FORESIGHT

Tackling Obesities: Future Choices – Qualitative Modelling of Policy Options

Government Office for Science

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Tackling Obesities: Future Choices – Qualitative Modelling of Policy Options

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This report has been produced by the UK Government's Foresight Programme. Foresight is run by the Government Office for Science under the direction of the Chief Scientific Adviser to HM Government. Foresight creates challenging visions of the future to ensure effective strategies now.

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This report was commissioned by the Foresight programme of the Government Office for Science to support its project on Tackling Obesities: Future Choices.

Contents

Background

Foresight Tackling Obesities: Future Choices

The aim of the Tackling Obesities: Future Choices project was 'to produce a long-term vision of how we can deliver a sustainable response to obesity in the UK over the next 40 years'.[1]

The project employed two concurrent methodologies – system mapping and scenario development – to explore, respectively, the relationship between the key factors influencing the prevalence of obesity levels and the different future contexts within which the obesity challenge need to be addressed. This work is described the Foresight Tackling Obesities: Future Choices project reports, *Building the Obesity System Map*[2] and *Visualising the Future: Scenarios to 2050*.[3]

This report brings together the system mapping and scenario development with the aim of developing a tool for generating and testing possible policy response options to obesity. The report describes the tool and applies it, showing how a set of policy response options influence obesity prevalence within the four future scenarios.

This approach can be reproduced using the information provided here, and in the other project reports, to enable others to test additional policy options.

1 Developing an analytical tool

This section describes the development of the tool for testing options for policy responses to obesity, today and in the future. It makes use of an obesity system map, which uses current knowledge of the key features and connections in obesity causation together with a set of four alternative futures for UK society.[3]

The aim of the analysis is to provide:

i a tool for designing and evaluating options for policy responses, based on the knowledge of the key variables influencing obesity development (the obesity system map) and the range of different ways in which UK society might change in the future (scenarios for the future of the UK and their impact on obesity)

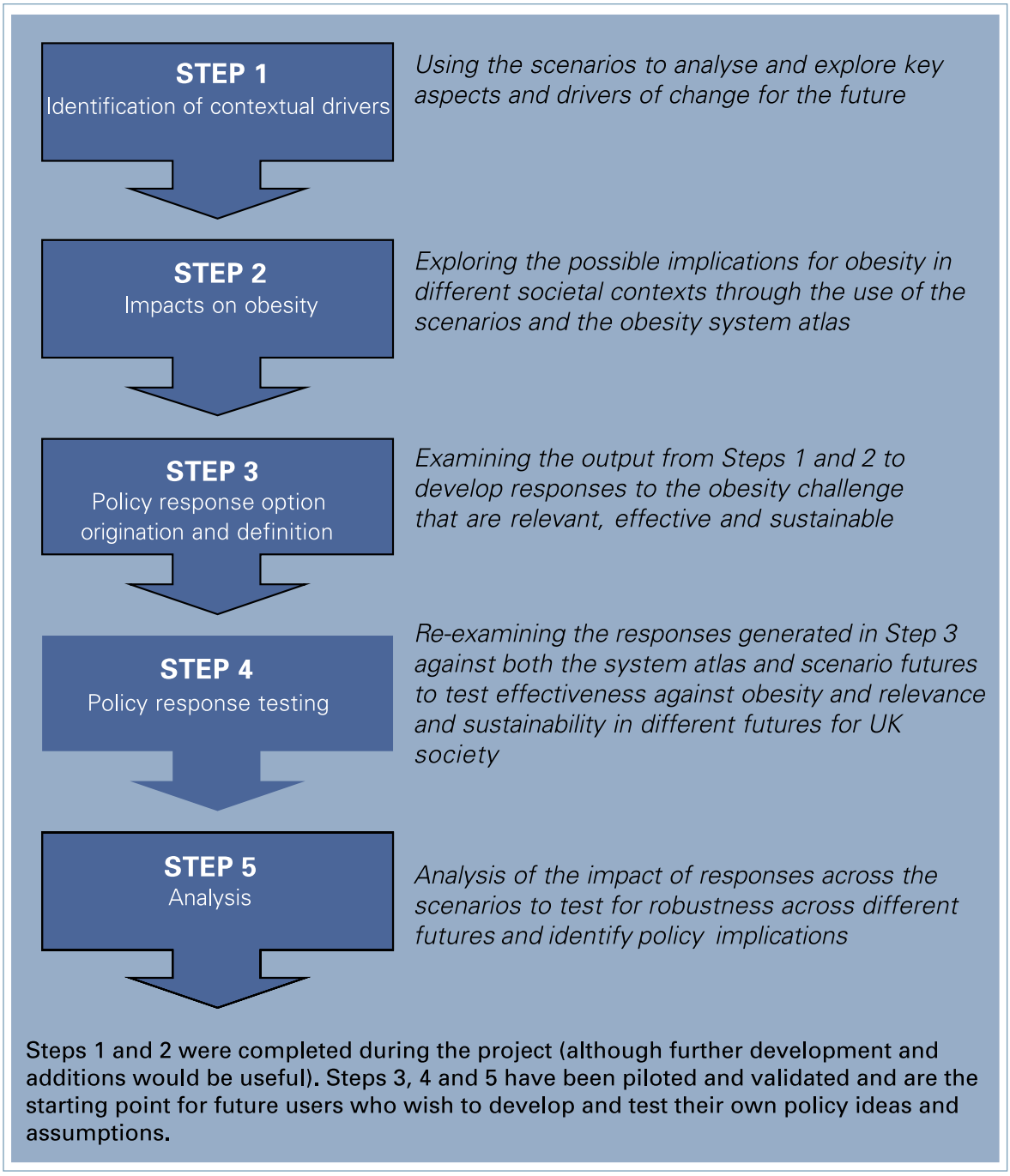
ii a method for refreshing the scenarios after the life of this project.

The tool has been tested, refined and validated as part of the Foresight Tackling Obesities: Future Choices project and has the potential to inform future policy making.

The obesity system map analyses what drives obesity, while the scenarios outline four contexts within which these obesity drivers may operate. For example, the map illustrates how physical activity levels have an impact on calorie intake and therefore on obesity. The scenarios outline different contexts within which activity may be encouraged or discouraged. The ease (or otherwise) of implementing policies designed to combat obesity will be different in each scenario. The system map and the scenarios connect via 'interface variables'. These are features common to both the system model and the scenarios but which vary from one scenario to another. For instance, 'market price of food offerings' appears in the obesity system map but will vary with each scenario.

The five main steps in the analysis are summarised in Figure 1 and are explored in detail throughout the remainder of this section.

Figure 1: Summary of the process for the qualitative modelling and testing of policy options



Steps 1 and 2 were completed during the project (although further development and additions would be useful). Steps 3, 4 and 5 have been piloted and validated and are the starting point for future users who wish to develop and test their own policy ideas and assumptions.

1.1 Step 1: Identification of contextual drivers

The objective of this first step was to:

i highlight key differences within the four scenarios that can be used in the generation of policy ideas

ii provide a description of different contexts against which the effectiveness of policy responses can be tested.

Experts attending a workshop were asked to identify broad drivers of change that would affect obesity, for example, social values or attitudes to health, and the different ways they might develop in the future (see Appendix 1 for a list of the drivers).

Ten drivers were selected as being particularly critical. These were clustered and developed further.

Key drivers of change for obesity	
• Resource challenges • Values and behaviour • The food chain • Education, information and the media • The built environment	• Economics and business models • Science, technology and research • Leadership and governance • Attitudes to health • The shape of society

The key drivers were then considered within the four different scenarios, focusing, in particular, on contrasts in their development over a 40-year time span, ending in 2050. A summary of the output is shown in Appendix 2 of this report, with a full description of the scenarios in the Foresight Tackling Obesities report, *Visualising the Future: Scenarios to 2050*.[3]

1.2 Step 2: Impacts on obesity

The objective of Step 2 was to explore how the different scenarios might affect the prevalence of obesity. This was done in three ways:

1 Considering the impact of the scenarios on the obesity system map by looking at how particular variables are activated and whether particular links (or loops) between variables are weakened or strengthened in different scenarios. The results are discussed in detail in the Foresight Tackling Obesities report, *building the obesity system map*[2] and a summary can be found in Appendix 3 of this report. These maps can be used as a visual tool to help identify the consequences of different societal conditions on obesity.

2 Capturing the main scenario features that might impact on obesity in a narrative.[3]

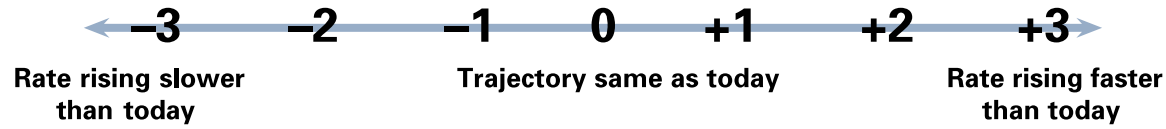
3 Conducting a qualitative assessment of the future trajectory of obesity – the **baseline obesity assessment**. Experts were asked to make a qualitative assessment of how the prevalence of obesity might change in each scenario assuming there was no further government intervention. There was general agreement that the prevalence of obesity would continue to rise in all four of the scenarios. Therefore the assessment was based on the degree to which this rising trajectory would improve or worsen relative to today. It considered:

i overall population prevalence of obesity

ii socioeconomic differences in obesity prevalence

iii prevalence of childhood obesity.

A simple numerical ranking system was adopted:



1.3 Step 3: Options for policy responses: origination and definition

Options for policy responses for obesity were identified and developed in two steps:

1.3.1 Analysing the social contexts of the scenarios and developing responses that would be effective in at least one scenario.

1.3.2 Exploring key variables in the obesity system map – i.e. those that form hubs through interaction with multiple factors and connect directly with the system's central dynamic engine – which could therefore be considered to act as policy levers within the system. Reponses that targeted these key variables/policy levers were then identified. This process is discussed in detail in the companion report.[2] Note that the step in 1.3.1 may generate different or additional responses to the step in 1.3.2. This is because the first step is not constrained by current knowledge about the causation of the obesity. However, the step in 1.3.2 enables the specific elements of the current obesity system to be targeted. This is important because tackling obesity needs to be a long-term process.

1.3.3 Consultation of stakeholders and additional desk research.

An initial set of 56 suggestions for policy responses was built up using these steps, 17 of which were selected as examples of the range and depth of responses that could be generated (see Section 2.2).

While the timescales of this project did not allow for detailed elaboration of each of the responses, it is recommended that, in future, each suggestion is examined in detail before proceeding to the next step, with special consideration given to urgency, costs, social acceptability, ease of implementation, and any dependency on enabling changes, for instance, a particular scientific advance. In general, for ideas generated by the obesity system map, the greater the strength of the causal linkages that join the targeted variable(s) in the system map to its core engine and energy balance, the more effective the policies that target these variables are likely to be.

1.4 Step 4: Policy response testing

The ideas for responses, generated in Step 3 were then examined by an expert workshop for their impact on obesity in each of the four scenarios. Specifically responses were assessed on the following:

- **Ease of implementation**. Would it be possible to implement the response in the context of a particular scenario?
- **Impact on obesity**. Assessment of the impact of a policy response to obesity prevalence within each scenario was summarised through use of a qualitative 'high', 'medium', 'low' ranking system – with the addition of 'negative' criteria for responses that might have a detrimental impact (i.e. increased obesity prevalence). Some responses were also ranked as '0' or neutral, where it was felt that they would have no impact, either positive or negative.

The rationale and qualifying comments can be found in appendix D.

1.5 Step 5: Analysis

The final analysis focused on identifying key messages and the implications for policy. This included the identification of highly scenario-dependent responses (i.e. those that would only be effective in one scenario) and those that were robust and consistent in their impact across all or most scenarios.

2 Testing policy responses: results

This section describes the prevalence of obesity in each scenario assuming there was no further government intervention. It also describes the results of a response testing exercise, emerging messages and conclusions.

2.1 Baseline obesity assessment

Experts were asked to consider how obesity prevalence might change in each scenario, assuming there was no further government intervention – the obesity baseline in the population. There was general agreement that **levels would continue to rise in all four scenarios, but there would be differences in the rate of increase**. The degree to which this current obesity baseline would improve or worsen was scored on a qualitative scale:

This was considered for three population-related categories:

a overall population prevalence of obesity

b socio-economic differences in obesity prevalence

c prevalence of childhood obesity.

A summary of the results arising from this process is shown in Figure 2.

In Scenario Two, there is a decrease in the rise in obesity across all dimensions assessed while, in Scenario Four, there is an increase. Marked differences can be seen between Scenarios One and Three. In Scenario One, some improvement occurs in childhood obesity trends but overall population levels worsen, whereas the reverse is seen in Scenario Three. This reflects differences in attitudes to obesity prevention and treatment and also the extent of health inequalities within these two scenarios. Tables 1–4 summarise the obesity baseline assessments for Scenarios One to Four, respectively.

Figure 2: Summary of baseline obesity assessment for each scenario

Table 1: Obesity baseline assessment for Scenario One

Dimension	Assessment	Comments
Population prevalence of obesity	+ 1	Long-term focus helps to some extent, but positive effects are countered somewhat by the wide variation in social norms, which add to obesity normalisation. The market is insufficient on its own to overcome the fact that humans are sometimes at odds with their environment and is not able to impact obesity prevalence at a population level. The built environment is still a contributing factor.
Socioeconomic differences in obesity prevalence	0	Although inequalities widen in the first decade of this scenario, the gap narrows to the degree that, by 2050, the impact on obesity prevalence is similar to today.
Prevalence of child obesity	–1.5	Long-term focus on child welfare and generational issues and ill-health prevention start to pay off, but this effect is polarised in society.

Table 2: Obesity baseline assessment for Scenario Two

Dimension	Assessment	Comments
Population prevalence of obesity	–2	In a socially responsible, community-based society with support for long-term systemic change, the key features of society and environment that indirectly influence obesity prevalence would be changing. Although driven by concerns other than obesity, this still influences obesity trends.
Socioeconomic differences in obesity prevalence	–1	Inequalities are narrowing in this scenario, and this therefore has an impact on obesity-associated inequalities. There are still groups, however, that are at higher risk, which explains the lower impact here than for overall population trends.
Levels of child obesity	–3	The dynamics in this scenario, such as long-term focus, co-ordinated systemic change and interest in the impacts on subsequent generations, would lead to changes focusing in particular on long-term child health and future generations, bringing about the impact on obesity trends (children not yet born would benefit from interventions yet to be introduced).

Table 3: Obesity baseline assessment for Scenario Three

Dimension	Assessment	Comments
Population prevalence of obesity	–1	The key feature here is the lack of prevention activity to improve the baseline, partially offset by the success of lobby groups in keeping obesity on the political agenda and maintaining a low level of action, which pays off over the long term.
Socioeconomic differences in obesity prevalence	–1	Socioeconomic differences are smaller in this scenario, with the resulting effect on obesity trends. Community-based, rather than individually focused, treatments have an impact.
Levels of child obesity	+1	An increased reliance on treatment and rising parental obesity serve to normalise obesity and consequently reduce efforts to prevent and address the problems of future generations. There are no long-term plans to address the wider determinants of obesity.

Table 4: Obesity baseline assessment for Scenario Four

Dimension	Assessment	Comments
Population prevalence of obesity	+3	The rise in obesity prevalence increases dramatically. Younger generations die before their parents as the focus on treatment and its normalisation, coupled with widening social divides, exacerbates trends.
Socioeconomic differences in obesity prevalence	+3	Significant widening in inequalities is reflected in obesity trends. Body shape is a status symbol and people rely on costly treatments to attain the desired shape. The economically disadvantaged have little access to treatment or prevention, thus increasing divides.
Levels of child obesity	+1	People remain concerned about children, so action is still taken on their behalf as knowledge and awareness increase.

2.2 Options for policy responses tested

Having first generated a bank of potential options for policy responses, 17 were selected for further testing and analysis. Options were selected to cover a broad range of criteria, of which the following were judged most important:

- targeting a diverse range of relevant areas of policy activity
- targeting the obesity system map in different ways, acting on the key variables or levers within the map
- acting at different levels of complexity, ranging from targeted and specific, to broad and cross-cutting
- providing insight into the more critical uncertainties, such as and the location of the fulcrum is between obesity prevention and treatment, targeted and population-wide interventions and enabling and directive interventions.

The 17 responses were grouped into eight domains of policy activity, showing the diversity of possible responses:

- The built environment and transport
- Research
- Education
- Social structure
- Health
- Fiscal incentives
- Regulation
- Family

Table 5 lists the 17 options in full. The definition of each option was refined during the analysis process to capture how each might be shaped to reflect the different scenario conditions and to capture implementation barriers and enablers.

Table 5: Options for policy responses used in the modelling exercise

The built environment and transport	
1	Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)
2	Improve the perceptions of safety from the points of view of traffic and crime
3	Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)
Health	
4	Focus on targeted interventions, such as when children are young, and targeting those most 'at risk'
5	Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole
6	Focus on the health consequences of obesity, such as diabetes, rather than obesity itself
Research	
7	Invest in the search for a highly effective post-hoc solution to obesity – a 'magic pill'
8	Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain
Fiscal incentives	
9	Introduce a tax on obesity-promoting foods
10	Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees (public and private sectors)
11	Use individually targeted fiscal measures to promote healthier living
Education	
12	Introduce programmes to increase food literacy and food skills
Regulation	
13	Control the availability of and exposure to obesogenic foods and drinks
Social structure	
14	Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society
15	Invest in technology to support informed individual choice, including devices to help monitor diet, activity
Family	
16	Promote/implement a programme of early interventions at birth or in infancy.
17	Penalise parents for the unhealthy lifestyles of their children

2.3 Exploring options for policy responses through the obesity system map

The policy options activate the obesity system in different ways and target specific variables or groups of variables – the 'interface variables' – within the map.

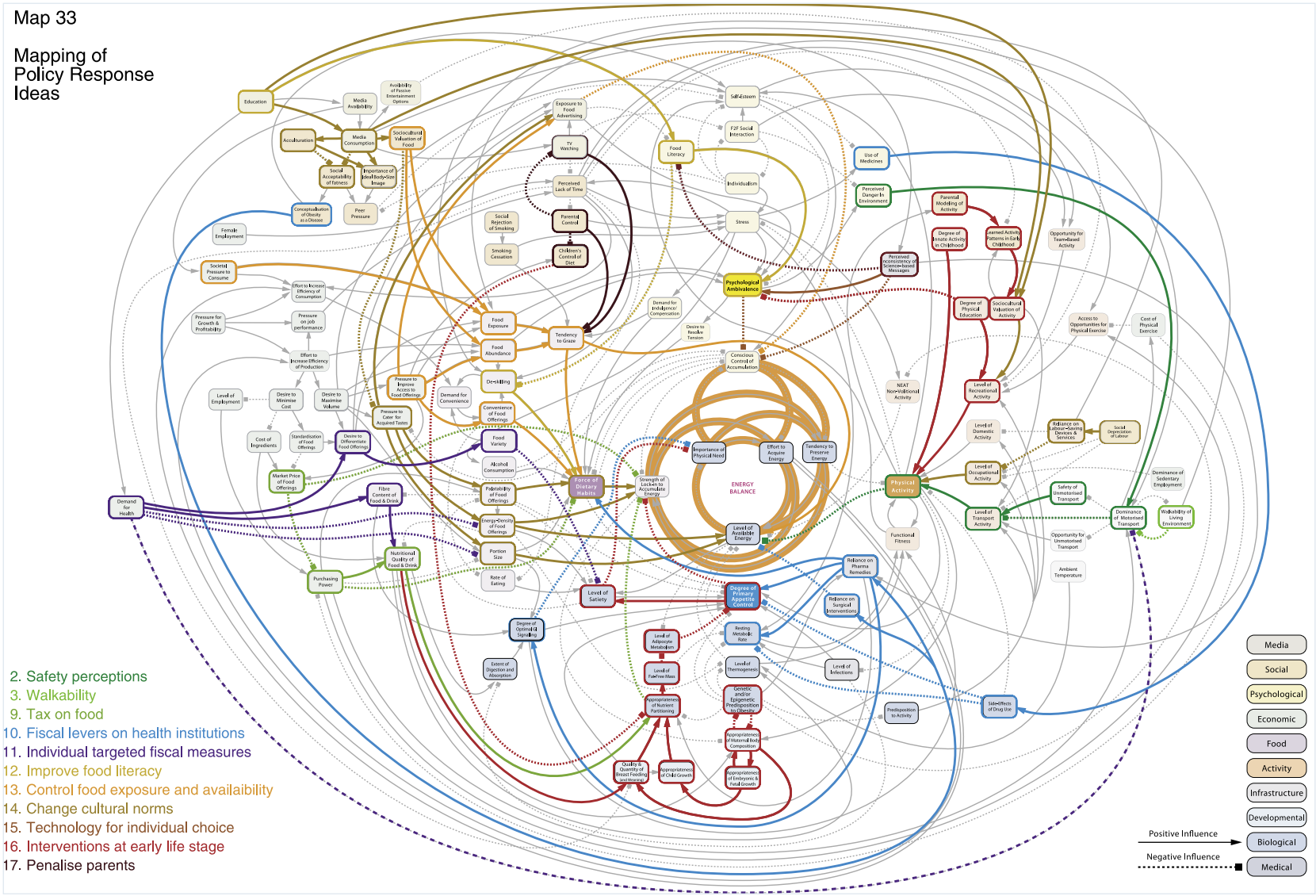
Table 6 indicates the key interface variables within the obesity system map, which are targeted by each of the options. Figure 3 shows the impact on the system map. For further discussion, see the Tackling Obesities: Future Choices - Building the Obesity System Map report.[2] Not all options interface directly with specific variables as some are more general in their application.

Table 6: Options for policy responses interface with system map

The built environment and transport	Interface variables targeted by response
1 Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	• Walkability of living environment • Dominance of motorised transport • Opportunity to use unmotorised transport
2 Improve perceptions of safety from the points of view of traffic and crime	• Perceived danger in the environment • Safety of unmotorised transport
3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	• Walkability of living environment • Dominance of motorised transport
Health	
4 Focus on targeted interventions such as when children are young, and targeting those most 'at risk'	• General approach to intervention
5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole	• General approach to intervention
6 Focus on the health consequences of obesity, such as diabetes, rather than obesity itself	• Acts downstream of system map and shifts focus away from map
Research	
7 Invest in the search for a highly effective post-hoc solution to obesity – a 'magic pill'	• Reliance on pharmaceutical remedies

The built environment and transport	Interface variables targeted by response
8 Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain	• Scientific consistency
Fiscal incentives	
9 Introduce a tax on obesity-promoting foods	• Market price of food offerings
10 Use fiscal levers to make all organisations/ institutions take some responsibility for the health of their employees (public and private sectors)	• Demand for health
11 Use individually targeted fiscal measures to promote healthier living	• Demand for health
Education	
12 Introduce programmes to increase food literacy and food skills	• Food literacy • De-skilling
Regulation	
13 Control the availability of and exposure to obesogenic foods and drinks	• Food exposure • Food availability
Social structure	
14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society	• Sociocultural valuation of activity • Demand for health
15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity	• Food literacy • Psychological ambivalence
Family	
16 Promote/implement a programme of early interventions at birth or in infancy	• Maternal body composition • Child growth • Breast feeding
17 Penalise parents for the unhealthy lifestyles of their children	• Parental control

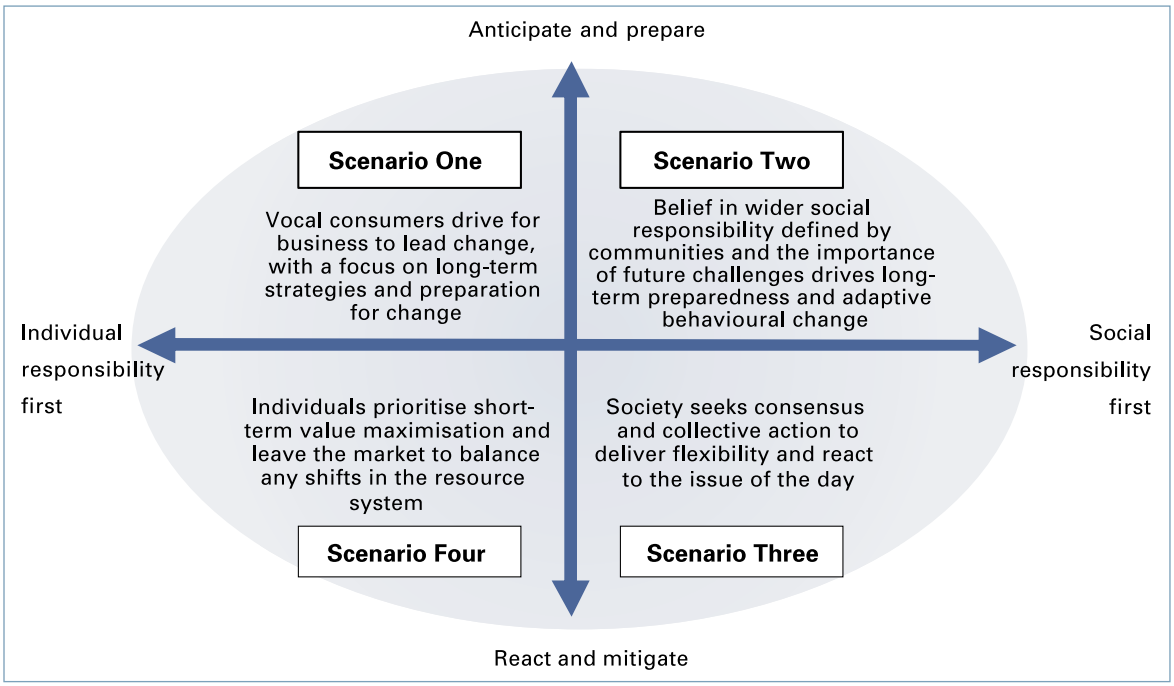
Figure 3: Obesity system map activated by selected policy responses



2.4 Exploring options for policy responses through the scenarios

The 17 response options were tested against the four scenarios (see figure 4) and assessed for their impact on future levels of obesity. A summary of the results is shown in Table 7 and the detailed results are shown in Appendix 4.

Figure 4: Scenario summary



The impact on the prevalence of obesity was assessed by qualitative scoring of the impact the option might have on obesity prevalence within the scenario. (Note: This assessment is aimed at showing how the social, environmental and economic context of the scenarios interacts with each response to affect obesity, rather than the effectiveness of the response itself in treating or preventing obesity. This would require further scientific analysis.) The ability to implement a particular option within each scenario was also considered.

Table 7: Summary of impact of options for policy responses across the scenarios

Key to impact levels: High impact (i.e. reduces obesity prevalence); Medium impact; Low impact; Negative impact (i.e. increases obesity prevalence); No impact.

Response options	Impact on obesity prevalence in scenarios			
	One	Two	Three	Four
The built environment and transport				
1 Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)				
2 Improve perceptions of safety both from the points of view of traffic and crime				
3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)				
Health				
4 Focus on targeted interventions such as when children are young, and targeting those most 'at risk'				
5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole				
6 Focus on the health consequences of obesity, such as diabetes, rather than obesity itself				
Research				
7 Invest in the search for a highly effective post-hoc solution to obesity-a 'magic pill'				
8 Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain				
Fiscal incentives				
9 Introduce a tax on obesity-promoting foods				
10 Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees (public and private sectors)				
11 Use individually targeted fiscal measures to promote healthier living				

Table 7: Summary of impact of policy responses across the scenarios (*Continued*)

Key to impact levels: High impact (i.e. reduces obesity prevalence); Medium impact; Low impact; Negative impact (i.e. increases obesity prevalence); No impact.

Response options	Impact on obesity prevalence in scenarios			
	One	Two	Three	Four
Education				
12 Introduce programmes to increase food literacy and food skills				
Regulation				
13 Control the availability of and exposure to obesogenic foods and drinks				
Soclal structure				
14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society				
15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity				
Family				
16 Promote/implement a programme of early interventions at birth or infant stages				
17 Penalise parents for the unhealthy lifestyles of their children				

Headline observations

Identifying a single, robust and effective response to obesity

There are only seven 'high' impact scores among the 17 options (see table 7), which is just 10% of a possible total number of high scores (i.e. 68, or 17 responses against four scenarios). Furthermore, where an option has a high impact, it may only do so in one or two of the four scenarios. No single option scores maximum impact right across the scenarios. Only seven of the 17 policy responses show some element of positive impact across all the scenarios (i.e. scoring 'low', 'medium' or 'high' in all of them). However, this outcome does not take account of potential additive effects that might be achieved if several of these measures were put in place together. Approximately 26% of the options have no effect or even an adverse effect.

This analysis suggests that it would be difficult for any single response to have a significant impact and that the impact of responses is to a large extent determined by social context. There are also implications for the degree of intervention undertaken and the level of risks that could be adopted by Government.

Overall, these results suggest that finding a robust and effective response to obesity is challenging and that individual policies are unlikely to achieve great impact. A portfolio approach is more likely to be effective, mitigating risk in the face of variable futures.

Responses with a minimal impact on obesity prevalence

A number of the responses were thought to have only a minimal impact in reducing obesity prevalence by 2050 in any of the scenario contexts explored. They include:

- 6 Focus on the health consequences of obesity, such as diabetes, rather than obesity itself
- 7 Invest in the search for a highly effective post-hoc solution to obesity – a 'magic pill' [in one scenario, this appeared to increase obesity]
- 11 Use individually targeted fiscal measures to promote healthier living [in one scenario, this response also had a negative effect]
- 12 Introduce programmes to increase food literacy and food skills
- 17 Penalise parents for the unhealthy lifestyles of their children [this response also had a negative effect in one scenario].

There are a number of reasons why this could be the case. For example, for 6 and 7, the low impact on obesity arises from the focus shifting to diabetes rather than obesity. In the case of option 12 may have little impact alone but is a key enabler of other interventions.

Responses with significant impact on obesity levels

Table 8 shows the responses that had significant impact (i.e. 'high' or 'medium') in one, two, three or all scenarios.

Table 8: Responses with significant impact on obesity prevalence

Impact	Response	Comments
Significant impact in all scenarios	**16** Promote/implement a programme of early interventions at birth or in infancy	
Significant impact in three scenarios	**3** Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	Effective in all but Scenario Four, though it still has a positive impact there
	10 Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees (public and private sectors)	Effective in all but Scenario One
Significant impact in two scenarios	**1** Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	Effective in Scenario One (at least in public spaces, where Government might have some control over planning procedures) and Scenario Two. Both are futures with a long-term focus
	4 Focus on targeted interventions such as when children are young, and targeting those most 'at risk'	Effective in Scenarios Two and Three
	5 Implement population-wide interventions i.e. focusing on improving the health and well-being of the population as a whole	Effective in Scenarios One and Two, which are both long-term futures with an emphasis on preparation and an acceptance of the need to act, even in the absence of complete evidence. This response was thought to have a negative impact in Scenario Four, where it would increase stigmatisation about obesity.
	13 Control the availability of and exposure to obesogenic foods and drinks	Effective in Scenarios Two and Three
	14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society	Effective in Scenarios Two and Three, where social responsibility is prioritised and accepted
Significant impact in one scenario	**8** Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain	Effective in Scenario One
	1 Introduce a tax on obesity-promoting foods	Effective in Scenario Two
	15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity	Effective in Scenario One

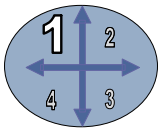
This analysis indicates that, in general, these options are highly sensitive to social context, particularly those seen to be effective in only one scenario. The implementation of such options would require close monitoring of trends in UK society to ensure that they were applied when they could be most effective. The only option effective in all scenarios (option 16) has an influence on underlying biological systems, which will not vary across the scenarios in the period under consideration (although there will be differences in implementation across the scenarios and this is reflected in the high-/medium-impact rankings).

The responses that could be termed the most scenario-dependent or scenario-sensitive (i.e. their impact correlates strongly with changes in the social context) are responses 1 – *introducing health considerations into all planning procedures* – and 5 – *implementing population-wide interventions*. The qualitative ranking for these responses across the four scenarios ranged from 'high impact' to 'negative effects'. Both these policies are systemic in nature, focusing on 'changing the rules of the game'[2](as described in the systemic clustering of the response ideas in Section 2.4 (b)), and the ability to implement and the mechanism of implementation both vary significantly and add to the varying impacts.

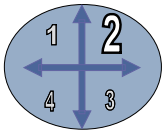
Table 7 shows that the scenario axes themselves affect the impact of the responses. The most significant correlation in impact occurs in those scenarios where social responsibility is prioritised i.e. Scenarios Two and Three, suggesting that, in some ways, it is the 'social responsibility' aspect that dictates the effectiveness of a policy option rather than whether they have a short- or long-term planning perspective.

In general, the long-term view seen in Scenarios One and Two benefits childhood obesity prevalence, with a significant eventual impact on population obesity. There are also similarities between Scenarios Three and Four (where rankings are clustered around low, neutral or negative impacts), which implies that, if a short-term approach is taken, a similar result is generated, regardless of societal behaviours (at least at the population level).

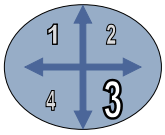
The scenario context: generating impact on obesity prevalence



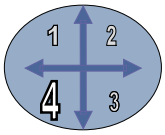
Scenario One (individual responsibility prioritised; long-term preparation for challenges) shows the greatest variation in terms of policy impact. This would suggest that the type of policies need to be carefully selected, and that, although significant successes can be achieved, with five 'negative impact' scores, there is a high risk of some options having unintended consequences and adversely affecting obesity prevalence.



Scenario Two (social responsibility prioritised; long-term preparation for challenges) is judged to provide the most conducive environment for policy effectiveness, with four responses graded as having a high impact on obesity in this context. None of the 17 responses were considered to have a negative impact on obesity. This partly reflects societal attitudes to intervention, for instance, people being more willing to accept intervention, more likely to instigate changes themselves and more likely to encourage this attitude in others, and may also be a consequence of narrowing inequalities in society generally. It may reflect the cultural biases of the workshop participants, who may have favoured a community-driven, sustainable-thinking type of environment.



In **Scenario Three (social responsibility prioritised; short-term reaction to challenges)**, only one of the 17 options is ranked as having a high impact on obesity levels. The majority of qualitative scores are for a low, although still positive, impact. This suggests that it may be difficult to achieve any great successes in this scenario, but the big risk is that many responses may have to be implemented to demonstrate that action is being taken, but with none having a big impact. None of the 17 responses were considered to have a negative impact in this scenario. A significant dimension here is time – people are not prepared to wait to see the impact in this scenario, so responses are unlikely to be sustained. The over-reliance on treatment will also affect the ability to introduce preventative measures.



In **Scenario Four (individual responsibility prioritised; short-term reaction to challenges)**, many responses do not have any impact on obesity prevalence at all, primarily because it would be impossible to implement them since Government has a smaller role in this scenario and is limited in the interventions it can make. The few positive responses are based around the exertion of fiscal levers or targeting the wealthy (who are seeking to improve their health anyway). The one exception is interventions at birth or in infancy. This was thought to be achievable because there would still be some health support for pregnant mothers, even if other healthcare was more difficult to obtain.

This brief assessment suggests that the **socially responsible** approach appears to be key in determining impact, and that, overall, the greatest impact is created in **Scenario Two**, followed by Scenario Three – although there is a sense that impact could be enhanced in Scenario Three. Scenario One is very sensitive to the type of response implemented, and Scenario Four tends to be difficult for Government to work in (the focus would probably have to be more on facilitating action from the private sector).

So the way in which policy makers will need to work will be very different across the scenarios, particularly in terms of directive/enabling interventions, partnership working and working through others, a focus on health and therefore on health policy, and so on.

2.4 (a) Interaction between the scenarios and the policy response options

This section discusses how the scenarios dictate the effectiveness of the types of policy option in more detail and outlines those options of the 17 tested that might be most effective in meeting the obesity challenge within each scenario (i.e. they scored 'high' or 'medium' in terms of their impact on obesity). Tables 9–12 outline the response portfolios for Scenarios One to Four respectively.

Scenario One

Baseline obesity prevalence: qualitative assessment of obesity change from today's trajectory (assuming no government intervention)

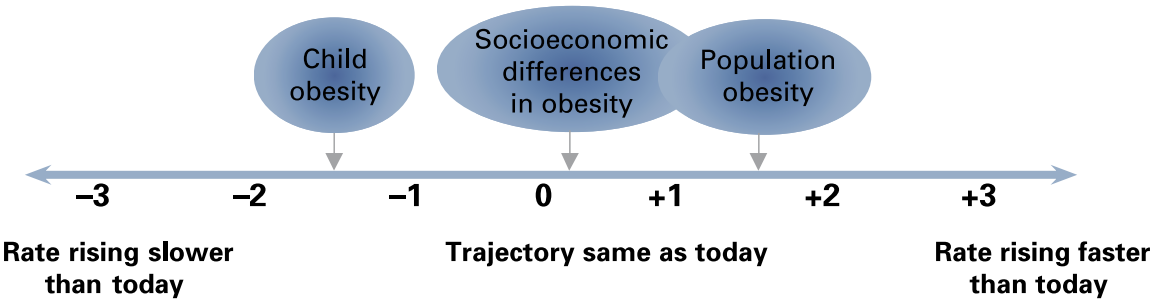


Table 9: Scenario One response portfolio

	Effective responses	Comments/trade-offs
THE BUILT ENVIRONMENT	**1** Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	• Lack of ability to implement this option would be the barrier to its achieving its greatest potential in this scenario as it would depend on building ownership. It may be implemented, however, because businesses recognise the importance of delivering health, both in terms of productivity concerns and legal liability • It would only have impact in public spaces, with little impact on 'domestic' space because there would be no motivation to change
	3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	• However, the drive to achieve this may lead to gated communities that enforce disparities and may escalate a perception of fear and risk
HEALTH	**5** Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole	• This is a future of mass customisation, so population interventions are difficult, but policy could be implemented by linking personalisation to economies of scale • The need to consider the trade-off would be in terms of cost or in loss of social freedoms
RESEARCH	**8** Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain	• The investment community is likely to be interested in this policy because it would minimise its liability. It would also be part of health insurance packages to bring in feedback, assessment of risk and common standards • It is likely to operate at a personal level with a focus on providing immediate feedback around diet and exercise
SOCIAL STRUCTURE	**15** Invest in technology to support informed individual choice, including devices to help monitor diet, activity	• Investment in technology would focus on methods of feedback to an individual e.g. 'smart refrigerators' technology (providing citizens with immediate feedback on their consumption patterns), and also in the field of nanotechnology and materials (for example, fundamentally to change the ways in which the body interacts with foods of specific composition) • The success of this response would depend on the ease with which the technology could be over-ridden or ignored (i.e. incorporated into insurance packages or used on a voluntary basis) and on the level of individual psychological ambivalence towards obesity
FAMILY	**16** Promote/implement a programme of early interventions at birth or in infancy	• Government would be less likely to implement these interventions – business is more likely to take the lead because of the market opportunity in producing appropriate products. Demand would come from consumers as a result of widespread concern about long-term and generational effects

Observations

The response portfolio for Scenario One reinforces the decrease in the trajectory of child obesity levels already apparent in the baseline assessment, particularly through policy option 16. This portfolio also exploits the longer-term focus in this scenario i.e. the focus on the built environment and population-wide health interventions, and this might address the increase in absolute numbers of the obese over the full scenario time period and also through generations. However, some of the responses in the portfolio may increase socioeconomic divides, particularly those around the built environment and transport.

Companies will have an interest in their potential impact on public health in this scenario. Individually targeted measures would be likely to be delivered almost entirely through private health insurance and a focus on corporate social responsibility (CSR).

The Government is less interventionist in this scenario (which explains the lack of regulation-focused responses in the portfolio), but it would have a role in setting standards to facilitate the emergence of a CSR-orientated framework and a global code of conduct to help companies include health in their strategies and in defining the nutritional/activity standards with which consumers could assess different products and services.

Scenario Two

Baseline obesity prevalence: qualitative assessment of obesity change from today's trajectory (assuming no government intervention)

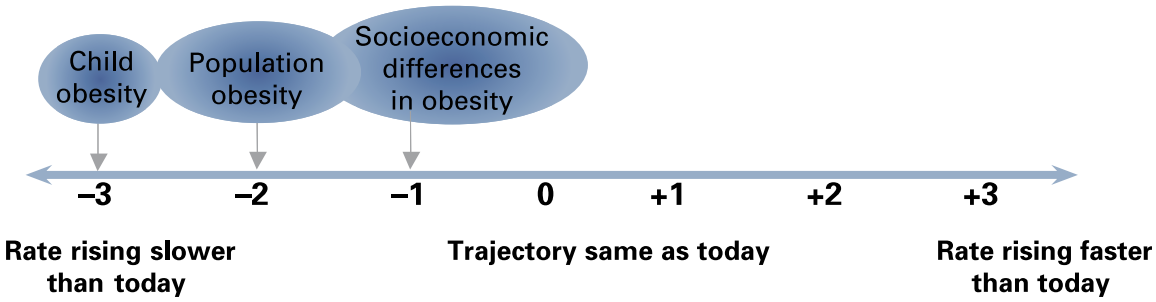


Table 10: Scenario Two response portfolio

	Effective responses	Comments/trade-offs
THE BUILT ENVIRONMENT	**1** Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	• This would be a precondition to most policies in this scenario and a consequence of a different approach to health
	3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	• There may be difficulties in resolving the needs of less-mobile members of the community, such as the disabled, the old, or those with young children, with the drive to walk or cycle
HEALTH	**4** Focus on targeted interventions such as when children are young, and targeting those most 'at risk'	• It would be necessary to persist over the long term with this response. However, in this scenario, being healthy is perceived as a civic duty and therefore added 'peer pressure' could work to help improve the worst cases. This would bring the risk of stigmatisation of the target groups, which could have negative consequences
	5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole	• Inequalities would need to be resolved – through response 4 – before implementing this response • This is also a slow-acting, long-term response
FISCAL INCENTIVE	**9** Introduce a tax on obesity-promoting foods	• A tax on obesogenic foods would be possible to implement this response option successfully, but it might be a somewhat regressive tax and would only be acceptable to the public as a whole when embedded in a comprehensive set of measures. The use of a system of differential pricing, rather than 'taxing', to stimulate healthier food choices i.e. incentives for good products rather than taxes on bad ones, may be a more acceptable fiscal incentive
	10 Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees (public and private sectors)	• This would help create collective action but would increase the burden on business
REGULATION	**13** Control the availability of and exposure to obesogenic foods and drinks	• Due to the type of collectivism that would exist in this scenario, controlling the availability of obesogenic foods could be done without having to resort to extensive regulatory measures. Measures could be instigated through Government setting examples of 'healthier living conditions' in public institutions. This would require minimum regulations to be issued in order to create momentum. It would take time to build impact
SOCIAL STRUCTURE	**14** Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society	• This could feel like indoctrination if not handled carefully, but in this scenario society is willing to accept more directive measures. However, some will still 'opt out'
FAMILY	**16** Promote/implement a programme of early interventions at birth or in infancy	• Instilling healthy eating norms at birth and in the early life stages would be a priority: investing in the young would be seen as important. This approach fits well with option number 4 and the long-term outlook

Observations

The obesity trajectory appears to be improving in Scenario Two, particularly for children. Additional interventions through the implementation of the policy portfolio may accelerate this improvement over the long term. The challenge with adopting many of these measures is that they may not have any obvious impacts within the shorter term. However, the long-term view prevalent in Scenario Two would mean society would be prepared to accept this short coming. It might still be important to adopt some shorter-term measures in order to generate examples of good practice and create and maintain an environment that would motivate people to sustain action. A significant barrier to implementation and sustaining the response in this scenario is the patchy nature of local delivery.

A focus on, and investment in, children and the young is a feature of this scenario and would drive an approach targeted at early life stages.

There is a different approach to work in this scenario. The notion of combining work with lifestyle issues may be important, leading to shifting patterns of work. Providing incentives, guidelines and regulations for the private sector would be a top priority as an additional policy instrument to achieve change in this scenario.

Scenario Three

Baseline obesity prevalence: qualitative assessment of obesity, change from today's trajectory (assuming no government intervention)

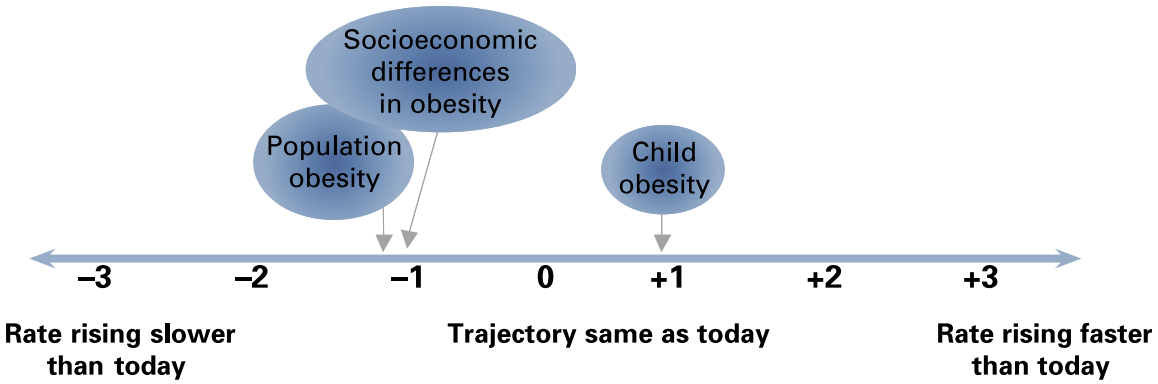


Table 11: Scenario Three response portfolio

	Effective responses	Comments/trade-offs
THE BUILT ENVIRONMENT	**3** Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	• Difficulties in this response may be in the evenness of implementation. It would only have significant impact if the community applied it systematically
HEALTH	**4** Focus on targeted interventions exploiting 'windows of opportunity' such as when children are young, and targeting those most 'at risk'	• This response, if sustained, should have a high impact on those targeted but it would have less of an effect on overall population obesity levels due to a general lack of sustained responses in this scenario
FISCAL INCENTIVES	**10** Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees (private and public sectors)	• Providing fiscal incentives to institutions for promoting healthy eating and activities will be important • This would probably be implemented via institutions, with Government in a supporting or facilitating role • In this future, rewards are considered to be more effective than penalties, although at the corporate level, penalties may be applied
REGULATION	**13** Control the availability of and exposure to obesogenic foods and drinks	• This would result in loss both of choice and of a certain level of social freedom, although this would be acceptable in Scenario Three
SOCIAL STRUCTURE	**14** Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society	
FAMILY	**16** Promote/implement a programme of early interventions at birth or in infancy	• This response would generate effective impacts on children, but the effect may be different on other age cohorts. Delivery is likely to be patchy in such a response, which needs a generation before the impacts can be fully revealed

Observations

Obesity would be less of a priority in this scenario because society is in a more reactive mode always dealing with the most immediate challenge. This can be seen in the baseline assessment for child obesity, which worsens. Despite slight improvements in population levels, it was felt that none of the policies tested against this scenario would ultimately make a great deal of difference because they would not be well implemented or sustained (all responses have a medium impact at best).

It may therefore be increasingly important to make links with other issues that would have second-order impacts on obesity, for instance, making car use less attractive, congestion charging, the 2012 Olympics taking place in London, 20mph speed limits in cities. However, it would be critical to steadily introduce these activities/efforts over time to create indirect sustained impact, otherwise the risk of loss of impact would be high. The built environment may be changed to adapt to congestion, and the challenge would be, at some level, there needs to be a recognition of how the benefits of such policies might be linked to health. It would therefore be very important to understand how different drivers of obesity interact to ensure that related issues are exploited most effectively and to guard against any unexpected consequences of relying on this approach.

In Scenario Three, near-term shocks or crises would be the trigger that would drive people to react and enable the implementation of new policies. It would be critical to support local momentum and create cohesion and vibrancy around issues so that they become the focus of immediate action. It would also be critical to be able to react quickly and be opportunistic and exploit events that shake the ambivalence around obesity.

Partnerships within Government and between the Government, the private sector, non-governmental organisations and other groups would be essential to achieving impact in this scenario but this would create a risk of slow progress and difficulty in establishing a shared objective.

Scenario Four

Baseline obesity prevalence: qualitative assessment of obesity, change from today's trajectory (assuming no government intervention)

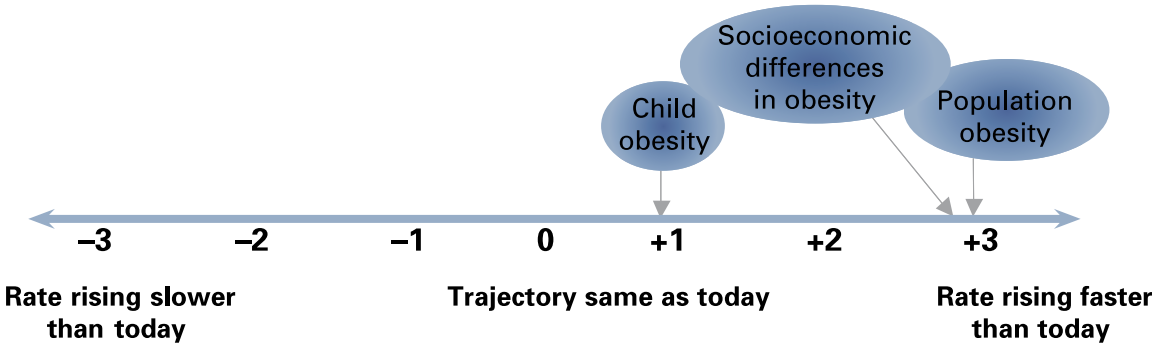


Table 12: Scenario Four response portfolio

	Effective responses	Comments/trade-offs
FISCAL INCENTIVES	**10** Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees (public and private sectors)	• This response may put the individual under extreme and conflicting demands in the workplace. For example, in the working environment, individuals may be expected to deliver efficiently and effectively within a competitive environment, while at the same time they could be expected to adopt a 'healthy lifestyle'. Job descriptions might include health outcome requirements
FAMILY	**16** Promote/implement a programme of early interventions at birth or in infancy	• Possibly the market may take over completely and lead campaigns directed at new mothers and babies, but it is also likely to be part of the limited public health service in this scenario. There are risks that this would be unevenly implemented due to social inequalities and also unlikely to be as sustained as other scenarios due to the short-term mindset in this scenario

Observations

This is a society focused on the short term. Therefore many of the responses would have very limited impact. In fact, only two of the 17 options are included within the Scenario Four portfolio. The focus for options in this scenario would be fiscal measures and partnerships with the business community or with global institutions that focus on trade. The majority of the 17 responses tested would need to be adapted significantly in order for them to be implemented successfully in this scenario. The greatest impacts are likely to arise where individuals are made to pay directly for their (health) decisions. Being opportunistic would also be important in this scenario.

Standards (e.g. 'kitemarks') would be a key policy lever in this type of future. Government may focus on setting the standards that businesses adopt in order to appeal to the health conscious. However, the development of standards would be a highly reactive process, prompted principally by consumer complaints.

This scenario features significant socioeconomic divides and therefore health inequalities. This means there would be a considerable risk of unexpected, diverse and possibly negative consequences for any policy implemented. Some options, such as gated communities, could be developed to make people feel safer and may be beneficial to the wealthy in health terms, but will actually make things worse for the less well-off.

2.4 (b) Analysis by policy domain

The 17 options cluster into eight domains of policy activity (see Section 2.2.). This section captures some observations and ideas that emerged regarding the development of implementation strategies within these domains.

The built environment and transport

Table 13 summarises the analysis of the built environment and transport policy domain.

Table 13: The built environment and transport summary	Scenario One	Scenario Two	Scenario Three	Scenario Four
1 Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)				
2 Improve perceptions of safety (from the points of view of traffic and crime)				
3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)				

- Policies in this area have to be based on the assumption that the built environment can be changed. Whether this is true and what might catalyse this change requires further exploration. It is unlikely that change to the built environment would occur for reasons of obesity or health alone, but environmental concerns might drive change. Obesity targets might therefore benefit indirectly from policies aimed at tackling congestion and fuel consumption. This is therefore an important area for cross-departmental/ disciplinary action and synergy.
- The impact of responses that target the built environment and transport appear to be uncertain, as the evidence on which to base a judgement is sparse,[4] but it is likely that the societal and decision-making context would be critical to ensuring impact.
- The complexity of ownership of the built environment would be a fundamental barrier or enabler for any options in this policy domain, as it would add further complexity to implementation, making it more difficult to generate co-ordinated impact. This could also affect the timing of change. For example, it might be easier to create a co-ordinated approach to publicly owned space than to space that is privately owned (see the Tackling Obesities: Future Choices – Obesogenic Environments. Summary of Discussion Workshop report).[5]
- There would be a greater change in impact where there are sizeable new developments if different design approaches could be included from the start. These example developments would provide opportunities for case studies to examine the success/failure of different approaches, and would also provide the much-needed data critical to progress. It would be harder to introduce change

where the renewal of existing infrastructure may take the full course of the scenario time period.

- The economic costs of delivering responses in this area would need to be carefully considered and a judgement made as to whether changes were cost-effective. In making these judgements, it would be critical to consider the long-term economic benefit and the potential breadth of impact across many policy domains, as well as considering who would bear the initial capital costs.
- The possibility of generating unexpected or negative consequences through systemic changes in the built environment would need to be considered. Most seem to arise because of differing impacts that are dependent on socioeconomic status. For instance, improving perceptions of safety would generate a highly positive impact for the wealthy in Scenario Four. However, increasing walkability could have a negative impact on the poorer sections of society in Scenario One. Engineering the environment to be more physically demanding might also mean disadvantaging those with disabilities.

Health

Table 14 summarises the analysis of the health policy domain.

Table 14: Health summary	Scenario One	Scenario Two	Scenario Three	Scenario Four
4 Focus on targeted interventions, , such as when children are young, and targeting those most 'at risk'				
5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole				
6 Focus on the health consequences, such as diabetes, rather than on obesity itself				

- Many of the options concerning health would only be successful if the focus is on long-term sustained intervention and if society is prepared to wait to see an impact (possibly for a generation). The ability to implement the policy would be a significant factor in defining success.
- Targeted interventions have a positive impact in all scenarios – high or medium in socially focused scenarios, and low in individualistic scenarios. However, this assumes the ability to define, identify and successfully intervene without the risk of increasing ambivalence around health and/or stigmatisation. The ability to identify 'at risk' groups is also likely to be scenario-specific, as this requires some foresight and the establishment of data-gathering processes, which are less likely to exist in the short term/treatment-focused worlds.

- Stigmatisation is a particular risk in some scenarios and is a contributing factor to the negative impact assessment for population-wide interventions in Scenario Four.

Research

Table 15 summarises the analysis of the research policy domain.

Table 15: Research summary	Scenario One	Scenario Two	Scenario Three	Scenario Four
7 Invest in the search for a highly effective post-hoc solution to obesity- a 'magic pill'				
8 Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain				

- Focusing on the development of a 'magic pill' is a costly high-risk approach, both because the treatment/test may not in fact be found and because it would be costly to supply. Although the benefits could be significant, investment in a 'magic pill' may have a highly negative effect if it takes the focus off obesity itself – i.e. if less was done to reduce the risk of becoming obese in the first place.
- Evaluation was considered a key enabling response for all scenarios, even though its individual impact is low. High impact was seen where the principles of evaluation and feedback were built into the corporate healthcare system of Scenario One.

Fiscal incentives

Table 16 summarises the analysis of the fiscal incentives policy domain.

Table 16: Fiscal incentives summary	Scenario One	Scenario Two	Scenario Three	Scenario Four
9 Introduce a tax on obesity-promoting foods				
10 Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees (public and private sectors)				
11 Use individually targeted fiscal measures to promote healthier living				

- The consideration of fiscal levers on food production would require research on where and how they should be targeted and in the criteria used to define healthy and unhealthy foods. The effectiveness of these fiscal levers would depend on the ability of consumers to substitute targeted products for something more (or less) healthy, price elasticity and the ability to successfully target measures without disproportionately affecting the less wealthy.
- Whether fiscal levers are penalties or rewards may depend on the scenario context and the specific measure taken.
- In Scenario Four, fiscal levers may be the only feasible option due to the difficulty of implementing other options.
- Some fiscal levers may increase the stigmatisation associated with obesity and could therefore have unexpected negative impacts on obesity prevention and treatment.

Education

Table 17 summarises the analysis of the education policy domain.

Table 17: Education summary	Scenario One	Scenario Two	Scenario Three	Scenario Four
12 Introduce programmes to increase food literacy and food skills				

- Responses in this category had less impact on obesity levels than might have been expected. However, there was a sense that education might be critical to ensuring the success of other options. Education options may have more positive impacts over the very long term; in the short term, the effects may only be superficial.
- In some scenarios, education options were used to demonstrate that action was being taken: a symbolic response and an achievable target.

Regulation

Table 18 summarises the analysis of the regulation policy domain.

Table 18: Regulation summary	Scenario One	Scenario Two	Scenario Three	Scenario Four
13 Control the availability of and exposure to obesogenic foods and drinks				

- The ability to implement a policy such as option 13 would depend on the acceptability of such measures in UK society. The costs of restrictive regulation would include reduction in choice, which may be considered unacceptable in the more individualised Scenarios One and Four but acceptable in Scenarios Two and Three.
- The option used to represent this policy domain (control the availability of and exposure to obesogenic foods and drinks) had variable impact, ranging from neutral in Scenario Four, where it would be unlikely to be consistently implemented, through to high in Scenario Two, where a directive, restrictive approach would be demanded by society.
- The cost to industry of responses such as this may influence governmental decisions, particularly in Scenarios One and Four.

Social structure

Table 19 summarises the analysis of the social structure policy domain.

Table 19: Social structure summary	Scenario One	Scenario Two	Scenario Three	Scenario Four
14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society				
15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity				

- Normative behaviour in the UK is very important for options concerning this policy domain. In the individual-focused scenarios, the diversity of behaviours would be so great that it would be difficult to establish or define the 'norm'. It suggests a segmentation approach, which would bring implementation and targeting challenges. Impacts can be seen in Scenarios Two and Three across the population but also in communities that decide to act for themselves in

effecting change. In Scenarios One and Four, this would be restricted to small focused communities or groups.

- In the individualistic scenarios, there would also be a significant risk of messages being lost in the flood of information available.
- Technology supporting individual choice may have a minor supporting role in this area in terms of facilitating behavioural shifts, although they were shown not to be sufficient when implemented alone, except in Scenario One, where such devices were built into the evaluation and feedback mechanisms of private healthcare systems.

Family

Table 20 summarises the analysis of the family policy domain.

Table 20: Family summary	Scenario One	Scenario Two	Scenario Three	Scenario Four
16 Promote/implement a programme of early interventions at birth or in infancy				
17 Penalise parents for the unhealthy lifestyles of their children				

- Early-life interventions in market-orientated scenarios would probably be delivered through companies targeting mothers and babies because they represent a commercial opportunity. However, this could lead to disparities due to the affordability of products and services.
- In Scenarios One and Two, intervention would be driven by a perception that early life represents a window of opportunity in which to intervene for health in the widest sense, while in Scenarios Three and Four, interventions would be targeted at specifics, such as obesity. There would also be a timelag before the effect of these interventions could be seen.
- Since the BMI of parents is the best predictor of child obesity, it makes sense to target them. However, family frameworks will change in the future and it will be critical to appreciate social structures other than the family (e.g. online social networks) and look at other key influences (e.g. peers and celebrities).
- It would be better to focus on educating parents, to support them in parenting, rather than penalising them. However, none of the scenarios were considered very helpful contexts in which this could happen.

2.4 (c) Ability to implement

Table 21 shows how the scenarios impact on the ability to implement the different response options and comments on particular characteristics of the response option or issues faced under the different scenario conditions. The ability to implement policies is highly scenario-dependent. There are definite divides between what is possible in the long-term focused scenarios compared to the short-term focused scenarios and between individualistic and community-driven worlds. In general, most responses are possible in Scenario Two and fewest in Scenario Four.

No responses were considered impossible to implement in any of the scenarios, but the more directive the response the less likely it is to be possible to implement it, with some only possible in Scenario Two. Three responses seem possible in all scenarios – targeted health interventions, early-life intervention and increasing the responsibility of employers for employees' health – although they would be implemented in different ways and would be easier to implement in some scenarios than others.

This suggests that monitoring and responding to the social context is fundamental to deciding which policy portfolio to adopt and in managing expectations over what impact can be achieved. It also suggests that different ways to deliver these policies may have to be found, e.g. working through other institutions or in partnership, otherwise it will not be possible to introduce a full portfolio of obesity policies.

Table 21: Impact of different scenarios on the ability to implement the response options

Response	Scenario One	Scenario Two	Scenario Three	Scenario Four
1 Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	Business recognises the need, so implementation is possible, though patchy	Implementation is very likely as systemic change is a large part of this scenario	Implementation is unlikely due to short-term thinking in this scenario	Implementation is unlikely because of short-term mindset and importance of particular economic drivers
2 Improve perceptions of safety from the points of view of traffic and crime	Implementation is difficult in a world of greater inequalities, where crime may increase but is a high priority in this risk-averse society	Implementation is likely	Implementation is possible	Implementation is possible but patchy (gated communities for some in society would be seen as a market opportunity)
3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	Implementation is possible but more likely to be patchy in affluent areas	Implementation is very likely	Implementation is possible	Implementation is unlikely (linked to options 1 and 2)
4 Focus on targeted interventions, such as when children are young, and targeting those most 'at risk'	Implementation is possible and driven by search by business for niche markets	Implementation is very likely	Implementation is possible (given the focus on specific groups in this scenario)	Implementation is possible, with focus on children, but symbolic value rather than significant impact
5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole	Implementation is difficult unless personalisation is linked to economies of scale	Implementation is likely (in tandem with option 4)	Implementation is unlikely (as there would be no quick results from this response)	Implementation is possible but limited to symbolic generic information campaigns
6 Focus on consequences of obesity, such as diabetes, rather than obesity itself	Implementation is possible if better predictors of chronic disease exist	Implementation is unlikely (focus on prevention)	Implementation is very likely	Implementation is very likely (through private healthcare)
7 Invest in the search for a highly effective post-hoc solution to obesity – a 'magic pill'	Implementation is possible and highly likely	Implementation is unlikely (focus on prevention)	Implementation is possible as pill would be perceived to 'fix' problem	Implementation is likely if seen as a market opportunity by the private sector. It would not be taken forward by Government
8 Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain	Implementation is likely as a means to reduce liability	Implementation is likely as evaluation is seen as an essential tool for measuring success against targets	Implementation is unlikely	Implementation is very unlikely
9 Introduce a tax on obesity-promoting foods	Tax is unlikely but subsidy system is possible	Implementation is likely	Implementation is unlikely	Implementation is possible (the only lever Government might have?) and some changes to subsidy system may be made

Table 21: Impact of different scenarios on the ability to implement the response options (*Continued*)

Response	Scenario One	Scenario Two	Scenario Three	Scenario Four
10 Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees (public and private sectors)	Implementation is difficult for Government, but companies take it on themselves due to CSR becoming the norm	Implementation is likely	Implementation is possible but through other institutions	Implementation is possible through tax breaks for companies with health schemes
11 Use individually targeted fiscal measures to promote healthier living	Implementation is likely as long as it is through the insurance industry	Implementation is likely, but only as part of option 4 implementation	Implementation is unlikely	Implementation is likely (as part of personalisation agenda)
12 Introduce programmes to increase food literacy and food skills	Implementation is highly likely	Implementation is highly likely	Implementation is possible but with some difficulty as the approach is unlikely to be sustained	Implementation is highly likely (all Government can do in this scenario)
13 Control the availability of and exposure to obesogenic foods and drinks	Implementation is likely in particular circumstances e.g. in schools or if particular retailers decide to adopt this policy for business reasons	Implementation is likely	Implementation is unlikely	Implementation is unlikely (choice is too large a driver here)
14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society	Implementation is not possible	Implementation is likely as a directive approach underpins the general approach to policy making in this scenario	Implementation is possible	Implementation is not possible
15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity	Implementation is very likely	Implementation is unlikely	Implementation is unlikely	Implementation is very likely (big market opportunities)
16 Promote/implement a programme of early interventions at birth or in infancy	Implementation is likely as part of personal health drives	Implementation is highly likely	Implementation is possible	Implementation is possible (one of the few remaining public health activities and also through private healthcare)
17 Penalise parents for the unhealthy lifestyles of their children	Implementation is possible but only through use of 'health missionaries'; hard to enforce	Implementation is unlikely (though there may be the indirect impact of social pressure to conform)	Implementation is unlikely (unworkable as defining or measuring 'unhealthy lifestyle' is not straightforward, therefore it is unclear what short-term 'success' would be)	Implementation is very likely (as part of child protection policy)

2.4 (d) Inequalities

This has emerged as a key dimension. There are significant differences in inequalities across the scenarios that allow the comparison of different social divides and their effect on the impact of response options.

Inequalities impact on the effectiveness of all responses to some extent. Although the impacts are more apparent in Scenarios One and Four, in which socioeconomic differences are more of an issue, there are inequalities implications of a different sort in Scenarios Two and Three. For example, in Scenario Two, inequalities between different communities become a key issue. The implication is that the effectiveness of the various options will depend on where you live. For Scenario Three, issues tend to be addressed if there are enough people affected within the community, and so inequalities arise as a consequence of less prevalent issues being disregarded.

Table 22: Describes some of the key socioeconomic inequalities issues that emerged in this analysis.

Table 22: Socioeconomic inequalities issues

Policy domain	Inequalities dimension
The built environment and transport	The impact of these options was moderately affected by inequalities. In Scenarios One and Four, there are implications for the ability of different groups to afford 'healthy' private space and also differences in the way the aims of the policy might be met, i.e. a more individualistic society would tend to address issues of safety by using forms of transport that 'separate' them from a perceived risk and it would be easier for the more wealthy to do this
Health	Inequalities were a significant issue for Scenarios One and Four, but it is possible that health inequalities may get lost among wider concerns about divisions in society. There are important implementation concerns that may require the tackling of inequalities first, as part of a wider strategy
Research	The key issues raised here related to access to the results of research – particularly access to a 'magic pill' solution in Scenarios One and Four, where private healthcare provision is dominant
Fiscal incentives	Income is a significant issue affecting the impact of these options. If the focus is on incentives targeted at the individual, the impact in Scenario One is likely to be greatest on the middle classes via access to health insurance. There is often no impact, or an adverse impact, on poorer societal groups. This type of policy option could reinforce inequalities if not carefully designed
Education	No specific issues emerge for these options, but this is assuming that access to education is equal for all members of society
Regulation	Controlling exposure to obesogenic foods and drinks may have different impacts on different social classes. For example, in Scenario One, the impact is greatest on the more affluent, who have more flexibility with regard to choice
Social structure	Access to new technologies would have a socioeconomic dimension. It is also important to consider how pervasive a common 'cultural norm' is. This is less likely to be the case where there are significant inequalities
Family	Inequalities will be a key factor in implementation difficulties, and approaches for these options would affect changes in behaviour with regard to the uptake of services. This can be seen in Scenario One. The issue of stigmatisation also becomes critical here – attitudes to stigmatisation vary across the scenarios

3 Emerging messages

The output of this analysis highlights a number of challenges to the achievement of sustained success in tackling obesity levels, but it also suggests a number of options that could have a positive impact on obesity.

The obesity baseline assessment shows how obesity levels are likely to continue to rise in all scenarios. However, in some scenarios the rate of increase varies. Critical factors are the relative priority given to the prevention versus treatment of health conditions and the extent of health inequalities. The lowest rate of increase in obesity was seen in the scenario with least inequality and where obesity prevention approaches were prioritised.

The top five options for policy response with the greatest average impact on obesity prevalence across the scenarios were:

- increasing the walkability/cyclability of the built environment (option 3)
- using targeted health interventions for those at increased risk – dependent on the ability to identify these groups, and when followed up by population-level public health interventions (option 4)
- controlling the availability of and exposure to obesogenic foods and drinks (option 13)
- increasing organisational responsibility for employee health (option 10)
- implementing early-life intervention programmes (option 16).

However, there was no single response that generated a high impact on obesity levels in all scenarios. This shows the amount of change that might be needed to tackle rising obesity levels and suggests that it is important to implement a portfolio of policies that, together, would have greater impact.

This requires co-ordinated action across different areas of policy activity, balancing trade-offs where necessary. This is particularly relevant when considering how the implementation of some options were dependent on other policy agendas (e.g. changes to the built environment are more likely to be driven by concerns over congestion, energy usage and environmental sustainability). Therefore obesity policy needs are met indirectly through intervention and interaction with another policy priority.

The analysis also revealed that there are a number of options that are 'necessary but not sufficient' for tackling obesity, that is, their own impact is limited, but they contribute to the impact or effectiveness of other interventions. Education-related interventions are examples of this.

Intervention in early life generated the highest average impact across all scenarios. Greatest success was achieved in scenarios where a long-term approach prevailed. It was in these scenarios where it was possible to implement and

sustain a life-course approach to prevention but also where society was prepared to measure success over longer timeframes. These were also the scenarios where it was possible to think across generations. In the scenarios that prioritised short-term solutions, the impact of such approaches was less, due to a lack of a sustained response.

There was significant variation in the level of impact achieved across the different scenarios. This highlighted a number of important issues:

- **How responses are implemented** is important and will make a difference to the level of impact achieved on obesity levels. Some scenarios would be particularly challenging environments in terms of policy implementation, either due to social attitudes, the structure of the delivery chain or other physical barriers. For example, some of the options that ranked highly for impact may not be considered acceptable by society and it would therefore not be possible to implement these at all. The mechanism of implementation would also vary considerably across the scenarios – for example, the balance between public and private sector delivery mechanisms – which suggests that different ways delivering these policies may have to be found. Working through other institutions or in partnership might be necessary – otherwise it would not be possible to introduce a full portfolio of policy options. Unexpected implementation effects could also lead to undesirable impacts, seen, for example, in the attempt to improve perceived safety in the built environment in Scenario Four, which resulted in people retreating to their cars and automated transport modes, further decreasing their activity levels.
- **Social context and attitudes** to obesity affect the potential impact of a response and its acceptability to society. A key trigger for the different scenarios and outcomes is how people feel about their lives, their fears, their sense of control and what their attitudes are.
- **Variation in health inequalities** (and attitudes to this) was a significant factor in determining the impact of different options. Some policies benefited particular groups but made the problem worse for others. It is also important to note that, while interventions targeted at those most at risk were useful, they risked increasing stigmatisation. Population-wide treatments may promote the normalisation of behaviours that are the ones society is trying to prevent.
- **There is a risk of a negative effect in some circumstances.** The analysis highlighted some circumstances where obesity levels increased as a consequence of a particular policy option. This does not suggest that any of the options are inherently wrong but shows how the implementation challenge and social context are so critical for success. Often these negative effects were manifested in particular social groups due to wider inequality issues or were the result of a shift in mindset that meant that obesity was no longer perceived as a priority and so sustained action to tackle it was reduced (for example, shifting the focus to the health consequences of obesity (e.g. diabetes) rather than obesity itself, as in option 6).

4 References

1 http://www.foresight.gov.uk/Obesity/Obesity.htm

2 Vandenbroeck, I.P., Goossens, J. and Clemens, M. 2007. *Building the Obesity System Map.* Foresight Tackling Obesities: Future Choices (http://www.foresight.gov.uk).

3 Chipperfield, T., O'Brien, R.m Bolderson, T., Eidinow, E., Shafner, I., Parry, V. 2007. *Visualising the Future: Scenarios to 2050*. Foresight Tackling Obesities: Future Choices (http://www.foresight.gov.uk).

4 Jones, A., Bentham, G., Foster, C. et al.. 2007. *Obesogenic Environments. Evidence Review.* Foresight Tackling Obesities: Future Choices (http://www.foresight.gov.uk).

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Appendices

Appendix 1 Drivers of change for obesity

A group of 29 key issues were identified during the expert workshop as being important to the development of UK society and obesity levels in 2050.

Health	**Science and technology**
1 Attitudes to obesity	**16** Attitudes to science
2 The UK health system	**17** Science and technology breakthroughs
3 Value of health	**18** Breakthroughs in the social sciences
Leadership	**Education and information**
4 Trust in leadership	**19** Access to information
5 Who's in charge?	**20** How we learn
6 Balance of geo-power	
The shape of society	**Values and behaviour**
7 Ageing	**21** How we associate
8 Social diversity	**22** Time horizons long-term versus short-term mindsets
Resource constraints	**The economy**
9 Environmental crises	**23** Changing economy distribution of income and employment patterns
10 Environmental limits to growth	**24** Psychological impact of economic instability
11 Energy dislocation change from a carbon to a non-carbon economy	**25** New business models profit may not be the maximiser of the future
Food production and retail	**Our living environment**
12 Role of food *including sustenance; health; social status; social interactions; parental role modelling of food habits; emotional role of food*	**26** The built environment
13 Agricultural system	**27** Mobility
14 Consumer choices	**28** Future of the home
15 Changing shape of the food industry	**29** Localism

Appendix 2 Mapping the contextual drivers for change and key features of the scenarios

Driver	Scenario One	Scenario Two	Scenario Three	Scenario Four
Direct relevance to obesity				
Healthcare overview	• Focus on being 'better than well', particularly for children and future generations • Prevention prioritised by the individual • People take a 'responsible' attitude to health: irresponsible behaviour is marginalised • Healthcare insurance and the private sector predominate; the public sector supports the less well off • There is overt health rationing, with the public sector largely focused on acute emergencies; private sector is increasingly discriminatory as to those it will insure	• A new broad approach to public health arises, with a focus on ill-health prevention. Health is 'designed into' many aspects of life • Public healthcare for all is still a priority but resources are stretched; there are restrictions on the availability of certain treatments, a focus on ill-health prevention (health tourism grows). There is uneven implementation of regulation and treatment between communities • It becomes a social responsibility to look after your health. Healthcare is there for those who 'deserve it': it is considered socially incorrect to demand in excess of need • The private sector flourishes but at a spiralling cost: probably unsustainable throughout the scenario period	• Affordable treatment is the focus • Inclusivity in health opportunities is a priority. There is mixed public and private healthcare delivery but still an emphasis on access for all • Individuals look to communities and peers to recommend choices in lifestyle and treatment • There are finite resources, both financial and human, but high expectations from the public, with increasing tensions about the sustainability of adequate healthcare across all sectors of society as levels of chronic conditions increase • Sizeable lobby groups obtain new treatments, smaller 'orphan conditions' may not be acknowledged	• Health is a symbol of status • The focus is on treatment and managing the consequences of individual actions rather than on prevention • There is a high personal responsibility to fund/insure healthcare – self-reliance is the key driver for all social services • For those who can afford them, there are excellent innovative private services; but limited public offering • There is a marked rich/poor divide in access to treatments
Education, information and the media	• Private education dominates • Individuals use the media and education as a route to power and status • There is a wealth of accessible information, but it requires an ability to interpret it • There is co-creation of media (blog heaven)	• There is an emphasis on public provision of education • Government is proactive in ensuring access to information • Information quality and content are heavily regulated • E-based connectivity facilitates community action	• There is a mix of public and private education • There is easy access to multiple opinions and active community-based debates • The extent of open debate identifies responsibilities but stifles action	• The private education market is top quality and internationally competitive across all age groups. There is an emphasis on business skills • Individuals use information and education to empower • The media are highly fashion- and trend-led

Appendix 2 Mapping the contextual drivers for change and key features of the scenarios (*Continued*)

Driver	Scenario One	Scenario Two	Scenario Three	Scenario Four
The built environment	• There is some systemic change driven by the market in response to consumers • There is active use of the environment, and perceptions of safety dominate the agenda • Insurers withdraw cover for buildings on flood plains • Complex public–private ownership and co-ordination difficulties limit what can be achieved	• Systemic change is driven by local and central government levels • New standards are set in the planning process to meet environmental and social objectives. Health is 'built in' • Infrastructure is overhauled to incorporate new systems such as recycling 'grey' water • Government bans building on flood plains	• There is no systemic or nationally co-ordinated infrastructure change, and limited local initiatives focus on repair and replacement	• There is no systemic change, just repair and replacement when necessary • The home is the focus of all services • Gated real estate booms
Transport	• Conventional car use is limited by energy costs and congestion, but there is a rise in individual hybrid fuel 'pods' • The infrastructure favours pedestrians and cyclists	• There is a much-reduced level of individual transport and a focus on public transport • Cycling and walking are encouraged by changes in the built environment	• Technology is used to tackle vehicle emissions but congestion is still problematic	• There is little public transport • The number of individual 'pods' rises
The food sector	• Consumers and resource pressures force change across the industry • Self-regulation is effective • The levers in addressing the problem of foods perceived to be unhealthy are demand from consumers and the need to sustain their trust in the industry; and the perception that sustainability will bring long-term profits • Functional products and brands deliver well-being and whole-lifestyle services, including outsourcing the control of diet; premium prices are paid for small portions • Brand loyalty is a key driver	• The industry is forced to consider public impact • The sector is not trusted to self-regulate. There is strong overall regulatory pressure as trust in business declines • There is a focus on nutrition, well-being and public health, particularly in public sector procurement and in schools, hospitals and prisons • The number of food miles is reduced and local sourcing becomes a key driver for retailers	• No fundamental change takes place in the industry • There is regulatory pressure to respond very effectively to food safety scares. The EU role in regulation strengthens • There is no focus on long-term issues such as nutrition except through limited measures in schools and hospitals • NGOs are very active • Local sourcing is a key driver	• Individual choice is paramount • Government only steps in to correct market abuse • There is continued supply of cheap food, with an increased drive for convenience • There is innovative response to changing consumer demands, a large premium market and interest in functional foods • More people are eating out

Appendix 2 Mapping the contextual drivers for change and key features of the scenarios (*Continued*)

Driver	Scenario One	Scenario Two	Scenario Three	Scenario Four
Inequalities	• There is a widening gap at first, but this narrows with the trickle-down effect of systemic change later in the scenario period • Government and wealthy individuals provide some support for the less well off	• Overall reduction in inequalities takes place • Gaps are narrowing within communities but inequalities between some communities become important • Support for the less well off is provided, as long as people take personal responsibility	• An overall reduction in inequalities occurs, with the gaps narrowing and fewer 'mega rich' • There is sustained effort to counter extreme inequalities • People feel included and empowered by open debate	• There are significantly widening inequalities, with a rise in the numbers of 'mega rich' • The individual can cross the divides opportunistically • Limited support is available for those less well off; the attitude is that everyone must look after themselves
Baseline obesity figures (compared to today's trajectory)	• Population levels are a little worse • There is an initial increase in the socioeconomic divide in obesity levels, but the long-term perspective affects behaviours. • Support from wealthy philanthropists balances the impact, resulting in a neutral impact in the long term • Improvement are seen in the levels of child obesity	• Population obesity levels decrease • The rate of divide lessens between rich and poor • Significant improvements in child obesity come about	• The trajectory towards reduced population obesity levels improves • Social divides are less • Child obesity is getting a little worse	• Population levels are increasing rapidly • The rate of divide between the rich and poor is increasingly marked • Child obesity is worsening, but not as rapidly as the other indicators
Generic themes				
Attitudes, values and perceptions of risk	• Responsibility and motivations are focused on the individual • There is a focus on the precautionary principle (i.e. prepared to suffer the costs now for future benefit)	• People have a personal responsibility to the community • The future is valued highly • There is an acceptance that action may be required despite the absence of evidence	• There is a drive for inclusive debate • People are risk-averse: action is built on conclusive evidence and consensus • There is a belief that society can only meet challenges by working together	• There is intense individualisation: financial success is paramount • A 'survival of the fittest' attitude exists • Failure is accepted, as long it is a springboard for success thereafter
Leadership/ power/ governance structures	• Consumers and the market are the major scenario governors • Consumers come together through flexible, transient networks and exert pressure on industry • Government facilitates industry action with 'light touch' regulation • Globalisation reduces still further the influence of the UK Government	• There is confidence in devolved community power • Government co-ordinates and facilitates action at the local level. Implementation is dependent on local delivery • There is a participative approach to governance: those who don't participate become isolated	• There is a multiplicity of governance: powerful local governance, taking action on some issues; the public look to central government to take responsibility for core systemic issues and the 'big picture' • NGOs' influence grows • Competing interests affect decision-making speed and outcomes	• The role of Government shrinks • There is a radical decline in political participation • Government regulation focuses solely on coping with market excesses • Power is fragmented among individuals and industry

Appendix 2 Mapping the contextual drivers for change and key features of the scenarios (*Continued*)

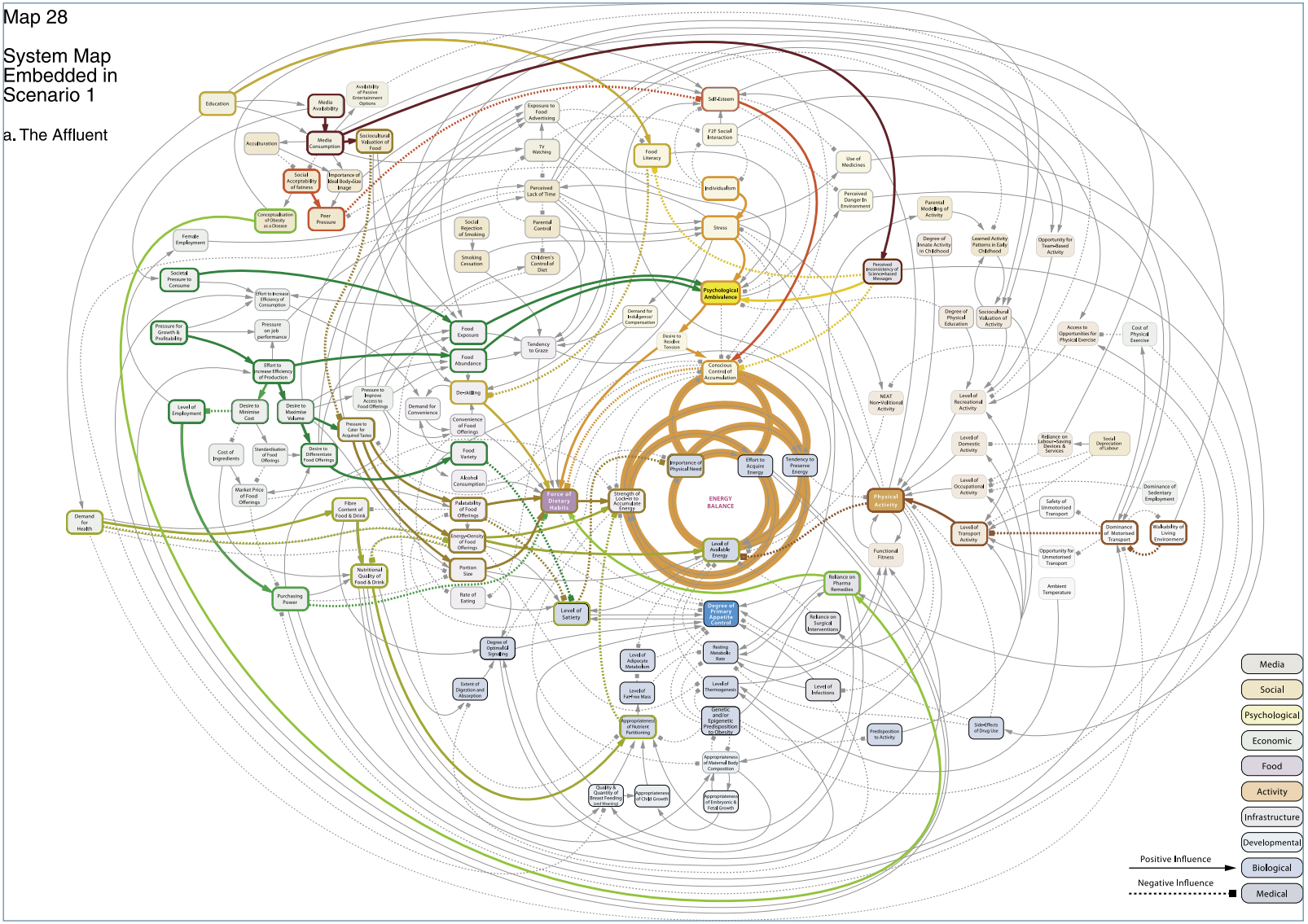
Driver	Scenario One	Scenario Two	Scenario Three	Scenario Four
Business models/ economics	• Sustainability is seen to lead to profitability • The market incorporates critical externalities • The economy remains strong • New types of consortia and collaborations are needed to invest in and sustain long-term partnerships	• The private sector is heavily regulated. Tax incentives encourage innovation • Externalities are included in development • The economy suffers at times when new opportunities are missed, but long-term plans show benefits • Some companies relocate to avoid regulation	• There is a complex mix of bilateral deals and some multilateralism • The pace of free-market globalisation slackens: protectionism and regulation become more acceptable • Smaller companies thrive with the flexibility to exploit the latest societal focus; some business moves abroad	• The profit motive dominates • The UK is globally successful, competitive and efficient: innovation is high and key to success • Economic volatility occurs in response to the global economy • There is rapid turnover of organisations
Family structures	• It is a parental responsibility to ensure the well-being of children and future generations • Households are shrinking and becoming less complex	• There is a sense of generational responsibility – towards children and the elderly and extended family • New definitions of family and community evolve	• There is more vertical integration of family • The power and influence of the child grows	• There is a strong drive by parents to develop achieving children • There are high numbers of single households and dispersed families
The research environment	• Research is sponsored by wealthy individuals or corporate foundations • 'Blue sky' thinking is encouraged, with a focus on long-term research and 'big challenges' • Multidisciplinarity is encouraged	• The public sector is the main funder • Government is willing to fund long-term research, based on inconclusive evidence • Public support exists for long-term funding • Some gaps in the research portfolio exist where expensive long-term commitments squeeze funding • Multidisciplinarity is encouraged • Public sector research is restructured to reflect the above	• The amount of publicly funded research decreases • There is a focus on quickly meeting short-term needs. Successful solutions weaken pressure for systemic change. Research and the use of evidence is driven by a need to find consensus • Science is answerable to the collective: public consultation on science and research is essential • Expertise is devalued	• There is virtually no publicly funded research, but Government has a role in defining standards • Industry research and development and links with universities are strengthened • Research is uncoordinated and not mutually reinforcing • Intellectual property rules are very strict • There is an expectation that science will deliver solutions • A great interest in new technologies and personalised gadgetry develops

Appendix 3 Obesity system map for each scenario

Map 28

System Map Embedded in Scenario 1

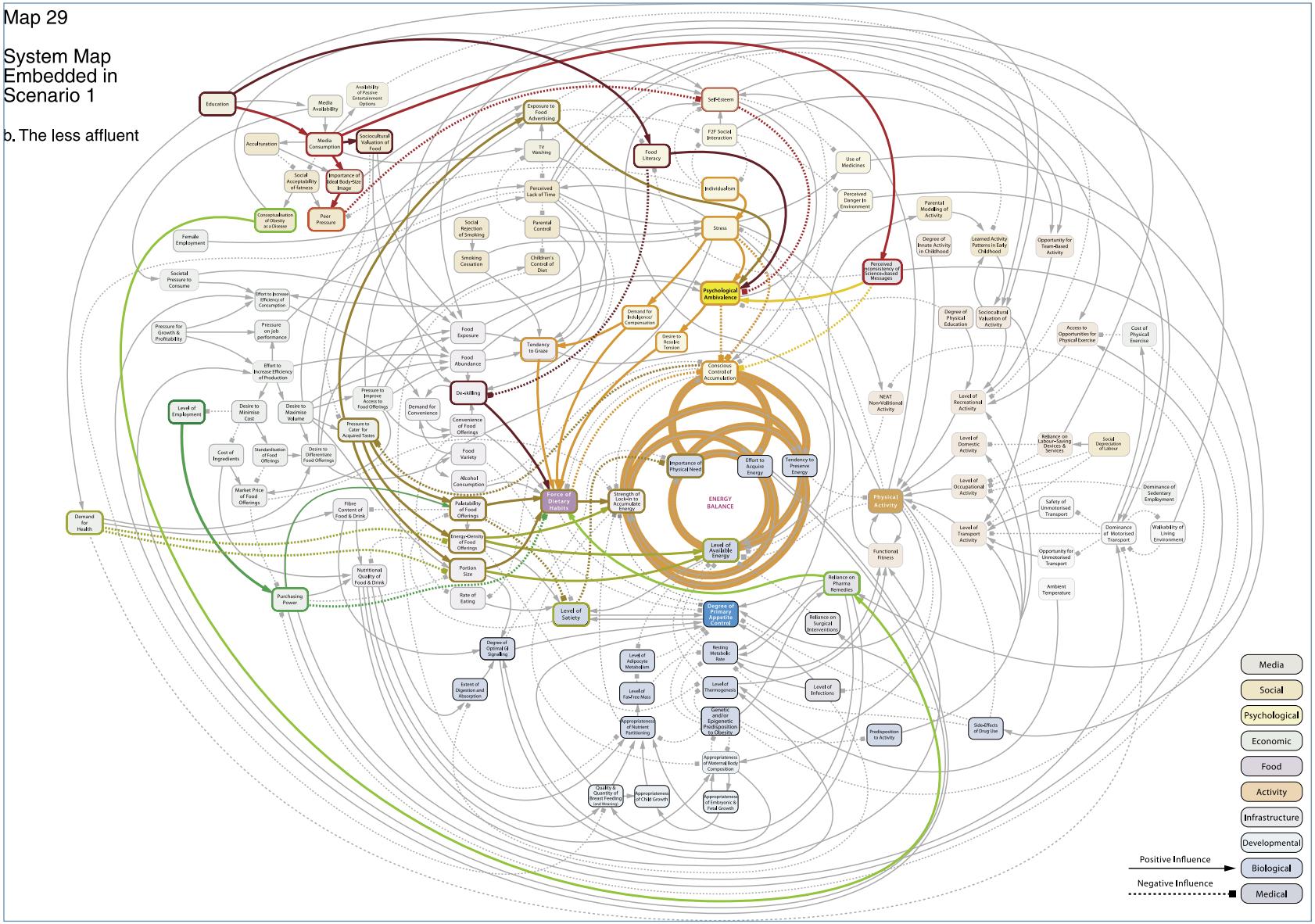
a. The Affluent



Map 29

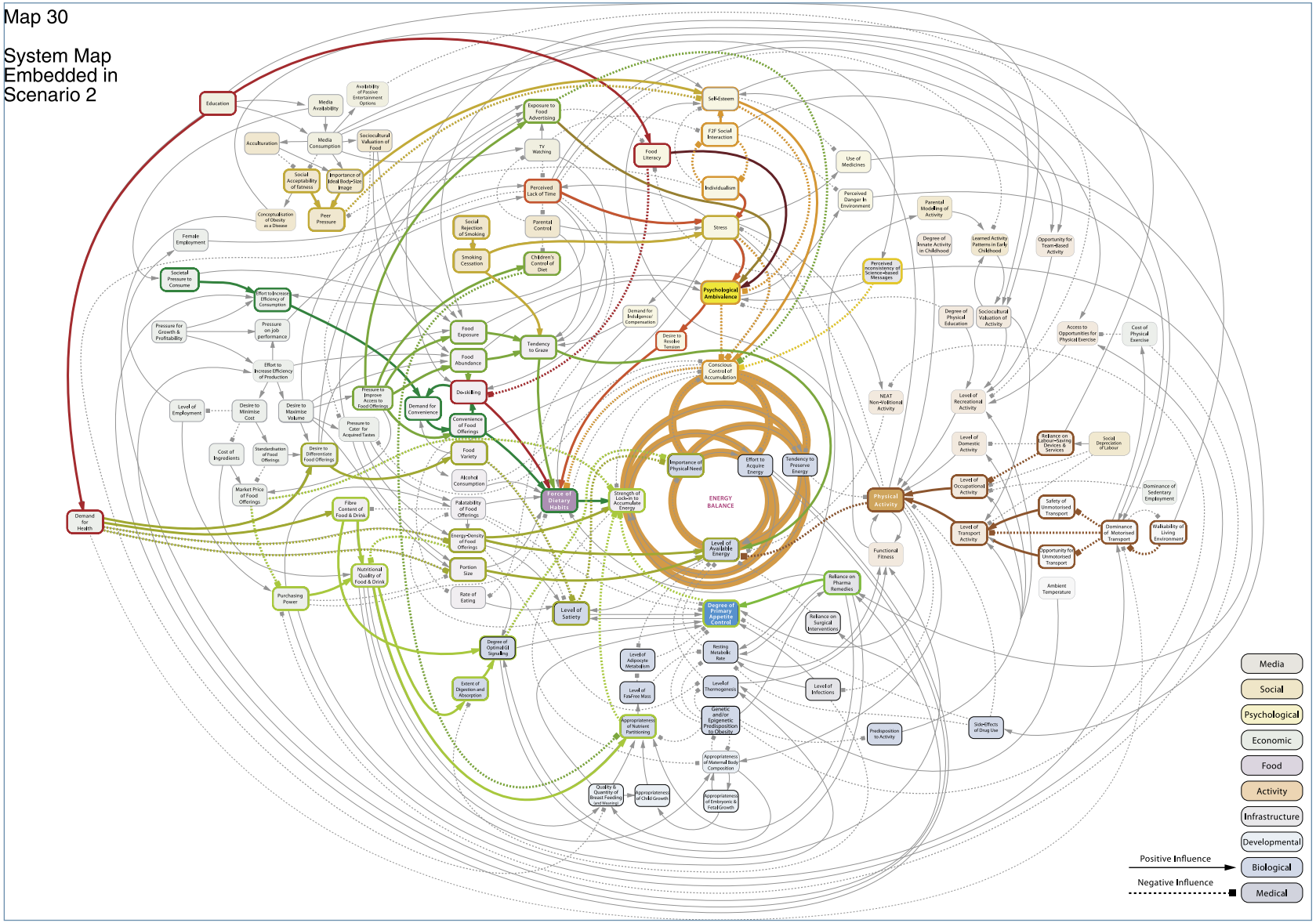
System Map Embedded in Scenario 1

b. The less affluent



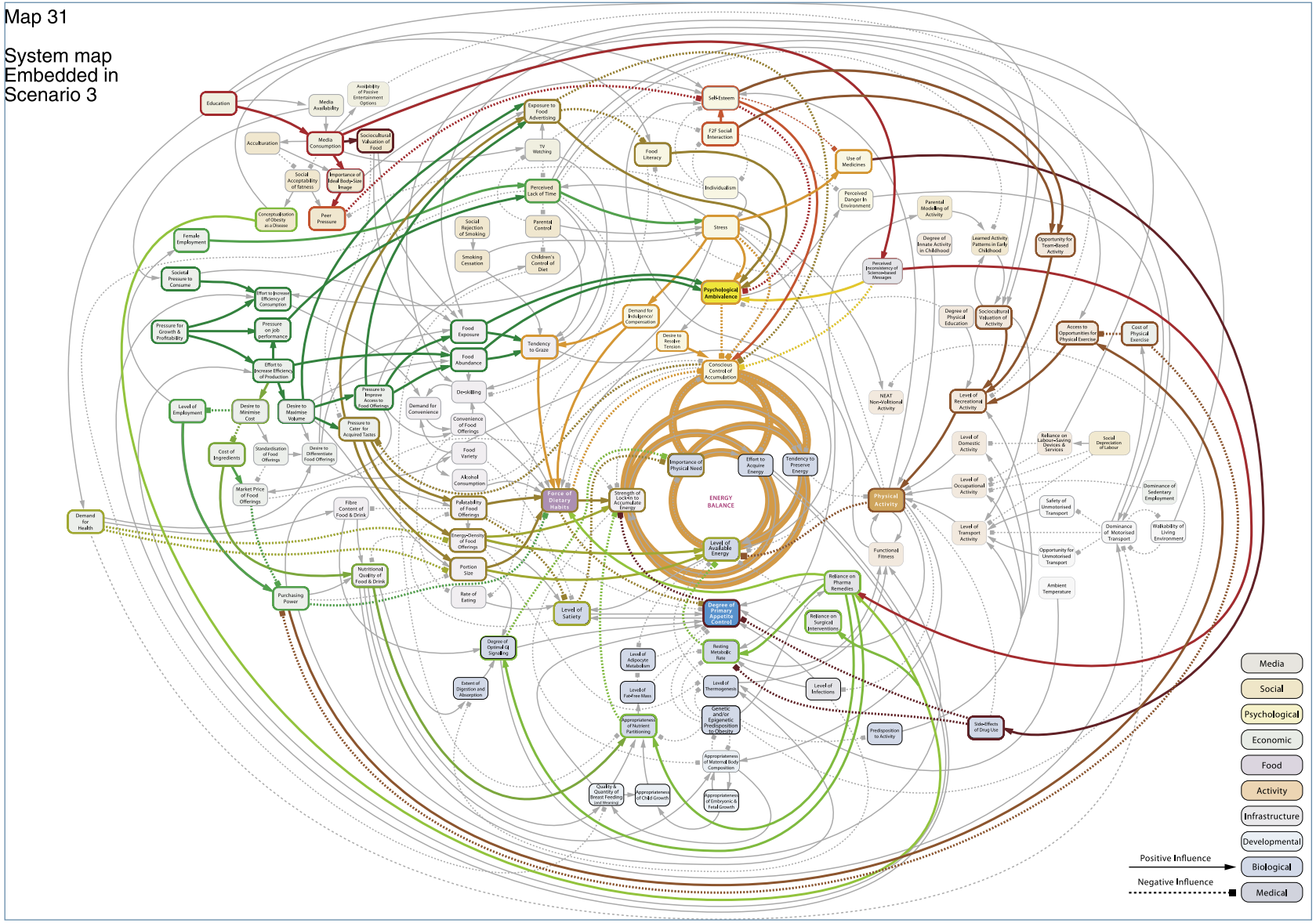
Map 30

System Map
Embedded in
Scenario 2



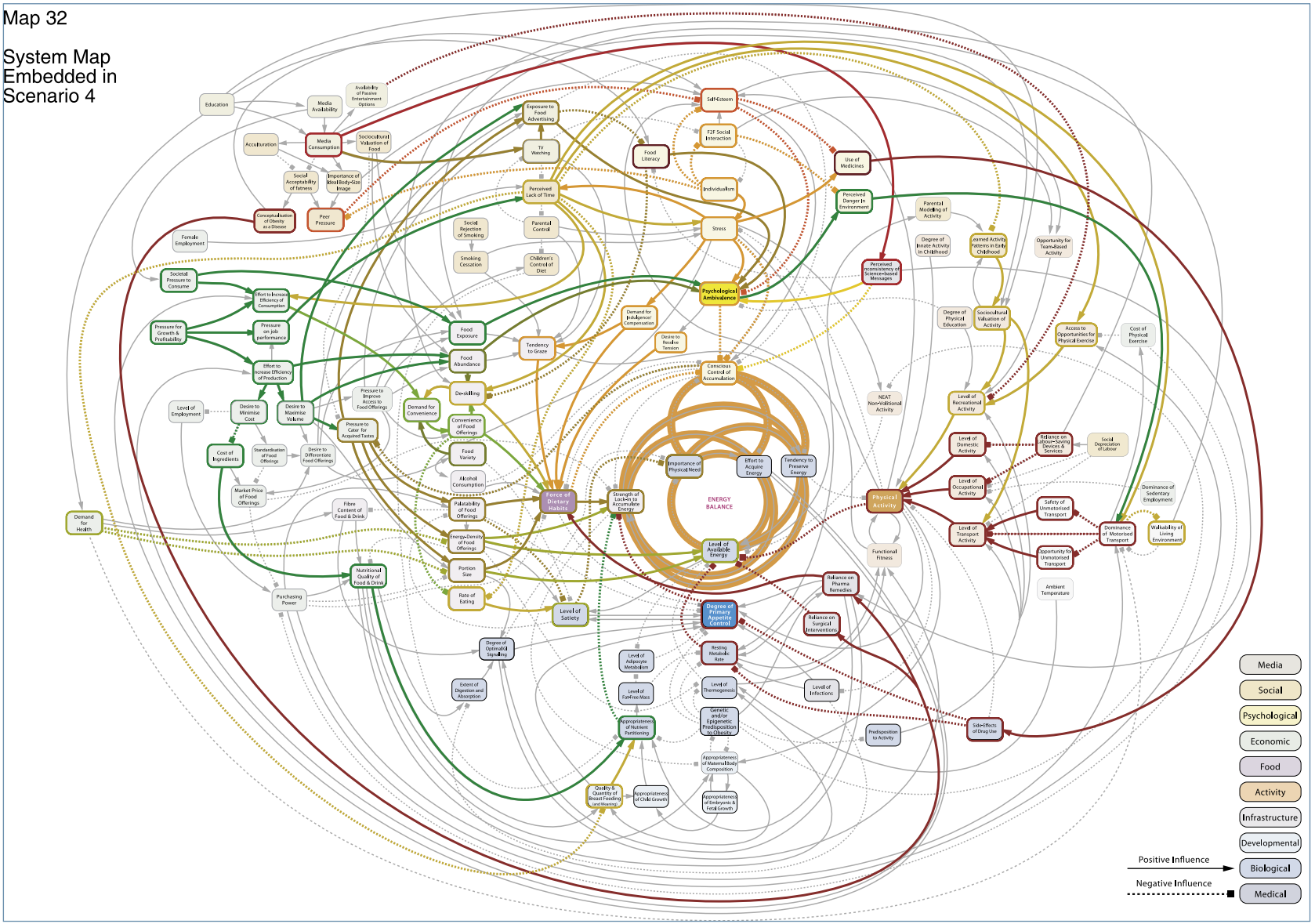
Map 31

System map
Embedded in
Scenario 3



Map 32

System Map
Embedded in
Scenario 4



Appendix 4 Detailed data from the response mapping exercise

Responses were assessed against two main criteria, and the rationale for the assessment and additional qualifying comments on implementation barriers and enablers were logged. The following tables contain the full data set collected in the exercise and analyses in the main text.

- **Ability to implement**

  Comments from participants on whether it would be possible to implement the response in the societal context described by the scenario.

- **Impact on obesity**

  A qualitative scoring of the impact the response might have on obesity levels within the scenario. The scoring focused on the social, environmental and economic context of the scenario, and how it interacted with each response to affect obesity, rather than the effectiveness of the response itself in treating or preventing obesity: this would require further scientific analysis.

  The qualitative impact scoring went from **low** impact to **high** impact, and distinguished between **positive** and **negative** effects. **0** indicated when participants felt that the response would have no impact on obesity.

Rationale and qualifying comments

Any additional comments or assumptions that relate to the implementation or impact of each response in the scenario e.g. barriers to the implementation of the response etc are also included.

Scenario One

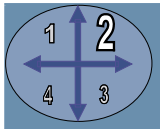
Response	Ability to implement	Impact on obesity High/medium/low (+) impact or (–) impact (0) = no impact	Qualifying comments
The built environment and transport			
1 Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	• A framework may be adopted but it would have latitude in terms of implementation • It would be possible to implement this response option because businesses recognise an important need to deliver health (both in terms of productivity concerns and legal liability) • This policy would work in this scenario, but it would depend on practical considerations	**L** for buildings, except for those in a higher socioeconomic class **H** for public space, across all socioeconomic classes	• There would be no impact on 'domestic' space (i.e. homes) because there would be no motivation for change • There would be a desire to design space for health and this fits with the long-term mindset. However, the ability to implement the policy is the problem with this scenario – particularly with buildings and spaces having different owners • Effort is most likely to go into the design of new build and gated developments, which would benefit those with access • Slower change would occur with existing build • There would be pressure on Government to regulate public places and to use these more effectively. This could move the focus to the road system and transport modes
2 Improve perceptions of safety from the points of view of traffic and crime	• This would be difficult in a world with widening inequalities and therefore an increase in crime would be likely • 'This is a worried world' – risk-averse – and so this response may be a priority	**M(–)** via 'pods', for example, to neutralise worries about going out into public spaces **L** for the younger and poorer segments engaging in gang formation. Many people would not be able to afford safety measures	• A 'pod' approach to transport/entertainment/shopping/living increases the perception of safety for the majority • A mechanism for implementing this in this scenario would mean people retreat to 'pod' transportation and activity levels fall • There would be some difference in impact in the poorest groups, who cannot afford a personal transport system
3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	• It would only be possible to implement this response in selective, affluent parts of the infrastructure	**M** for large part of society **M(–)** for the less affluent	• This would serve to increase day to day activity levels in population • This response would be likely to reinforce inequalities, although the majority would get some benefit. Key issue is the ownership of space (public vs. private) • Corporate sponsored cycle roads would reinforce the deterioration of shared public space

Health			
4 Focus on targeted interventions, such as when children are young, and targeting those most 'at risk'	• It would be possible to implement this response as it would be driven by business seeking premium-paying niche-market opportunities	**L** on average **H** with some specific cases of high impact, depending on the state of technology (e.g. availability of 'magic pill')	• This would be effective for those who are targeted but would not reach critical mass to impact on population figures • This policy would be reliant on the ability to identify who is at risk. In this scenario, it may have more uptake from the 'worried well' • Broader diffusion would be driven by broader concern and social responsibility • This would be more difficult for those in Government (as they have less delivery opportunities), but they would be able to focus their resources on the less wealthy in the population
5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole	• This is a world of mass customisation so it would be difficult to introduce this policy, but the response may be implementable by linking personalisation to economies of scale	**M**	• What would be the cost of this beneficial effect? Would the price be paid in monetary terms or in a loss of freedom? • There would be impact from economies of scale. However, implementation is likely to be patchy as it would be dependent on the choice of the individual to access private services
6 Focus on the health consequences of obesity, such as diabetes, rather than obesity itself	• This would be implementable if better predictors existed for diabetes than obesity. Otherwise, it would be difficult in this scenario, which is proactive • Proactive behaviour may be driven by knowledge of particular biomarkers that indicate likely obesity development	**0**	• There would be no impact from the perspective of population figures, but some successful individual-level interventions would be possible (e.g. tackling diabetes results in weight reduction)
Research			
7 Invest in the search for a highly effective post-hoc solution to obesity – a 'magic pill'	• This is highly likely to be implemented but would be considered the sub-optimal solution	Potentially **H+** However, risks: **H(–)** because of deferral **M(–)** because of compensatory behaviour **L (–)** because of settling for sub-optimal solution	• This is unlikely to be Government research: big business would make the investment • There may be a highly negative effect on obesity if it means that investment is focused elsewhere under the assumption that a health solution would be found

Fiscal incentives				
8	Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain	• The investment community would be likely to be interested in this to minimise their liability	**H** This could have a big impact on diet	• Evaluation toolkits would exist on a personal level with immediate feedback • This response would make possible the standardisation of measurement instruments
9	Introduce a tax on obesity-promoting foods	• Subsidising healthy unprocessed food would be easier because it is popular – it would be possible to tax soft drinks and advertising	**L**	• Success of this policy would depend on price elasticity/ income effects and the risk of substitution (about which nothing is known) • A change in the EU Common Agricultural Policy would be necessary (which may be part of a basic driver pricing in externalities) • It would be difficult to translate/operationalise a fat tax (opposite to smoking) • This would need to take into account carbohydrate competition: food vs. fuel • This policy may affect obesity by stealth
10	Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees	• This response is not very likely to be implemented in this world, which is more focused on leveraging individual decisions	**L**	• The response might take the form of tax breaks for cycling to work or stopping subsidies for cars
11	Use individually targeted fiscal measures to promote healthier living [for example, when buying healthcare insurance, the premium would increase with unhealthy behaviour]	• This is likely to be implemented in this scenario, probably through the insurance industry	**0** for the affluent elite which guards the status quo **M** for the middle classes **0** for the less affluent **M(–)** risk, as there may be increased psychological ambivalence around changing behaviour	• This policy option may be enabled by new technologies (personalised sensors) that provide feedback to health insurers • The most affluent could afford to pay for the consequences of obesity in this scenario and would have less concern about financial penalty • The greatest effects would be on the middle classes, who may already be health-conscious • The less affluent would have problems with access to insurance and this would therefore become less relevant and less effective for them

Education			
12 Introduce programmes to increase food literacy and food skills	• It is highly likely that companies and governments in this scenario would implement this response	**L**	• The impact on obesity would be minimal, at least in the short to medium term. However, the policy would enable other measures to be taken • Psychological control of consumers would increase confidence • This policy could leverage/capitalise on key life moments (onset middle age, childhood, heart attack) • This would probably be part of a service offered by private companies and bought into by consumers
(Auto)regulation			
13 Control the availability of and exposure to obesogenic foods and drinks	• This would probably be implemented in controlled circumstances (private schools, health services, supermarkets)	**L** for majority **0** for lower 20% of the population	• This would probably depend on company-led CSR influences and standard specifications: contractors could act as gatekeepers
Social structure			
14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society	• It would not be possible to implement this option in this scenario	**0**	• This response option does not apply in this scenario as the social context does not allow a directive approach
15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity	• This option would very likely proliferate in this scenario	**M** but could be **0** as it would be easy to override efforts (depending on level of psychological ambivalence)	• It is unlikely that this would be white goods technology – more likely to be nanotechnology • This option is very likely to be prevalent in this scenario as it would provide a market opportunity. However, the resulting behaviour change is uncertain and would depend on a number of other factors, though in this scenario the forward-thinking ethos makes perseverance and reliance on this type of technology by consumers more likely
Family			
16 Promote/implement a programme of early interventions at birth or in infancy	• It is likely that this option would be implemented by personal health missionaries, health trainers, health visitors, etc. • Government would not implement these interventions	**L via Government** **H via business**	• This would produce a focus on women, being key gatekeepers in families • In the long term, this may be a market opportunity. If something useful can come of it, business would be likely to provide the service in advance of conclusive evidence • This approach would need a more directive approach for the lower socioeconomic classes compared to a more coaching role for the higher socioeconomic classes
17 Penalise parents for the unhealthy lifestyles of their children	• Policy implementation would be possible but only by personalised health missionaries	**M(–)**	• This measure is unlikely to be very effective in an individualistic society driven by commerce • Services that attempted to do this would lose custom and this could lead to ambivalent consumers actively seeking 'unhealthy' choices

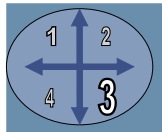
Scenario Two

 Response	Ability to implement	Impact on obesity High/medium/low (+) impact or (–) impact (0) = no impact	Qualifying comments
The built environment and transport			
1 Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	• Yes: the communal environment could cope with systemic change. This option provides a huge opportunity for systemic change	**H**	• This option would be a pre-condition to most policies in this scenario • Society would seek to introduce significant change and would be willing to invest to do it • The more significant change means the impact is greater than in Scenario One
2 Improve perceptions of safety from the points of view of traffic and crime	• Yes	**L**	• This would have a low impact alone but it would facilitate the response to option 3 • The societal approach would mean that people tackle the root of the problem rather than retreating to individual transport systems as in Scenario One, therefore walking and leisure activity increases
3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	• Yes	**M**	• This policy could not be achieved without first having success in the response to option 2 – i.e. increasing perceptions of safety • There would be a societal-level impact on activity levels • There would be regional/community divides with regard to the degree of implementation
Health			
4 Focus on targeted interventions, such as when children are young, and targeting those most 'at risk'	• Yes	**H** but slow	• It would be necessary to persist with this response on a long-term basis in order to see a population-level effect • In this scenario, there is a social responsibility to be healthy, and so peer pressure may act to raise the worst cases to a more average 'weight' level and would increase the impact ranking
5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole	• Yes: this policy would be implemented as the 2nd stage in a programme once inequalities had been resolved	**H** but slow	• It would be necessary to persist with this response on a long-term basis before seeing an impact • For success with this option, it would be necessary to resolve obesity inequalities first • This response would follow from (or complement) option 4, which focuses on targeted interventions • Implementation would be likely to be patchy, thus slowing down the results to be gained
6 Focus on the health consequences of obesity, such as diabetes, rather than obesity itself	• No: in this scenario the focus would be on obesity itself	**L**	• This approach is unlikely to be pursued in this scenario, which would be more interested in preventing chronic disease • Some impact on obesity would be achieved through effective treatment of disease

Research				
7	Invest in the search for a highly effective post-hoc solution to obesity – a 'magic pill'	• No	**0**	• Such efforts would be considered a waste of resources in this scenario; the response option is unlikely to be pursued due to the focus on well-being and prevention • Any developments would have small impact through use in treatment efforts
8	Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain	• Yes: this would be an essential tool as it reduces the time required to reach a target	**L**	• This option would help to direct and underpin all other policies but would have little direct impact, being an enabling response
Fiscal incentives				
9	Introduce a tax on obesity-promoting foods	• Yes	**M**	• This response is known to be effective • The impact of the response would help to reduce inequalities in this scenario
10	Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees	• Yes	**M**	• This response would get everyone to move in the same direction, creating collective action
11	Use individually targeted fiscal measures to promote healthier living	• Yes/No: part of option 4		• The focus is unlikely to be at the individual level in this scenario, so there would be no private health insurance mechanism to implement and a population-level effect would be unlikely
Education				
12	Introduce programmes to increase food literacy and food skills	• Yes	**L**	• This policy option would only have a facilitating/enabling effect as it does not lead directly to behaviour change or resolve issues around ambivalence or opportunity
12a	Traffic-light labelling of food = informed choice	• Yes	**+** (impact could be **H** if all food included)	• This would drive food development and research

Regulation			
13 Control the availability of and exposure to obesogenic foods and drinks	• Yes	**H**	• This would be an acceptable approach in this scenario and would impact significantly on energy intake if overall exposure was addressed • It would gather momentum and impact over the years • It is possible to control quality, but quantity is more difficult so portion size would still be an issue
Social structure			
14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society	• Yes: underpins many other policies	**M**	• It would be possible to take this approach in this scenario, where intervention is more acceptable, and to harness the 'peer pressure' from society that promotes the norm of 'being responsible for your health'. This would make interventions self-reinforcing • It would take time for this response to pervade society and some would 'opt out'
15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity	• No	**L**	• This response would be unlikely to feature much in this scenario and would therefore have a low impact level. Those who use such systems would be likely to stick with them due to their long-term mindset
Family			
16 Promote/implement a programme of early interventions at birth or in infancy	• Yes	**H**	• It would take time to see the impact of this response, but it is likely to implemented as the focus is on long-term prevention, and therefore society would be willing to accept intervention. It would probably be started early in the scenario as there would be a willingness to act before conclusive evidence is obtained if there was a strong indication of a positive benefit • This response option fits with option 4
17 Penalise parents for the unhealthy lifestyles of their children	• No	**0**	• Singapore has worked with responses similar to this one, but it is a more directive society • There would be a risk of stigmatisation • There would be some 'social pressure' to conform to a healthy lifestyle in this scenario, making direct action less necessary

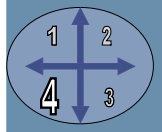
Scenario Three

 Response	Ability to implement	Impact on obesity High/medium/low (+) impact or (–) impact 0 = no impact	Qualifying comments
The built environment and transport			
1 Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	• Low, given short-term horizons	**M** for small number of targets **L** for majority	• The built environment is a barrier in itself in achieving success with this response • Note that the built environment impacts on food availability as well as activity • It is unlikely that any effort with respect to this response would be sustained in this scenario, so the impact would be patchy
2 Improve perceptions of safety from the points of view of traffic and crime	• Medium	**L**	• Any threats would have to be addressed immediately; there would be little in terms of a co-ordinated, planned approach to increasing the perception of safety on the grounds of health. However, concerns about crime may indirectly change what is done
3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	• Medium	**M** if community implements it systematically	• This response may not be implemented evenly but it would eventually have impact
Health			
4 Focus on targeted interventions such as when children are young, and targeting those most 'at risk'	• Medium, due to the focus and precision work in this scenario	**H** for those who are targeted **M** for the rest of society	• There would be a medium impact as few would be targeted in this scenario and there would be minimal population-level effect • Efforts would be constrained by the need to identify those at risk systematically and early enough – not something that is likely to happen in a scenario focused on treatment
5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole	• Low, as it would not yield quick results	**L**	• It is unlikely that a long-term response programme could be sustained in this scenario

6	Focus on the health consequences of obesity, such as diabetes, rather than obesity itself	• High	**L**	• This response option could have a negative impact on obesity by taking the focus away from it • The focus on the treatment of the consequences of obesity would normalise the need for this response
Research				
7	Invest in the search for a highly effective post-hoc solution to obesity – a 'magic pill'	• Medium: this is a very acceptable investment idea as it 'fixes' the problem	**L**	• There is likely to be a lot of interest in this approach in this scenario • It would contribute to the normalisation of obesity and not 'stem the tide' of the growing numbers of obese
8	Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain	• Low, as there would be little momentum in this response idea	**L**	• In this scenario, there would be little recognition of the importance of long-term evaluation; the focus would be on short-term measures of success
Fiscal incentives				
9	Introduce a tax on obesity-promoting foods	• Low	**L**	• This scenario is one of high business regulation, but there would be little interest in long-term preventative measures as the focus is on short-term safety issues and provision of information
10	Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees	• Low, as it would be easier to implement this option through institutions	**M**	• In this scenario, rewards are better than penalties for achieving behavioural change, especially with regard to this response • Individuals get rewards, while at corporate level penalties may be employed more frequently
11	Use individually targeted fiscal measures to promote healthier living	• Low	**L**	• The focus in this scenario is on rewards rather than penalties and on community-level rather than individual-level measures
Education				
12	Introduce programmes to increase food literacy and food skills	• Low: this response would be hard to implement, although there would be a need for education in this short-term world	**L**	

Regulation			
13 Control the availability of and exposure to obesogenic foods and drinks	• Low	**M**	
Social structure			
14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society	• Medium	**M**	
15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity	• Low	**L**	
Family			
16 Promote/implement a programme of early interventions at birth or in infancy	• Medium: it would be possible to intervene at early and birth stages	**M** for children	
17 Penalise parents for the unhealthy lifestyles of their children	• Low: this option would be unworkable as it is not possible to define or measure an 'unhealthy lifestyle'	**L**	

Scenario Four

 Response	Ability to implement	impact on obesity High/medium/ low (+) impact or (–) impact 0 = no impact	Qualifying comments
The built environment and transport			
1 Introduce health as a significant element in all planning procedures (including new build and upgrading of the current infrastructure)	• The short-term mindset and rational economics makes implementation very unlikely • If it could be implemented, it would have an effect on physical activity and retail planning (but there would be some uncertainty over the impact of retail planning on diet)	**(–)**	• Food industry barriers would make this policy unfeasible • The short-term mindset and main scenario drivers would act as barriers to this • There would be a negative effect due to haphazard implementation and complexity of ownership arrangements
2 Improve perceptions of safety from the points of view of traffic and crime	• There may be a drive for private companies to build and promote gated communities for the 'haves' • Government would have less powers of intervention in this area	**H** for the very wealthy **(–)** for the majority	• Gated communities: those who could afford to live here would benefit, but those who couldn't afford to would be at a disadvantage and social inequalities would increase • The mechanism for achieving this in this scenario might mean an increased focus on individualised transport and protection systems and consequently further reductions in physical activity
3 Increase the 'walkability' and 'cyclability' of the built environment (urban and rural)	• This would not work without improving perceptions of safety in general • This may not be able to be achieved without implementing option 1 to enable the best spatial planning	**L**	• Cycling would be promoted within the closed gated communities • There would be little trickle-down effect because the focus would be on gated communities • If there was a price rise in oil, the less wealthy would not have access to a vehicle and so walking would inevitably increase. This could have an indirect beneficial effect on obesity

Health			
4 Focus on targeted interventions such as when children are young, and targeting those most 'at risk'	• This would happen if there was a focus on children • There is no evidence that targeted interventions work. This response would probably be implemented symbolically but may not be effective (it would simply be changing the focus from health inequalities to health variations)	**L**	• Inequalities are a significant part of this scenario so health messages could get lost in other inequalities issues
5 Implement population-wide interventions i.e. focus on improving the health and well-being of the population as a whole	• Campaign billboards might be used as a symbolic gesture • Many of the health campaigns could be outsourced to human resources companies	**(–)**	• This would be a tax-cutting society and resources would be stretched. Reliance on private medical insurance would be the only way • The Department of Social Marketing would probably be the new name for the Department of Health
6 Focus on the health consequences of obesity, such as diabetes, rather than obesity itself	• This policy is likely to be implemented: obesity is a given, so the focus would be on managing it. However, there would be no impact on obesity itself	**0**	• The 'haves' would be ok; a patch-up would be provided for the 'have nots'
Research			
7 Invest in the search for a highly effective post-hoc solution to obesity – a 'magic pill'	• There would be little government research in this scenario so this would not be led or funded by Government	**0**	• Government may focus on making the environment conducive to research e.g. through intellectual property and procurement and funding for knowledge transfer • Government may contract out researchers to projects such as these • Government may focus on regulating standards
8 Introduce toolkits to evaluate the success of obesity interventions and policies throughout the whole of the delivery chain		**0**	• Market research (to empower individuals) would be the focus in this scenario, not evaluation research

Fiscal incentives			
9 Introduce a tax on obesity-promoting foods	• This would be implementable in this scenario: fiscal penalties would be one tool that Government would have available	**0**	• Price might change behaviour • However, a tax on obesity does not address the amount that goes on subsidising the agricultural system
9a *Reassigning subsidies system*	• Subsidies would be likely to be reduced because they would be distorting the market	**H(+)**	• This may open up new opportunities, but there is a risk of unintended consequences • The 'haves' and 'have nots' would still be an issue
10 Use fiscal levers to make all organisations/institutions take some responsibility for the health of their employees [for example, Government gives tax breaks to companies that introduce health schemes]	• Corporations as employers might have schemes for employee health • Would Government give tax breaks to companies that use such schemes?	**M** for employees • graded according to position in firm • graded according to human capital contribution	• Schools may link up with businesses for funding: the state would be withdrawing, so schools would need to be more entrepreneurial • Time pressures and pressure on the individual would be significant
11 Use individually targeted fiscal measures to promote healthier living	• This response is highly plausible in this scenario: rather than funding expensive interventions, this is personalisation and choosing health	**L:** Impacts on self-esteem may increase inequalities	• This would have two effects: o supporting people to get health insurance o charging people who are fat; rationing for the obese – making stigma worse • Health incentive plans may be implemented • There would be huge opportunities in the actuarial field
Education			
12 Introduce programmes to increase food literacy and food skills	• This is highly plausible in this future context (and may be the minimum Government can do)	**L**	• The education market would be more commercial but the Government would probably still be setting the curriculum: food literacy would have to be part of it • The rights to school campaigns may be sold to the highest bidder • This could be low on the priority list as people are worrying about jobs • Information coming from the private sector may generate conflicting messages
Regulation			
13 Control the availability of and exposure to obesogenic foods and drinks	• Choice is key in this scenario, so implementation of this response would be unlikely	**L**	• If it was practical to implement this response, it might be successful

Social structure			
14 Take a directive approach to changing cultural norms in order to establish healthy living as the default in UK society		**0**	• Taking approach to changing cultural norms through stigmatisation • There would be tension between the stigmatisation of obesity and the belief that obesity is ok • A proxy world might be created, where you would choose a celebrity to represent you • Status is important and money can compensate for obesity
15 Invest in technology to support informed individual choice, including devices to help monitor diet, activity	• Information is valuable so this would be a valuable option. It would be a huge opportunity to benefit from personalised information e.g. personalised nutrition; genetic screening	**L(+)** <–> **0** because just giving you information and not telling you how to use it	• Technology would be getting cheaper • It would be available to all as it is cheaper
Family			
16 Promote/implement a programme of early interventions at birth or in infancy [for example, financial incentives to breast-feed?}	• This would probably be one of the cheapest interventions	**M** but there are high risks around how this would work	• Would we have public health to implement this? This may be the last bastion of public health services • It might also be possible to market food supplements for pre-conception women
17 Penalise parents for the unhealthy lifestyles of their children	• This approach would be highly plausible and could form part of child protection policy	**L(–)**	• This is likely to increase stigma • Crude interventions are likely to be introduced in this scenario but they may not have support systems in place

First published in October 2007. Department of Innovation Universities and Skills. www.dius.gov.uk
DIUS/PUB/2K/10/07/NP