

POLICY SUMMARY 15

What do we know about the strengths and weakness of different policy mechanisms to influence health behaviour in the population?

David McDaid, Adam Oliver,
Sherry Merkur

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This policy summary is one of a new series to meet the needs of policy-makers and health system managers.

The aim is to develop key messages to support evidence-informed policy-making and the editors will continue to strengthen the series by working with authors to improve the consideration given to policy options and implementation.

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| Contents | Page |
|--------------------------------------------------------------------------------------------|------|
| Prelims | v |
| 1 Background | 1 |
| 2 Focus of the policy summary | 3 |
| 3 What factors influence why people do or do not change their behaviour? | 4 |
| 4 What mechanisms have been used to help influence health behaviours? | 7 |
| 5 What do we know about the effectiveness and cost effectiveness of these mechanisms? | 13 |
| 6 How can the evidence base, including different modes of implementation, be strengthened? | 23 |
| 7 Conclusions and summary of key themes | 27 |
| References | 29 |

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List of abbreviations

| | |
|------|----------------------------------------------------------------------------------------------------------------------|
| ACE | Assessing the Cost Effectiveness of prevention programmes |
| DALY | disability-adjusted life-year |
| EU | European Union |
| GDP | gross domestic product |
| GP | general practitioner |
| NICE | National Institute for Health and Care Excellence (previously National Institute for Health and Clinical Excellence) |
| UK | United Kingdom of Great Britain and Northern Ireland |
| USA | United States of America |
| US\$ | United States dollar |
| WWW | Walking for Wellbeing in the West |

List of figures and boxes

Figures

- Figure 1 Mechanisms used to influence health behaviours
- Figure 2 Example of a framework for action for behaviour change to promote physical activity

Boxes

- Box 1 Two approaches to influencing food-purchasing patterns of supermarket customers
- Box 2 Dissemination of information on traffic injuries in Norway
- Box 3 Assessing the economic case for scaling up a community pedometer walking programme in Scotland
- Box 4 Evaluation: using commitment contracts to encourage extended weight loss
- Box 5 Health-promoting children's television programme and subsequent food product branding in Iceland
- Box 6 Modelling the cost effectiveness of interventions to promote physical activity in Australia
- Box 7 Questions to consider when planning to implement an intervention for behaviour change
- Box 8 Example of issues to be considered in the design and implementation of a behaviour-change intervention: framing a commitment contract
- Box 9 The benefits of partnership working: the Change4Life campaign

Executive summary

Many health problems are potentially avoidable and governments have long had powerful tools at their disposal to influence population health and change individual behaviours, directed both 'upstream' at some of the underlying causes of poor health, as well as at 'downstream' challenges when poor health behaviours are already manifest. But how effective are these different actions? This policy summary briefly maps out what is known about some of the different potential mechanisms that can be used to influence behaviour change to promote better health, including some innovative approaches that are arising from disciplines such as behavioural economics and psychology.

There is a robust evidence base supporting the use of taxation to reduce consumption of harmful products such as alcohol and tobacco, but this approach has been used much less frequently to influence consumption of foods and sugary soft drinks, with mixed success. Legislation can also be a highly effective tool to influence health behaviours and it has often been most successful when preceded by other actions to raise awareness of the health impacts of a poor health behaviour, for example, not wearing a seatbelt. Other effective measures can include income-redistribution policies or measures to improve access to education and lifelong learning. Passive information and health-education campaigns may only have modest impacts on behaviour, but mass media campaigns can be targeted at whole populations at relatively low cost per head of the population, meaning that even modest levels of behaviour change may be cost effective.

Combinations of several of these interventions can be even more effective and often highly cost effective, but they will not work for everyone. Individuals do not always respond and may be resistant to changing their behaviours, even in the face of significant financial costs. For instance, many in society will be resistant to any change in entrenched behaviours; they may be more influenced by peer pressure and addiction. Many people also have difficulties in weighing up the gains in participating in an unhealthy activity today, such as smoking, with the increased risks to health in years to come. A poor appreciation of risk is one reason why some individuals are highly optimistic about their chances of avoiding any future harm to their health. There may also be social or environmental factors that make it hard to adopt healthier behaviours. Countering obesity may only require modest changes to physical activity and dietary habits, but these changes are still difficult for many people to adhere to, particularly for those living in an obesogenic environment with less-active jobs and easy access to high-energy-density foods and sugary drinks. These challenges have been used to argue for a greater focus on techniques developed using behavioural psychology and economics. Can our choices be influenced in subtle ways that ultimately help society achieve more of its health policy goals?

Behavioural economics seeks to explain why individuals may make decisions that do not conform to rational economic theories related, for instance, to risk and price. Policy interventions informed by behavioural economics can be ‘softer’ than stricter forms of policy, but they should be perceived as tools to *complement* regulation, by moving society incrementally in a direction that might benefit all, and only as a substitute for regulation when additional enforced measures are perceived by the public as an expression of government overstepping the mark.

To date, however, the evidence base for actions that take their cue from behavioural economics and psychology is weak. Commitment contracts, with or without financial incentives, have not had a long-term impact on health objectives such as weight loss. However, where the time frame for impact to be achieved is short, the chance of behaviour change is greater – for example, the benefit of providing incentives to encourage smoking cessation to women during pregnancy. Changes to the environment, to make healthy lifestyle choices more convenient, may have more long-term success, but no long-term evidence is available. Other behavioural interventions, for instance, changing default decisions such as having to opt out rather than opt in to organ donation, or reframing information with visual and other cues to address issues of cognitive bias, are also promising, with effective applications observed outside the health sector.

Behavioural economics is clearly not a universal panacea, but by using the insights from human psychology that are embedded in the approach, it appears possible to design interventions that – *in some circumstances* – are relatively well equipped to motivate people to behave in ways that are better for themselves, and for society at large. In the current financial climate, many potential policy proposals may also have the added advantage of being very low cost. It is, though, important to understand what mechanisms are acceptable to the public; they may object to the principle of rewarding individuals simply for doing the right thing, or be uncomfortable with the idea of automatic organ donation, preferring instead to rely on family consent. It is therefore important to build evaluation in to any implementation process, particularly given that actions may have more impact on some population groups than others; issues of equity also need to be considered.

Finally, it should be stressed that, while the science of behaviour change has been in development for some time, the actual application of theories and findings to public health policy is still developing. The key tools remain measures such as taxation, legislation and provision of health information. The evidence base on what works to influence behaviour, and in what context, is still in development, with many unanswered questions on how best to design new innovative interventions that can complement, and in some instances augment, these well-established mechanisms. Despite there being plenty of policy ideas informed by behavioural economics floating around, more ideas are needed in a health context, and far more evidence is required on their likely effectiveness and cost effectiveness.

Key messages

- Traditionally, public health policy has relied on a combination of tools, most frequently health-education and -information campaigns, taxation policies to influence decisions related to health behaviour, and legislation to prohibit unhealthy activities.
- While these approaches are effective and have led to many public health improvements, they are blunt instruments; individuals do not always respond to these tools and may even be resistant to changing their behaviours in the face of significant financial benefits. Rational persuasion can have relatively little impact on entrenched habits, particularly if they involve strong peer pressures or even addiction.
- In some cases, expansion in the use of strict approaches that limit choice, such as new legislation, can be unpopular with a public that may see some actions as an unnecessary encroachment into matters of personal choice.
- A better understanding of factors that influence behaviour change may help in designing public health strategies that reach segments of the population that have been impervious to existing public health strategies.
- There is a growing body of knowledge on mechanisms that directly seek to influence health behaviours, recognizing that individual choice and decision-making is influenced by many different factors. Many of these approaches have evolved out of research focused on behavioural economics and psychology.
- However, while a lot is known about long-standing public health actions, such as the role of taxation, legislation and health-information campaigns, the evidence base on what works to influence behaviour, and in what context, is still in development; there are many unanswered questions on how best to design new innovative interventions that can complement, and in some instances augment, well-established mechanisms. These mechanisms can also have both positive and negative unintended consequences.
- There is little evidence that behaviour-change interventions, for instance those using standard financial incentives for change, or those that use techniques such as commitment contracts, with or without financial incentives, have a long-term impact on objectives such as weight loss. Changes to the environment, to make healthy lifestyle choices more convenient, may have more long-term success, but again there is little long-term evidence available. The shorter the time frame for impact to be achieved, the greater the chance of behaviour change – for example, the benefits of smoking cessation during pregnancy. Other behavioural

interventions, for instance changing default decisions, such as having to opt out of organ donation, or reframing information with visual and other cues to address issues of cognitive bias, can also play a role, but information on their effectiveness is limited.

- Adopting a more positive approach to health-promotion messages, emphasizing the immediate enjoyment of a healthy lifestyle, is helpful.
- Examples of positive public–private-sector partnerships can be identified, especially where a business case for healthy living can be identified.
- Given the lack of robust evidence on mechanisms to influence change in health behaviour, it is important that, in planning implementation, an assessment of needs is undertaken and that planners are as specific as possible about the content, target group and provision of theories justifying the action.
- While some low-cost actions can be highlighted, it should be stressed that there is little robust information on the effectiveness, let alone the cost effectiveness, of innovative approaches to behaviour change. Therefore, careful evaluation, including analysis of costs, should be embedded into pilot phases of evaluation before scaling up interventions.

1 Background

1.1 The economic impacts of avoidable health problems

Around half of all illness is linked to choices people make in their everyday lives – whether that is the choice to smoke, drink excessively, eat too much or exercise too little. These patterns of behaviour may be ‘deeply embedded in people’s social and material circumstances, and their cultural context’ (National Institute for Health and Clinical Excellence [NICE], 2007). The health and economic impacts of major health problems that are, in part, avoidable are well known and there is overwhelming evidence that changing people’s health-related behaviour can have a major impact on some of the largest causes of mortality and morbidity and their costs to society (House of Lords Science and Technology Committee, 2011).

For instance, obesity is an eminently avoidable but nonetheless growing problem in Europe. Addressing obesity is a key goal of much public health policy. The condition has been linked with an increased risk of a wide range of conditions, including cardiovascular disease and diabetes. Overall in high-income countries, the total costs, including time lost from employment, of illness related to obesity, such as diabetes and cardiovascular diseases, have been estimated to be more than 1% of gross domestic product (GDP) (Sassi, 2010). Costs to health-care systems can be substantial: between 1.5% and 4.6% of total health-care expenditure in France (Emery et al., 2007), 4.6% in the United Kingdom of Great Britain and Northern Ireland (UK) (Allender & Rayner, 2007) and 1.9% in Sweden (Odegaard et al., 2008). Cardiovascular diseases were estimated to cost more than €168 billion annually in the 25 countries of the European Union in 2005 (EU-25), with more than 60% of the impact falling on health-care systems (Leal et al., 2006). Obesity is also associated with increased risk of cancer. Around 6.5% of all health-care costs in Europe are focused on cancer, which in 2002 was estimated to have an impact on the EU-25 countries of €54 billion (Stark, 2006).

Public health policies have also long focused on smoking. It is the greatest cause of premature death in Europe, where it claims over one and a quarter million lives prematurely every year. It has been estimated that, each year, tobacco costs the world economy some US\$ (United States dollars) 500 billion in lost productivity, health-care costs, deforestation, pesticide/fertiliser contamination, fire damage, cleaning costs and discarded litter; smoking has been estimated to reduce individual national income by as much as 3.6% (Shafey et al., 2009); and smoking-related conditions were estimated to cost the UK National Health Service (NHS) £5.2 billion in 2005, equal to 5.5% of UK health-care costs (Allender et al., 2009). Individual smokers and their families pay heavily in terms of direct costs, reduced income from smoking diseases and loss of income for

other urgent family needs. The private mortality costs of smoking in terms of value of life, were estimated to be US\$ 222 for each packet of cigarettes for men and US\$ 94 for women (Viscusi & Hersch, 2008). The overall annual costs of chronic obstructive pulmonary disease, much of which is linked to smoking, have also been estimated in Europe to be €38.7 billion (European Respiratory Society and European Lung Foundation, 2003).

Much public health policy has also focused on the avoidance of the harmful use of alcohol. Alcohol is associated with more than 60 different health problems (Rehm et al., 2010). Even taking account of alcohol's preventive effects, it has been estimated to cause 115 000 deaths each year in the EU alone, at a cost of €125 billion. This includes substantial costs due to lost employment, violence and crime (Anderson & Baumberg, 2006). It is also a major cause of health inequalities: 25% of the differences in middle-aged life expectancy between eastern and western Europe may be due to alcohol (Zatonski, 2008).

Another area of concern, avoidable injuries due to poor behaviour, as for instance in the road environment, is also associated with substantial economic costs. In 2004, the estimated annual costs, both direct and indirect, of traffic injury in the EU-15 countries exceeded €180 billion, with some countries incurring costs of up to 3% of GDP. Traffic injuries are the leading cause of hospitalization and death for people who are younger than 50 years in the EU, costing €180 billion annually (Racioppi et al., 2004). In the Russian Federation, the annual cost of road injuries is estimated to be US\$ 34.3 billion, with a cost per fatality of more than US\$ 1.1 million (Marquez et al., 2009).

1.2 Public health policy and behaviour change

Mindful of these and many other major social and economic impacts of poor health, policy-makers are continually looking for cost-effective ways in which to protect and improve population health. This concern for health is shared by the public at large. It is rare that a day goes by without media attention being given to the latest health scare or the latest way in which we can promote our health.

There is an increasing evidence base on the effectiveness of interventions to protect health and prevent disease, but a key challenge remains increasing the uptake of healthy lifestyles and behaviours; governments want to know how they can best use public funds and harness the power and goodwill of other stakeholders to help facilitate individuals to make different choices. Yet, changing behaviours can be difficult; few individuals are unaware of the harms associated with smoking or drinking, but they gain pleasure from these activities and there may be social or environmental factors that make it hard to adopt healthier behaviours. Countering obesity may only require modest changes to physical activity and dietary habits, but these are still difficult for many people to adhere to, particularly when they live in an obesogenic

environment with less-active jobs and easy access to high-energy-density foods and sugary drinks.

Governments have many different policy levers that are potentially of use in helping to influence health behaviours. They may positively influence health behaviours and/or reduce engagement in unhealthy behaviours or activities. Measures range from so-called 'upstream' actions, often outside of health-care systems, that focus on the underlying social determinants of health, such as poor education, poverty, inequalities and social deprivation, to downstream measures that address public health issues that have already begun to arise. All have their place within any health-promotion strategy.

Governments may target actions at the population as a whole or at specific population subgroups, such as individuals, households and communities, with the aim of reducing health inequalities and promoting health for all. These actions may be delivered in many different sectors, with a wide range of costs and benefits. For instance, there is a growing interest in early intervention for children and new parents, in order to promote positive mental and physical well-being and reduce the chances of long-term socioeconomic and health impacts. These actions will not be confined to health systems; many are likely to be funded and implemented across different tiers and sectors of government, such as the education sector. Delivery is also not confined to the state. Actions to promote health can be delivered by a range of non-state actors, such as nongovernmental organizations, as well as faith groups and the private sector.

2 Focus of the policy summary

This policy summary briefly maps out what is known about different potential mechanisms to influence behaviour change to promote better health. It draws on information from existing systematic reviews of relevant interventions and approaches, as well as a targeted review for recent innovation in the field. It looks at factors that influence behaviour change and places them in the context of an overall framework for the promotion of health, which distinguishes between interventions based on their target audience, mode of action, advantages and disadvantages, and ability to induce longer-term behaviour change. Almost no health-promotion efforts can be achieved using just one of the mechanisms alone; the policy summary also highlights how combinations of different mechanisms can be used to achieve different public health goals and looks at what is known about their cost effectiveness.

In particular, the review focuses in more depth on some more innovative approaches that are arising from disciplines such as behavioural economics and psychology. This should not be inferred to mean that these approaches

are more appropriate or cost effective than others, but rather that they have received less attention in the development of public health policy. Approaches such as the use of differing types of financial incentives, and different ways of framing and communicating messages or altering the environment in which we all live, may be complements, or in some cases substitutes, to elements of public health strategies. The review draws on examples of practice from across many areas of health promotion, including issues of physical activity, diet, smoking, alcohol consumption, mental well-being and injury prevention. These behaviours have an important role for the burden of noncommunicable disease and injury, but the list of examples and areas of focus presented should not be considered to be exhaustive.

3 What factors influence why people do or do not change their behaviour?

What factors influence why people do or do not change their behaviour? Behavioural economists and psychologists have sought to address this question.

It is clear that individuals do not always respond easily to traditional health-information campaigns and may even be resistant to changing their behaviours in the face of significant financial benefits. Rational persuasion can have relatively little impact on entrenched habits, particularly if they involve strong peer pressures or even addiction. A better understanding of factors that influence behaviour change may help in designing public health strategies that reach segments of the population that have been impervious to initiatives such as health-promotion information campaigns, or tools such as taxation.

In particular, it is currently in vogue to look at how behavioural economic findings can inform understanding and influence policy design. The award of the Nobel Prize for Economics to Daniel Kahneman significantly raised the profile of behavioural economics, and Richard Thaler and Cass Sunstein's book, *Nudge*, has been much admired in some policy circles (Thaler & Sunstein, 2008). For instance in the UK, the current coalition government established a Behavioural Insights Team in the Cabinet Office, with Thaler serving as an official adviser. This unit sought to look at what people actually do in practice rather than what they should do in theory. Meanwhile, Sunstein has served as US President Obama's regulation 'Tsar'. The essence of the nudge approach is that behavioural economic insights can be used to change the 'choice architecture' (i.e. the environment), so that people are more likely to make voluntary decisions that, on reflection, they would like to make, and yet ordinarily fail to do so.

Owing to its potential to guide people towards making 'better' decisions, behavioural economics has been perceived in some policy circles as being

a potential alternative to stricter forms of regulation, such as taxes and bans. It is, however, a misconception to believe that behavioural economists oppose stricter forms of regulation – few, if any behavioural economists would argue that voluntary behavioural interventions and nudges should replace, for example, compulsory seatbelt legislation, drink–drive laws, food-safety legislation and taxation on certain harmful products.

Policy interventions informed by behavioural economics can be ‘softer’ than stricter forms of policy, but they should be perceived as tools to *complement* regulation, by moving society incrementally in a direction that might benefit all of us, and only as a substitute for regulation when additional enforced measures are perceived by the public as an expression of a government overstepping the mark. In some circumstances, however, behavioural economics would arguably imply that harder forms of regulation are warranted. For instance, referring to a different sector and the financial crisis, it has been suggested that any behavioural economist would contend that most individuals are not the best judges of the optimal amount that they ought to borrow and thus that there is a need for tight regulation of mortgage markets (Ariely, 2009).

3.1 What is behavioural economics?

So, what is behavioural economics? It arose out of critiques of neoclassical economics, which has dominated economic thought over the last century. Neoclassical economics assumes that people are the best judges of their own ‘utility’ (or happiness), and that they will seek to maximize the happiness they gain from the choices that they make – that is to say, they are ‘optimizers’. Moreover, it is assumed that their preferences are fixed and stable over time.

Since the 1950s, these principles have been questioned. From the 1960s, through work by Paul Slovic, Daniel Kahneman and Amos Tversky (among many others), it became apparent that people’s preferences are often not ‘fixed and stable’, but rather that they are regularly constructed in response to how choice contexts are ‘framed’, and are influenced by the manner in which preferences are elicited. The finding that preferences depend on, and are influenced in systematic ways by, how choice contexts are described, is central to the ‘nudge’ agenda.

Behavioural economics thus recognizes the limits of human rationality, with ‘rationality’ being defined by the mainstream economic sense of the word, and comprises a number of observations on human decision-making that do not fit well with neoclassical economic theory (Dolan et al., 2010). These include:

- the observation that losses loom substantially larger than gains – for instance, if one were to lose £20, the magnitude of the hurt felt would

be far greater than that of the pleasure of winning £20 – a phenomenon known as loss aversion;

- that reference points matter, such that people often care more about what they gain or lose around what they already have, rather than what they end up with;
- that people tend to overweight small probabilities – which is a partial explanation for why individuals buy lottery tickets, while at the same time purchasing appliance insurance that is usually expensive and poor value;
- that people allocate their money to discrete bundles, so that the value they attach to a particular amount of money will be contextual – for example, an individual might think £5 is a lot if he or she observes a £5 difference in the price of cinema tickets, but not if he or she observes a £5 difference between dealers in the price of a particular model of car;
- the observation of motivational crowding, such that offering money to people to do something may actually ‘crowd-out’ their intrinsic, altruistic motivation to do that very thing;
- ‘hyperbolic discounting’, which is the observation that people tend to place an enormous weight on the ‘immediate’ compared to the future, living for today at the expense of tomorrow (e.g. eating too much junk food, smoking) and overlooking the future consequences of their actions.

In addition to the above-stated observations, individuals often seemingly adopt a number of mental short cuts (rules of thumb or ‘heuristics’) when reaching their decisions, and apparently ‘satisfice’ rather than ‘optimize’, which goes against the grain of mainstream economics. These observations can include:

- *the availability heuristic*, in which people tend to assess the probability of an event by the ease with which similar instances can be brought to mind (e.g. many people erroneously think that the annual death rate from shark attacks is greater than that caused by falling coconuts);
- *the anchoring heuristic*, in which individuals often unconsciously focus upon, and can be manipulated by, entirely irrelevant cues when making decisions (e.g. the reason why salespeople use high initial prices in negotiations);
- *the overconfidence bias*: for example, most people think their driving ability is better than average, which has obvious implications for road traffic safety;
- *the influence of context*: for example, individuals giving up drinking may need tailored support to help them think through how to deal with difficult situations (e.g. social occasions, where they are used to drinking);

- *the influence of identity*: if heavy drinking is linked to a macho culture as part of an individual's social identity, he or she may need a powerful alternative identity to replace it if behaviour change is to be realized;
- *the influence of networks*: the old adage of 'who you know shapes how you behave' has been shown to apply in respect of obesity; at the same time, peer-support groups such as Weight Watcher clubs may help to facilitate behaviour change.

Behavioural economists have thus uncovered a library of systematic preference patterns and heuristics that cannot be explained by standard economic theory. Importantly, as will be emphasized throughout this policy summary, what works with one group will not always work with another. Segmentation and targeting are all important. Methods for changing behaviour need to be aligned with cultures, cognitive styles, social contexts, etc. In relation to alcohol, for example, some groups may be most influenced by messages about long-term harm, while others may be more influenced by self-image and the perceptions of others. Changing the environment in which people live and work is often the most powerful way of influencing their behaviour. For example, where the social norm is to smoke, it is harder to be a non-smoker. Banning smoking in workplaces and other public places has had an impact on changing this culture across all settings.

4 What mechanisms have been used to help influence health behaviours?

We now consider the different mechanisms that are available to policy-makers to help influence health behaviour. These can be considered in different ways, for instance in terms of their level of compulsion and intensity, ranging from the passive provision of information at one end of the continuum to strict enforcement of prohibition on activities, products and services at the other (see Figure 1).

It is important to recognize that a strategy to influence health behaviours may involve a number of different actions, as for instance illustrated in the framework of actions to encourage more physical activity in Figure 2. From this figure, it is clear that the focus of actions to date has been on issues related to the availability of services, provision of information, mandatory participation in school sports and provision of single-sex exercise classes. Much less attention has been placed on making use of behavioural economics and psychological tools that can influence internal and social factors that impact on behaviour (Prendergast et al., 2008).

Figure 1: Mechanisms used to influence health behaviours

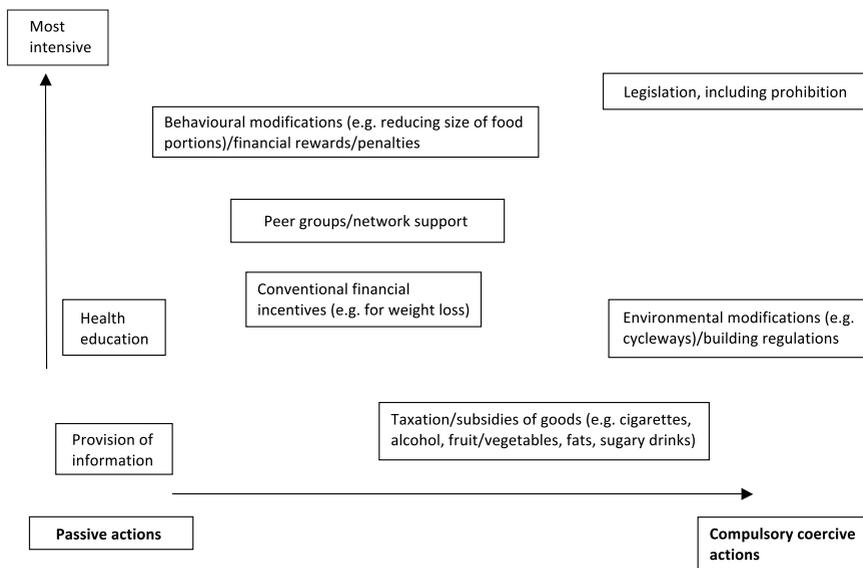
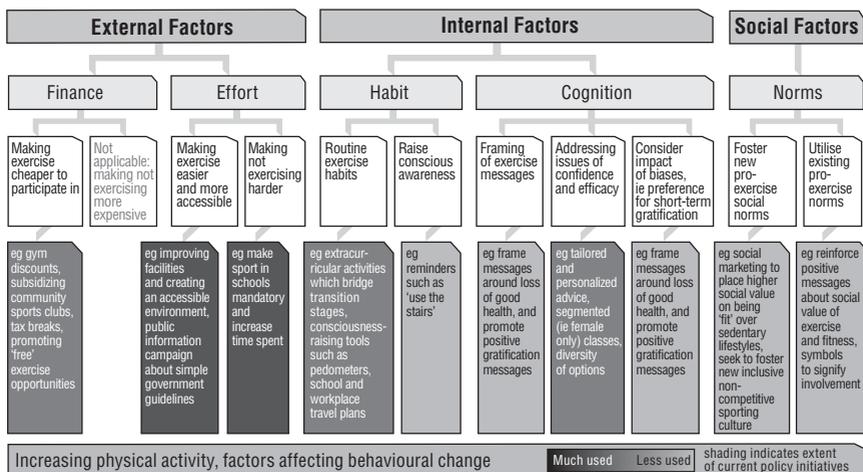


Figure 2: Example of a framework for action for behaviour change to promote physical activity



Source: Prendergast et al., 2008.

The most passive and least intensive of options is the simple distribution of information, perhaps through the mass media or through more targeted means, such as in primary care physician practices. Improving health literacy through health education is a more intensive approach that can help communicate issues such as how to interpret risk. This could be combined with provision of information on the health consequences of some actions, which can include visual prompts at the time that decisions are being made. This may, for instance, include voluntary industry agreements or legislative requirements on the provision of information on the calorie, fat, sugar and salt content of foods in restaurants. In March 2011, the UK Government announced that many restaurants and fast food outlets had agreed to include calorie counts on their menus, and some pubs would display alcohol units on beer mats and glasses.

Another approach is to make use of one-to-one or group-based learning and support. This may often be delivered by health-care professionals, as well as by peer groups. People often like to have an external pressure or commitment – challenging but sympathetic – to help them to do the things they want to do anyway. For other individuals, however, being part of a mutually reinforcing group may be the key to behaviour change – the peer-to-peer elements of Weight Watchers and Alcoholics Anonymous are clearly key components of those approaches. Mechanisms can also be used to help routinize health-promoting behaviours, such as the use of pedometers for walking, or food diaries to monitor food consumption.

Many actions can help improve access to healthier choices, without preventing individuals engaging in unhealthy activities. This approach can again draw on what is known from psychology – that individuals will generally make do with the portion size on their plates; therefore, reducing the size of the portion (or indeed the plate) may help to reduce calorie intake. Other measures might involve reducing the size of chocolate bars, which does not limit the ability of a person to buy further bars if they so wish. In the same way, ‘all that you can eat’ buffet-style restaurants and happy hour bars are likely to encourage an individual to consume more calories than they would normally. Legislative/regulatory change may be required to reduce access to these types of products, particularly if they have commercial benefits to business.

Measures to change the physical environment in which people live can also be used to influence their behaviour; examples are the provision of dedicated green spaces or cycle lanes to encourage cycling; installation of traffic-calming measures in residential areas to change driver behaviour; and building regulations intended to reduce noise pollution between properties. Measures might also be taken to address automatic behaviour responses (Marteau, Hollands & Fletcher, 2012); for instance, the way in which products are displayed at the point of sale could be varied – for example, not having

cigarettes on view at checkout counters, or having healthy foods near these checkouts. In the same way, access to salads in self-service restaurants could be made easier, while less healthy foods might require a bit more effort to reach.

Financial measures have long been used as part of public health policies. Many have assumed that, in line with conventional economic theory, increasing/decreasing costs associated with unhealthy/healthy activities will have an impact on demand and consumption patterns. Behavioural economic aspects have not been explicitly considered in their design. Traditionally, these measures have taken the form of specific taxes on the consumption of some goods such as cigarettes or alcohol. To a lesser extent, taxation has also been used to tax unhealthy foods such as fats or sugary drinks, although several European governments have introduced 'fat taxes', but not always successfully (as was the case in Denmark (Snowdon, 2013)). Subsidies for healthy products can also be used. These may be targeted at either the consumer or perhaps the supplier (this may also counter any incentives that the food industry receives to display certain products in prominent locations). In addition to taxation, other financial incentives may be targeted at specific individuals, for instance through the provision of vouchers to reduce the costs of gym membership, or regulations around the pricing of products. These again assume that individuals operate as rational individuals in responding to price signals.

Actions informed by behavioural economics can also make use of material or financial incentives to reinforce behaviour change, and examples can be seen in respect of smoking-cessation or weight-loss programmes. In psychology, approaches that get individuals to make a formal commitment to behaviour change have been shown to have impact. Such commitment contracts are sometimes combined with financial incentives. Funds may be earned or losses averted, depending on progress in achieving health-promotion goals. Such measures can also be used to increase participation rates in health-promoting activities, such as going to the gym.

A wide range of examples of potential mechanisms drawing on behavioural economics and using financial incentives have been cited in the work of the UK Government's Behavioural Insights Team (Behavioural Insights Team, 2010). This team has, for example, piloted an intervention that appeals to loss aversion in relation to smoking cessation. The intervention offers the opportunity to those who wish to quit smoking to sign a voluntary contract where they lose rewards if they fail a regular urine- or blood-based smoking test. However, as indicated in Section 5.5, with rare exceptions, offering people rewards if they quit smoking has been shown to be ineffective in any sustained sense; it therefore remains to be seen whether 'commitment contracts' demonstrate more success, owing to the loss-aversion phenomenon.

In addition to loss aversion, another approach influenced by behavioural economics is the use of 'prompted choice'. In the UK as a whole, people have traditionally had to opt in to be an organ donor, which had led to a donor rate of roughly 20%. A system of presumed consent will, however, be introduced in Wales from December 2015. In several other countries, such as Austria, France, Portugal and Spain, people have to actively choose not to be a donor. That is to say, they are required to opt out. As a consequence, in those countries at least 80% of the adult population are listed as potential donors.

The report of the Behavioural Insight Team (2010) also pays quite a lot of implicit attention to hyperbolic discounting, in that it offers a number of proposals that are intended to make activities that may be perceived as unpleasant (e.g. exercising, eating vegetables) more enjoyable to undertake. The team also proposes a range of initiatives that it claims are informed by behavioural economics, intended to increase rates of exercise, healthy eating and medical self-monitoring. For instance, financial and non-financial incentives, presumably modified to have the greatest expected effect (e.g. through the use of deposit contracts as discussed earlier for smoking cessation, or by using lottery payment mechanisms, whereby people may 'anchor' on the amount to be won rather than the probability of winning, or by simply making the incentive 'fun'), have been proposed.

Some of these measures draw on behavioural psychology; this approach can also be used in other ways, such as the positioning of fresh fruit near checkout counters in supermarkets or inducements to engage in physical activity, for example, the often-cited example of 'piano stairs', based on a one-day experiment in Stockholm where music was made as individuals walked up the stairs, increasing the use of the stairs (Volkswagen, 2009).

Visual prompts can also be used to encourage behaviour change. These prompts sometimes potentially serve to alter the reference point or anchor that people attach to 'good' behaviour (by increasing the salience of relevant information, resonating with the successful but simple 'five a day' fruit and vegetable campaign). On average, this campaign lifted consumption of fruit and vegetables by 0.3 portions per day between 2002 and 2006 (Capacci & Mazzocchi, 2011).

The labelling of products in supermarkets as being healthy also has an impact on purchases – this can also be a good business move if demand is favourably influenced (see Box 1). A recent trial in the UK also concluded that numerical and visual information on the short-term benefits of quitting smoking can help increase the use of smoking-cessation interventions (Vogt & Marteau, 2012).

Further psychological initiatives include modifications to supermarket trolleys to designate a part of the trolley that the consumer might reserve for fruit and

vegetables, in response to a pilot project in New Mexico in the United States of America (USA) (see Box 1) that showed that this prompted consumers to double their purchases (if not necessarily their eating) of these items (Taylor, 2010). Interestingly, behavioural psychology was also originally used in the 1930s to persuade individuals to make use of shopping trolleys – with decoy customers with heavily loaded trolleys being visibly placed in shops.

Box 1: Two approaches to influencing food-purchasing patterns of supermarket customers

A team led by Collin Payne of New Mexico State University, USA, stretched some yellow tape across the middle of a shopping cart, with a sign telling shoppers to put fruit and vegetables in one half and their other groceries in the other. There was a 102% increase in sales of fruits and vegetables, without any decrease in supermarket profitability (Taylor, 2010).

In the UK, a system of food labelling, with green products being the healthiest and red the least healthy, appears to have had some impact on consumer behaviour. Giving evidence to a Parliamentary Committee on behaviour change, the then chief executive of a major supermarket chain (Sainsbury's), Justin King, stated that '... on the introduction of Multiple Traffic Light labelling, against a comparable 12 week period during which fresh ready meal sales grew 26.2%, sales of Be Good To Yourself Easy Steam Salmon and Tarragon (mostly green traffic lights) grew 46.1%, whereas sales of our Taste the Difference Moussaka (mostly reds) decreased by 24%' (House of Lords Science and Technology Committee, 2011).

Legislation and regulation, if applied in conjunction with other interventions such as education and information campaigns, has been effective in influencing health behaviours in all settings (NICE, 2007), for example, through restrictions on access to some products, such as drugs and other substances.

In many countries, there are specific health and safety laws to reduce the chances of injury in settings such as the home, school and workplace. Another area where legislation plays an important role is in injury prevention, for instance through mandatory wearing of seat belts in cars, wearing of helmets by motorcyclists and restrictions on access to firearms. However, legislation is not always necessary for habitual change to promote safety on the roads – even without legislation, many countries have observed significant increases in the use of helmets by bicyclists. Moreover, enforcement measures will often be needed to ensure that laws are complied with. There tends to be more public support for actions to protect children rather than adults, for example, in terms of banning smoking in cars when there are children present, as evidenced by legislation passed by the UK Parliament in 2014.

5 What do we know about the effectiveness and cost effectiveness of these mechanisms?

Knowing what the key findings are on traditional interventions and those relying on observations from behavioural economics and psychology may help in the design of interventions that influence people in positive ways in many different areas, including public health policy. This section highlights what is known about the effectiveness of these different measures to promote behaviour change in different contexts and settings. Where information on such measures is available, it also highlights what is known about their cost effectiveness.

It remains the case that the evidence base on effective strategies to change health-related behaviours is limited. Traditional approaches to behaviour change appear to have been most effective when the behaviour change in question has been relatively modest in nature, for example, the increased use of seat belts in cars (Mulgan, 2010). What is also clear is that, while behavioural economic insights are informing policy in some contexts, for example, in England, UK, there remains little information on the effectiveness of the approach, let alone its cost effectiveness.

5.1 Information and health education

The evidence on the impact of media campaigns is mixed and highly context specific. Generally, passive information and health-education programmes, while invoking cognitive and emotional responses and being necessary for behaviour change, may only have a relatively modest impact on behaviour change on their own. However, given that some mass media campaigns can be targeted at whole populations at relatively low cost per head of the population, even modest levels of change may be cost effective. They are more likely to have an impact when behaviour change is a time-limited event, for example, the need for vaccination. However, long-term change to habitual behaviour, such as is needed for a healthy diet or greater levels of physical activity, is difficult to realize, particularly given the pervasiveness of advertising and marketing of unhealthy products in society.

Mass media campaigns can also sometimes be hindered by poorly designed messages and lower exposure of the audience to the message, in an increasingly fragmented media environment. Individuals may have difficulty in understanding risks or statistics in messages; the way in which information is packaged and the way in which relative risk is communicated is important.

Campaigns may also address health behaviours that audiences do not have the resources to change. Thus, they need to be combined with other strategies: a number of studies of campaigns focused on increasing consumption of fruit,

vegetables and low-fat milk have proved successful, especially when measures were taken to ensure that the target population was also able to access healthy foods (Wakefield, Loken & Hornik, 2010). These issues are context specific; in countries where healthy dietary patterns are more widely embedded in culture, such as Italy, mass media exposure on the virtues of the Mediterranean diet has been significantly associated with greater adherence to this diet (Bonaccio et al., 2012).

A number of studies on evidence of the impact of media campaigns have focused on tobacco use. For instance, there is some evidence from a Cochrane review of 11 studies to suggest that mass media campaigns, including television and radio broadcasts, may have some impact on the smoking behaviours of adults, as part of comprehensive tobacco control programmes (Bala, Strzeszynski & Cahill, 2008). They are unlikely to be effective in individuals who are at high risk of daily exposure to smoking, without the use of other approaches, such as bans at work and in public bars (Gagne, 2007). The intensity and duration of mass media campaigns may also influence their effectiveness, but this is difficult to quantify. There is also weak evidence to support the use of mass media campaigns to prevent the uptake of smoking in young people (Brinn et al., 2010). Tobacco industry campaigns encouraging young people not to smoke could have the opposite effect if they conveyed the message that smoking as an activity for adults only was a 'forbidden fruit' (Wakefield, Loken & Hornik, 2010).

One review of the effectiveness of media campaigns on behaviours found little evidence of their effect on alcohol use, other than significant impact on drink-driving, where the law was enforced. It further found that individual motivation also influences the success of campaigns, as in the case of campaigns on physical activity (Wakefield, Loken & Hornik, 2010).

Mass media campaigns can potentially be a low-cost way of reaching a wide population, as in the case of influencing the consumption of skimmed milk (Wootan et al., 2005), but their cost effectiveness is often assessed within the context of other interventions. Targeted information campaigns can also play a cost-effective role; one example of this has been the use of information on road traffic accident black spots in the Norwegian community of Harstad (see Box 2) (Ytterstad, 2003). The provision of low-cost information on support services at suicide black spots, such as bridges, has also been associated with a reduction in completed suicides.

Box 2: Dissemination of information on traffic injuries in Norway (Ytterstad, 2003)

Aims: pursued as part of a broader public-health goal to reduce road traffic accident rates among children, the programme sought to increase awareness of the risk of traffic accidents in children and families and to influence the adoption of safer behaviours.

Methods: reports containing information about traffic injuries were distributed quarterly to all households in Harstad. The information focused on victim stories, medical statistics and data on the location of the accidents. Dissemination of the relevant information was targeted specifically to a local community, with 'personalized' messages about the effects of traffic injuries and precise locations.

Results: 56% of respondents reported having acquired information or good advice about traffic safety from the reports. From the first 2 years to the last 2 years of the 10-year programme, there was a significant (59%) reduction in traffic injury rates among children in Harstad. Overall rates for all ages decreased by 37%. The intervention suggests that combining general educational material with tailored messages can bring about sufficient awareness to effect a change in behaviour.

5.2 One-to-one counselling and peer-group support

There is some very limited evidence for peer-group support programmes for dietary behaviours and weight loss. In a review of commercial weight-loss programmes in the USA, one trial of a Weight Watchers programme was associated with a 3.2% decrease in weight after 2 years (Tsai & Wadden, 2005). More recently, a study in Australia modelled the potential cost effectiveness of two weight-loss programmes that included face-to-face group counselling sessions. Cost-effectiveness ratios were not favourable, at a cost of 130 000 to 140 000 Australian dollars per disability-adjusted life-year (DALY) averted (Cobiac, Vos & Veerman, 2010). A major review on the use of lifestyle advisers and health trainers only provides limited support for their effectiveness; the programmes were not found to be cost effective in respect of physical activity and dietary behaviour change (Carr et al., 2011).

5.3 Routinizing of behaviours

There is some limited evidence emerging on the potential cost effectiveness of walking programmes that make use of pedometers to help routinize behaviour and ensure targets are met. One economic modelling study (Shaw et al., 2011), drawing on data from the Walking for Wellbeing in the West (WWW) controlled trial in Glasgow, Scotland, UK (Fitzsimons et al., 2008), suggests that there is an economic case for scaling up this intervention more widely. This approach also highlights some of the issues that need to be taken into account in the evaluation of such programmes (see Box 3).

Box 3: Assessing the economic case for scaling up a community pedometer walking programme in Scotland (Shaw et al., 2011)

An economic analysis of the Walking for Wellbeing in the West (WWW) study assessed the costs of the interventions (minimal and maximal) and combined these with effects to present incremental cost-effectiveness ratios (cost per person achieving the target of an additional 15 000 steps/week). A qualitative evaluation, involving focus group discussions with WWW participants and short interviews with members of the WWW research team, explored perceived benefits and barriers associated with walking, as well as the successful aspects and challenges associated with the interventions.

Incremental cost effectiveness was estimated as £92 and £591 per person achieving the target for the minimal and maximal interventions respectively. Qualitative evaluation gave insight into the process by which the results were achieved, and identified several barriers and facilitators that would need to be addressed before implementing the interventions in the wider community, in order to ensure their effective transfer. These included assessing the impact of the relationship between researchers and participants on the results, and the motivational importance of monitoring and assessing performance.

It was concluded that pedometer-based walking interventions may be considered cost effective and suitable for implementation within the wider community. However, several research gaps remain, including the importance and impact of the researcher/participant relationship, the impact of assessment on motivation and effectiveness, and the longer-term impact on physical and mental health, resource utilization and quality of life.

5.4 Legislation and regulation

Legislation can be a highly effective tool, but it is unlikely to have much impact if imposed out of the blue, and may be viewed with resentment by the general public. It has been most successful when preceded by other actions to raise awareness of the health impacts of actions and to try and make modifications to the socioeconomic environment. Smoking provides an interesting example of this: as the evidence of harm has been accepted by the public, government intervention has grown from simple provision of information to, first, the provision of a wide range of support to stop smoking (helped by the development of new medicines and other aids) and then, more recently, the introduction of bans on smoking in enclosed public spaces. Despite its intrusive nature, public support for these bans remains quite strong, in part because the public has been convinced of the harm to others as a result of passive smoking, in part because some smokers themselves felt that it would help them to quit, but also simply because many non-smokers find the smoky atmosphere that used to prevail in pubs and some restaurants to be unpleasant. This suggests that building support for interventions at the more intrusive end of the spectrum

not only takes time, but may also depend on building coalitions of people with different perspectives.

There is good evidence suggesting that bans on smoking at work and in public places are effective (Shields, 2007; Callinan et al., 2010), although the form that they take and the level of enforcement can make a difference (Naiman, Glazier & Moinuddin, 2011). Evidence from Austria and Finland indicates that partial bans in premises such as bars and restaurants that seek to separate smoking from non-smoking areas seem to have little impact; there also appears to be less imperative on the part of these organizations to prevent smoke leaking into smoke-free areas (Johnsson et al., 2006; Reichmann & Sommersguter-Reichmann, 2012).

Legislation may also be necessary to limit exposure of children to the advertising of unhealthy products. In some circumstances, industry self-regulation may be possible, but experience from Australia indicates that this had no impact on advertising of fast food to children (Hebden et al., 2011).

Another example of an intervention that lies at the intrusive end of the spectrum is Singapore's approach to tackling childhood obesity. This involves compulsory exercise for overweight children, as well as careful monitoring of their diet – both of which involve some explicit segregation from others at school. While this has successfully reduced rates of obesity in children from 14% to 9% (at a time when obesity has been rising in neighbouring countries), it has been argued that this has come at the price of stigmatizing overweight children (which may have been a prime influence in getting them to lose weight), and a growth in psychological problems, including eating disorders (Mulgan, 2010).

5.5 Fiscal measures and financial incentives

There is a robust evidence base supporting the use of taxation to reduce consumption of harmful products such as alcohol and tobacco, and this issue is not focused on in this report. Taxes have been used much more infrequently to influence consumption of foods, so the evidence base here is more limited, although countries such as Hungary have recently introduced taxes on some unhealthy foods, where it remains to be seen what impact this will have. One tax on fat introduced in Denmark in October 2011 was abandoned 15 months later, after an effective campaign by industry for its repeal (Snowdon, 2013). The evidence that exists on the role of taxes for foods is complex – one review reported a wide variety of outcomes, with some statistically significant findings in the opposite direction to that expected (Hawkes, 2012). It is clear that when it comes to altering the price of food, the impact of price will sometimes be mediated by other factors that influence food choice, such as the cultural acceptance of alternative products (Hawkes, 2012).

It should, though, be noted that the effectiveness of taxation can be dependent on enforcement of customs barriers and actions to prevent the development of a black market. Minimum pricing per unit of alcohol is now being considered in some jurisdictions; in the case of the island of Ireland, which includes the Republic of Ireland and Northern Ireland (UK), an all-island approach to harmonize minimum pricing is planned, in order to avoid the potential for cross-border gaming of the taxation system. While taxes do have an impact, as in the case of smoking, not all population groups will change their behaviour in response to price signals alone. Other mechanisms to influence behaviours are required.

The evidence base on the use of financial incentives to influence behaviour is weak. As well as being unpopular in some surveys of the public (who tend to argue that these incentives sometimes unfairly reward people for 'bad' behaviours) (Lynagh, Sanson-Fisher & Bonevski, 2013), most studies suggest that their impacts are short term in nature only, as for instance in the case of schemes to tackle obesity (Paul-Ebhohimhen & Avenell, 2008). This may be due to the way in which incentives are offered and the time period in which they are paid, as well as specific contextual factors (Lynagh, Sanson-Fisher & Bonevski, 2011; Jeffery, 2012; Oliver & Brown, 2012). There is also, potentially, a risk of gaming associated with the use of financial incentives – providing individuals with an incentive to take up poor health behaviours in order to qualify to enter schemes to earn rewards for giving up these behaviours. Financial incentives are more likely to be successful in situations where there are reliable, accurate and acceptable measures of behaviour change, and opportunities for gaming are minimized (Lynagh, Sanson-Fisher & Bonevski, 2013).

One review of 11 'quit and win' contests for smokers in New York state, USA, where those who quit for at least a month were then entered into a prize draw, did observe significantly higher rates of smoking cessation at 6-month follow-up compared with non-incentivized attempts by smokers to quit. This approach was deemed to be cost effective (O'Connor et al., 2006).

One Cochrane review on smoking cessation was only able to identify one trial where incentives and competitions were shown to enhance long-term cessation rates (Cahill & Perera, 2011). No evidence on the cost effectiveness of any programmes was identified. While 18 studies identified did demonstrate initially promising outcomes, when financial incentives and rewards were no longer being offered, cessation rates declined. One exception was a workplace smoking-cessation reward programme that sustained cessation success rates 6 months beyond the time period of rewards. This scheme gave out substantial cash payments that totalled US\$ 750 per quitter for abstinence over a 12-month period, rather than running its own smoking-cessation programme (Volpp et al., 2009). However, this approach was possible because of the availability of local, independently funded smoking-cessation programmes.

Moreover, subsequent analysis looking at the attitudes to financial incentives in this study showed that most quitters (69.8%) in the incentive group were already motivated to quit, reported that they would have quit for less money, and said incentives were 'not at all' or only 'somewhat' important. Most non-quitters in the incentive group reported that even US\$ 1500 would not have motivated them to quit. The authors thus concluded that financial incentives are ineffective at motivating some smokers to quit, stating that internal motivation and readiness to quit need to be sufficiently high for relatively modest incentives to be effective (Kim et al., 2011).

There are, however, some circumstances where there is good evidence that even a short period of smoking cessation can help achieve a health-promoting objective, as in the case of smoking during pregnancy, where a review of six financial incentive schemes indicates that smoking abstinence rates increase, with benefits for fetal growth, mean birth weight, percentage of low-birth-weight deliveries, and duration of breastfeeding (Higgins et al., 2012).

Successful piloting of schemes using financial incentives to help pregnant mothers to cease smoking can also be seen in the UK in Scotland (Dundee) and England (Birmingham). Mothers were paid £12.50 in the form of a credit on an electronic card, which could be spent on groceries at the local supermarket (excluding alcohol and cigarettes) – if they stopped smoking. In a positive assessment of the pilot, researchers found that an important reason why the incentive worked was 'that using rewards gave mothers an excuse to opt out of the social norm of smoking within their peer group, but, crucially, did not isolate them from that group'.

5.6 Commitment contracts

There is weak evidence on the effectiveness of commitment contracts that do not make use of monetary incentives. A Cochrane review of 47 such schemes for health-promotion activities reported favourable outcomes in just 16 trials, with no long-term impacts on adherence. The review authors concluded that there was insufficient evidence from large, good-quality studies to routinely recommend contracts for improving adherence to treatment or preventive health regimens (Bosch-Capblanch et al., 2007).

Financial incentives have also been embedded into commitment contracts, for example, in trying to achieve weight loss, but, again, any gains achieved have been lost after the end of programmes. There is some evidence indicating that any positive changes in health behaviour gained as part of commitment contracts, such as risking the loss of a sum of money should health behaviour targets not be met, can be maintained for a longer time period if contracts are extended in length. This then begs the question as to how long contracts should be. One trial, taking account of individual propensity for loss aversion, made

use of deposit contracts in which the study participants put their own money at risk, which they would lose if they failed to achieve their weight targets (John et al., 2011). This programme demonstrated that greater levels of weight were lost than in a control group over a longer period of time (see Box 4).

Box 4: Evaluation: using commitment contracts to encourage extended weight loss (John et al., 2011)

Objective: previous efforts to use incentives for weight loss have resulted in substantial weight regain after 16 weeks (Volpp et al., 2008). The objective was to look at the effectiveness of a longer scheme (32 weeks versus 16 weeks) in a US population with body mass indexes between 30 and 40 kg/m².

Design: participants had a weight loss goal of 1 pound (0.45 kg) per week for 24 weeks, followed by an 8-week maintenance period. A control group participated in either a weight-monitoring programme involving a consultation with a dietician, or monthly weigh-ins. There were two intervention groups; each received the same intervention as the control groups. Participants committed to deposit contracts where these funds would be lost if weight-loss targets were not met. In one deposit contract group, participants were told that the period after 24 weeks was for weight-loss maintenance; in the other, no such distinction was made.

Results: deposit contract groups lost significantly more weight than control participants (8.7 pounds (3.9 kg) versus 1.17 pounds (0.53 kg) ($P = 0.04$)). However, 36 weeks after the 32-week intervention, the net weight loss between the incentive and control groups was no longer significant, at 1.2 pounds (0.54 kg) versus 0.27 pounds (0.12 kg).

Conclusions: commitment contracts produced significant weight loss over an 8-month intervention; this was similar to that seen in a previous 4-month study; however, participants also regained weight post-intervention. Future experiments with commitment contracts should look at how long-term efficacy might be achieved, for instance through varying the duration and levels of deposit amounts. The impact of non-incentive-based contracts should also be compared with that of deposit contracts.

There remains limited evidence on the effectiveness of other types of reward schemes. Hyperbolic discounting was used in the framing of a new partnership in the UK between the government and LazyTown, an Icelandic television and latterly multi-media programme (see Box 5).

Box 5: Health-promoting children's television programme and subsequent food product branding in Iceland (see <http://www.lazytown.com/>)

LazyTown was developed as a public-private initiative that has been operating nationally in Iceland since 1996, with the aim of making health education entertaining.

In Iceland, the scheme has led to a sustained reduction in the rates of childhood obesity.

In England, the Behavioural Insights Team and the Department of Health have formed a partnership with LazyTown, where a healthy superhero character, Sportacus, motivates children to eat healthily and be more active. The initiative requires young children to sign an 'energy contract' with their parents that rewards them for eating healthily (fruit is labelled 'sports candy'), going to bed early and being active. The show also has the world's laziest supervillain Robbie Rotten. LazyTown has an extensive web presence and applications can now be downloaded for mobile media devices, recognizing that children can be reached in many different ways. It is also on YouTube and Facebook.

Interestingly, the enjoyment that children gain with the LazyTown brand may also have other uses. Between 27% and 42% of preschool children in a trial in Iceland perceived LazyTown branded food to taste better than identical non-branded food. These findings indicate children's preferences for child-oriented wrappings rather than regular wrapping (Gunnarsdottir & Thorsdottir, 2010). While this fact has long been used as a tool by the food industry to market unhealthy foods, the same approach could be used as one element of a strategy to promote healthy eating among young children. Such a scheme would almost certainly need the buy-in of food producers in order to be viable.

5.7 Combinations of strategies

Combinations of interventions are more successful than reliance on any one measure, but there have been relatively few attempts to estimate the effectiveness of combined actions compared to actions in isolation. Where such combined strategies have been evaluated, behavioural approaches have formed only a modest component of these efforts.

Modelling approaches developed as part of the World Health Organization's CHOICE (Choosing Interventions that are Cost Effective) programme and then further adapted elsewhere have been used to look at population-wide actions in a number of areas, including prevention of chronic disease related to alcohol, tobacco or obesity. The cost effectiveness of different combinations of interventions to prevent alcohol abuse in 22 European countries has been examined (Chisholm et al., 2009). In the case of the UK, for example, the most costly combination of effective interventions: increased taxation, brief targeted advice, advertising restrictions, restrictions in access to alcohol and roadside breath tests, would still be highly cost effective. The programme would cost €350 million to implement or €6 per head of population, gaining more than

7400 healthy years of life every year per 1 million population, at an annual cost of €800 per healthy life-year gained.

Work in Australia on measures to prevent obesity, undertaken as part of the wide-ranging ACE (Assessing the Cost Effectiveness of prevention programmes), identified a number of programmes with net savings to the health-care system over the life of the child, for example, education programmes to reduce television viewing, reduction of TV advertising of high-fat and/or high-sugar foods and drinks to children, and family-based general practitioner (GP) programmes targeted at families of overweight or moderately obese children (Carter et al., 2009). However, while all of these interventions were deemed cost effective, the incremental cost effectiveness of different combinations of these interventions was not considered.

Other work linked to the ACE initiative modelled the potential cost effectiveness of different strategies to encourage the uptake of physical activity. This identified a number of actions that could be cost effective in an Australian context – where a cost of 50 000 Australian dollars per DALY averted was the common metric used (see Box 6) (Cobiac, Vos & Barendregt, 2009).

Box 6: Modelling the cost effectiveness of interventions to promote physical activity in Australia (Cobiac, Vos & Barendregt, 2009)

From evidence of intervention efficacy in the literature on physical activity, and evaluation of the health-sector costs of intervention and disease treatment, the cost impacts and health outcomes of six physical activity interventions were modelled over the lifetime of the Australian population. The cost effectiveness of each intervention against current practice for physical activity intervention in Australia, and the costs of implementation were determined.

Based on current evidence of intervention effectiveness, the intervention programmes that encourage use of pedometers, and mass media-based community campaigns, are the most cost-effective strategies to implement and are very likely to be cost saving. An internet-based intervention programme (3000 Australian dollars per DALY), a GP physical activity prescription programme (12 000 Australian dollars per DALY), and a programme to encourage more active transport (20 000 Australian dollars per DALY), although less likely to be cost saving, have a high probability of being under a threshold of 50 000 Australian dollars per DALY. GP referral to an exercise physiologist (79 000 Australian dollars per DALY) is the least cost-effective option, if time and travel costs for patients in screening and consulting an exercise physiologist are considered.

The authors concluded that, despite substantial variability in the quantity and quality of evidence on intervention effectiveness, and uncertainty about the long-term sustainability of behaviour changes, it is highly likely that, as a package, all six interventions could lead to substantial improvement in population health, at a cost saving to the health sector.

Work at the Organisation for Economic Co-operation and Development has also looked at the most cost-effective ways to influence dietary behaviour as a way of preventing obesity. One model found that it was highly cost effective to combine the use of improved food labelling; self-regulation of food advertising; school-based intervention; mass media campaigns; and physician-dietician counselling in primary care. This had a cost per DALY gained of less than US\$ 10 000 in different European and other high-income countries (Sassi, 2010).

6 How can the evidence base, including different modes of implementation, be strengthened?

Given the limitations in evidence and use of many actions to encourage behaviour change, from a behavioural economics and psychology perspective, this review now considers how the evidence base might be strengthened and highlights some issues that policy-makers and planners may wish to consider in respect of implementation.

One good starting point is to undertake a needs assessment in respect of potential target population groups. Multiple actions are likely to be required – some delivered to whole populations, others to specific population groups. A needs assessment, to identify actions of interest to target communities, can help facilitate change and, ultimately, uptake. Segmentation of initiatives so that they are tailored to specific groups can promote effectiveness. But this means it is important to understand what the principal barriers are in different population groups that need to be changed; this can also help in tailoring actions in order to improve uptake. Needs assessment and dialogue with local communities or target groups can help identify such barriers. For instance, cost or travel time to regularly take part in exercise activities at sporting facilities may be barriers; subsidies to take part in exercise, or the opening up of schools sport facilities to the local communities, may help to address these issues in some country contexts.

Individuals who are not highly motivated to make a behavioural change may need the opportunity to receive messages on the benefits of behaviour changes and perhaps also to have modifications made in their environments, in order to make change a more convenient choice. One study observed that individuals who were not well motivated and were from deprived communities would not make changes in lifestyles following provision of information to inform choice alone (Kellar et al., 2011).

The successful implementation of new mechanisms to influence behaviour change that can complement or augment existing mechanisms will also be dependent, in part, on public attitudes towards different potential interventions. Individuals may not wish to be 'lectured to' by governments

on some health issues, for example, on alcohol consumption. The public also may be unwilling to support some behavioural interventions that they perceive reward individuals for having bad habits, such as the use of financial incentives to encourage smoking cessation. Early assessment of attitudes and needs can help identify such concerns.

Another study in the UK (Promberger, Dolan & Marteau, 2012) suggests that public willingness to support the use of financial incentives to change behaviours very much depends on the type of financial incentive and the health problem being targeted. There is more support for the use of vouchers to buy food, rather than luxury goods or cash rewards, when behaviour change is achieved. The study also found more support for the use of rewards to reduce weight rather than to help people to stop smoking. Public perceptions of the effectiveness of these interventions are also crucial; small improvements in overall effectiveness can result in greater increases in public approval for the use of these interventions.

6.1 Steps towards development of interventions for behaviour change

Guidance produced by NICE in England, UK, notes the importance of specifying three things with respect to any intervention that aims to change behaviour (NICE, 2007):

1. be as specific as possible about content;
2. spell out what is done, to whom, in what social and economic context and in what way;
3. make clear what underlying theories will help make explicit the key causal links between actions and outcomes.

The NICE guidance also emphasizes the importance of being clear about the behaviours that need to be changed, contextual changes that need to be made, and the level at which the intervention will be delivered (e.g. population wide, specific communities, specific individuals). It provides a set of questions as a checklist for planners (see Box 7).

Given that relatively little is known about the effectiveness of many behavioural interventions, it is important to build evaluation in to any implementation process, particularly given that actions may have more impact on some population groups than others and issues of equity need to be considered. There may also be other unintended positive or negative consequences of actions – for instance, do those who give up smoking start eating more, and, if so, how can this be countered? Evaluating how these actions work in practice may also help in tailoring them to meet the needs of different groups, for example, those from different cultural or social backgrounds.

Box 7: Questions to consider when planning to implement an intervention for behaviour change (NICE, 2007)

- Whose health are you seeking to improve (target population(s))?
- What behaviour are you seeking to change (behavioural target)?
- What contextual factors need to be taken into account (what are the barriers to and opportunities for change and what are the strengths/potential of the people you are working with)?
- How will you know if you have succeeded in changing behaviour (what are your intended outcomes and outcome measures)?
- Which social factors may directly affect the behaviour, and can they be tackled?
- What assumptions have been made about the theoretical links between the intervention and outcome?

There will be specific factors that also need to be considered in the precise form that an action takes. For instance, take the example of commitment to change initiatives, where some form of deposit contract is used, and individuals deposit money, which they can only retrieve if they meet specific health-behaviour targets. This policy review has highlighted that these approaches can be successful in the short term in respect of smoking cessation and weight loss, but a number of issues that need to be considered and carefully evaluated in the design of these contracts have been put forward (Halpern, Asch & Volpp, 2012) (see Box 8).

Box 8: Example of issues to be considered in the design and implementation of a behaviour-change intervention: framing a commitment contract

Issues to be considered include the time period over which contracts operate. Experience suggests that behaviour change achieved with these contracts is not sustained in the long run.

The issue of what happens to money that is lost may also influence adherence to the terms of a contract – an individual may be less motivated to take action, for instance, if the money goes to charity, but may be more motivated if the money goes to other individuals who successfully complete the terms of their contracts.

The size of the deposit, and who determines this, may also influence uptake and compliance with contracts. Should there be matched deposits from the state or other stakeholder, and, if so, what should the balance be between deposits?

Can individuals who would be most likely to adhere to the terms of contracts be identified? Potentially, this would increase the cost effectiveness of these approaches.

All of these issues could be examined and potentially tested in pilot phase before more widespread implementation.

Adapted from: Halpern, Asch & Volpp, 2012

6.2 Capacity-building for implementation

Health-system professionals, those working in other sectors, and volunteers involved in the delivery of behaviour-change interventions will all have specific needs for knowledge and skills that are necessary to support implementation. In England, UK, NICE has recommended training and support to improve ability to identify and assess evidence on behaviour change; understanding of the determinants of health, and on how to interpret data and design and evaluate actions; and the skills to work in partnership with other stakeholders and target population groups. It has also recommended reviewing current education and training practice, with disinvestment in approaches not supported by evidence (NICE, 2007).

What of the role that different stakeholders can play in implementation? Only a small number of actions for behaviour change can be delivered within the health-care system. It is important to coordinate actions across different government departments and across different tiers of government – national, regional and local. Engagement with the media, not-for-profit sectors, employers and enterprise will be essential to effective actions. This includes identification of positive benefits to these stakeholders of engaging in behaviour change, as for instance can be seen in the case of the Change4Life campaign in the UK (see Box 9).

Box 9: The benefits of partnership working: the Change4Life campaign

In the UK, the Change4Life campaign involved over 200 partners drawn from the voluntary sector, businesses and local government. The campaign also involved over 50 000 local community groups. The *Change4Life one year on* report (Department of Health, 2010) noted that a number of health charities, including Cancer Research UK, Diabetes UK and the British Heart Foundation, ran their own campaigns in support of Change4Life. Businesses also supported the movement, for example by providing free gym access, discounted fruit and vegetables and low-cost bikes. Witnesses to a UK Parliamentary Inquiry on Behaviour Change (House of Lords Science and Technology Committee, 2011) reported that the campaign had used partnership working effectively. The chief executive of a major public relations company noted that the Change4Life campaign minimized conflict, and the head of corporate affairs at Asda, one of the UK's largest supermarket chains, said that the campaign worked because there was clarity around the role and responsibilities of all of the partners.

For instance, business has become much more green, as it has seen that there is market for green products; there is some scope for similar marketing opportunities in health promotion, as in the case of the willingness of the food industry to promote some healthier forms of food and drink that consumers demand, such as low-fat milk and low-fat margarine. Another example of this in a UK context is cooperation between business and government to promote the 'five a day' consumption of fruit and vegetables, where businesses have viewed the 'five a day label' as a way of making their products more attractive. More information is needed on how best to leverage the support of all stakeholders.

7 Conclusions and summary of key themes

Many different tools are available to policy-makers wishing to positively improve health through influencing health behaviours. Traditionally, public health policy has relied on a combination of tools, most frequently health-education and -information campaigns, taxation policies to influence decisions related to health behaviour, and legislation to prohibit unhealthy activities. However, while there have been many public health improvements, for example, reductions in the rate of smoking in most high-income countries, it is increasingly recognized that they are blunt instruments, which are effective but do not necessarily reach all of a target audience in all circumstances, or can be unpopular with a public that may see some measures as unnecessary encroachments of the state into matters of personal choice.

This policy review has indicated a growing body of knowledge on other mechanisms that directly seek to influence health behaviours, recognizing that

individual choice and decision-making is influenced by many different factors. They have evolved out of research focused on behavioural economics and psychology. These approaches should not be seen as a replacement for some of the conventional approaches to health-behaviour change; in many cases, they may be additional elements of a public health strategy to help reach different segments of a population. In some cases, they may also have the potential to be cost-effective alternatives to aspects of public health strategies.

Behavioural economics, in particular, seeks to explain why individuals may make decisions that do not conform to rational economic theories related, for instance, to risk and price. It can perhaps best be thought of as offering a library of tools, not all of which can be used at any specific time, but each of which may be of use in some particular contexts. It is not a universal panacea, but by using the insights from human psychology that are embedded in the approach, it may be possible to design interventions that – *in some circumstances* – are relatively well equipped to motivate people to behave in ways that are better for themselves, and for society at large.

For instance, if they are used to help people behave in ways that, after a period of reflection, they genuinely want (e.g. to lose weight) or that they believe are genuinely good for society (e.g. to quit smoking), but people face bounds on their rationality, are directed by mental short cuts or heuristics that send them the wrong way, or find their decisions to be particularly sticky around pre-set default options, then designing policy to account for these latter considerations appears legitimate and potentially beneficial. For instance, default positions are unavoidable, so if people are often inert in their actions, it makes sense to choose the default that it is likely to generate the most individual and societal benefit.

These approaches also suggest that there is scope to put more emphasis on the positive benefits of health and the level of enjoyment that can be achieved by changing behaviour (NICE, 2007; Behavioural Insights Team, 2010). Mechanisms that can reshape the environments in which people live can play an important role, helping to make it easier for individuals to make healthier choices, for example, on portion sizes, while still leaving them free to choose a less healthy amount of food.

In the current financial climate, many potential policy proposals may also have the added advantage of being very low cost; for instance, altering a default rule, such as that required by prompted choice, requires imagination and a commitment to persuade sceptics that it is worth testing, but does not appear to require substantial additional financial resources for its implementation. In other circumstances, costs may be borne by the nongovernmental sector, for example, minor redesign of supermarket trolleys to encourage the purchase of fruit or vegetables.

It is also important to understand what mechanisms are acceptable to the public. Some might be deemed to be politically or ethically questionable (e.g. the general public might well object strongly to rewarding people for doing things that most people might think they ought to be doing anyway) (Reisinger et al., 2011). Members of the public may object to the principle of having financial incentives or opt out for organ donation, preferring instead to rely on family consent (Rodrigue, Cornell & Howard, 2006). They may also object to penalties, for example, in respect of failing to meet weight-loss targets (Promberger et al., 2011).

Each proposal should be assessed on its own merits and it is important to emphasize that, under most behavioural economics and psychological proposals, people are not mandated to change their behaviour if they do not wish to do so. People can still choose not to eat healthy portions or to lose weight, they do not have to moderate drinking, and they can remain physically inactive. Behavioural interventions ought not, therefore, to be coercive in any strict sense of the word; rather, they should offer a gentle nudge to people to engage in behaviours that, on reflection, they would prefer to do. This nudge, however, can be significant when the environment in which individuals live is significantly altered, for instance through the expansion of dedicated cycle paths.

Finally, it should be stressed that, while the science of behaviour change has been in development for some time, the actual application of theories and findings to public health policy is still developing, with an increasing number of experiments and some mainstream policies now being put in place in parts of Europe, the USA and elsewhere. Thus, while a lot is known about long-standing public health actions, such as the role of taxation, legislation and health-information campaigns, the evidence base on what works to influence behaviour, and in what context, is still in development, with many unanswered questions on how best to design new innovative interventions that can complement, and in some instances augment, well-established mechanisms. Despite there being plenty of policy ideas informed by behavioural economics floating around, more ideas are needed in a health context, and far more evidence is required on their likely effectiveness and cost effectiveness.

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