost of protracted planning disputes or failure to achieve planning consent. These do not take into account the potential costs associated with creation of a ‘white elephant’ type structure which is under-utilised or rejected by the community it was created for.

When the costs and benefits of an intervention have been estimated but the implementation of the intervention needs to be ratified by a local community, the cost effectiveness of community engagement in the ratification process can be assessed if decision-makers are prepared to estimate the subjective probabilities of acceptance of the intervention with and without the engagement.

Inherent in working with local communities and partnerships there is an element of engagement and this varies based on the level of the partnership working. If projects are considered in aggregate and if the benefits of engagement are large, by no means all engagement has to succeed for engagement in aggregate to be cost effective.

5 Despite large uncertainties about the extent to which weight loss programmes can maintain initial weight losses, and other uncertainties about the future many years hence, the economic analyses are optimistic about the cost effectiveness of weight reduction programmes. Interventions costing £10 or less per head to carry out will be cost effective for all except the tiniest weight losses (and of course will not be cost effective if there are weight gains on average compared with not carrying out the intervention). Programmes targeting the obese alone should be cost effective if their cost does not exceed £100 per head unless weight loss is tiny. Programmes targeting the general population and costing about £100 per head would appear to require a minimum average weight loss of about 1 kg or 0.3 BMI points to be cost effective, but programmes targeting the obese only can probably cost in the order of £500 to £1000 per head, provided the average weight loss is some 0.3 to 1 kg per head, and still remain cost effective. In other words, most weight loss programmes believed to be 'successful', especially those targeting the obese, will be cost effective.

XIII Members of the PDG Economic Subgroup

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