Annex 6

Impact Assessment

Impact Assessment Contents

IA Section 1

Executive Summary

Background and relevant duties

1.1 In December 2003, the Secretary of State for Culture, Media and Sport asked Ofcom to consider proposals for strengthening the existing code on advertising food to children. The following July, Ofcom produced a research report in July 2004 on 'Childhood Obesity – Food Advertising in Context' in order to consider what evidence there was to support such proposals. In November 2004, the Department of Health published the White Paper "Choosing Health: Making healthier choices easier" which reiterated the request that Ofcom consult on proposals for tightening the rules on broadcast advertising, sponsorship and promotion of food and drink in order to ensure that children are properly protected from encouragement to eat too many high fat, salt or sugar foods.

1.2 Ofcom's study concluded that television advertising had a "modest direct effect" on children's food preferences, consumption and behaviour. Indirect effects were likely to be larger, but there was insufficient evidence to determine the relative size of the effect of TV advertising on children's food choice, by comparison with other relevant factors such as exercise, trends in family eating habits inside and outside the home, parents' demographics, school policy, public understanding of nutrition, food labelling and other forms of food promotion.

1.3 This Impact Assessment and the accompanying consultation document examines the various options for regulating food advertising on television and their potential impact. This is in line with Ofcom's duty to set and review standards for advertising and to assess the impact of any important proposals under consideration.

1.4 In setting of standards, Ofcom has to ensure, amongst other things, that persons under the age of eighteen are protected and that there is adequate protection from the inclusion in television services of harmful material, having regard also to the vulnerability of children and the opinions of consumers in the relevant markets and of members of the public generally.

1.5 The options for regulating food advertising on television are also in line with Ofcom's general duty to further the interests of citizens and consumers for instance:

- securing the availability throughout the UK of a wide range of television services which (taken together) are both of high quality and calculated to appeal to a variety of tastes and interest;
- maintaining sufficient plurality of providers of different television services;
- having regard to:
  - the desirability of promoting the fulfilment of the purposes of public service television broadcasting in the UK;
  - the desirability of promoting and facilitating the development and use of effective forms of self-regulation.

Economic Rationale for Regulatory Intervention

1.6 Ofcom's research shows that television advertising is one of a range of factors that influence food consumption by children. Ofcom has considered the economic justification for regulatory action to restrict television advertising, in particular whether consumers, and particularly children, are sufficiently informed about:

- the components of a healthy diet;
- the trade-off between present consumption and future health implications; and
- information about the food they are consuming.

1.7 Ofcom has also considered:

- the impact of pester power;
- externalities[1] in the consumption of food which mean that individuals, and particularly children, do not properly trade off the costs and benefits of consuming the food that they purchase;
- the fact that while the measured effect of advertising/television is small, cumulatively it can make an appreciable difference to the number of children falling into the obese category[2];
- the benefits of co-ordinating restrictions on advertising with other measures that the Government is taking to improve children's diets; and
- the implications of the precautionary principle that regulatory action may be justified even for very low risk outcomes, where the potential detriment is very high.

1.8 Taking into account the particular vulnerability of younger children in evaluating the commercial intent behind adverts, Ofcom believes that there may be an economic rationale for regulatory intervention, particularly intervention targeted at protecting younger children.

Implementation and Other Issues

1.9 There are a number of issues relating to implementation and other factors in considering possible regulatory restrictions:

- It is possible that advertisers will advertise brands in place of products mitigating the effects of any regulatory restrictions;
- Broadcasters may avoid regulatory restrictions by relocating outside the UK;
- A reduction in advertising revenue may lead to broadcasters reducing the amount of positive messaging (promoting healthy eating) that they voluntarily undertake;
- A reduction in advertising revenue may lead to broadcasters reducing the quantity and quality of their programming through, for example, more frequent repeats, more acquired material and/or less original production;

[1] Costs arising from consumption that are not borne by the individual consuming the food (eg NHS costs of treating obesity related illnesses)
[2] Sonia Livingstone (2006), 'New research on advertising foods to children. An updated review of the literature.' This report provides an update on the earlier report to Ofcom entitled, 'Advertising Foods to Children: Understanding promotion in the context of children's daily lives', by Sonia Livingstone and Ellen Helsper (2004).

- If food manufacturers are unable to advertise high in fat, salt or sugar (HFSS) foods or any food or drink to children, this may create a barrier to entry and reduce innovation in food and drink markets; and
- The effects of any television advertising restrictions, either for HFSS or all foods, on revenues for manufacturers and advertisers would be incremental to the effects of a range of existing and future measures aimed at reducing consumption of HFSS products and to a certain extent would be interdependent with them.

Analysis of proposed policy packages

1.10 Ofcom has considered a number of packages of measures that are aimed at regulating advertising and sponsorship of core category[3] and HFSS foods. Ofcom has sought to quantify the likely costs associated with each package against the possible benefits, whilst recognising the limitations and inherent difficulties associated with such an exercise. In making its assessment, Ofcom has relied on the benefits analysis undertaken by the Food Standards Agency (FSA) together with the Department of Health (DH) as they, rather than Ofcom, are the bodies with the relevant expertise to make the benefits assessment. Where it has not been possible to quantify the costs or benefits, Ofcom has described the likely impacts. All of these packages (apart from the 'do nothing' option) include content restrictions put forward by BCAP which are aimed at reducing the level of children's emotional engagement with food and drink adverts and are set out in Annex 8 of the main consultation document.

Do Nothing

1.11 Ofcom's previous research[4] concluded that "television advertising clearly has an influence and equally clearly there is a need for a tightening of specific rules". While a 'do nothing' measure would have no impact on advertisers, broadcasters or manufacturers (since it forms the base case for the analysis), it would fail to restrict advertising of HFSS foods to children and therefore fail to affect consumption patterns and through this the dangers and costs of obesity and other dietary-related conditions. The additional academic research that has been carried out for Ofcom further supports the case that TV advertising does have an impact on food consumption and therefore restrictions can play a role in addressing this issue. Given the particular concerns about younger children's inability to distinguish between advertising and programming content and widespread parental concern about how the 'Big Five' [5] product categories are advertised on television, a 'do nothing' approach would not appear to be in line with Ofcom's duty to "have regard to the vulnerability of children and the opinions of consumers in the relevant markets and of members of the public generally". Therefore Ofcom retains its previous conclusion that specific measures are needed to address concerns about childhood obesity.

Package 1: Timing restrictions on specific food and drink products

1.12 This package would exclude all advertising/sponsorship of HFSS foods (as defined by the FSA nutrient profiling model) from children's airtime (as defined in paragraph 7.7) and from programmes which are of particular interest to children (i.e. where the

[3] Core category includes all food, soft drink and chain restaurants.
[4] Ofcom: "*Childhood Obesity – Food Advertising in Context: Children's food choices, parents' understanding and influence and the role of food promotion.*" (July 2004)
[5] Big Five: confectionery, soft drinks, crisps/savoury snacks, fast food, pre-sugared breakfast cereals – based on Nielsen classification.

viewing index[6] for 4-9 year olds is greater than 120). It would also include the BCAP content restrictions.

Costs of package

1.13 Based on analysis of historic advertising and sponsorship data and assumptions about the potential for broadcasters to mitigate the revenue impact, Ofcom has estimated the revenue impact of this package on broadcasters. This varies substantially between terrestrial, dedicated children's channels and other cable-satellite channels. Even within these categories, different broadcasters are affected to different extents - reflecting the amount and timing of advertisements / sponsorship that would be affected by this package, the type of advertising on different channels and differences between channels in their source of revenue (i.e. between advertising /sponsorship and subscription).

1.14 The potential impact on the commercial terrestrial channels is estimated to vary from **0.4% - 0.7%** of total revenue[7]. The impact on dedicated children's channels is estimated to be much higher from **4.0% - 20.2%** of total revenue. The impact on the other satellite-cable channels is generally much lower – mostly less than **0.2%**; however, it is likely that, seven channels (which constitute a mixture of genres such as sport, music, documentaries) would be more particularly affected – from **0.8% - 2.2%** of revenue.

1.15 The total cost of this package to broadcasters is estimated to be a loss of revenue of **£20.7m - £32.6m pa** (depending on the ability of the broadcaster to replace the lost advertising) with a central estimate of **£27.9m pa**.

1.16 Further to these costs, advertising agencies earn commission on advertising expenditure. Thus if advertising expenditure were to fall as set out above, then based on the notional 15% commission rate that agencies receive, this would equate to a loss of revenue of **£3.1m - £4.9m pa**. However, this is a conservative estimate as, on average, the commission rate is likely to be substantially lower than 15%.

1.17 Ofcom's assessment is that the short to medium term impact of Package 1 on HFSS food manufacturers will be modest. However some food manufacturers argue that their products would be particularly adversely impacted by being labelled "HFSS" and are strongly opposed to the use of nutrient profiling in determining advertising restrictions.

Benefits of package

1.18 Ofcom possesses no expertise in the fields of nutrition or health related issues or in the analysis of the economic impact of policy measures relating to population health. To assess the benefits of this package Ofcom has relied on analysis undertaken by the FSA together with the Department of Health, which has been provided to Ofcom for the purpose of preparing this impact assessment. The work undertaken by the FSA and DH is based on analysis of the effects of a change in children's diets on obesity and other dietary related conditions. The direct benefits (of reduced obesity) from this option are estimated to save costs of around **£5m pa**. [8] However, improved diets could lead to much larger indirect benefits from a reduction of intake of salt,

[6] The viewing index, identifies programmes where the child audience as a proportion of the total audience for the programme is more than 20% higher than its proportion of the general population.
[7] Total revenue refers to advertising revenue, sponsorship revenue and subscription revenue.
[8] The benefits quoted reflect much larger valuations of the cost savings when the existing cohort of children reach middle/old-age, they are therefore discounted in line with the Government Green Book methodology to current values.

NMES[9] and saturated fat which could reduce the incidence of strokes, and coronary heart disease, and increased consumption of fruit which could lower the incidence of cancer. The FSA suggests an overall total benefit of approximately 5,000 lives per year saved from these non-obesity related conditions which equates, once adjusted for the proportion of HFSS impacts affected to around **£303m pa** [10] based on the VOL (value of life) approach [11] and around **£63m pa** based on the QALY [12] (quality adjusted life years) approach. Applying the adjustment for the proportion of HFSS impacts affected to the sensitivity analysis that the FSA have carried out suggests a range of **£150m – £605m pa** for the benefits based on VOL and **£33m – £125m pa** based on QALYs.

Package 2: Timing restrictions on all food and drink products

1.19 This package is the same as Package 1, but without the use of nutrient profiling. It would exclude advertising/sponsorship of all food and drink from children's airtime (as defined in paragraph 7.7) and from programmes which are of particular interest to children (i.e. where the viewing index for 4-9 year olds is greater than 120). It would also include the BCAP content restrictions.

Costs of package

1.20 The estimated cost to broadcasters (in terms of lost revenue) of the scheduling restriction element of this package are similar to, but a little higher than those for Package 1, reflecting the fact that HFSS is a subset (80%-90%) of total food and drink advertising.

1.21 The impact on the commercial terrestrial channels varies from **0.5% - 0.8%** of total revenue. The impact on dedicated children's channels is much higher from **4.1%** - **20.9%** of total revenue. The impact on the other satellite-cable channels is generally lower – less than **0.2%**; however it is likely that seven channels (again a mixture of genres) that would be more adversely affected – with a loss of up to **2.4%** of revenue.

1.22 The total cost of this package to broadcasters is estimated to be **£23.2m - £36.5m pa** (depending on the ability of the broadcaster to replace the lost advertising) with a central estimate of **£31.2m pa**.

1.23 As discussed in paragraph 1.16 if advertising expenditure were to fall as set out above, then based on the notional 15% commission rate that advertising agencies receive, this would equate to a loss of revenue of **£3.5m - £5.5m pa**. However, this is a conservative estimate as, on average, the commission rate is likely to be substantially lower than 15%.

1.24 Ofcom's assessment is that the short to medium term impact on food manufacturers will be modest. Because of the reduced opportunity to either reformulate products to avoid the restrictions or diversify their output across healthy food options, Ofcom believes that the costs to food manufacturers in total are likely to be larger than for Package 1. However as noted above, because Package 2 it does not rely on nutrient

[9] Non-milk extrinsic sugars.
[10] Discounted as above.
[11] VOLs are based on medical costs, lost output and human costs (using a willingness-to-pay methodology) which provide a value of life estimate in situations where death results.
[12] QALYs attempt to provide a combined measure of the quantity and quality of life. They are estimated by assigning every life-year a weight on a scale where one represents full health and zero represents death.

profiling some food manufacturers have suggested that they would prefer this package.

Benefits of package

1.25 In the benefits assessment prepared by the FSA, they have estimated the effects of a ban on HFSS adverts rather than all food and drink advertising. Given their approach which is based on assessing the impact of a change in children's diets resulting from HFSS advertising restrictions, it would be very difficult to adapt their methodology to cover this wider restriction which would affect adverts for healthy as well as less healthy foods. However:

- HFSS advertising is 80%-90% of all food and drink advertising and therefore the benefits are likely to be of a similar order of magnitude;
- A ban on all food advertising would restrict the advertising of some healthy foods (for example low-fat meals). To the extent that this advertising would have promoted consumption of these healthy foods, this will reduce the benefits of this package compared to Package 1;
- A ban on all food advertising would remove the incentive on advertisers to reformulate products so that they were below the FSA nutritional profiling cut-off level and therefore allowed to be advertised.

1.26 Therefore Ofcom considers that the benefits of this package would be close to, but probably lower than the benefits of Package 1 (set out in paragraph 1.18 above).

Comparison of Package 1 and Package 2

1.27 As set out in the paragraphs above, the costs associated with Package 1 are likely to be lower than those of Package 2 (with the possible exception of the impact on some manufacturers), while the benefits of Package 1 are likely to be higher than those of Package 2.

Package 3: Volume-based restrictions on all food and drink products

1.28 This package would exclude all advertising/sponsorship of all food and drinks from pre-school children's programmes (as defined in paragraph 7.29). There would also be volume restrictions limiting advertising plus sponsorship to 30 or 60 seconds per clock hour at times at which children are generally viewing television in large numbers, as set out in paragraphs 7.30- 7.31. It would also include the BCAP content restrictions.

Costs of package

1.29 Ofcom has estimated the costs to broadcasters in terms of lost revenue of this package. Since broadcasters are likely to have more flexibility to shift the timing of adverts under this restriction than under a complete ban, Ofcom considers that they would be able to retain a greater proportion of their advertising revenue at risk in the affected time periods than under Packages 1 or 2.

1.30 The estimated costs to commercial terrestrial channels are approximately **3%** of total revenue reflecting the wider timeslots that this package would constrain for terrestrial broadcasters' advertising activity compared to Packages 1 and 2. The impact on dedicated children's channels would be lower than for the previous packages from **2.3%-12.1%** of total revenue reflecting the opportunity that these channels would be able to sell some HFSS/food and drink advertising compared to the complete

exclusion under the other packages. The cost to other satellite-cable channels is estimated on average at **0.3%**. However there are likely to be eight channels (again a mixture of genres) that would be more adversely affected – with a loss of up to **2.2%**. As discussed in paragraph 7.33 you are invited to comment on whether a threshold for non-children cab/sats is appropriate. Thus the numbers set out for other cab/sats are an upper limit of the effect such a restriction would impose.

1.31 The total cost of this package to broadcasters is estimated to be **£61.0m** - **£110.7m pa** (depending on the ability of the broadcaster) with a central estimate of **£90.8m pa**.

1.32 As discussed in paragraph 1.16 if advertising expenditure were to fall as set out above, then based on the notional 15% commission rate that advertising agencies receive, this would equate to a loss of revenue of **£9.2m - £16.6m pa**. However, this is a conservative estimate as, on average, the commission rate is likely to be substantially lower than 15%.

Benefits of package

1.33 The analysis and modelling which the FSA has provided to Ofcom did not specifically consider the benefits attached to volume restrictions. However applying the methodology adopted for assessing the costs of the scheduling restrictions in Package 1 above, a ban on advertising / sponsorship of HFSS adverts during pre-school programming would apply to about 2% of impacts which in turn would equate to an estimated benefit of about **£12.1m pa** based on VOL and **£2.5m pa** based on QALY.

1.34 However this package addresses all food and drink adverts and not just HFSS adverts, therefore as set out in paragraph 1.25 above, the benefits of this element of the package would be lower than the benefits from a ban on HFSS advertising but still of a similar order of magnitude.

1.35 In addition, the volume restriction element of this package would apply to just under a third of total (all audience) food and drink impacts in the first instance. Ofcom has estimated that this would equate to just over 50% of children's (4-15 years old) impacts. Were the range of values to broadcasters of HFSS and non-HFSS adverts to be very similar, then this would lead to estimated benefits of **£333m pa** (VOL) and **£69m pa** (QALY) including the benefits of the pre-school programming ban. However broadcasters are likely to react to a volume restriction by removing those adverts which generate the least value to them first. In the worst case, assuming that broadcasters removed all non-HFSS adverts before removing any HFSS adverts in response to the volume restriction, this would equate to around 45% of children's impacts being affected and the (lower bound) on the benefits would be around **£285m pa** (VOL) and **£59m pa** (QALY).

1.36 A reasonable but still prudent estimate of the benefits that might accrue would be halfway between this lower bound and the average estimate i.e. around **£309m pa** (VOL) and **£64m pa** (QALY), with a range of **£135m – £641m pa** (VOL) and **£29m - £133m pa** (QALY).

Comparison of Package 3 with Packages 1 & 2

1.37 Compared to Packages 1 and 2, Package 3 has less of an effect on children's channels (since apart from pre-school channels they are able to do some advertising). However it would have a much larger effect on terrestrial channels reflecting the wider time period across which the volume restriction would apply. The

total estimated costs to broadcasters of Package 3 are around 2½ to 3 times higher than those of Package 1 or 2, while the estimated benefits are similar.

A pre-9pm restriction on advertising

1.38 Ofcom has also considered the impact of a much wider restriction on either HFSS or all food and drink advertising - up to 9pm on all channels. The costs to broadcasters of this option are estimated to be around **£170m pa** (3% of revenue) for a restriction on HFSS advertising and **£206m pa** (4% of revenue) for a restriction on all food and drink advertising after allowing for mitigation. The benefits based on the FSA analysis would be around **£496m pa** (VOLs) and **£103m pa** (QALYs). Ofcom considers that the impact on broadcasters of such a measure would be disproportionate and is therefore not proposing to proceed with this particular option.

Summary of quantified costs and benefits

1.39 Table 1.1 summarises the quantified costs to broadcasters and potential benefits that have been estimated for the different packages.

Table1.1: Summary of quantified costs and benefits (estimated £m pa)

		Timing restrictions on specific food and drink products	Timing restrictions on all food and drink products	Volume-based restrictions on all food and drink products
Costs to broadcasters				
	Low	20.7	23.2	61.0
	Central	27.9	31.2	90.8
	High	32.6	36.5	110.7
Benefits based on QALY				
	Low	33	Close to, but lower than Package 1	29
	Central	63		64
	High	125		133
Benefits based on VOL				
	Low	150	Close to, but lower than Package 1	135
	Central	303		309
	High	605		641

Source: Ofcom analysis

IA Section 2

Background and Context

Introduction

2.1 The analysis presented in this Annex, when read in conjunction with the rest of this consultation document, represents an Impact Assessment (IA), as defined by Section 7 of the Communications Act 2003 ("the Act"). You should send any comments on this IA to Ofcom by the closing date for this consultation. We will consider all comments before deciding whether to implement the proposals set out in the consultation document.

2.2 IAs form part of best practice policy-making and are commonly used by other regulators. This is reflected in Section 7 of the Act, which means that generally we have to carry out IAs where our proposals would be likely to have a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. In accordance with Section 7 of the Act, in producing the IA in this document, Ofcom has had regard to such general guidance as it considers appropriate, including related Cabinet Office guidance.

2.3 Economic analysis, such as the analysis presented in this IA can provide a valuable tool for evaluating and selecting different options for regulation but other factors, such as public policy considerations, also need to be taken into account. However, this IA is primarily concerned with assessing, so far as this is possible, the likely costs and benefits of various options for restricting advertisements for either high fat, salt or sugar (HFSS) or all foods [13] on TV.

2.4 The impact on Ofcom's stakeholders (broadcasters, advertisers, independent television producers, viewers and consumers) is analysed, where quantifiable, with respect to the costs imposed on them; where not quantifiable, through a discussion of the type of costs that might be imposed by various policy measures. These costs are summarised in Section 7. Ofcom has no expertise in nutrition or health related issues, or in the analysis of the economic impact of policy measures relating to population health. Therefore in assessing the likely benefits of the different options, Ofcom has had to rely on analysis undertaken by the FSA as the body with the relevant expertise to make this assessment together with the Department of Health (DH). This analysis is attached at Annex C and summarised in Section 8.

2.5 However, whilst focusing on costs and benefits, Ofcom also recognises that there are inherent difficulties in seeking to quantify the likely costs and benefits of the options proposed. Moreover, the economic analysis is only one of a range of considerations to be taken into account which would include, for instance, public policy considerations. There are also a number of other initiatives taking place on childhood health and obesity, as discussed in section 4 of the main body of this consultation document. Analysis of the estimated costs and benefits of broadcasting restrictions should therefore be seen in this wider context.

2.6 In discharging its functions, Ofcom's principal duty is to further the interests of citizens and consumers (section 3 (1)) and is required to secure a number of other matters including maintaining a sufficient plurality of providers of different television

[13] Note: in this IA the term core category products (which includes all food, soft drinks and chain restaurants) is used as a proxy for all foods.

services (section 3(2)(d)) and the availability throughout the UK of a wide range of television services (section 3(2)(e)).

2.7 In performing these duties, Ofcom is also required to have regard to:

- the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed, and any other principles representing the best regulatory practice (section 3(3)); and, where relevant:
- the desirability of promoting and facilitating the development and use of effective forms of self-regulation (section 3(4)(c));
- the vulnerability of children (section 3(4)(h));
- the interests of different ethnic communities (section 3(4)(l); and
- the opinions of consumers in relevant markets and of members of the public generally (section 3(4)(k).

2.8 Ofcom also seeks to abide by a set of regulatory principles which it has developed in the light of its general duties and the principles of best practice in regulation. These are published on Ofcom's website[14], but those of particular relevance to this consultation are as follows:

- Ofcom will strive to ensure its interventions will be evidence-based, proportionate, consistent, accountable and transparent in both deliberation and outcome;
- Ofcom will always seek the least intrusive regulatory mechanisms to achieve its policy objectives;
- Ofcom will research markets constantly and will aim to remain at the forefront of technological understanding; and
- Ofcom will consult widely with all relevant stakeholders and assess the impact of regulatory action before imposing regulation upon a market.

2.9 In addition to this IA, a race impact assessment has also been carried out and is included at Annex 8 of the main consultation document.

Background

2.10 In December 2003, the Secretary of State for Culture, Media and Sport wrote to the Chairman of Ofcom and asked Ofcom to consider proposals for strengthening the existing code on advertising food to children.

2.11 In response to this request, Ofcom conducted a wide-ranging programme of research during the first half of 2004. The aim of this research project was to provide a robust evidence base that would help in understanding the role that TV advertising plays in influencing children's [15] food and drink consumption in the context of the whole spectrum of influences. This report was published in July 2004 [16] ("the Ofcom 2004 report"). The report concluded that television advertising is only one of a range of factors that influence consumption by children of HFSS products and that the rise in obesity levels among children is multi-determined. TV advertising is part of a wider social context and its direct influence is relatively modest. Indirect effects however

[14] *Ofcom's regulatory principles* (http://www.ofcom.org.uk/about/sdrp/).
[15] Ofcom defined Children as those aged 4-15.
[16] Ofcom: "Childhood Obesity – Food Advertising in Context: Children's food choices, parents' understanding and influence and the role of food promotion." (July 2004) http://www.ofcom.org.uk/research/tv/reports/food_ads/report.pdf

are likely to be larger, but there is insufficient evidence to determine their relative size by comparison with other relevant factors such as exercise, trends in family eating habits inside and outside the home, parents' demographics, school policy, public understanding of nutrition, food labelling and other forms of food promotion. As a result Ofcom's overall conclusion at that time was that there was a need for some specific and targeted tightening of the rules on television advertising to children although it did conclude that a total ban on the television advertising of food and drinks did not appear to be proportionate.

2.12 Since this report was published in 2004, Ofcom has commissioned a further review of academic research by Professor Sonia Livingstone to update the work she undertook in 2004. There is a growing volume of research into the issues of child health and diet, and Ofcom considered it important to take these additional research publications into account. In this update her conclusions regarding television advertising having a modest direct effect on children's food preferences are unchanged. Furthermore, her updated report concluded that, 'expert commentators are now convinced that television viewing plays a role in contributing to the problem of children's unhealthy diet'. She went on to conclude that although the measured effect on advertising/television was small (perhaps around 2% of the variation in food choice/obesity), cumulatively this could make an appreciable difference to the number of children who fall into the "obese category" and that this effect could be larger than the measurable effect of exercise and other factors.

2.13 An important point that was emphasised in the updated report from Professor Livingstone was that multiple factors accounted for childhood obesity and that a range of interventions were being tested to improve children's health. Any restrictions on television advertising to children should be seen as a part of this multi-factored approach.

2.14 Referring to Ofcom's 2004 Report, the DH in its White Paper (November 2004) said that, in line with the research and the responses to Ofcom's consultation, the Government considered that there was a strong case for action to restrict further advertising and promotion to children of those foods and drinks that are high in fat, salt or sugar (HFSS). The White Paper further said that the Government would work with the broadcasting and advertising sectors on ways to help drive down levels of childhood obesity. In particular, the Government:

> "would look to Ofcom to consult on proposals to tighten the rules on broadcast advertising, sponsorship and promotion of food and drink and secure their effective implementation by broadcasters in order to ensure that children are properly protected from encouragement to eat too many high fat, salt or sugar foods – both during children's programmes and at other times when large numbers of children are watching. It should also include options for broadcasters and advertisers to participate in healthy living programmes"[17].

2.15 The Government indicated that there would be a target for a change in the nature and balance of food promotion to children by 2007. The Government further stated that, "if, by early 2007, they [the measures taken] have failed to produce change in the nature and balance of food promotion, we will take action through existing powers

[17] Department of Health White Paper (November 2004) – Chapter 2 "Health in the consumer society" pages 11-12

or new legislation to implement a clearly defined framework for regulating the promotion of food to children."[18]

Existing initiatives

2.16 There are already a number of initiatives underway from industry targeted at addressing obesity[19]. These include the commitment of the food industry to work with the FSA on reducing salt and fat in foods. For instance, the Department of Health's White Paper reported that "Project Neptune" was an industry-wide sodium reduction programme and that in the soup and sauces sector, "encouraging progress" had already been made. There has also been a 22% reduction between 1998 and 2003 in the amount of salt in breakfast cereals.

2.17 There have also been moves by broadcasters to promote healthy eating through positive messages on television[20]; moves by schools to improve diets; an increased awareness through media of the risks of certain types of food that children are eating etc. Ofcom welcomes all these initiatives since they are likely to address those areas which can have the largest impact with the least distortionary effect. The nature of these different initiatives is also in keeping with Ofcom's own approach in that one of Ofcom's key regulatory principles is that it "will always seek the least intrusive regulatory mechanisms to achieve its policy objectives." [21]

2.18 At a high level, there has been a change in the level of advertising by the food and drink industry. Between 1999 and 2003 total Core Category [22] advertising spend showed signs of a downward trend, falling from £856 million to £738 million. However spend levels in the last two years have increased and spend in 2005 was £862 million, representing an 11% year increase compared to £778 million in 2004. The volume of television spend was also showing signs of a trended decline over the same period, falling from £669 million in 1999 to £533 million in 2003. However TV spend also increased by 7% between 2004 and 2005 from £547 million to £585 million.

2.19 When looking at TV spend as a proportion of total Core Category spend, TV has shown a long-term downward trend with the proportion of spend allocated to television decreasing from 78.2% in 1999 to 67.9% in 2005. There has been a corresponding increase in Press & Radio expenditure. Press has increased from 11.3% in 1999 to 16.6% in 2005. Radio spend has increased from 2.8% in 1999 to 4.2% in 2005.

2.20 Nielsen media data mirrors this downward trend. Children's exposure to Core Category advertising has declined by 6.25% in 2005 across all airtime, and by 25% across children's airtime. Core Category impacts accounted for a smaller proportion of all television advertising children were exposed to in 2005 down from 6.7% in 2004

[18] Department of Health White Paper (November 2004) – Chapter 2 "Health in the consumer society" page 12.
[19] For example ASDA have recent launched its "Great Stuff" range designed to help mums give their children a healthy balance diet.
[20] For example Nickelodeon informed Ofcom of an initiative called Nicktrition launched on 6 June 2005, which is an umbrella brand for positive messaging. This initiative includes on-air activity, (such as long-form programming), off-air activity (such as Nick on the road, Jump up join in), Online (a Nicktrition website) and partnerships (with Life Education Centres, MTV networks etc.).
[21] http://www.ofcom.org.uk/about/sdrp/
[22] Core category products include all types of food (bakery goods, confectionery, cooking products and seasoning, dairy products and substitutes, drinks and beverages, fruit, vegetables and pasta, meat, fish and poultry and prepared and convenience foods), soft drink and chain restaurants based on Nielsen classifications.

to 5.3% in 2005. The share of total Core Category impacts delivered during children's airtime also declined.

2.21 Core Category impacts represented 17.6% of total impacts delivered during children's airtime in 2005 - down from 22.7% in 2004. Although Core Category exposure declined, year-on-year there has been a marginal increase in the proportion of child impacts delivered during peak-time and an increase in the amount of peak/late night activity (airtime).

2.22 Although there was slightly less Core Category advertising during children's airtime[23], in 2005, 71.3% of the advertising within that category was devoted to the Big Five[24] product groups. This was down from 79.3% in 2004 and appears to show signs of trended decline over time.

2.23 We note that some manufacturers have chosen voluntarily to move away from television advertising aimed at younger children. For instance, Kraft has indicated to Ofcom that it has a policy preventing advertising products that it regards as less healthy in media targeted at children under the age of six. It also restricts advertising in the 6-11 age group to those products that meet certain nutrition criteria. Cadbury Schweppes has also told Ofcom that under its Marketing Code of Practice it, 'will not advertise where children under the age of eight are likely to be the majority of the audience.'

Structure of this document

2.24 The remainder of this document is structured as follows:

- Section 3 discusses the TV advertising market, the role of advertising and the operation of this market;
- Section 4 discusses the economic rationale for intervention;
- Section 5 sets out the potential policy options that are being considered by Ofcom;
- Section 6 illustrates the impact on broadcasters, advertisers and manufacturers of the policy measures;
- Section 7 analyses the potential costs of the different policy options;
- Section 8 summarises the FSA report into the benefits of banning HFSS adverts to children;
- Section 9 analyses the proposed policy packages.

[23] Children's airtime is on terrestrial channels generally between 6am-9am and 3pm-6pm on weekdays and 6am-1pm on weekends. For dedicated children's channels, all airtime is children's airtime.
[24] Big Five: confectionary, soft drinks, crisps/savoury snacks, fast food, pre-sugared breakfast cereals – based on Nielsen classification.

IA Section 3

The TV Advertising Market

The Role of Advertising

3.1 There is a considerable literature which debates the role of advertising in terms of its impact on consumer preferences. However, for the purposes of this analysis, we do not present a detailed review of the various theories about the role of advertising but rather set out what Ofcom understands to be the main features of TV advertising as a form of display advertising and how the market for TV advertising operates.

3.2 Given the sums that are spent on advertising (see Table 3.1 below) and TV advertising in particular, it is clear that there is a belief that advertising is able to influence the purchasing decisions that consumers make. Two issues are therefore what form does that influence take and how strong it is.

Table 3.1: UK Advertising Expenditure* 2000 – 2004

Current Prices	2000	2001	2002	2003	2004
£ million	16,987	16,537	16,780	17,411	18,385

Source: The Advertising Statistics Yearbook 2005
* Includes expenditure on national and regional newspapers, consumer and business magazines, television, radio, outdoor, direct mail, cinema, internet, directories and production costs.

3.3 Display advertising [25] aims primarily to influence the brands that consumers purchase and advertising works by influencing the brand choice of customers at the point that they are ready to buy. In the case of products that are consumed frequently or on a regular basis (as is the case for most food) readiness to buy is likely to be prompted by a specific event e.g. running out of breakfast cereal. This implies that repetition of advertising messages will be important in addition to the timing of the advertisement and – in the case of television advertising - its relation to the programming in which it is inserted.

3.4 The ability of advertising to perform the role of suggestion/influence is likely to be linked to the 'memorability' of an advertisement. This in turn is likely to be linked to factors such as: repetition, intensity (e.g. use of colours, pictures etc), association value and ingenuity. It will also be the case that different persuasive techniques appeal to different age groups. Television is a versatile advertising medium that allows the combination of sound and moving pictures and has widespread, near universal coverage - it is thus considered to be a particularly attractive advertising medium.

3.5 Tables 3.2 and 3.3 below set out data on the level and growth of display advertising as a whole and, within that, television advertising over the period 2001-2004. The data indicates that television advertising has grown faster than display advertising in general and has increased its share of total display advertising. Television advertising is also the single largest medium for display advertising.

[25] Definition: display advertising is advertising that combines text with other graphical information e.g. logos, photographs, diagrams, moving images, etc.

Table 3.2: Display Advertising Expenditure 2001 – 2004

£ million	2001	2002	2003	2004
Current Prices	12,410	12,639	13,051	13,623
% change yr-on-yr		1.8%	3.3%	4.4%

Source: The Advertising Statistics Yearbook 2005

Table 3.3: TV Advertising Expenditure* 2001 – 2004

£ million	2001	2002	2003	2004
Current Prices	3,525	3,697	3,824	4,029
% change yr-on-yr		4.9%	3.4%	5.4%

Source: The Advertising Statistics Yearbook 2005
* includes agency commission

3.6 In general terms display advertising is used as a marketing tool. It is one of a number of forms of promotional activity available to firms as they seek to compete with other firms. Other forms of marketing promotion could include price promotions, "buy one, get one free" offers, packaging etc. Display advertising can be used both to increase the overall size of the "market" (i.e. increasing overall consumption) and also to defend or increase market share against competing products. Display advertising can be an important mechanism for building brand loyalty because of the retention aspect of advertisements.

3.7 Advertising can be particularly effective in respect of new product launches or in the early growth phase of a market when it has an important role to play in terms of bringing a new product to the attention of consumers. Trade associations also undertake generic advertising campaigns to increase the overall sales of a particular category of product. For instance at various times there have been generic campaigns seeking to increase the overall consumption of meat, eggs, milk, etc. Advertising can therefore have a role in seeking to persuade consumers to increase their overall level of consumption but Ofcom's understanding is that - in the case of food products - advertising is also often about competitive positioning i.e. aimed at encouraging consumers to purchase particular brands within a product category (e.g. to purchase Coca-Cola rather than Pepsi).

TV Advertising

3.8 Within the category of display advertising, TV advertising is regarded as one of the most effective media due to a number of important advantages:

- It has near universal reach in the UK, which is important for mass-market advertisers such as manufacturers of fast moving consumer goods ("fmcg");
- It has the ability to reach consumers rapidly, which is vital for manufacturers of goods that have a short shelf life (e.g. pop singles or new films) or who want to build awareness of a product quickly;
- The audio-visual environment offers powerful creative advertising possibilities for brand creation and strengthening;

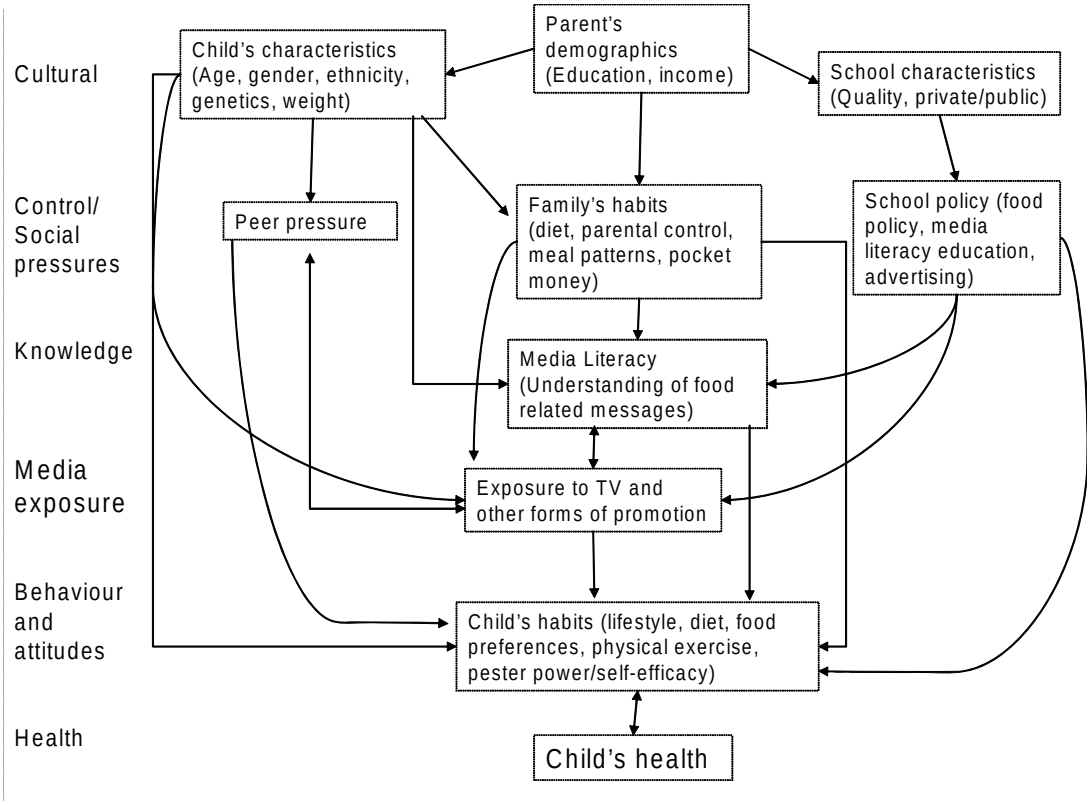
- There is a certain viewer attachment to it in the sense that TV content and advertising can be part of the discussion at work, home and school. Advertisers are able to benefit from such viewer attachment; and
- As far as advertising targeted to children is concerned, TV is likely to be preferred to other media, both, because children are attracted to audio-visual content, and because they are not mature enough to respond to other media such as print advertising [26].

3.9 The distinctiveness of the medium has been recognised in a number of previous competition based investigations of the television advertising market [27] in which television has generally been recognised as being in a distinct economic market from other forms of advertising media. That is, other advertising media such as radio, outdoor etc were not regarded as close demand-side substitutes for advertising on television.

3.10 As well as advertising there are many other factors affecting children's food preferences. These cover a diverse range of variables including: biological factors (e.g. heredity, hunger and gender); family (income, working status of the mother, eating patterns); friends (e.g. norms and peer networks); schools (school meals, sponsorship and vending machines); consumerism (youth market, pester power) etc. This complex network of multi-directional influences on children's food choices is illustrated in the diagram below.

[26] In discussions with Ofcom, the Institute of Practioners of Advertising (IPA) suggested that for younger children (aged five and below) there was little real alternative on a mass media scale to television advertising. As children get older their media usage broadens but even so television still represented the core means of mass communication.
[27] For example, the Competition Commission report into the merger between Carlton Communications and Granada plc (2003).

Diagram 3.1 – 'Web of causality' model: Children's food preference, consumption and behaviour are caused by multiple direct and indirect factors



Source: Developed by Livingstone and Helsper (2004) published in Ofcom's, 'Childhood Obesity – Food Advertising in Context' 2004, p113.

3.11 In Sonia Livingstone's 2006 update of the literature review she states that there is a growing consensus that advertising works and expert commentators are now convinced that television viewing plays a role in contributing to the problem of children's unhealthy diet.

3.12 Ofcom's 2004 report established that children's airtime is a particularly important time of day for younger children to be exposed to food advertisements. Typically, younger children (4-9 years) see more advertising for Core Category products in children's airtime [28] than older children (10-15 years), because they spend more time watching television in children's airtime. The updated figures for 2005 paint a similar picture:

- Children aged 4-9 see just over half (55.6%) of all the Core Category advertisements that they are exposed to in children's airtime; and,
- Children aged 10-15 see around one quarter (23.1%) in children's airtime.

3.13 Television advertising is considered to be an important and effective medium for reaching children. In terms of how children respond to television advertising, younger children may not be influenced by the content of advertising per se, but may still find the intensity of the message (through colour and sound), and the celebrity status of the advertisement engaging. Consequently advertisers may appeal to younger children through the use of bright colours, lively music and the involvement of

[28] Children's airtime is on terrestrial channels generally between 6am-9am and 3:30pm-5:00pm on weekdays and 6am-1pm on weekends. For dedicated children's channels, all airtime is children's airtime.

animated characters and celebrities. Younger children are also not able to recognise the commercial intent behind the advertising message and may therefore be more susceptible to advertising influence[29].

3.14 Older children are likely to pay attention to the content of the message and be persuaded because they attend to, and engage with, the arguments put forward for a proposition or product. Advertisers are likely to appeal to such children through the use of witty or stylish imagery and subtle messages.

3.15 Ofcom's 2004 report pointed out that children generally associate heavily advertised branded foods as 'fun' based on their packaging and widespread use of pictures, cartoons and characters. Effectively marketed, television advertising ensures positive imagery of brands in the minds of children.

General Trends in TV advertising

3.16 As part of its review of Public Service Broadcasting, Ofcom commissioned a report from PriceWaterhouseCoopers [30] which produced a series of forecasts for aggregate TV advertising revenue over the period 2004-2014. The main conclusion of the report was that Net Advertising Revenues ("NAR") for terrestrial PSB channels and digital channels would grow at different rates. Overall over this period, total NAR was forecast to grow at around 2.5% per annum in real terms. However, within that, terrestrial PSB channel NAR was expected to remain broadly constant in real terms while multi-channel NAR was expected to grow at around 9-10% per year in real terms, reflecting increased audience fragmentation. The implication of this report was that over time the existing commercial terrestrial broadcasters could come under increasing financial pressure.

3.17 Although the report forecasts more rapid growth rates for multi-channel NAR, it also recognised that the multi-channel NAR was more vulnerable to changes in audience share and so would tend to be more volatile. As such Ofcom has taken this into account in considering the overall impact of the options on the different types of broadcasters in order to ensure that any response is proportionate.

Children's Television

3.18 In the UK, children have access to television from a number of different sources: children's programming is available on the main terrestrial broadcasters (BBC, ITV, Five, GMTV and, to a lesser extent, Channel 4) and there are also a number of dedicated children's channels which are available to homes which have access to digital multi-channel television.

3.19 The digital children's market is one of the most competitive for multi-channel providers with services in the UK including The Disney Channel, Cartoon Network, Boomerang, Toonami, Nickelodeon, Nicktoons, Nick Jr, Jetix, Pop, Tiny Pop and Trouble in addition to the BBC's dedicated digital services for children (CBBC and CBeebies). In 2005 CBeebies was the most watched channel with the Disney Channel, Boomerang, Cartoon Network and Nickelodeon each achieving between 0.3-0.6% audience share in multi-channel homes. In all there are over 20 dedicated children's channels operating in the UK (including time shifted version i.e. "+1" versions) and ITV launched a dedicated children's service on DTT on 11 March

[29] Where children do not recognise the commercial intent of advertising "numerous empirical studies in this realm indicate that the ability to recognise intent does not develop for most children before 8 years .. and hence are uniquely susceptible to advertising influence". Report of the American Psychological Association task force on advertising to children, Feb 2004.
[30] 'Forecasting UK TV advertising Revenue 2004-2014'

2006. Also on 2 March 2006 it was announced that Hit Entertainment is in talks with Hallmark Channel parent Sparrowhawk regarding launching a new UK kids channel.

3.20 Children's programming on the main commercial terrestrial channels is typically provided in specific blocks of airtime: e.g. 6am-9am on Five; 3.15pm-5pm on ITV during the week; 6am - 1pm (GMTV/ITV) at weekends etc. Within these times some programming on GMTV, ITV, Channel 4 and Five specifically targets pre-school children. For example, GMTV targets pre-school children on Saturdays between 6am-7.25am, Channel 4 targets pre-school children everyday between 6am-7am and Five targets pre-school children between 6am-9am everyday except Saturday when the times are 7am-9am. In contrast the dedicated children's channels broadcast for much longer periods – over 12 hours per day although the programming mix would change over the course of the day. Some are also more targeted than others, for instance Nick Jr and Tiny Pop's core audience are pre-school children. The schedules for the dedicated children's channels are built around a high rate of repeats e.g. the same programme may be repeated 2-3 times a day.

3.21 However, children spend a significant proportion of their viewing time outside of what is termed children's airtime. For instance, programming in the early evening - such as *Coronation Street* is likely to have large numbers of children watching although they might make up only a relatively small share of the audience. BARB analysis of 2005 viewing data indicates that children spent 68.9% of their viewing time (equivalent to 10.9 hours per week) outside of children's airtime. This is significantly higher for children aged 10-15 (79.4%) compared to children aged 4-9 (57.3%).

3.22 The cost of television programming tends to be characterised in terms of relatively high fixed costs and low operating costs e.g. there is a fixed cost to making/acquiring programming and then the cost of additional viewers is very low if not negligible. There are also costs which channels incur for distributing their services e.g. in terms of transmission, or for satellite transponder capacity and also conditional access services and subscriber management. As such there is a limit to the amount of cost cutting that can occur in response to, for example, revenue reduction.

3.23 The mix of programming between original commissions and acquired material varies across different channels, but the main terrestrial channels tend to commission more original programming (including animated material) whereas – with the exception of the BBC channels and possibly the new CITV channel[31] - the dedicated children's channels tend to rely more heavily on acquired material, particularly imported material (e.g. cartoons from America).

3.24 Among the terrestrial commercial channels, ITV1 (excluding GMTV) is required by regulatory obligations not only to provide a fixed amount of children's programming – currently 8 hours per week and also to ensure that this is predominantly originated in the UK. In 2005 ITV1 exceeded the volume requirement by providing around 10 hours of children's programming per week and so have some flexibility to lower the amount of children's programming without Ofcom's consent.

3.25 Around 80% of ITV1's total programme investment for children's programmes consists of original production with the rest comprises acquired or repeat programming. Over two-thirds of this content is also independently produced. This significantly exceeds both the current original production obligation of 65% and the 25% quota for independent production.

[31] Over 80% of the output of CBBC and CBeebies comprises original production.

3.26 In 2004 the commercial digital children's channels broadcast more than 1,750 hours of programming per week between them. Of this around 70 hours per week consisted of first-run original programming (including animation), Disney (which broadcasts no advertisements) accounted for most of this original programming [32].

3.27 It is estimated that dedicated children's channels (excluding the BBC's CBeebies and CBBC) spent around £52m [33] on programming in 2004.

3.28 In terms of size of audience and viewing share, the terrestrial channels individually tend to attract a greater proportion of children's viewing compared to individual non-terrestrial channels. For example the current channel shares for children [34] in percentages show that BBC1 has 17.3%, BBC2 has 6%, ITV1 has 18.9%, Channel 4 has 7.1% and Channel 5 has 5.1%, which totals approximately 54% compared to 46% for the non-terrestrial channels. In terms of commercial impacts, the dedicated children's channels account for around 30% of all children's commercial impacts.

3.29 Access to the dedicated children's channels depends on access to digital television. Take-up of digital services is high among families with children – it is estimated that over 70% of families with children have access to multi-channel TV. However, at present those households which have access to digital television through Freeview do not have automatic access to commercial children's channels - currently, only CBBC and CBeebies are available free to air on the DTT platform.

3.30 The dedicated children's channels revenue comes from subscription revenue from platform operators (e.g. cable, satellite) and advertising/sponsorship revenue. Subscription revenue accounts for on average 58% of total revenue on these channels (excluding the Disney channels which do not carry advertising). The main commercial terrestrial broadcasters rely solely on advertising revenue and sponsorship while the BBC's services are funded through the licence fee.

3.31 For the dedicated children's channels, the key product categories advertising in children's airtime, and their percentage share of revenue on average in 2004 were: Food and drink (39%), Toys and Games (42%), Cinema/DVD (8%), Computer Games (2%) and Other (9%). According to these channels, the majority of categories have shown little growth, with only the toys and games category displaying year on year growth of 10% in 2003/04 and 14% (forecast) in 2004/05.

The Operation of the TV advertising market

3.32 The sale of commercial airtime in the UK is based on the supply of airtime by broadcasters and the demand for airtime by advertisers and media buyers. Depending on the nature of the product, advertisers seek to sell their products either to a narrow or a wider population of viewers. Hence airtime is usually sold on the basis of the demographics of the viewing population such as children, young males (16-34), all adults, housewives with children etc. These demographics are actually based on the audience for programmes. When broadcasting programmes, broadcasters schedule the programmes so that the greatest number of viewers that the broadcaster is targeting are likely to be watching. Such viewers are known as target audiences and broadcasters in effect deliver audiences for advertisers.

3.33 TV advertising does not operate like a simple spot market in that advertisers do not typically buy an advertising slot around a particular programme. Instead an advertiser - or more typically an advertising agency/buyer acting on behalf of advertisers -

[32] Source: The Communications Market 2005. (Ofcom)
[33] Source: The Communications Market 2005. (Ofcom)
[34] Source: The Advertising Statistics Yearbook 2005, table 11.2.5 (p131)

contracts with a broadcaster for the delivery of a given number of commercial impacts where an impact is the viewing of one advertisement by one viewer, usually normalised in terms of 30 second advertisements. Furthermore, the TV advertising market is characterised by bi-lateral, agency deals carried out annually. Advertising deals are generally negotiated between media buyers and broadcasters in the last quarter of the year. In these negotiations shares of media buyers' budgets are committed in return for a negotiated value and quality of airtime for the coming calendar year. [35] Deals take a variety of forms, but the majority follow this general principle. Audiences for the coming year are predicted, based upon historical performance and programming line-up.

3.34 The Station Average Price (SAP) of the broadcaster is the most widely used basis of negotiation. Essentially it is a notional benchmark price which can vary by region and according to the demographics of the audience that the advertiser wishes to reach. The actual SAP achieved will vary on a month-to-month basis depending on the ratings achieved by the broadcaster and the amount of revenue received by the sales house from advertisers. However, advertising expenditure commitments are influenced in turn by advertisers' expectations of what the SAP will be, as this will determine how much they need to spend to achieve their target level of ratings.

3.35 Due to differences in their respective programming schedules and also, in relation to digital television factors such as availability, broadcasters attract different target audiences in varying amounts. Advertisers therefore are likely to advertise on those channels and times best able to deliver their key target audiences. For example, an advertiser seeking to target women with women's products is unlikely to want to advertise on a sports channel, because although there will be some women watching the programmes of this channel, the majority of viewers are likely to be men. In such a situation, for every woman who might watch the advertisement, there are likely to be more men watching, but men are unlikely to purchase the product being advertised. This would be inefficient advertising as a significant proportion of the audience would be 'wasted' and it would be an expensive way of reaching the target audience (see below). It would be more efficient for the advertiser to purchase airtime around programming that is aimed more at the relevant target demographic e.g. housewives or housewives with children.

3.36 As such the price and discount across channels will differ because the viewer demographics across channels are different. For instance, the dedicated children's channels may only supply airtime for 'children' or 'housewives with children', while the PSBs offer programming based on (up to) 15 demographics. Traditionally, the SAP for the children's demographic has been cheaper than other demographics partly due to the to the fact that airtime in children's TV converts very efficiently to the children's demographic with little wastage. As such broadcasters can afford to sell children's airtime at a much larger discount.

The relationship between price and supply

3.37 In the short run, the overall supply of airtime (commercial impacts) is largely fixed in that programme schedules are typically fixed in advance. Broadcasters have a relatively good idea about the number of impacts that are likely to be generated. However, even if the overall supply of impacts is fixed, if scheduling restrictions were to be introduced on the amount of time available for certain types of advertising (e.g. HFSS foods), then that would imply that the supply of airtime available for other types

[35] In the case of ITV1, the Contracts Rights Renewal (CRR) remedy introduced following the Competition Commission's investigation into the merger between Granada plc and Carlton Communications plc imposes certain restrictions on the terms which ITV1 must offer media agencies.

of advertising could potentially increase. This is because broadcasters will still wish to sell the airtime 'vacated' by advertisers of HFSS foods in the face of a scheduling restriction. [36]

3.38 However, unless the programming mix also changes, then the composition of the audience will not change i.e. restricting advertisements for HFSS foods around children's programming would provide more airtime for firms seeking children (or housewives with children) as the target audience but would not increase the airtime for firms seeking adult audiences. As a result, if firms seeking to advertise HFSS products are displaced from children's airtime, this could lead to a shift in the relative price of advertising at different times of the day e.g. advertising in children's airtime could become cheaper while advertising in the evening peak could become more expensive.

Existing Regulatory Restrictions on Television Advertising

3.39 There are currently a number of general rules and restrictions regarding the overall amount of advertising on television, which derive from the Television Without Frontiers (TWF) Directive[37] .

3.40 The Directive specifies the overall amount of advertising that a broadcaster is allowed in any one day. This states it should not exceed an average of 9 minutes per hour of broadcasting with a maximum of 12 minutes in any one clock hour. However for Channel 3 licensees, Channel 4 and Five, the overall amount of advertising in any one day cannot exceed 7 minutes per hour of broadcasting although this can increase to an average of 8 minutes per hour between 7am and 9am and between 6pm and 11pm in any one day, but still subject to the maximum of 12 minutes in any clock hour.

3.41 One effect of these rules is that advertising minutage is not distributed evenly over the day. In order to maximise commercial impacts at peak times while staying within the limits, the main terrestrial broadcasters tend to make use of the maximum 12 minutes per hour in the heart of the evening peak, but then have less than 7 minutes of advertising per hour at other times of the day. Daytime - particularly the afternoon – is a period when advertising tends to be less than the permitted daily average.

3.42 Advertising around children's programming is also subject to specific restrictions. For instance, advertisements for merchandise based on children's programmes must not be broadcast in any of the two hours proceeding or succeeding episodes or editions of the relevant programmes. Even so advertising around children's programmes tends to be dominated by toys and food.

3.43 There can be little in the way of food and drink advertising to children around pre-school programming depending on the time of year. It is often the case that for early morning programming ad breaks is routinely shut down i.e. not shown. For example during January 2006 the DDS [38] search tool called Spot List[39] showed that neither GMTV nor Channel 4 had any spots in their pre-school programming schedule. For

[36] Commercial PSBs are required to offer all their airtime for sale due to a regulatory requirement; however, other commercial channels in general also find it commercially sensible to do so.
[37] Council Directive 89/552/EC of 3 October 1989 on the co-ordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the pursuit of television broadcasting activities, as amended by Directive 97/36/EC of 19 June 1997
[38] The Donovan Data Systems (DDS) search tool is a research tool commonly used in the media industry to analyse Television Audience Information provided by BARB.
[39] The Spot List, lists all the spots which are carried during a designated time period.

Five there were a limited number of spots and within these a small proportion were food and drink adverts.

IA Section 4

Economic Rationale for Regulatory Intervention

4.1 Regulatory intervention would typically be justified in terms of seeking to address market failure e.g. where the characteristics of a market are such as to lead to an inefficient or sub-optimal outcome. Such characteristics can include consumers lacking sufficient information on the products to make rational choices or externalities meaning that consumers do not take account of all the relevant costs. In addition to intervention to address market failures, there can be other grounds for intervention e.g. in order to achieve other public policy objectives such as those set out in the Choosing Health White Paper. This section considers the nature and extent of any market failures or other distortions and in particular the particular vulnerabilities of children (especially younger children) that might justify regulatory intervention.

Lack of consumer information

4.2 Standard economic analysis assumes that consumers are well informed about the products that they are purchasing and therefore able to make trade-offs between the benefits that they receive from consuming the good and the costs of that consumption so as to optimise their overall welfare. Where consumers are not well informed about the costs and benefits of consumption, then regulatory intervention in the market may be justified.

Information on a healthy and balanced diet

4.3 It may be the case that consumers are not aware of the long term health implications of their consumption, and/or have limited knowledge of what might represent a healthy diet. While consumers may make choices based on the nutritional content in individual foods or food types, they may not have sufficient information to enable them to choose combinations of foods that contribute to an overall balanced diet; the lack of which is one of the causes of obesity. In particular it is unlikely that younger children are able to make informed choices about their diets.

Trade-off between present consumption and future health implications

4.4 Even if consumers were fully informed of the consequences of less healthy eating, they might find it difficult to trade-off present consumption against future health benefits, particularly if the future health benefits are uncertain and depend on a host of other factors unrelated to consumption. Furthermore, children are likely to find this trade-off more difficult than adult consumers and thus be more vulnerable particularly if there is a cumulative impact of advertising over time[40]. While on an individual basis the benefits of healthy eating may be remote and uncertain, on a population basis the relationship between increases in less healthy eating and health problems may be clearer and sufficient to justify regulatory action.

[40] In the Department of Health White Paper it was reported that, in response to an earlier consultation, even commentators who felt that it was inappropriate for the Government to take a role in encouraging adults to make more healthy choices felt that it was appropriate to intervene for children (Paragraph 47, Chapter 2).

Information on the product

4.5 If retail consumers do not have adequate information on the food they are consuming (for example, the nutritional content of some foods), they will not be able to properly balance the costs and benefits of that consumption (for example if they do not realise that a certain food contains an ingredient with probable long term health consequences).

4.6 This may justify action to ensure that food advertising and labelling provides appropriate information to consumers. This may include requiring labels to be consistent and comprehensible to consumers, that advertisers do not make misleading claims about the nutritional aspects of food being advertised, and where appropriate that certain foods carry health warning messages. However any such labelling initiatives are likely to be more valuable to adults, who can assess the information more appropriately, than to children especially younger children.

4.7 As such since the problem of information asymmetry is particularly acute in the case of younger children, this would tend to suggest that regulatory measures addressing the volume or nature of commercial messages for HFSS foods may be more appropriately targeted at younger children as they cannot be readily dealt with by information provision alone.

The impact of pester power

4.8 The TNS Family Food Panel survey[41] showed that a substantial minority (44%) of parents agreed that they tend to buy what their children want and that parents from the lowest social grade group are the most open to such persuasion. Empirical studies have indicated that children under the age of 8 do not recognise the commercial intent of advertising. Where decisions about food purchases and consumption are driven through the impact of pester power by children's choices that are themselves heavily influenced by advertising, it is more difficult for parents to restrict or control the amount of less healthy food that is purchased and consumed within their children's overall diet.

Externalities[42]

4.9 Since the costs of obesity are not borne fully by the obese person (because the National Health Service provides treatment that is free at the point of use), there is a negative externality associated with the consumption of less healthy foods. Leaving individuals to trade-off the costs and benefits of their consumption will not lead to an efficient outcome because individuals will not take full account of the cost of medical treatments that they do not directly face. Therefore Government may seek to lower consumption below the level set by an unregulated market to reflect this market failure.

4.10 If the Government were concerned *just* with the externality resulting from the cost of obesity and obesity related illnesses, arguably the most effective method to address this market failure would be through a tax on HFSS foods to 'internalise' the external costs of obesity not faced by the consumer (in the same way as taxes on tobacco, alcohol and fuel are justified – in part - by the external costs that they impose). Although it could be argued that regulating TV advertising of HFSS foods on its own may not be the most direct way of addressing this problem, as referred to earlier, it

[41] Ofcom 2004 Report, p.57.
[42] Costs arising from consumption that are not borne by the individual consuming the product.

might have a role as part of a range of measures designed to address the social costs imposed by the consumption of HFSS foods.

Summary

4.11 The above discussion has focussed on the different economic rationales that may justify intervention by a regulator. Taking into account the particular vulnerability of children (i.e. from evaluating the commercial intent behind advertisements to making informed trade-offs between the short term benefits and long term costs of consuming less healthy food) the discussion suggests that there may be an economic rationale for regulatory intervention to change the balance of food promotion to children, especially for younger children who cannot assimilate as readily as older children information provided to them. Such intervention would be aimed at addressing the market failure caused by the lack of, or asymmetry in, consumer information on what constitutes a healthy, balanced diet; on the nutrient content of different food etc.

4.12 The discussion also suggest that there could be another rationale for intervention based on the presence of externalities in the consumption of HFSS foods which imposes a high social cost that is not directly faced by the individuals making the purchasing decisions.

4.13 At the same time the discussion does suggest that intervention in the TV advertising market *on its own* is not likely to be the most appropriate, nor most effective way to correct these market failures. As indicated above, some may be better corrected by changes to education, food labelling, taxation etc but these areas of intervention are outside Ofcom's remit.

4.14 The underlying basis for the public policy objectives discussed above and the reasoning behind the objectives set out in the Government White Paper are relevant considerations for Ofcom to take into account when performing its statutory duties, having regard to such matters as the vulnerability of children and the opinions of consumers in carrying out its duty to ensure adequate protection from the inclusion of harmful material in broadcast services. There may also be other less direct costs and benefits (for example parents benefiting from finding it easier to persuade their children to eat a healthier diet, or children losing out by not enjoying free toys in cereal packets) which may result from restricting advertising but which are not quantified in this IA.

The Precautionary Principle

4.15 The FSA's paper on the benefits of restricting HFSS advertising to children, illustrates the importance of the precautionary principle when deciding whether regulatory action is appropriate. The FSA highlights the fact that at present the health and life expectancy effects of childhood obesity are not well known, because the existence of significant numbers of obese children is a new phenomenon.

4.16 Circumstances where there is uncertainty regarding the longer term health effects but where their potential is clearly adverse, are ones where it might be appropriate to apply the precautionary principle approach to policy formation. The precautionary principle is defined in the Green Book published by HM Treasury as, 'the concept that precautionary action can be taken to mitigate a perceived risk. Action may be justified even if the probability of that risk occurring is small, because the outcome might be very adverse.' In other words even though at present the health and life expectancy of childhood obesity are not well known, because the outcome of having

significant numbers of obese children may be considered adverse to the nation, the precautionary principle may be justify action in order to mitigate the potential risk.

4.17 Updated research carried out by Professor Livingstone concludes that although the measured effects of advertising /television were small, cumulatively this could make an appreciable difference to the number of children that fell into the obese category. It is thus plausible that although food advertising has only modest direct effect on children's food preferences, targeted intervention on the amount and the way in which HFSS products are advertised on television could have a significant longer-term impact on obesity and the general health of society.

IA Section 5

Policy Options

5.1 Given the conclusion in the Ofcom 2004 report that television advertising is only one of a range of factors that influence consumption by children of HFSS products and that the rise in obesity levels among children is multi-determined, Ofcom considers that any measures it proposes should be considered as additional measures to the voluntary initiatives underway from manufacturers and advertisers, paragraph 6.18, plus existing Government initiatives. The Government initiatives are set out more fully in section 4 in the main body of the consultation document.

5.2 As discussed in the consultation document, in early December 2005 the FSA presented Ofcom with its Nutrient Profiling Scheme. The policy options set out below which specifically make reference to HFSS foods are based on the use of this model to differentiate between HFSS and other foods. However restrictions based on all food and drink do not use the FSA nutrient profiling model.

5.3 During the course of Ofcom's analysis a broader range of policies than those set out below were considered in order to arrive at these specific policy proposals. In arriving at these options, the analysis carried out for the impact assessment, whilst not determinative, was able to inform Ofcom in evaluating all the policies considered and to help Ofcom consider the proportionality of the different policies. However, in using this analysis Ofcom has also recognised the limitations and inherent difficulties in quantifying the possible health benefits of the options presented as well as the costs. The policy measures that Ofcom has considered and attempted to quantify are the following:

Policy options

1. Do nothing

- no changes to the current market going forward.

2. Scheduling restrictions

- restrictions on broadcasting HFSS advertisements and sponsorship during programming aimed at children;
- restrictions on broadcasting HFSS advertisements and sponsorship during programming of particular appeal to children;
- restrictions on broadcasting HFSS advertisements and sponsorship before specific times of the day (eg. 9.00pm);
- restriction on broadcasting all food and drink advertisements and sponsorship during programming aimed at children (possibly segmented by age);
- restrictions on broadcasting all food and drink advertisements and sponsorship during programming of particular appeal to children;
- restrictions on broadcasting all food and drink advertisements and sponsorship before specific times of the day (eg. 9.00pm); and
- restrictions on broadcasting all food and drink advertisements and sponsorship in or around programmes made for pre-school children (defined as 4 or under).

3. Volume restrictions

- restrictions on the number of seconds per clock hour of all food and drink advertisements and sponsorship during times at which children watch television (up to 8pm).

4. Content restrictions

Ofcom has invited BCAP to submit a set of rule proposals for addressing the content of food advertising. The detailed proposals are at Annex 8 of the main consultation document. The key clauses are in summary:

- food advertisements must avoid anything likely to encourage poor nutritional habits or an unhealthy lifestyle in children;
- advertisements for food must not advise or ask children to buy, or to ask their parents to buy, the products. There must be no appearance of encouraging children to pester;
- promotional offers (inc. collectibles and giveaways) in food advertisements must not be targeted at children ages under 10 years;
- food advertisements must not encourage children to eat or drink the product only to obtain a promotional offer;
- celebrities and licensed characters must not be used in food advertisements whose content is targeted directly at children under 10;
- nutrition claims must be supported by sound scientific evidence, and must not give a misleading impression of the health benefits of the product as a whole;
- no nutritional or health claim may be targeted at pre-school children; and
- advertisements must not condone or encourage excessive consumption of any food.

5. Other options within Ofcom's remit

- not issuing any new rules, but encouraging self-regulation amongst manufacturers, advertisers and broadcasters by publishing specific guidance;

6. Other measures considered but judged to be outside Ofcom's statutory remit

- promote and implement positive messaging, for example, funding healthy eating campaigns;
- run an HFSS advertisement "trading scheme", whereby broadcasters could "buy" the ability to run otherwise prohibited HFSS advertisements by broadcasting editorial or advertising material with positive messaging (healthy eating);
- require those who advertise HFSS products to contribute to a central fund to be made available to those who wish to advertise healthier products, or to promote healthy eating.

5.4 We have referred to the measures (in point 6) above either because they, or variants of them, have been suggested to us either in the White Paper or by other interested parties more generally. However, Ofcom has concluded that it would not have any statutory basis to implement them. Consequently, they have not been included amongst the policy options being consulted on and are not considered further in this impact assessment.

IA Section 6

Impact on broadcasters, advertisers and manufacturers

Introduction

6.1 As set out in Section 4, Ofcom believes there may be an economic case for intervention to address the balance of television advertising of HFSS foods or all food and drink. This section looks at the impact on a number of stakeholders, such as advertisers, manufactures and broadcasters, both terrestrial and cable/satellite channels.

6.2 The analysis starts by discussing the issues raised by broadcasters around quantitative restrictions and Ofcom's response to these issues which helps to inform the development of the costs which may be expected to be incurred. It goes on, in Section 7 to assess, in monetary and percentage terms, the impact that the policy options may have where this can be measured.

6.3 In order to understand the impact of quantitative restrictions. Table 6.1 below shows the total volume of Core Category [43] impacts[44] and children's airtime in 2004.

Table 6.1: Total volume of Core Category impacts by broadcaster for all airtime and children's airtime in 2004

Broadcaster	All Airtime - Impacts (bn)	Children's Airtime - Impacts (bn)
ITV	5.3	1.3
Channel 4	1.5	0.001
Five	1.3	0.42
Total Terrestrial	8.1	1.7
Dedicated Children's Channels	4.7	4.7
Multichannels (excluding children's channels)	3.2	0
Total	16	6.5

Source: Nielsen data

6.4 Table 6.1 shows that the terrestrial channels between them account for just over half of all Core Category impacts. Furthermore, although about 40% of all Core Category impacts are in children's airtime only 20% of terrestrial Core Category impacts are in children's airtime. This indicates that any policy option which focuses on children's

[43] Core Category foods include soft drinks, chain restaurants and all food categories within the Nielsen database.
[44] An impact is equivalent to one viewer watching one advertisement, which is usually normalised in terms of a 30 second advert.

airtime is likely to impact more heavily on the dedicated children's channels than on the terrestrial channels.

6.5 This section sets out the comments received (through an informal pre-consultation process) from broadcasters and advertisers regarding policy options relating to the restriction of HFSS products. Although section 7 assesses the likely costs for both HFSS and Core Category products, it should be noted that Ofcom has only asked and received comments from broadcasters and advertisers in relation to a restriction on HFSS categories. The definition of HFSS which has been used in this analysis is based on a conservative classification into detailed Nielsen sub-categories[45], as a proxy for application of the FSA's nutrient profiling model. The Nielsen sub-categories are discussed in greater depth in Annex 11 of the main consultation document.

Impact on broadcasters, advertisers and manufacturers of a restriction on HFSS foods

6.6 Any restriction on the volume of advertising of HFSS products – whether in terms of banning advertising at certain times of the day or limiting the amount of such advertising, will tend to reduce the amount of advertising revenue received by broadcasters. However, there are a number of responses that broadcasters and advertisers could make in order to mitigate the likely effect of any quantitative restrictions e.g. replacement of HFSS advertising with advertising for other products, moving HFSS advertising to non-restricted times of the day, cuts in the costs of programming etc. These need to be factored into the assessment of the costs that would be imposed as a result of the different policy options.

Substitution – TV and other advertising

6.7 To understand the possible ways in which broadcasters and advertisers may change their trading strategies in the market in order to adjust to a potential loss in revenue from scheduling restrictions of HFSS foods, Ofcom pre-consulted with broadcasters and advertisers on the potential for substitution of HFSS advertising in the event of restrictions being imposed. The information made available to Ofcom is restated below, followed by Ofcom's views on the arguments put forward.

Terrestrial broadcasters

6.8 According to terrestrial broadcasters there are several reasons why the opportunity to substitute other revenue may be very limited:

- Since non-HFSS product categories may not be targeted at the same demographics as HFSS products, they risk getting slotted into inefficient airtime which may not be commercially attractive for the broadcaster.
- While it is possible that HFSS advertisers may be able to use unrestricted airtime, there is a limit on the number of breaks that can be placed in the unrestricted airtime, their length and therefore the number of ads that can be run. For example if there are currently approximately 50 breaks a day, and if there was a prohibition on HFSS advertising in day parts up to 21:00, this would reduce the number of unrestricted breaks to approximately 10. In addition, broadcasters will make every effort to ensure that they are not running directly competing advertisers in the same

[45] For example the bakery goods sub-category includes biscuits, cakes and bread which are likely to be predominantly (but not exclusively) HFSS and therefore the revenue and impacts associated with this category have been classified as HFSS. However categories such as fruit and vegetables are excluded.

break, thus adding further constraints on the ability of advertisers to move to unrestricted times.

- Advertisers will have to pay a premium to move to unrestricted airtimes. Currently daytime is very cost effective as the average price is lower, and helps to offset the higher price in other dayparts. If this advantage is lost, advertisers face a higher overall price. This might discourage some food and drink manufacturers from advertising on TV at all.

6.9 For some of the terrestrial channels a restriction in children's airtime would only put a small percentage of revenues at risk and some of this is likely to be replaced by adverts for other products. However, the dedicated children's channels will feel the effects of a restriction on children's airtime much more acutely as these restrictions affect all of their airtime. Thus the opportunity for substitution will depend on how restrictive the policy option is. A restriction on all food and drink advertising (both HFSS and non-HFSS) before 9pm would mean a higher reduction in revenues and could lead to some advertisers exiting TV altogether.

IPA[46]

6.10 The IPA estimated that, for ITV, post-9pm airtime could carry a 30% premium on the station average price (SAP) and a 20% surcharge for the post-7pm SAP and that these premia existed regardless of the level of discount that agencies had negotiated on behalf of their clients. This is because peak is the most highly demanded segment as it offers the best reach, carries the best programming and is skewed towards more upmarket and scarcer audiences.

6.11 Given that children's airtime is typically traded at a discount to the general level of SAP, the IPA estimated that if advertising currently aimed at children in children's airtime were displaced to the evening peak, then those advertisers could be faced with a doubling of price. For instance, if the general level of SAP was indexed at 100, then the index for peak airtime would be equivalent to 130. In contrast, children's airtime might trade at an index of 65 (i.e. at a 35% discount to the general level of SAP).

6.12 The IPA argue that if restrictions on HFSS products were to be applied to children's airtime, it is probable that much of this expenditure will be lost to television, rather than shifted to other times of the day and this will have a negative impact on TV advertising agencies and media buyers. This is because the expenditure is likely to be redeployed into pricing, on-pack or in-store promotions and greater retailer incentives. Advertisers are not likely to redeploy their television expenditure into alternative above-the line media because other media do not offer the creative opportunities that are particularly attractive to children. The IPA calculated that the reduction in advertising expenditure to advertising agencies could be in the range of £40m -£70m. This in turn could represent income of between £6m and over £10m (based on the notional 15% commission that agencies receive).

6.13 The IPA also believed that it was unlikely that advertisers would reposition their advertising strategies to target alternative demographics in the event that there was a ban on the promotion of HFSS products during children's airtime. Although this might be possible for some products/brands it was not necessarily a realistic scenario for all products i.e. it might not be possible to reposition some products to appeal to different demographics.

[46] IPA - Institute of Practitioners in Advertising

6.14 Where substitution might be possible, the closest substitutes were likely to be Housewives with Children or Young Adults. The IPA estimated that even if the costs associated with marketing, packaging and distribution arrangements were not taken into account, the direct media cost of switching targeting on TV away from children could be 5 times more expensive for a campaign targeting Housewives with Children on a cost per Gross Rating Point (GRP[47]) basis and 6 times more expensive for a campaign targeting 16-34 Adults (on a GRP basis).

Ofcom's views on the potential for substitution and the impact of volume restrictions

6.15 Ofcom recognises that scheduling restrictions will impact on the demand for airtime in both restricted and unrestricted hours and that this is likely to change prices in these times. However it is less clear that the reduction in prices in the restricted times will mean an overall loss of revenue with no substitution from other advertisers (either from non-HFSS food and other advertisers in the case of HFSS restrictions, or non-food advertisers only in the case of an all food and drink restriction). The broadcasters and advertising agencies have not explained why non-HFSS advertisers who are already advertising to children within the proposed restricted period would not increase their expenditure in response to a reduction in the price of advertising in children's airtime. Equally, if the reduced demand for airtime results in a price reduction, new advertisers may be attracted into the market. That said, Ofcom recognises that the terrestrial channels are more likely to have scope for replacing lost HFSS advertising compared to children's channels and that the more extensive the restriction the less flexibility broadcasters are likely to have to recover lost revenue.

Impact on food manufacturers and advertisers

6.16 In assessing the impact on food manufacturers and advertisers of a potential restriction of TV advertising, it is important to note that any such restrictions either for HFSS or all food and drink, would not be imposed in a vacuum – there are many other initiatives currently underway or planned which will also impact on manufacturers and advertising agencies. Public sector measures include:

- long term and increasing emphasis in school curricula on the benefits of diet with reduced HFSS consumption;
- increasing publicity by the UK Government, as well as relevant Government agencies in Wales, Scotland and Northern Ireland [48], aimed at adults (including parents) with responsibilities for children emphasising the importance of healthy diets with reduced HFSS consumption, and exercise;
- voluntary measures by schools and retailers to curtail HFSS vending (which the Government proposes to make mandatory)[49] ; and

[47] The Gross Rating Point total for a campaign is the sum of the all TVRs for the individual advertising spots in that campaign. The Television Rating (TVR) measures the popularity of a programme, day-part, commercial break or advertisement by comparing its audience to the population as a whole. 1TVR is numerically equivalent to 1% of the target population.

[48] In addition to work co-ordinated by the UK Government's Department of Health, other initiatives have been taken by relevant Government departments and agencies in Wales (http://www.healtheschool.org.uk), Scotland (http://www.scotland.gov.uk/Topics/Health/health/19133/19651) and Northern Ireland (http://www.investingforhealthni.gov.uk/fitfutures.asp).

[49] For example, Cadbury Schweppes has removed brand advertising from its vending machines in schools, and has replaced many carbonated drinks with bottled water. The Government has

- moves by various education authorities and schools to reduce the HFSS content of school meals (which the Government proposes to make mandatory).

6.17 Ofcom sees no reason to expect that the pressure from the Government and lobby groups will diminish. If anything, it seems likely that this pressure will be increased – for example, when it published the White Paper, the Government said that it would take action itself to regulate HFSS advertising if significant change in the nature and balance of HFSS advertising had not occurred by 2007. Since then, the Government has promised further action to prevent the sale of HFSS products in school vending machines, and to restrict the use of HFSS products in school meals.

6.18 In addition to these public sector measures, a recent publication by the Food & Drink Federation (FDF) reports[50] that, food manufacturers and advertisers are themselves taking a variety of voluntary measures to:

- emphasise the importance of balanced diets with plenty of exercise within publicity in advertisements, on websites and in publications financed by HFSS manufacturers[51] ;
- label many products to provide more nutritional information for consumers, coupled with detailed nutritional information on websites;
- reformulate some HFSS products to reduce HFSS content[52];
- encourage healthy eating through labelling and messaging on HFSS products[53];
- diversify their product portfolios to include non-HFSS products;
- reduce the quantum of HFSS advertising targeted at children[54] ;
- modify advertising techniques in order to reduce the appeal of advertising to young children; and
- remove branded vending machines from schools or broaden the range of healthy products available from such machines.

6.19 Clearly, the effects of any television advertising restrictions, either for HFSS or all foods, on revenues for manufacturers and advertisers would be incremental to the effects of a range of existing and future measures aimed at reducing consumption of HFSS products and to a certain extent would be interdependent with them (the more successful advertising restrictions were seen to be in solving the problem of childhood obesity, the less the pressure to introduce other alternative measures). This makes it very difficult to establish in quantitative terms what the baseline would be (i.e. what would happen if no advertising restrictions were imposed), and what the incremental impact of advertising restrictions would be, particularly in terms of estimating the possible benefits.

announced plans to ban the vending in schools of products that are high in fat, salt or sugar, and to improve the quality of school meals. http://news.bbc.co.uk/1/hi/education/4287712.stm

[50] Food and Drink Manifesto, Delivering on our Commitments, September 2005, Food and Drink Federation.

[51] See, for example, a description of the activities funded by Cadbury Schweppes http://www.cadburyschweppes.com/EN/EnvironmentSociety/CaseStudies/PromActiveLSUK.htm

[52] Walkers crisps announced on 6 February 2006 that they were reducing the saturated fat content of Walkers crisps by 70%.

[53] As discussed in paragraph 2.16, ASDA have recently launched its “Great Stuff” range.

[54] Kraft has decided not to target food advertising at children under 6, and to withdraw from advertising products that do not meet its ‘Sensible Solution’ criteria - http://www.kraft.com/responsibility/nhw_sensiblesolution.aspx.

6.20 Against a background of rising (but unquantified) costs being incurred by food manufacturers and advertisers in response to the changing climate of opinion towards HFSS products, the many assumptions that would need to be made about the variables described above, and the lack of data about the economic effects of different scenarios, Ofcom believes that it would be unrealistic and almost certainly misleading to express in quantative terms the incremental effects of television advertising restrictions on food manufacturers and advertisers. This would be true even if it was possible to obtain data on some of the impacts, as partial data would not be sufficient to evaluate the interdependencies between the different factors outlined above.

6.21 Restrictions on television advertising could have a range of impacts on manufacturers and these will vary depending on whether the restriction is based on HFSS foods or all foods:

- for a restriction on HFSS products, food manufacturers may face the extra costs of reformulating HFSS products so that they comply with the FSA Nutrient Profiling Scheme;
- if reformulation of HFSS products was judged to be impracticable or not cost-effective (or under a restriction on all food and drink advertising), manufacturers may face additional costs in achieving the same impact as television advertisements through other media, such as points-of-sale advertising, radio, outdoor and printed media;
- in the case of a restriction on all food and drink, there could be a reduced incentive to innovate and introduce healthier ranges of food products; and
- there may be a reduction in sales of HFSS products which is not fully offset by sales of non-HFSS products or in the case of all food sales of food products not fully offset by sales of non-food products.

6.22 New product development is normally informed by consumer demand or the incentive to differentiate between other suppliers of the product. A restriction on advertising of HFSS foods may increase the incentives for manufacturers to embark on innovation as consumers demand more healthy products and manufacturers are keen to compete on the basis of being seen as responsible suppliers. Developing healthy products would allow them to access the restricted TV advertising slots giving them a competitive advantage over those supplying HFSS products.

6.23 A restriction on either HFSS or all food and drink advertising could have an adverse impact on the opportunity for new companies and products to successfully enter the market for HFSS or all foods. Given the importance of high profile TV campaigns in launching new products, restrictions on advertising these products could be a barrier to entry in HFSS or all food and drink markets and could entrench the position of existing manufacturers who already have product awareness in the market.

6.24 Nonetheless, there are a number of considerations that point to the economic impact of restrictions on television advertising on food manufacturers and advertisers being relatively modest:

- first, as discussed in paragraph 6.18 they are already subject to pressures that are leading them to incur additional costs in terms of reformulating foods in the case of HFSS products and making use of different avenues to promote HFSS and all food and drink products. It is unlikely that these pressures would diminish, even if television advertising was not restricted. Restrictions on television advertising would add to these pressures, but would not be wholly responsible for them;

- second, many HFSS and food products are not advertised on television, so sales of these products are unlikely to be affected by advertising restrictions;
- third, many of the proposed restrictions on television advertising will not eliminate the scope for advertising on television, but are particularly targeted at reducing the quantity of advertising to children and will not prevent advertising that is not targeted at children;
- fourth, assuming that changes in food preferences lead to greater consumption of non-HFSS products to replace consumption of HFSS products, there will be opportunities for manufacturers and advertisers to make and promote these products, as the FSA has pointed out in its recent consultation on proposed front-of-pack nutrition labelling[55] . Ofcom notes that some companies have been broadening their product range to include non-HFSS products[56] and that some companies are seeking to exploit market opportunities created by health concerns [57];
- fifth, as already noted, it may be possible for manufacturers to reformulate some products so that they are no longer HFSS, and thus to sustain and even grow their market share; and
- finally, Ofcom's own research has shown that television advertising has only a modest direct impact on food preferences, thus restricting advertising may not, by itself, result in significantly reduced sales.

6.25 Taking these factors together, Ofcom's view is that the short to medium term impact upon HFSS or all food manufacturers and advertisers will be modest, reflecting both the research indications that advertising has only a modest direct impact upon consumption preferences, and the range of measures that manufacturers and advertisers can take to mitigate the effects on their revenues. However, if the restrictions were based on all food and drink then the impact of this would be more adverse than if the restriction was based on HFSS foods alone.

6.26 However, some manufacturers consider a ban on all food and drink adverts to be preferable to an HFSS ban based on the FSA nutrient profiling model. Ofcom understands that this is, in part, due to the fact that they consider that restricting HFSS advertising would, in their view, demonise certain foods and disproportionately affect manufacturers of certain types of food and drink.

Opportunities for channels to save costs

Regulatory restrictions on ITV

6.27 As discussed in Section 3, ITV faces specific regulatory obligations in respect of children's programming[58] and therefore faces potential restrictions on its ability to make substantial changes to its children's programming without Ofcom's consent.

6.28 There is also a specific issue regarding any changes to the advertising mix of ITV affecting the Contract Rights Renewal (CRR) agreement currently in place. The Contracts Rights Renewal (CRR) remedy was introduced following the Competition Commission's investigation into the merger between Granada plc and Carlton

[55] Consultation on a Voluntary Front of Pack Signpost Labelling Scheme for the UK – Appendix 3 - Partial Regulatory Impact Assessment, 16 November 2005, Food Standards Agency.
[56] Coca Cola plans to add more non-carbonated drinks to its range in 2006 (http://news.bbc.co.uk/2/hi/business/4689702.stm).
[57] See, for example, http://www.linkvending.co.uk/Healthy_Vending.htm and http://www.ukvending.co.uk/schoolvending.htm
[58] Currently around 8 hours per week on ITV1 and a further 7 hours on GMTV.

Communications plc and imposes certain restrictions on the terms which ITV1 must offer media agencies.

6.29 Introducing any of the policy options set out in Section 5 will have an impact on the current contracts that have been negotiated between ITV and the advertisers. Although this will affect the ability of advertisers to roll over their existing contracts, which is currently allowed by the CRR, these restrictions should not have an adverse affect on this. It should be the case that these restrictions can be dealt with, within the CRR through variations to advertisers' contracts. Any variations or new contracts would have to be offered to advertisers by ITV on 'fair and reasonable' terms.

Dedicated children's channels

6.30 Ofcom has been informed by one dedicated children's channel that its initial strategy in the event of a restriction in airtime would be to reduce the budgets for original programming devoted to positive messages related to healthy eating. Further, a reduction in advertising revenue will impact on original children's programming and will require them to reduce their investment in certain franchises. Additional revenue losses could result in the following strategic choices being made to ensure management of their cost base and retain shareholder value:

- Possible reduction in their channel portfolio;
- Scaling back investment in new digital technologies and distribution media (such as mobile, broadband etc)
- Removal of interactive (iTV) services on linear channels.
- A freeze on new employment and reduced investment in training and development
- Significant reduction in marketing budgets and off-air pro-social (positive) campaigns.

Other options available to dedicated children's channels

6.31 These channels acknowledge the fact that they receive subscription revenue from wholesale distributors such as Sky and the cable companies, which provide the children's channels as part of their packages to their retail customers. One dedicated children's channel informed Ofcom that it has recently signed contracts with Sky and the cable companies at rates that are lower (in per subscriber terms) than the previous contract. According to this channel, this reflects not only the buyer power that Sky and the cable companies have, but also the proliferation of children's channels in the last few years. Given that these channels have weak bargaining power, it is unlikely that they would be able to raise additional revenue through subscription to make up for the loss of advertising revenue and thus would be following the strategy set out above.

6.32 Another dedicated children's channel informed Ofcom that the loss of advertising revenues would almost certainly reduce their ability to invest in the UK's independent animation industry. Reducing the quality of programming is a choice they would prefer to avoid, because in a market where the major competitor is the BBC, a drop in quality would trigger a loss of audience which would result in lower advertising revenues, which in turn would mean further cost cutting by reducing quality. Original UK commissioned animation is a key part of this channel's offering, but is expensive relative to library or US produced content. Further, it suggested that a significant drop in its revenues could mean revisiting its business model which allows them to transmit from the UK. There may be a point where it might consider moving its base

to another country which does not restrict the advertising of food to children. However this depends on a significant fall in revenues and is based on other business considerations, on which it has been unable to elaborate at this stage.

Ofcom's views on the potential for cost reduction

6.33 While Ofcom would prefer that broadcasters were able to continue to offer choice to viewers and offer diverse programming to all children's ages by operating all channels in their multi-channel portfolio, it recognises that programme and other cost reductions and reducing channel portfolios are commercial decisions that some broadcasters may choose to make.

6.34 Ofcom does recognise that if broadcasters reduce the amount of original commissioning that they carry out as a result of restrictions on the advertising of HFSS products then there could be an adverse impact on both viewers and independent producers. Audience research consistently shows that viewers value UK-originated programming more highly than imported materials and repeats[59] . This means that if there were a significant change in the programming mix e.g. a move to greater use of imported material (particularly by the terrestrial channels) then viewers would regard this as a reduction in the quality of television programming. Closure of channels could also represent a reduction in range and plurality for viewers.

6.35 Furthermore, if the terrestrial broadcasters moved away from commissioning original material then that would have a knock-on effect on production companies that make children's programming. Although much original children's programming is co-produced and is therefore developed for use in a number of countries, children's producers would need to develop other (international) sources of funds and there could be a reduction in the production base in the UK. It has not been possible to quantify this effect, however it is a possible outcome.

6.36 As Ofcom's jurisdiction on advertising on TV applies only to UK-based licensees any children's channels that relocated to jurisdictions without similar restrictions on HFSS or all food advertising could continue to broadcast HFSS or all food and drink advertising, without risking any intervention by Ofcom. If a significant number of channels followed suit, any proposed scheduling restriction could be ineffective (and disproportionate) because it would not reduce the exposure of children to HFSS products and additionally, would have the effect of removing any possibility of the channel being subject to UK regulation on the content of programmes and the delivery of television access services.

6.37 Ofcom does acknowledge that it is possible that some channels may consider relocating to a country that has no restriction on advertising of HFSS foods to children. Many of the multi-channel children's channels are multinational companies who have acquired licences to transmit in and from different countries in Europe. This could be done without any obvious changes so far as most viewers were concerned – there are already overseas based channels that target the UK, just as there are many UK-based channels targeting other countries. Against this, broadcasters would need to weigh the costs of relocation (although these might be offset if channels moved to lower-cost countries) and the risk that the new jurisdiction might itself impose advertising restrictions in due course.

[59] Section 4.3.4, The Communications Market 2005

Modelling the impact on broadcasters

6.38 In order to assess the effect of these different policy options, these policy measures will be compared against a "do nothing" benchmark, which assumes no changes to the current market going forward.

6.39 Ideally, analysis of a scheduling restriction on broadcasters should include an analysis of:

- the change in prices in the restricted hours from an increase in supply of airtime to non-HFSS advertisers in the case of HFSS restrictions and to non-food advertisers in the case of all food restrictions, and the change in prices in the unrestricted hours following any increase in demand from HFSS or all food advertisers;
- the response of the advertisers to the change in prices (i.e. change in demand) in terms of new revenue committed for the restricted and unrestricted airtime;
- the new equilibrium prices in the restricted and unrestricted airtime; and
- the opportunity for broadcasters to reduce their costs (for example by less original programming in response to a loss on revenue).

6.40 An analysis of the kind above requires sufficient data on demand, supply, prices and price elasticities across time and across all broadcasters. This would be a complex exercise for many reasons including:

- the known variable on price is the average price; but revenue committed is based on a negotiated price and individual discounts. It could be argued that advertisers agree to a negotiated price and discount based on historical average prices; in such a case, demand would be a function of average price, lagged by a few periods;
- the demand for airtime (i.e., revenue committed by advertisers) varies over time and is dependent on whether the product is a promotion, a seasonal offer, or is meant to enhance the brand value in the viewer's mind. As a result, the total demand will vary across advertisers/manufacturers (depending on the strategy that each adopts) and indeed will vary across broadcasters and channels based on the expectation of viewership. Demand may have a higher correlation with these factors than with the price, and the pattern of demand may vary across different periods of the year, thereby requiring some smoothing to the data to account for discrete changes; and
- the demand for airtime on TV is also dependent on external factors such as the price and effectiveness of other media and other sources of advertising (for instance instore promotions, promotions in public places like a High Street or shopping arcade, etc.).

6.41 Given the complexity of the market for TV advertising, and limitations on available data, Ofcom does not believe that a complex analysis of the kind above can be undertaken with any reasonable degree of confidence. Instead, Ofcom has attempted to understand the range of the impact on broadcasters' revenues by undertaking an analysis based on assumptions about the opportunity for broadcasters to mitigate the loss of revenue following different policy restrictions. This analysis is described in Section 7.

IA Section 7

Analysing the costs of the policy options

Estimating the costs of the policy options

7.1 Broadly, the policy measures that Ofcom has considered fall into the following categories:

- Do nothing;
- Scheduling restrictions;
- Volume restrictions;
- Restrictions on the treatment of content of advertising; and
- Combination of the above restrictions.

(A) Do nothing

7.2 Ofcom's previous research[60] concluded that "television advertising clearly has an influence and equally clearly there is a need for a tightening of specific rules". While a 'do nothing' measure would have no impact on advertisers, broadcasters or manufacturers (since it forms the base case for the analysis), it would fail to restrict advertising of HFSS foods to children and therefore fail to affect consumption patterns and through this the dangers and costs of obesity and other dietary-related conditions. The additional academic research that Ofcom has had carried out further supports the case that TV advertising does have an impact on food consumption and therefore restrictions can play a role in addressing this issue.

7.3 Given the particular concerns about younger children's inability to distinguish between advertising and programming content and widespread parental concern about how the 'Big Five' product categories are advertised on television, a 'do nothing' approach would not appear to be in line with Ofcom's duty to "have regard to the vulnerability of children and the opinions of consumers in the relevant markets and of members of the public generally". Therefore Ofcom retains its previous conclusion that specific measures are needed to address concerns about childhood obesity and this option is only considered within the context of this impact assessment in terms of providing a base for comparison against the other policy options.

(B) Scheduling restrictions

7.4 The first type of restriction is based on prohibitions on advertising and sponsorship at certain times of the day. Broadly, there are three types of scheduling restrictions which can be applied to either HFSS or all food and drink[61] (i.e. in total six options) that are considered in this option:

i. Restricting advertising and sponsorship in children's airtime;

ii. Restricting advertising and sponsorship in children's airtime and in all programmes of particular appeal to children.

[60] Ofcom: "*Childhood Obesity – Food Advertising in Context: Children's food choices, parents' understanding and influence and the role of food promotion." (*July 2004)
[61] For the purpose of modelling in this IA, all food and drink is proxied by the Nielsen Core Category of all food, soft drink and chain restaurants.

iii. Restricting advertising and sponsorship for all programmes between 6am and 9pm (includes children's airtime)

7.5 Ofcom has also considered the effects of excluding all food and drink advertising and sponsorship from pre-school children's programming – this is discussed in paragraph 7.29 as it is proposed to be part of the volume restriction package.

7.6 Under all of these options these scheduling restrictions result in the total exclusion, in their respective time periods, of either HFSS or all food and drink advertising and sponsorship.

7.7 Children's airtime is identified as:

- ITV1: 15.30-17.00 (weekdays); 09.25-13.00 (Saturday); and 09.25-11.00 (Sunday)
- GMTV: 06.00-09.25 (Saturday and Bank Holidays); 07.25-09.25 (Sunday)
- Channel 4: 06.00-07.00 (every day)
- Five: 06.00-09.00 (weekdays); 07.00-11.10 (Saturday); and 06.00-12.30 (Sunday)
- Nickelodeon Group, Turner Broadcasting Group, Jetix Group, CSC and Trouble – all output.

7.8 Programmes with particular appeal to children have been identified as those programmes where the child audience, indexed against the all-individuals audience for a programme, produces an index greater than 120. If children aged 4-9 have an index of 100 for a particular programme then this audience contains the same proportion of children aged 4-9 as found in the general population. Thus an index of 120 signifies that the proportion of children aged 4-9 watching the programme is 20% higher than the proportion of such children in the population[62] .

7.9 Since all airtime on children's channels is defined as children's airtime, the effect of restrictions (ii) and (iii) on children's channels is no different from the effect of restriction (i).

7.10 For the purposes of assessing the likely effects of these scheduling restrictions on broadcasters, Ofcom has spilt the commercial broadcasters into three broad categories:

- **Terrestrial channels** which include the commercial PSBs (ITV[63] ,GMTV, Channel 4 and Five);
- **Dedicated children's channels** which include all those commercial (cable/satellite) channels which focus solely on children; and
- **Other channels** which include commercial channels whose programmes may include those which appeal to children, such as music channels as well as other commercial cab/sat channels.

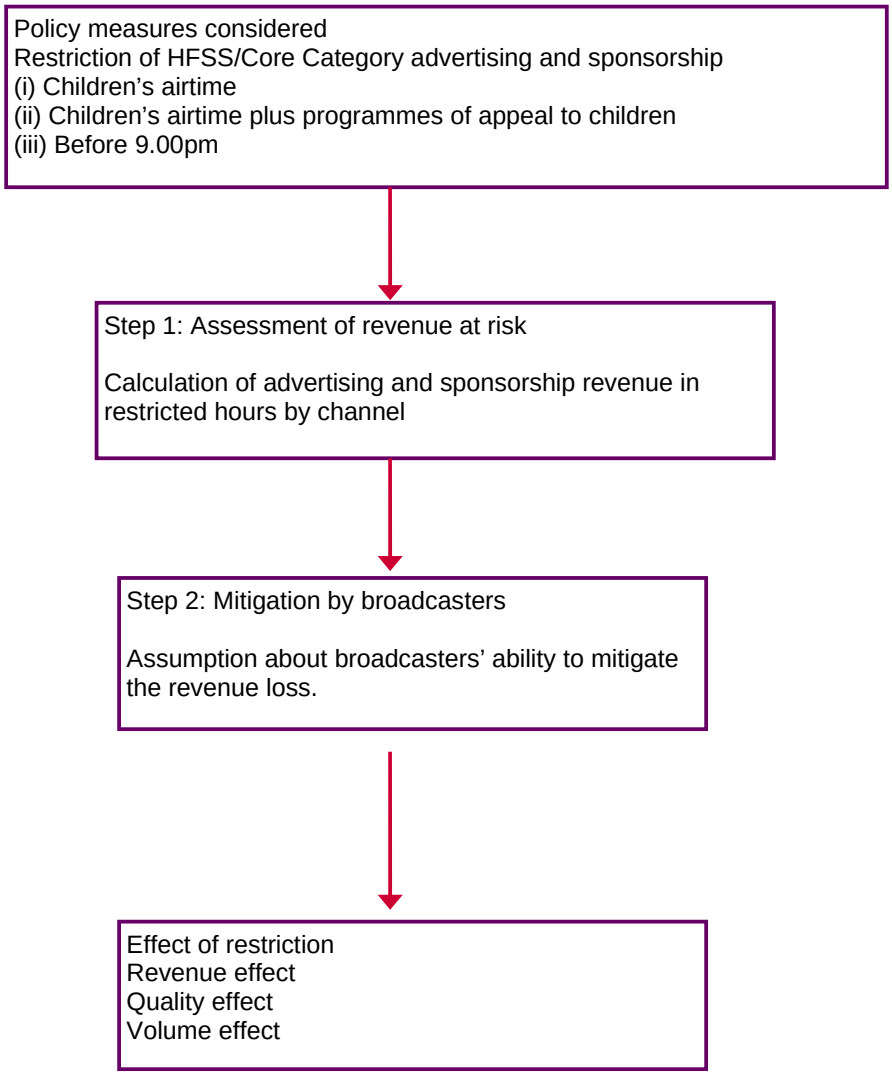
[62] This approach is consistent with the approach used for alcohol advertising.

[63] ITV launched a children's channel (CITV) on 11 March 2006 initially on DTT only. Ofcom has noted that ITV has been prepared to launch an advertising funded channel into what is already a very competitive environment in the knowledge that there is the possibility of restrictions on the advertising of HFSS products. This new children's channel will be subject to any of the restrictions set out in section 5. However, because the analysis has been based on historic data, it has not been possible to assess what effect the restrictions might have on this new channel.

7.11 In order to estimate the costs of any of the above restrictions to the broadcasters, Ofcom has developed the following framework, for each policy option there are two steps, illustrated in Figure 7.1 which are used to assess the possible impact:

- **Step 1:** Estimate for each broadcaster the maximum revenue directly at risk from the restriction;
- **Step 2**: An assumption about broadcasters' ability to mitigate the effects of the restriction.

Figure 7.1: Breakdown of the step analysis used to assess the effect of advertising/sponsorship scheduling restrictions



Analysis of revenue at risk

7.12 The quantitative analysis carried out by Ofcom attempts to model the impact on different broadcasters of particular restrictions on food and drink advertising at different times of the day. In order to do this it needs to take into account the different audiences for advertising slots over the course of the day and the likely scale of advertising revenue that would be generated in such ad breaks. The absolute impact in terms of the potential loss of advertising revenue is then related back to a

channel's overall revenue (i.e. from advertising, sponsorship and subscription) in order to derive figures for the impact as a percentage of total revenue for the different options being considered. The data which Ofcom uses to estimate these revenue effects are drawn from two separate sources.

7.13 Data on the overall revenue - i.e. in terms of advertising, sponsorship and subscription - for individual channels are taken from the returns (for calendar year 2004) which channels are required to make to Ofcom as part of their licence obligations. Ofcom believes that this data represents the single most authoritative source of aggregate revenue data both for individual channels and also for portfolios of channels within the same corporate group.

7.14 The data on different categories of food advertising revenue by time of day is based on data from the Nielsen Media Research database (June 2004 – May 2005). Ofcom understands that this data is built up on a bottom-up basis. The Nielsen data starts from estimates of the cost of advertising for individual channels e.g. in terms of a Cost per Thousand (CPT) - Ofcom understands that these estimates are taken from a range of industry sources and cross-referenced to ensure accuracy. Then using BARB data, the estimates of CPT are applied to the audiences for individual advertising spots to derive an estimate of the advertising revenue generated by each advertising spot. The CPT figures are weighted appropriately according to the time of the day, the length of the spot and the audience demographic. Ofcom believes that this approach should generate accurate data for distribution of advertising revenue over the course of the day.

7.15 Given the sources of data for the quantitative analysis, broadcasters that are affected by the measures set out in the different options should be able to replicate the modelling work that Ofcom has carried out.

Question 1) Do you agree with the basic modelling approach set out above by Ofcom? Are you aware of other data sources which could be used to corroborate the data used by Ofcom?

7.16 As has been discussed some broadcasters also obtain revenue through subscription and sponsorship. For sponsorship revenue, Ofcom only has data relating to total sponsorship revenue, not disaggregated by HFSS products or Core Category products. In order to include sponsorship revenue in the cost analysis, Ofcom has worked out the proportion of total sponsorship revenue to total advertising revenue plus sponsorship revenue and has grossed up the advertising revenue data it has received for HFSS and Core Category products. However, it should be noted that sponsorship is generally a very small proportion (on average less than 5%) of total revenue.

7.17 To assess the impact of restricting programmes with strong appeal to children, Ofcom has used the average daily viewing index score for children aged 4 to 9 for half-hourly time slots on all channels. This was matched with data on the total of child advertising impacts for HFSS foods. From this it was possible to identify how many impacts would be affected by this policy in addition to those impacts which would be affected by the children's airtime restriction. The percentage of impacts affected as a proportion of all impacts was calculated and this percentage was then applied to the HFSS or Core Category revenue of each channel to give the revenue at risk and this was then added to the revenue at risk from a restriction in children's airtime.

7.18 Although some of the broadcasters have provided Ofcom with similar information, this initial analysis focuses on the advertising revenue at risk figures derived from the

Nielsen database,[64] because of its comprehensive coverage of all children's channels. However, there may appear some slight differences between the data presented by broadcasters and Nielsen. This may be because the Nielsen categories are quite broad and this could have generated differences in the method of identification of HFSS advertisements by different broadcasters for the various scheduling restrictions. Ofcom is considers that it is being conservative in using these estimates[65].

7.19 The total estimated revenue at risk is set out in Tables 7.1 and 7.2, these numbers are averaged across channels and so the revenue at risk for an individual channel may differ from the average.

Table 7.1: Step 1 – HFSS foods: Revenue at risk (advertising plus sponsorship)

	Children's Airtime		Children's Airtime plus programmes of particular appeal to children			Pre-9pm		
	Total terrestrial	Total dedicated children's channels (TDCC)	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC
Reduction in revenues (£m)	16.2	17.2	24.9	17.2	5.4	237.7	17.2	51.0
Reduction in revenues (% of total)*	0.6	14.0	0.9	14.0	0.2	8.7	14.0	2.0

* These percentages are based on total revenue which includes all advertising, sponsorship and subscription revenue.

Table 7.2: Step 1 – Core Category foods: Revenue at risk (advertising plus sponsorship)

	Children's Airtime		Children's Airtime plus programmes of particular appeal to children			Pre-9pm		
	Total terrestrial	Total dedicated children's channels (TDCC)	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC
Reduction in revenues (£m)	18.0	18.4	28.6	18.4	6.4	292.0	18.4	60.9
Reduction in revenues (% of total)*	0.7	15.0	1.0	15.0	0.3	10.6	15.0	2.4

* These percentages are based on total revenue which includes all advertising, sponsorship and subscription revenue.

[64] For this analysis Ofcom has modelled the application of the FSA nutrient profiling model to determine whether products are HFSS by inclusion of the following Nielsen categories: Bakery goods, confectionery, cooking products and seasoning, dairy products, meat, fish and poultry, prepared and convenience foods, soft drink and chain restaurants.

[65] Further to this the Nielsen data does not distinguish between product and brand advertising. As such the data used in the analysis includes revenue from product and brand advertising. This will result in a further overestimation of the revenue at risk.

Step 2: Broadcasters mitigate the potential loss of revenue

7.20 As discussed above, if advertising revenue from HFSS/Core Category foods is restricted, broadcasters could seek to mitigate the revenue loss in various ways including:

- From existing or new non-HFSS/Core Category food advertisers in the restricted airtime. (This is particularly true for terrestrial channels (PSBs) who have a regulatory obligation to sell all of their airtime[66]).
- Sell airtime to HFSS/Core Category food advertisers in the unrestricted hours – since HFSS/Core Category food advertisers may compete with non-food advertisers for a different target audience, they will be required to pay a premium for such airtime. Such a premium might offset part of the loss of advertising revenue in the restricted airtime.
- Commercial channels can seek alternative sources of revenue such as increasing their subscription charge.
- Broadcasters may be able to reduce costs to increase profitability in the event of revenue loss. As indicated in paragraph 6.32 the dedicated children's channels may reduce costs by reducing the quality of their programming through switching to cheaper imports of children's programmes, or by repeating programmes more frequently.

7.21 Ofcom has tried to separately model the effects of revenue substitution from the effects of cost reduction. However in the analysis below Ofcom has chosen not to model directly the impact of cost reductions that broadcasters may be able to make. Part of the reasoning behind this is due to difficulty in arriving at reasonable assumptions on what costs should be included. Is it appropriate to take the costs associated with all programming or should modelling just include the costs associated with children's programming, despite that fact that terrestrial public service broadcasters would have the ability to reduce costs in other areas? Ofcom recognises that cost reduction is a possibility, however in terms of modelling it has subsumed this ability to mitigate revenue at risk through cost reduction within the modelling of substitution (this is partly reflected in the wide sensitivity ranges used in this modelling).

Mitigation of revenue loss

7.22 Step 1 assessed the level of revenue at risk from the potential advertising and sponsorship restrictions. Step 2 considers that there would be some mitigation of the potential revenue loss such that only a certain percentage of the revenue at risk would actually be lost.

7.23 Ofcom has considered three scenarios when assessing the extent of mitigation, a low, central and high percentage for both terrestrial and cab/sat channels. It is assumed that children's channels have a lower opportunity to mitigate revenue loss than the terrestrial channels.

[66] Non-PSB children's channels may choose to retain airtime to deliver more impacts to certain existing advertisers to make up for a previous year's shortfall. At least one broadcaster has informed Ofcom that this is a choice that they make.

7.24 Table 7.3 sets out the assumptions Ofcom has made regarding the likely proportion of revenue at risk that could be recovered by the different types of broadcasters.

Table 7.3: Mitigation rates from the base assumption that all HFSS/Core category revenue is lost due to the inability to substitute or reduce costs

Assumed level of Substitution	Terrestrial channels/ Multi-channels	Children's channels
Base (No substitution)	0%	0%
Mitigation		
Low substitution	35%	25%
Medium substitution	45%	35%
High substitution	60%	50%

7.25 Ofcom in its analysis has used as its central case the "medium assumption" as this is considered to be the most reasonable outcome and reflects the different ability of the terrestrial and dedicated children's channels in substituting HFSS or all food and drink adverts.

Question 2) Do you agree that the range of substitution percentages set out in table 7.3 reflect the likely mitigation scenarios? Explain the reasoning behind your answer.

7.26 Tables 7.4 and 7.5 provide a summary of the results for Step 2 using the central case assumption. Further details are provided in Annex A, in tables A1 and A2, which set out the impact on broadcasters for all the sets of assumptions.

Table 7.4: Central case estimate of revenue at risk after mitigation for restriction of HFSS advertising

	Children's Airtime		Children's Airtime plus programmes of particular appeal to children			Pre-9pm		
	Total terrestrial	Total dedicated children's channels (TDCC)	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC
Reduction in revenues (£m)	8.9	11.2	13.7	11.2	3.0	130.7	11.2	28.0
Reduction in revenues (% of total)*	0.3	9.1	0.5	9.1	0.1	4.8	9.1	1.1

* These percentages are based on total revenue which includes all advertising, sponsorship and subscription revenue.

Table 7.5: Central case estimate of revenue at risk after mitigation for restriction of Core Category advertising

	Children's Airtime		Children's Airtime plus programmes of particular appeal to children			Pre-9pm		
	Total terrestrial	Total dedicated children's channels (TDCC)	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC
Reduction in revenues (£m)	9.9	11.9	15.7	11.9	3.5	160.6	11.9	33.5
Reduction in revenues (% of total)*	0.4	9.8	0.6	9.8	0.1	5.9	9.8	1.3

* These percentages are based on total revenue which includes all advertising, sponsorship and subscription revenue.

7.27 The average figures in tables 7.4 and 7.5 mask significant disparities between channels. For example, while the estimated loss of revenue for children's channels for Core Category products for children's airtime including programmes of particular appeal to children, is around 9.8% the range is much wider from 4.1% - 20.9%. For non-children's multichannels the estimated loss of revenue on average is less than 0.2%, however the effect could be as large as 2.4% on some of these channels. Tables 9.1 and 9.2 also provide a detailed breakdown by channel for the central case assumption of the estimated loss of revenue after mitigation, for the scheduling restriction policy option for children's airtime plus programmes of particular appeal to children, for HFSS and Core Category products.

(C) Volume restrictions

7.28 As an alternative to the scheduling restrictions Ofcom has also considered restricting the volume of Core Category advertisements shown at times which children are generally watching television in large numbers.

7.29 The first element of this restriction would be a total exclusion of all food and drink advertisements in or around programmes made for pre-school children (where pre-school children are defined as 4 or under). This would include the following time periods for each channel:

- GMTV – 06.00-07.25 on Saturday;
- ITV1 – 15.30-15.50/16.00 on weekdays;
- Channel 4 – 06.00-07.00 every day;
- Five – 06.00-09.00 weekdays,
  07.00-09.00 Saturday,
  06.00-09.00 Sunday; and
- Pre-school dedicated children's channels – all output on Nick Jr and Tiny Pop.

7.30 The second part of the restriction would be based on volume restrictions where all food and drink advertising is limited to 30 seconds per clock hour for the time periods below:

- For the terrestrial channels – 06.00 to 09.00 and 15.00 to 18.00 on weekdays and 06.00-13.00 on weekends;
- For the dedicated children's channels – from 06.00 to 20.00 all days; and
- For other cab/sat channels – 06.00 to 09.00 and 15.00 to 18.00 weekdays and 06.00-13.00 on weekends.

7.31 The third part of the restriction would also be based on a volume restrictions for all food and drink advertising but limited to 60 seconds per clock hour for the time periods below:

- For the terrestrial channels – 18.00 to 20.00 on weekdays and 13.00 to 20.00 on weekends; and
- For other cab/sat channels – 18.00 to 20.00 weekdays and 13.00 to 20.00 on weekends.

7.32 In the modelling below any double counting due to an overlap between the pre-school restrictions and the volume restrictions has been eliminated in the final numbers.

7.33 These particular time periods have been chosen as they represent the times at which children are most likely to be watching television, based on current viewing trends, although Ofcom's analysis in the first instance has measured the total number of commercial impacts affected by these volume restrictions (i.e. adult and children's impacts). Ofcom notes, however, that for many channels, children do not form the key target audience. Ofcom has considered whether, for those cable or satellite channels which have only small child audiences, it might be disproportionate to include them in the restriction, e.g. whether there should be a minimum child

audience threshold to take this into account. Such a threshold might be devised in terms of the actual audience mix of the channel, or the absolute numbers of children viewing the channel. Ofcom would welcome input on how, if an audience threshold is appropriate, it might be constructed.

Question 3) For the other non-children's cab/sat channels, is it appropriate to apply the volume restrictions to all of these channels or should there be an audience related threshold applied to these channels before the restrictions come into effect? If there should be an audience related threshold, please provide views on what this should be.

7.34 Under the second part of this restriction there would be a cap (in terms of seconds of advertising per clock hour) on the quantity of Core Category product advertising and sponsorship at various times. While advertisers of Core Category products will not be prohibited from advertising in these times, the amount of airtime available for such adverts will be capped, thereby reducing the exposure that children have to advertisements and sponsorship of Core Category products.

7.35 The impact of this restriction will depend on the number of seconds per hour allowed for Core Category adverts. A zero second cap would be equivalent to a scheduling restriction i.e. a total ban in the specified time period. Until the cap is reached, the restriction has no impact (i.e. it is not a binding constraint). However, even once the constraint bites, it could be expected that a broadcaster would shed the least valuable adverts first – scheduling the limited number of advertisements allowed in the highest rating slots and selecting those advertisers prepared to pay the highest price for the slots. Therefore the revenue effect for broadcasters would be small at first, only increasing as the restriction moved towards a total ban. As such the impact of the volume restriction in both revenue and ratings terms may be less severe than initially appears. Ofcom has reflected this in its modelling by using higher substitution assumptions for volume restrictions than for scheduling restrictions.

7.36 Another consequence of shedding the least valuable adverts first, is that depending on the relative values to broadcasters of adverts for HFSS products compared to non-HFSS products, it may be the case that the broadcaster removes a higher proportion of its adverts for healthier food rather than HFSS products in response to the volume restriction on all food and drink adverts. Ofcom has considered this in estimating the benefits of the package of measures that includes this option in paragraph 9.34.

7.37 A volume restriction may also have an effect on the distribution of adverts. The volume restriction is likely to lead to the distribution of food adverts exhibiting a more even distribution pattern across the day. A consequence of this might be that following the restriction, food adverts appear during periods of the day when these ads are not currently shown.

7.38 The methodology adopted to model the effects of a volume restriction was similar to that used to calculate the revenue lost for the children's airtime plus those programmes of particular appeal to children i.e. the proportion of impacts that would be affected was calculated and this proportion applied to the channels' core category revenue.

7.39 However, it should be noted that in order to calculate the reduction in revenues for the other multi-channels, Ofcom took the top 25 channels with the highest Core Category spend which make up 80% of total core category advertising spend. Ofcom then multiplied the resulting numbers by a factor of 1.25 to get a 100% total.

7.40 The analysis below follows the same steps as that used in assessing the scheduling options:

- Step 1: Estimate for each broadcaster the maximum revenue directly at risk from the restriction (for volume restriction this is the proportion of seconds per clock hour above the 30/60 second cap multiplied by the impacts in that hourly slot and then totalled across the restricted hours to estimate the total impacts affected; the proportion of revenue affected is then assumed to be the same as the proportion of impacts affected);
- Step 2: An assumption about broadcasters' ability to mitigate the effects of the restriction.

Table 7.6: Revenue at risk from restricting Core Category advertising in pre-school hours and volume restrictions during period when children are most likely to be watching

	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC*
Pre-school scheduling restriction:			
Reduction in revenues (£m)	2.3	1.5	
Reduction in revenues (% of total)**	0.1	1.2	
Volume restriction:			
Reduction in revenues (£m)	166.1	10.6	18.3
Reduction in revenues (% of total)**	6.0	8.7	0.7
Pre-school and Volume restriction:			
Reduction in revenues (£m)	168.4	12.1	18.3
Reduction in revenues (% of total)**	6.1	9.9	0.7

*The figures for the Other multichannels ex TDCC, are the upper limit of the range of impact as these include all non-children's cab/sats. As discussed in paragraph 7.33 it may be the case that a threshold is imposed on these channels, as such any impact would be reduced.

** These percentages are based on total revenue which includes all advertising, sponsorship and subscription revenue.

Substitution of Advertising

7.41 As discussed in paragraphs 7.20 and 7.21 it is considered that broadcasters would be able to mitigate a certain percentage of the revenue at risk. For the volume restrictions Ofcom considers that broadcasters would have more flexibility to mitigate the effects of the restriction and so the substitution rates should be higher than those set out in Table 7.3. This is due to a variety of reasons, including:

- broadcasters would be able to keep some of their most valuable adverts as it is not a total ban in any clock hour (i.e. the adverts forced out first would be the lower value ones);
- there is more flexibility for broadcasters to be able to shift adverts between slots in order to maximise revenue given the proposed constraints; and

- there would be a price effect such that the price of the remaining advertisements that could be shown would rise.

Table 7.7: Mitigation rates for volume restriction

Assumed level of Substitution	Terrestrial channels/ Multi-channels	Children's channels
Low substitution	45%	35%
Medium substitution	55%	45%
High substitution	70%	60%

7.42 A "medium" substitution rate was used as the central case in the analysis.

Question 4) Do you agree that the range of substitution percentages set out in table 7.7 reflect the likely mitigation scenarios for volume restrictions? Explain the reasoning behind your answer.

Table 7.8: Central case estimate of revenue at risk for pre-school ban plus volume restriction

	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC*
Pre-school scheduling restriction:			
Reduction in revenues (£m)	1.0	1.0	
Reduction in revenues (% of total)**	0.04	0.8	
Volume restriction:			
Reduction in revenues (£m)	74.8	5.9	8.2
Reduction in revenues (% of total)**	2.7	4.8	0.3
Pre-school and Volume restriction:			
Reduction in revenues (£m)	75.8	6.8	8.2
Reduction in revenues (% of total)**	2.8	5.6	0.3

*The figures for the Other multichannels ex TDCC, are the upper limit of the range of impact as these include all non-children's cab/sats. As discussed in paragraph 7.33 it may be the case that a threshold is imposed on these channels, as such any impact would be reduced.

** These percentages are based on total revenue which includes all advertising, sponsorship and subscription revenue.

7.43 The average figures in table 7.8 mask some disparities between channels, for example, while the estimated loss of revenue for children's channels is on average 5.6% the range is much wider from 2.3% - 12.1% and for non-children's multi-channels the average estimated loss of revenue is 0.3%, with a loss of up to 2.2%.

(D) Treatment of the content of advertisements

7.44 In addition to the scheduling and volume restrictions laid out above, Ofcom is also consulting on changes to the content rules which govern HFSS and all food and drink advertising. Section 5 outlined in summary the proposals for content rules submitted to Ofcom by BCAP, and Annex 9 of the main consultation document sets them out in detail. These rules are subject to Ofcom approval[67] , before they can be incorporated by BCAP into the Television Advertising Code.

7.45 The nature of the proposals for content restrictions i.e. the proposed revisions to the TV advertising standards code mean that it is difficult to model their potential impact. As a result Ofcom is not proposing to quantify the impact of these proposals but rather to discuss in qualitative terms their possible effect.

7.46 The different options for scheduling/volume restrictions, are aimed in particular at reducing the exposure of younger children to advertising that promotes HFSS products. In parallel the BCAP proposals on content restrictions are measures which target both younger and older children who are likely to have a more mature and rational response to advertising but may still not be in a position to make informed trade-offs between current consumption and future health benefits. It is also the case that older children are more likely to be in a position to self-purchase e.g. use pocket money to make purchases for themselves. From the age of 9 it is assumed that children are able to make a distinction between programming and advertisements. However, there is still a presumption that children need a degree of protection in terms of the advertising messages to which they are exposed. The BCAP proposals are intended to change the nature of advertising messages that older children are exposed to rather than simply reduce their exposure to food advertising and to be used in conjunction with either the scheduling or volume restrictions.

7.47 The BCAP proposals are in line with other initiatives which the food industry has taken on themselves to move away from advertising to younger children[68] .

7.48 The direct benefits that flow from these proposals will be that children will not be exposed to advertising messages:

- that promote poor nutritional habits or unhealthy lifestyles; or
- that promote excess consumption; or
- that promote pestering of parents; or
- that impose any pressure to purchase particular products, via for example, the use of licensed characters or promotional offers (this restriction applies to advertisements target at children under 10); or
- that promote consumption purely to obtain a promotional offer; or
- that make unsubstantiated nutritional claims; or
- that include nutritional or health claims targeted at pre-school children.

7.49 The benefit of the content restrictions is thus that they would help to reinforce the effect of the quantitative (scheduling/volume) restrictions on children's advertising.

[67] As required by the Broadcast Advertising Co-regulation Memorandum of Understanding between Ofcom and ASA/BCAP.

[68] In January 2006, members of the Union of European Beverage Associations (Unesda) such as Coca-Cola, Cadbury Schweppes and PepsiCo announced that they would stop targeting children under 12 in their advertising campaigns. Unesda proposed to draw up a (voluntary) code of conduct which would also stop direct commercial activity in primary schools and offer more low-calorie drinks.

7.50 Ofcom does not consider that these restrictions, in themselves, will impose significant financial costs on food manufacturers. In the first instance, the proposals have been agreed by the industry and therefore food manufacturers are presumably aware of (and committed to) these proposals. Furthermore, food manufacturers will have a period of time in which to prepare for these changes and can thus begin to develop new advertising campaigns to take account of these proposals i.e. it is not the case that existing campaigns will become redundant overnight and advertisers would be forced to meet the cost of developing new campaigns to replace them. Finally, as mentioned above a number of food manufacturers have already taken steps to change the content of their advertisements so that these proposals are in line with the general trend in the treatment of advertising to children.

7.51 Since the proposals for content restrictions will form part of the TV Advertising Standards Code, compliance with these restrictions will be administered by the ASA. Ofcom therefore expects that it will be possible to move to a relatively high level of compliance relatively quickly and that the benefits of these proposals will not be diluted by non-compliance.

(E) Combining measures

7.52 The analysis above has focused on estimating the costs of restricting scheduling, volume, and content separately. However as set out in the accompanying consultation document, Ofcom is consulting on three core packages that combine different elements of these restrictions. It should further be noted that because the analysis has focused on estimating the costs separately it would allow implications to be drawn on the impact of other combinations of the same elements. The costs together with the benefits of these packages of options are set out in Section 9.

IA Section 8

Summary of FSA Benefits Analysis

Introduction

8.1 The aim of this section is to summarise the analysis undertaken by the Food Standards Agency (FSA) in conjunction with the Department of Health (DH) of the benefits to be derived from restricting advertising of HFSS foods to children and to explain how Ofcom has used the benefits assessment. The complete document can be found in Annex C of the impact assessment

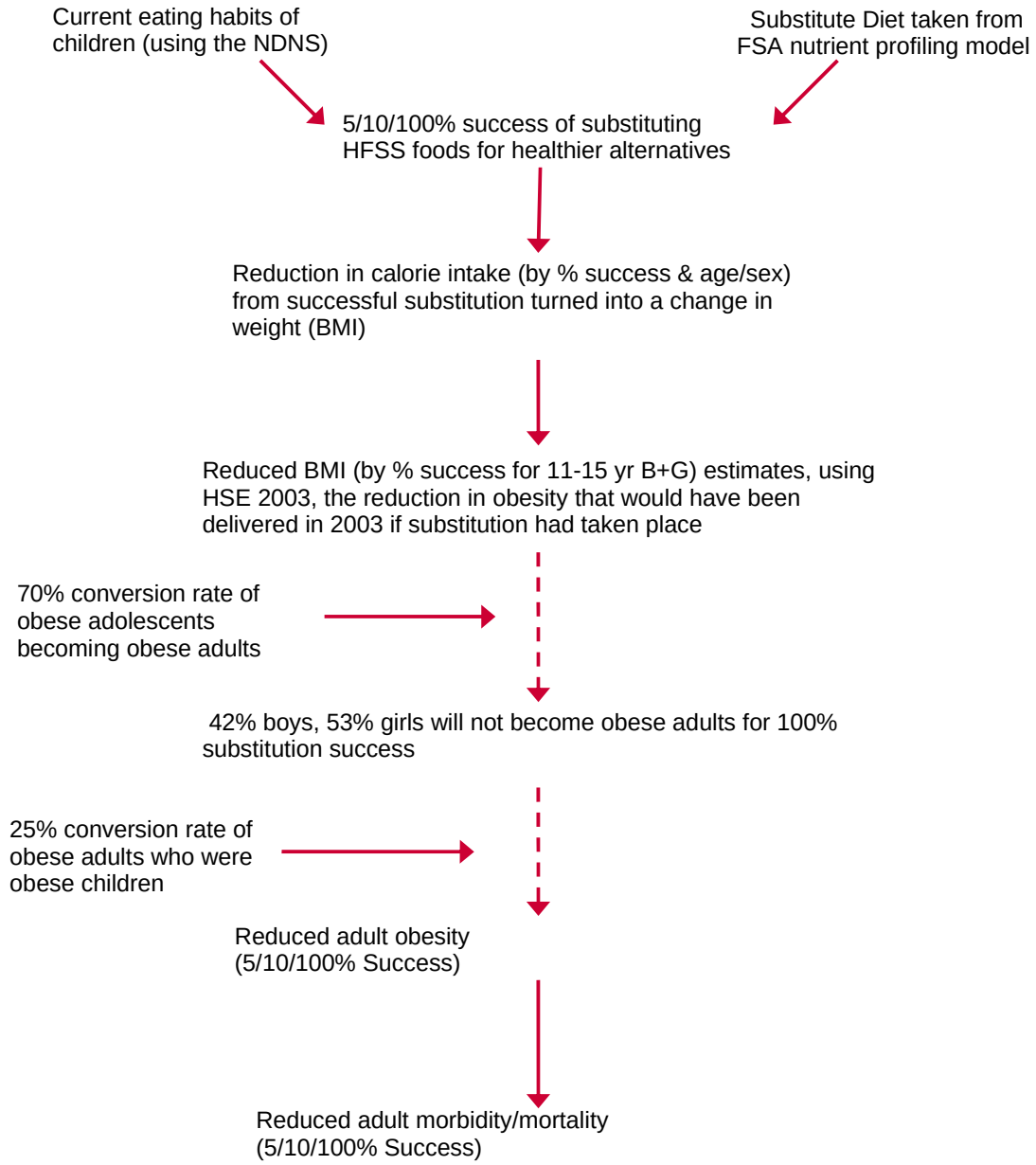
8.2 Ofcom has no expertise in nutrition or health related issues, or in the analysis of the economic impact of policy measures relating to population health. We have therefore had to rely on the assessment of the benefits carried out by the FSA (the body with the relevant expertise to make this assessment) in conjunction with the DH. Whilst we recognise that there are inherent difficulties in quantifying the health benefits of measures to restrict food advertising on television, the analysis does provide an indication of the possible benefits that could result from the proposed options and is one of a range of considerations to be taken into account in putting forward these options for consultation.

8.3 The benefits that are presented by the FSA commence with those which focus on the direct benefits of cost savings associated with reducing childhood and hence adult obesity and then consider the wider benefits from reducing HFSS advertisements to children including reduced incidence of cancer, stroke and coronary heart disease.

Obesity related benefits – Methodology

8.4 The FSA has developed a model to assess the direct benefits of restricting HFSS adverts to children on reducing obesity. The model takes its starting point from the National Diet and Nutrition Survey of Young People aged 4-15 years published in 1997 (NDNS). This is the most up to date survey showing the eating habits of children – i.e. what they eat and how much they eat. The model has also used two Health Surveys for England (HSE) 1990 and 2003 which show the distribution of Body Mass Index (BMI) measurements used to define the BMI level for obese children (this is discussed in greater depth in Annex 3 - Obesity Measurement of the FSA report). The model used by the FSA is summarised in figure 8.1 below.

Figure 8.1: Map of steps used by the FSA to assess obesity related benefits



Substitution to healthy diet

8.5 Using the data gathered by the NDNS and the FSA nutrient profiling model, the FSA nutritionists have modelled healthier choices by substituting all HFSS products with "realistic" healthier alternatives – for example a pizza that is considered to be HFSS with a pizza that is not. The FSA has modelled a variety of assumptions – 100%, 10%, and 5%, substitution of HFSS foods by healthier alternatives. From this it can then be worked out, with reference to the NDNS data, what the reduction in calorie intake is for a group of children, by age and by sex.

Energy intake – reduced calories

8.6 The model then feeds the change in calorie intake into the dose response function, which is discussed in greater depth in the FSA's report in Annex 4 - Dose Response

Function[69] . The dose response function links the changes in body weight to a change in energy balance from substituting HFSS foods for more healthy alternatives. The reduction in calories for each substitution success compared to the NDNS data is set out in the first table in Annex 5 - Changes in Obesity of the FSA report.

Energy intake – reduced BMI

8.7 The model uses this reduction in calories to translate these into changes in a child's BMI using the dose response function and average heights of children by age group. This can be calculated for each age and sex group although the FSA has focused on 11-15 year olds as there is a more direct link between obesity in 11-15 year olds and obesity in adults[70] . This reduction in a child's BMI is then applied to the HSE 2003 survey results. This gives an estimate of the reduction in obesity that would have been delivered in 2003 if substitution had taken place. The results can be seen in Annex 5 - Changes in Obesity.

Conversion from obese children to obese adults

8.8 The FSA have assumed a 70% conversion rate of obese children who become obese adults[71] . This conversion rate is applied to the percentage BMI reductions, as set out in the table on page 9 of the FSAs report, resulting in 42% of obese boys and 53% of obese girls not becoming obese adults for a 100% diet substitution. These reduce to 4.2% and 5.3% respectively for a 10% substitution.

Reduced adulthood obesity

8.9 As discussed below the costs of obesity are calculated in terms of adulthood obesity. Therefore the FSA considers how many obese adults were obese children. The reason for this is that there will be some adults who were not obese as a child but have become so in adulthood, and these adults are less likely to have been impacted by a reduction in viewing of HFSS adverts when they were children.

8.10 The FSA has considered data from a range of studies linking adult and childhood obesity. For instance, Power et al found that 11-13% of obese adults in the UK were also obese children. In the US, the studies have found conversion rates as high as 57%. However, the FSA has assumed that 25% of obese adults were obese children and therefore the FSA reduce the number of obese adults by a factor of four. This is based on the general tread of obesity expanding in British children of all ages. In addition, the FSA notes the possibility that the seeds of longer term obese-creating diets are developed in childhood but do not manifest as obesity until adulthood.

Total cost savings

8.11 The FSA have used a cost saving of £4.25bn per annum for the UK (2002 prices) based on the House of Commons Health Committee report. The FSA suggest that this underestimates the total costs of obesity as it does not include the individuals' own willingness to pay to avoid the mortality associated with obesity.

8.12 From here the 25% conversion rate of obese adults that were obese children and the average number of obese girls and boys prevented from not becoming obese adults

[69] The dose response function takes into account the number of calories needed by a child on a daily basis taking physical activity into account.
[70] However it should be noted that the DH in its White Paper focused on children under the age of 11.
[71] This figure has been sourced from The Parliamentary Office of Science and Technology.

(47.5%) is applied to the £4.25bn pa cost figure giving a cost saving of just over £505m pa [72] (in 2002 prices) for a 100% policy effectiveness (and thus a £50m pa saving for 10% policy success).

Cost savings associated with reduction in childhood obesity

8.13 There are many health effects associated with childhood obesity, for example increased blood lipids, glucose intolerance, hypertension and increases in liver enzymes associated with fatty liver[73], the majority of the benefits from reduced child obesity do not arise immediately and these benefits would require appropriate discounting to obtain present values. Table 8.1 below sets out the cost savings in 2002 prices and the costs savings discounted by 50 years for morbidity[74] related costs and 60 years for mortality related costs to reflect the likely delay in reduced healthcare costs. This has been done by using the Government Green Book social time preference rates of 3.5% pa for the first 30 years and 3% pa thereafter .

Table 8.1: Stand-alone obesity cost savings associated with restricting HFSS adverts to children

Assumptions	Stand-alone obesity cost savings (pa)	
	2002 Prices	NPV discounted 50/60 yrs
100% substitution of HFSS foods	£505m	£99m
10% substitution of HFSS foods	£50m	£10m
5% substitution of HFSS foods	£25m	£5m

Wider Health Benefits - Methodology

8.14 The FSA have outlined other more significant benefits, which might be associated with a restriction of HFSS adverts to children.

Product reformulation

8.15 Given the importance that manufacturers and retailers of core category food products (HFSS) place on broadcast promotion, it is possible that, food manufacturers may (where practically possible) seek to reformulate their products so that they can continue to be advertised on television to children. This potential incentive for core category product reformulation may have a significant effect on the nutrient intake of British children, via this indirect mechanism. However this is extremely difficult to model and has not been included in the models put forward by the FSA.

[72] £4.25bn multiplied by 25% conversion rate, multiplied by 47.5% of population prevented from becoming obese = £505m.
[73] Adult high blood pressure, arthritis, cardiovascular disease and menstrual problems can all be driven by childhood obesity independent of adult weight.
[74] Morbidity includes those people who will not die from an obesity related disease, which is covered by mortality; instead it includes those who will have to live with the disease going forward.

All Nutrients

8.16 The FSA have pointed to other possible cost savings, which could be associated with a policy of restricting HFSS adverts to children. These benefits have been modelled in a different way to those set out above, the full details are set out in the FSA report.

8.17 There are potential dietary health benefits in reducing salt, saturated fat and sugar consumption other than a reduction in obesity and its related costs. Thus the benefits that may accrue from a restriction on broadcast promotion of HFSS foods to children could also positively impact on those diseases which are linked to high levels of salt, sugar and saturated fat. In addition, the FSA modelled the potential for increased child fruit consumption to reduce the incidence of cancer.

8.18 The FSA have estimated the annual deaths that could be prevented by a unit reduction in salt, saturated fat and sugar. This is set out in a table on page 15 of the report.

8.19 According to the NDNS model a 100% dietary substitution yields an average daily reduction of 0.9g in a child's salt intake[75]. If this effect were mapped onto the UK's adult population, this would equate to an annual prevention of 6,050 deaths. A further 1,550 lives would be saved from a 1% reduction in saturated fat[76], and for non-milk extrinsic sugars (NMES) 12,500 lives saved from an approximate 6.25% reduction in food energy intake. Annex 7 of the FSA report sets out in detail the calculations behind these figures.

8.20 The DH has also estimated the number of UK deaths prevented by increased fruit intake from a lower incidence of cancer. According to the NDNS a 100% successful substitution would increase childhood daily intake of fruit increase by 100g. This equates to an annual prevention of 31,050 adult deaths. Thus, as shown in Table 8.2, extrapolating the dietary effect of a change in children's diets into adulthood, could prevent approximately 50,000 deaths annually in the UK, or around 5,000 deaths annually for a 10% policy success.

Table 8.2: Illustrates the numbers of deaths prevented by a reduction in salt, saturated fat and sugar and through increased fruit intake

	Deaths prevented for 100% policy success	Deaths prevented for 10% policy success
Reduction of 0.9g of salt	6,050	605
Reduction of 1% in saturated fat	1,550	155
Reduction of 1% for NMES	12,500	1,250
Increase of 100g of fruit	31,050	3,105
Total deaths prevented	51,150	5,115

8.21 The next step is how to value these potential annual lives saved. The FSA has put forward two alternative methodologies – the first is based on the Department for Transport's Valuation of Benefits of Prevention of Road Accidents and Casualties in 2003[77] , which incorporates medical costs, lost output and human costs (using a willingness-to-pay methodology) to provide value of life (VOL) estimates in situations where death results.

[75] Salt is a significant risk factor in developing high blood pressure and cardiovascular disease.
[76] High intakes of saturated fat are associated with raised blood cholesterol, a major risk factor for coronary heart disease (CHD).
[77] Department for Transport, Highways Economics Note 1, December 2004

8.22 This value is derived from accident victims who tend to be approximately 20-29 years old, whereas dietary related deaths normally occur later in life. This implies that the VOL figure may overestimate the cost of dietary related deaths since for example the loss of output may be less for older people. However the productivity elements of the VOL figure account for less than 7% of its total because the public's willingness-to-pay to reduce the risk of death is very significant. The NHS costs are small as they relate only to the short term care following a fatal accident. However for dietary related deaths it is likely that the patient will have received some care pre-fatality which is likely to exceed the costs associated with a transport accident. Therefore the FSA believe these effects are likely to be offsetting and propose to employ an unadjusted transport VOL figure.

8.23 The FSA has also used a second approach, which along with VOL, is considered by the Treasury's guidance to managing risks to the public. This approach uses Quality Adjusted Life Years (QALY[78]). QALYs are an output measure whereby cost effectiveness can compare the costs of alternative ways of producing the same or similar outputs.

8.24 The FSA has set out the potential benefits for the VOL and QALY approaches. For each of these methodologies the ratio of the number of non-fatal events prevented per fatal event associated with the key nutrient intakes of salt, fat, sugar and fruit have been used.

8.25 The value of statistical life (VOL) was £1.42m in Q4 2004. When this cost is applied to the estimated potential annual lives saved of 50,000, an estimated benefit of £70 billion per year arises from prevented deaths. The FSA then apply a 10% uplift factor on the mortality outturns to capture the effect of reduced morbidity.

8.26 Regarding the monetised QALY benefits the FSA have included in their paper a table which converts death averted into life years saved and morbidity prevented based on a 100% substitution success. The value that people place on QALY is then needed to complete the analysis. The FSA have quoted a figure of £30,000 which has been derived from a variety of sources.

8.27 So far these figures have assumed a 100% substitution success. The FSA notes that this is unlikely to be achieved and have assumed a 10% success effect base case. As such the figures quoted in paragraphs 8.25 and 8.26 are reduced by a factor of ten.

8.28 In its analysis of the wider benefits the FSA have made an assumption about the tracking of childhood consumption of the wider nutrient categories into levels of adult consumption. Given both the 70% mapping of adolescent obesity into adulthood and the strong and developing tracking evidence of early childhood nutrient intakes through time, the FSA's report estimates the cost savings using a 25%, 50% and 100% level and proposes using the 50% mapping ratio as the central case.

8.29 As noted under the stand-alone obesity benefits, the large majority of diet-related health outcomes tend to occur later in life, thus the benefits of children substituting HFSS foods for healthier alternatives will mostly accrue in the decades to come. Given this it is necessary to discount today's monetary values of these benefits. As with the stand-alone obesity benefits the Government's Social Time Preference Rate[79] has been used[80] . By discounting the benefits of reduced morbidity by 50

[78] The QALY has been created to combine the quantity and quality of life. It takes one year of perfect health expectancy to be worth 1 QALY. QALYs can therefore provide an indication of the benefits gained from particular interventions within a single measure.
[79] The Green Book, Appraisal and Evaluation in Central Government (2003). HM Treasury. P99

years, and mortality by 60 years, the equivalent present value of these future benefits that would accrue to today's 15 year old when they are 65 or 75 years old when the diet-related disease caused mortality is obtained.

8.30 Table 8.3 below sets out the cost savings in terms of the annual monetised benefits of the policy of restricting HFSS adverts to children via reduced UK mortality and morbidity from the wider diet-related diseases using a 10% substitution rate of non-HFSS foods for HFSS foods and mapping ratios of 25%, 50% and 100%.

Table 8.3: Wider health cost savings associated with restricting HFSS adverts to children based on VOL and QALY

Assumptions	Wider health cost savings (pa)	
	NPV discounted 60 yrs mortality and 50 yrs morbidity (VOL)	NPV discounted 60 yrs mortality and 50 yrs morbidity (QALY)
100% mapping into adulthood	£1,210m	£250m
50% mapping into adulthood	£605m (FSA central case)	£125m (FSA central case)
25% mapping into adulthood	£300m	£65m

8.31 The FSA's view is that these figures are potentially conservative given that their modelling was unable to capture all the benefits. For example the model is unable to substitute pre-prepared convenience foods with potential healthier substitutes. In addition the potential benefits associated with reformulations of core category foods have not been included.

8.32 Table 8.4 below sets out the direct benefits from reduced obesity, and the wider benefits associated with a reduced risk of stroke, CHD and cancer (on a value of life and quality adjusted life year basis) together with the total benefit discounted as in paragraph 8.29.

Table 8.4: Cost savings associated with a complete ban of HFSS adverts to children

FSA base case	Total cost savings (pa)	
Stand-alone benefits of reduced obesity discounted by 50/60 yrs	£10m	
Benefits of total ban on HFSS adverts discounted by 50/60 yrs	£605m (VOLs)	£125m (QALYs)

Note: Based on FSA's central case

8.33 Table 8.4 illustrates that the stand-alone benefits from reduced obesity are relatively small, it is the wider benefits of reduced risk of stroke, coronary heart disease (CHD) and reduced cancer which give the majority of savings.

Estimating the benefits of Ofcom policy options

8.34 The FSA have calculated the benefits of a complete ban on HFSS advertising on television. However, as set out in Section 5, this is not a policy option under consideration, Ofcom has therefore scaled down the benefits calculated by the FSA

[80] As advised by the Green Book, the first 30 years are discounted at the rate of 3.5% and a 3.0% rate used for discounting beyond 30 years.

to reflect the proportion of child impacts (i.e. 4-15 years old) that are likely to be restricted by each of the scheduling restriction options as a proportion of total HFSS impacts (for example given that the children's airtime plus programmes of strong appeal to children affects about 50% of HFSS impacts, Ofcom has reduced the benefits calculated by the FSA by 50%)[81]. The reason for using child impacts on 4-15 year olds, rather than on 4-9 year olds is because the FSA's analysis has focused on children up to 15 years old in calculating the benefits. Table 8.5 below sets out the total discounted benefits for the scheduling restrictions considered.

Table 8.5: Total discounted cost savings associated with different policy options

Policy option	Total discounted cost saving adjusted for HFSS impacts	
Children's Airtime - *reduction of 67%*	£200m (VOLs)	£41m (QALYs)
Children's Airtime plus programmes of strong appeal to children – *reduction of 50%*	£303m (VOLs)	£63m (QALYs)
Pre-9pm ban – *reduction of 18%*	£496m (VOLs)	£103m (QALYs)
Pre-school programming – *reduction of 98%*	£12.1m (VOLs)	£2.5m (QALYs)

8.35 Table 8.5 has set out the benefits associated with different restrictions on HFSS adverts used by Ofcom. However, Ofcom has also considered restrictions on all food and drink adverts. Given the FSA's approach, which is based on assessing the impact of a change in children's diets resulting from advertising restrictions, it would be very difficult to adapt their methodology to cover for this wider restriction, which affect adverts for healthy as well as less healthy foods. However:

- HFSS advertising is between 80%-90% of all food and drink advertising and therefore the benefits are likely to be reasonably similar;
- A ban on all food advertising would restrict the advertising of some healthy foods (for example low-fat meals). To the extent that this advertising would have promoted consumption of these healthy foods, this will reduce the benefits of restricting all food and drink advertising compared to HFSS alone;
- A ban on all food and drink advertising would remove the incentive on advertisers to reformulate products so that they were below the FSA nutritional proofing cut-off level and therefore allowed to be advertised.

8.36 Therefore Ofcom considers that the benefits from a ban on all food and drink adverts would be close to but lower than the benefits of a ban on HFSS products.

8.37 Ofcom has also considered options involving volume restrictions which would allow a certain amount of food and drink advertising up to a maximum number of seconds per clock hour. The benefits associated with volume restrictions on food adverts have been estimated by considering the number of impacts that would be restricted. The volume restriction option set out in paragraphs 7.29-7.31 in the first instance would apply to just under a third of all impacts. Ofcom estimates that this would equate to just over 50% of children's (i.e. 4-15 years old) impacts. Applying the

[81] It should be noted that the number of impacts affected by the restriction for children's airtime plus programmes of strong appeal to children, uses a blend of impacts on 4-9 year olds for programmes of particular appeal and 4-15 year olds for children's airtime. This is due to the way the impacts have been calculated for the programmes of strong appeal to children.

same approach as in table 8.5, would give estimated benefits of **£333m pa** (VOL) **and £69m pa** (QALY) including the benefits of the pre-school programming ban.

8.38 However, broadcasters are likely to react to a volume restriction by removing those adverts which generate the least value to them first. In the worst case, assuming that broadcasters removed all non-HFSS adverts before removing any HFSS adverts, Ofcom has estimated that this would equate to just around 45%[82] of children's impacts and the lower bound on benefits would be around **£285m pa** (VOL) and **£59m pa** (QALY). A reasonable but still prudent estimate of the benefits that might accrue would be halfway between this lower bound and the average estimate i.e. **£309m pa** (VOL) and **£64m pa** (QALY).

The Precautionary Principle

8.39 The FSA also place strong emphasis on the precautionary principle. They state that it appears necessary to use this due to the fact that the quantified effects set out may not capture the life-long health effects created by the new phenomenon of increasing numbers of obese children. Thus due to the lack of real scientific certainty regarding the longer term health effects created by this increase in childhood obesity, a precautionary policy approach should be applied.

[82] This is based on an assumption that 80% - 90% of Core Category adverts are HFSS. In doing the calculation 85% has been used as this is the mid-point.

IA Section 9

Analysis of proposed policy packages

9.1 This impact analysis has examined the costs assessed by Ofcom (section 7) and the benefits, as assessed by the FSA in conjunction with the DH (section 8), of a wide range of different options for restricting either HFSS or all food and drink advertising and sponsorship on commercial television channels.

9.2 As noted previously, Ofcom has no expertise in the economic analysis of policy measures relating to population health and has been reliant on those with the relevant expertise (FSA/DH) for this analysis. Ofcom has taken account of the possible benefits which the analysis suggests may result from restricting food advertising on television, whilst recognising the limitations and inherent difficulties in quantifying the health benefits of the options presented as well as the likely costs.

9.3 Where quantification of the costs and benefits has not been possible there has instead been a discussion of the nature and relative magnitude of these elements.

9.4 The consultation document focuses on a smaller number of packages of measures that aim to meet the request in the White Paper to "consult on proposals to tighten the rules on broadcast advertising, sponsorship and promotion … to ensure that children are properly protected from encouragement to eat too many high fat, salt or sugar foods" in line with the policy objectives summarised in paragraphs 2.6 and 2.7. The packages are broadly equivalent in terms of the reduction in children's exposure to HFSS impacts but they vary in terms of the costs that are imposed on different groups of stakeholders.

9.5 This section brings together the impact analysis relating to the specific packages. It does not repeat general comments (e.g. implementation issues, the precautionary principle etc) that are common to the general question of advertising restrictions and are considered elsewhere in this IA.

Do Nothing

9.6 Ofcom's previous research[83] concluded that "television advertising clearly has an influence and equally clearly there is a need for a tightening of specific rules". While a 'do nothing' measure would have no impact on advertisers, broadcasters or manufacturers (since it forms the base case for the analysis), it would fail to restrict advertising of HFSS foods to children and therefore fail to affect consumption patterns and through this the dangers and costs of obesity and other dietary-related conditions. The additional academic research that Ofcom has had carried out further supports the case that TV advertising does have an impact on food choices and therefore restrictions can play a role in addressing this issue. Given the particular concerns about younger children's inability to distinguish between advertising and programming content and widespread parental concern about how the 'Big Five' product categories are advertised on television, a 'do nothing' approach would not appear to be in line with Ofcom's duty to "have regard to the vulnerability of children and the opinions of consumers in the relevant markets and of members of the public generally". Therefore Ofcom retains its previous conclusion that positive measures are needed to address concerns about childhood obesity.

[83] Ofcom: "*Childhood Obesity – Food Advertising in Context: Children's food choices, parents' understanding and influence and the role of food promotion.*" (July 2004)

Package 1: Timing restrictions on specific food and drink products

9.7 This package would exclude all advertising/sponsorship of HFSS foods (as defined by the FSA nutrient profiling model) during children's airtime (as defined in paragraph 7.7) and during programmes which are of particular interest to children (i.e. where the viewing index[84] for 4-9 year olds is greater than 120). It would also include the BCAP content restrictions set out in section 5.

Costs of package

9.8 The potential cost to broadcasters of the scheduling restriction element of this package varies very significantly by channel as shown in Table 9.1 (the impact of content restrictions is described qualitatively in paragraphs 7.44-7.51).

Table 9.1: Revenue at risk after impact of mitigation from Package 1

Channel	Companies	Total TV revenues (£m)*	Revenue children's airtime 'at risk' (£m)	% Of total revenue at risk
ITV	ITV	✂	✂	0.4
Channel 4 (together with S4C)	C4	✂	✂	0.7
Five	C5	✂	✂	0.6
Total Terrestrial		**2,748**	**13.7**	**0.5**
Boomerang	Turner Broadcasting Corporation	✂	✂	16.4
Cartoon Network		✂	✂	5.8
Toonami		✂	✂	15.1
Pop	Chart Show Channels	✂	✂	20.1
Tiny Pop		✂	✂	4.0
Jetix	Jetix	✂	✂	8.9
Trouble	Trouble TV	✂	✂	8.9
Nickelodeon	Nickelodeon	✂	✂	6.1
Nicktoons		✂	✂	20.2
Nick Jr		✂	✂	10.7
Total children's channels		**122.4**	**11.2**	**9.1**
Total non-children's channels		**2,512**	**3.0**	**0.12**
Total all TV		**5,382**	**27.9**	**0.52**

*Note that total TV revenues include advertising, sponsorship and subscription revenue.

9.9 Table 9.1 above shows that the revenue impact of this package on broadcasters varies substantially both between terrestrial and cable-satellite channels. Even within these categories, different broadcasters are affected to different extents - reflecting the amount and timing of advertisements / sponsorship that would be affected by this package, the type of advertising on different channels and differences between

[84] The viewing index, identifies programmes where the child audience as a proportion of the total audience for the programme is more than 20% higher than its proportion of the general population.

channels in their source of revenue (i.e. between advertising/sponsorship and subscription).

9.10 The potential impact on the commercial terrestrial channels is estimated to vary from **0.4% - 0.7%** of total revenue. The impact on dedicated children's channels is estimated to be much higher from **4.0% - 20.2%** of total revenue. The impact on the other satellite-cable channels is generally much lower – mostly less than **0.2%**; however seven channels (covering a mix of genres such as sport, music, documentary) would be more severely affected – from **0.8% - 2.2%** of revenue.

9.11 Recognising that the impact on dedicated children's channels is a significant reduction in their total revenue, Ofcom is proposing a phased approach to the introduction of these timing restrictions for dedicated children's channels. This is described in section 5 in the main body of the consultation document.

9.12 The total cost of this package to broadcasters is estimated to be a loss of revenue of **£20.7m - £32.6m pa** (depending on the ability of the broadcaster to replace the lost advertising) with a central estimate of **£27.9m pa**.

9.13 Further to these costs, advertising agencies earn commission on advertising expenditure. Thus if advertising expenditure were to fall as set out above, then based on the notional 15% commission rate that agencies receive, this would equate to a loss of revenue of **£3.1m - £4.9m pa**. However, this is a conservative estimate as, on average, the commission rate is likely to be significantly lower than 15%.

9.14 Ofcom's assessment is that the short to medium term impact on HFSS food manufacturers will be modest. However some food manufacturers argue that their products would be particularly adversely impacted by being labelled "HFSS" and are strongly opposed to the use of nutrient profiling in determining advertising restrictions.

Benefits of package

9.15 The possible benefits of this package are based on the analysis undertaken by the FSA (summarised in section 8). The direct benefits (of reduced obesity) from this option are estimated to save costs of around **£5m pa** (after discounting and adjusting for the proportion of HFSS impacts affected – as discussed in paragraphs 8.29 and 8.34). However, improved diets could lead to much larger indirect benefits from a reduction in the intake of salt, NMES and saturated fat which could reduce the incidence of strokes, coronary heart disease and from increased fruit consumption which could lower the incidence of cancer. Taking the FSA data and adjusting for the proportion of HFSS impacts affected, would suggest an overall benefit of approximately **£303m pa** based on the VOL (value of life) approach and around **£63m pa** based on the QALY (quality adjusted life years) approach. Applying the adjustment for the proportion of HFSS impacts affected to the sensitivity analysis that the FSA have carried out suggests a range of **£150m – £605m pa** for the benefits based on VOL and **£33m – £125m pa** based on QALYs.

Package 2: Timing restrictions on all food and drink products

9.16 This package would exclude all advertising/sponsorship of all food and drink during children's airtime (as defined in paragraph 7.7) and during programmes which are of particular interest to children (i.e. where the viewing index for 4-9 year olds is greater than 120). It would also include the BCAP content restrictions discussed in section 5.

Costs of package

9.17 The potential cost to broadcasters (in terms of lost revenue) of the scheduling restriction element of this package is similar to, but a little higher than those for Package 1, as shown in Table 9.2, reflecting the fact that HFSS is a subset (80%-90%) of total food and drink advertising.

Table 9.2: Revenue at risk after impact of mitigation from Package 2

Channel	Companies	Total TV revenues (£m)*	Revenue 'at risk' (£m)	% of total revenue at risk
ITV	ITV	✂	✂	0.5
Channel 4 (together with S4C)	C4	✂	✂	0.8
Five	C5	✂	✂	0.7
Total Terrestrial		**2,748**	**15.7**	**0.6**
Boomerang	Turner Broadcasting Corporation	✂	✂	17.2
Cartoon Network		✂	✂	6.0
Toonami		✂	✂	15.6
Pop	Chart Show Channels	✂	✂	20.9
Tiny Pop		✂	✂	4.1
Jetix	Jetix	✂	✂	9.4
Trouble	Trouble TV	✂	✂	10.1
Nickelodeon	Nickelodeon	✂	✂	6.7
Nicktoons		✂	✂	20.9
Nick Jr		✂	✂	11.8
Total children's channels		**122.4**	**11.9**	**9.8**
Total non-children's channels		**2,512**	**3.5**	**0.1**
Total all TV		**5,382**	**31.2**	**0.6**

*Note that total TV revenues include advertising, sponsorship and subscription revenue.

9.18 The potential impact on the commercial terrestrial channels varies from **0.5% - 0.8%** of total revenue. The impact on dedicated children's channels is much higher from **4.1% - 20.9%** of total revenue. The impact on the other satellite-cable channels is generally lower – less than **0.2%**; however there are seven channels (again covering a mix of genres) that would be more adversely affected – with a loss of **up to 2.4%** of revenue.

9.19 The total cost of this package to broadcasters is estimated to be **£23.2m - £36.5m pa** (depending on the ability of the broadcaster to replace the lost advertising) with a central estimate of **£31.2m pa**.

9.20 Ofcom is proposing a similar phased introduction of the timing restrictions for dedicated children's channels. Details can be found in section 5 in the main body of the consultation document.

9.21 As discussed in paragraph 9.13 if advertising expenditure were to fall as set out above, then based on the notional 15% commission rate that advertising agencies receive, this would equate to a loss of revenue of **£3.5m - £5.5m pa**. However, this is a conservative estimate as, on average, the commission rate is likely to be substantially lower than 15%.

9.22 Ofcom's assessment is that the short to medium term impact on food manufacturers would be modest. Because of the reduced opportunity to either reformulate products to avoid the restrictions or diversify their output across healthy food options, Ofcom believes that the costs to food manufacturers in total are likely to be larger than for Package 1, however as noted above because Package 2 does not rely on nutrient profiling some food manufacturers have suggested that they would prefer this package.

Benefits of package

9.23 The FSA have estimated the effects of a ban on HFSS adverts rather than all food and drink advertising. Given their approach which is based on assessing the impact of a change in children's diets resulting from advertising restrictions, it would be very difficult to adapt their methodology to cover this wider restriction which would affect adverts for healthy as well as less healthy foods. However:

- HFSS advertising is 80%-90% of all food and drink advertising and therefore the benefits are likely to be reasonably similar;
- A ban on all food advertising would restrict the advertising of some healthy foods (for example low-fat meals). To the extent that this advertising would have promoted consumption of these healthy foods, this will reduce the benefits of this package compared to Package 1;
- A ban on all food advertising would remove the incentive on advertisers to reformulate products so that they were below the FSA nutritional profiling cut-off level and therefore allowed to be advertised.

9.24 Therefore Ofcom considers that the potential benefits of this package would be close to, but lower than the estimated benefits of Package 1 (set out in paragraph 9.15 above).

Comparison of Package 1 and Package 2

9.25 As set out in the paragraphs above, the costs associated with Package 1 are likely to be lower than those of Package 2 (with the possible exception of the impact on some manufacturers), while the benefits of Package 1, estimated above, are likely to be higher than those of Package 2.

Package 3: Volume-based restrictions on all food and drink products

9.26 This package would exclude advertising/sponsorship of all food and drinks during pre-school children's programmes (as defined in paragraph 7.29), together with volume restrictions limiting advertising and sponsorship to 30/60 seconds per clock hour at times which children are generally viewing television in large numbers, as set out in paragraphs 7.30-7.31. It would also include the BCAP content restrictions discussed in section 5.

Costs of package

9.27 Ofcom has estimated the revenue loss to broadcasters from this package, as shown in Table 9.3. Since broadcasters are likely to have more flexibility to keep the most valuable advertising and sponsorship and to shift the timing of adverts under this restriction than under a complete ban, Ofcom considers that they would be able to retain a greater proportion of their advertising revenue in the affected time periods than under Packages 1 or 2.

Table 9.3: Revenue at risk after impact of mitigation from Package 3

Channel	Companies	Total TV revenues (£m)*	Revenue 'at risk' (£m)	% of total revenue at risk
ITV	ITV	✂	✂	2.8
Channel 4 (together with S4C)	C4	✂	✂	2.7
Five	C5	✂	✂	2.7
Total Terrestrial		**2,748**	**75.8**	**2.8**
Boomerang	Turner Broadcasting Corporation	✂	✂	9.3
Cartoon Network		✂	✂	3.2
Toonami		✂	✂	9.0
Pop	Chart Show Channels	✂	✂	3.0
Tiny Pop		✂	✂	4.1
Jetix	Jetix	✂	✂	5.6
Trouble	Trouble TV	✂	✂	6.1
Nickelodeon	Nickelodeon	✂	✂	2.3
Nicktoons		✂	✂	12.1
Nick Jr		✂	✂	11.8
Total children's channels		**122.4**	**6.8**	**5.6**
Total non-children's channels		**2,512**	**8.2**	**0.3**
Total all TV		**5,382**	**90.8**	**1.7**

9.28 The estimated costs to commercial terrestrial channels are approximately **3%** of total revenue reflecting the wider timeslots during which advertising and sponsorship is restricted compared to Packages 1 and 2. The impact on dedicated children's channels would be lower than for the previous packages from **2.3% - 12.1%** reflecting the opportunity that these channels would have to sell some HFSS / food and drink advertising compared to the complete ban under the other packages. The cost to other satellite-cable channels is estimated on average at **0.3%**, however there are eight channels (again a mixture of genres) that would be more adversely affected – with a loss of up to **2.2%** (although the numbers set out for other cab/sats are an upper limit of the effect such a restriction would impose).

9.29 Recognising that the child audiences of many other satellite-cable channels are very small, while the impact of the volume based restrictions could be significant for some channels, Ofcom is consulting on whether to include a threshold for the child

audience of cable and satellite channels, below which volume based restrictions would not be applied to the channels.

9.30 The total cost of this package to broadcasters is estimated to be **£61.0m - £110.7m pa** (depending on the level of substitution available) with a central estimate of **£90.8m pa**.

9.31 As discussed in paragraph 9.13 if advertising expenditure were to fall as set out above, then based on the notional 15% commission rate that advertising agencies receive, this would equate to a loss of revenue of **£9.2m - £16.6m pa**. However, this is a conservative estimate as, on average, the commission rate is likely to be substantially lower than 15%.

Benefits of package

9.32 The FSA benefit modelling did not specifically consider the benefits attached to volume restrictions. However applying the methodology adopted for assessing the costs of the scheduling restrictions in Package 1 above, a ban on advertising / sponsorship of HFSS adverts during pre-school programming would apply to about 2% of impacts which in turn would equate to an estimated benefit of about **£12.1m pa** based on VOL and **£2.5m pa** based on QALY.

9.33 However this package addresses all food and drink adverts and not just HFSS adverts, therefore as set out in paragraph 9.23 above, the possible benefits of this element of the package would be lower than the benefits estimated to result from an exclusion of HFSS advertising but still of a similar order of magnitude.

9.34 In addition, the volume restriction element of this package would apply to just under a third of all impacts. Ofcom has estimated that this would equate to just over 50% of children's impacts. Were the range of values to broadcasters of HFSS and non-HFSS adverts to be very similar, then this would lead to benefits of about of around **£333m pa** (VOL) and **£69m pa** (QALY) including the benefits of the pre-school programming ban. However, broadcasters are likely to react to a volume restriction by removing those adverts which generate the least value to them first. In the worst case assuming that broadcasters removed all non-HFSS adverts before removing any HFSS adverts in response to the volume restriction, this would equate to around 45% of children's impacts being affected and the (lower bound) on the benefits would be around **£285m pa** (VOL) and **£59m pa** (QALY)[85].

9.35 A reasonable but still prudent estimate of the benefits that might accrue would be halfway between this lower bound and the average estimate i.e. around **£309m pa** (VOL) and **£64m pa** (QALY).

Comparison of Package 3 with Packages 1 & 2

9.36 Compared to Packages 1 and 2, Package 3 has less of an effect on children's channels (since apart from pre-school channels they are able to do some advertising), however it would have a much larger effect on terrestrial channels reflecting the wider time period across which the volume restriction would apply. The total estimated costs to broadcasters of Package 3 are around 2½ to 3 times higher than those of Package 1 or 2, while the estimated benefits are similar.

[85] Although Ofcom notes that because adult impacts would also be affected there might be some additional offsetting benefits to counter this particular effect.

Summary of quantified costs and benefits

9.37 Table 9.4 summarises the quantified costs to broadcasters and potential benefits that have been estimated for the different packages.

Table 9.4: Summary of quantified costs and benefits (estimated £m pa)

		Timing restrictions on specific food and drink products	Timing restrictions on all food and drink products	Volume-based restrictions on all food and drink products
Costs to broadcasters				
	Low	20.7	23.2	61.0
	Central	27.9	31.2	90.8
	High	32.6	36.5	110.7
Benefits based on QALY				
	Low	33	Close to, but lower than Package 1	29
	Central	63		64
	High	125		133
Benefits based on VOL				
	Low	150	Close to, but lower than Package 1	135
	Central	303		309
	High	605		641

Source: Ofcom analysis

Question 5) Ofcom would be interested to hear your views on the assumptions and methodology used in this Impact Assessment. If you do not agree with the assumptions and methodology, set out above, please provide the reasoning behind this and details of an alternative approach.

IA Annex A

Cost Analysis

Table A1: Loss of revenue for HFSS scheduling options by high, medium and low mitigation levels for package one

	Children's Airtime		Children's Airtime plus programmes of particular appeal to children			Pre-9pm		
Substitution Level – Revenue Impact	Total terrestrial	Total dedicated children's channels (TDCC)	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC
High (£m)	6.5	8.6	10.0	8.6	2.2	95.1	8.6	20.4
Medium (£m)	8.9	11.2	13.7	11.2	3.0	130.7	11.2	28.0
Low (£m)	10.5	12.9	16.2	12.9	3.5	154.5	12.9	33.1
High (%)	0.2	7.0	0.4	7.0	0.1	3.5	7.0	0.8
Medium (%)	0.3	9.1	0.5	9.1	0.1	4.8	9.1	1.1
Low (%)	0.4	10.5	0.6	10.5	0.1	5.6	10.5	1.3

Note: For the terrestrial's and Other channels the substitution rates are – 35% low, 45% medium, 60% high and for the Children's channels the substitution rates are – 25% low, 35% medium, 50% high.

Table A2: Loss of revenue for Core category scheduling options by high, medium and low mitigation levels for package two

	Children's Airtime		Children's Airtime plus programmes of particular appeal to children			Pre-9pm		
Substitution Level – Revenue Impact	Total terrestrial	Total dedicated children's channels (TDCC)	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC	Total terrestrial	Total dedicated children's channels (TDCC)	Other multichannels ex TDCC
High (£m)	7.2	9.2	11.4	9.2	2.5	116.8	9.2	24.4
Medium (£m)	9.9	11.9	15.7	11.9	3.5	160.6	11.9	33.5
Low (£m)	11.7	13.8	18.6	13.8	4.1	189.8	13.8	39.6
High (%)	0.3	7.5	0.4	7.5	0.1	4.3	7.5	1.0

Medium (%)	0.4	9.8	0.6	9.8	0.1	5.9	9.8	1.3
Low (%)	0.4	11.3	0.7	11.3	0.2	6.9	11.3	1.6

Note: For the terrestrial's and Other channels the substitution rates are – 35% low, 45% medium, 60% high and for the Children's channels the substitution rates are – 25% low, 35% medium, 50% high.

IA Annex B

Benefit Analysis

Table B1: Stand-alone obesity cost savings associated with restricting HFSS adverts to children for policy option two (a reduction of 50%)

Assumptions	Direct cost savings (pa)	
	2002 Prices (without a 50% policy reduction)	NPV discounted 50 yrs (with a 50% reduction)
100% substitution	£505m	£50m
10% substitution	£50m	£5m
5% substitution	£25m	£3m

Table B2: Wider costs savings associated with restricting HFSS adverts to children based on VOL (including the reduction for policy option two of 50%)

Assumptions	Indirect cost savings (pa)	
	Undiscounted (without a 50% policy reduction)	NPV discounted 60 yrs mortality and 50 yrs morbidity (with a 50% policy reduction)
100% mapping into adulthood and 10% substitution	£7,990m	£605m
50% mapping into adulthood and 10% substitution	£3,995m	£303m (Central Case)
25% mapping into adulthood and 10% substitution	£2,000m	£150m

Table B3: Wider costs savings associated with restricting HFSS adverts to children based on QALYs (including the reduction for policy option two of 50%)

Assumptions	Indirect cost savings (pa)	
	Undiscounted (without a 50% policy reduction)	NPV discounted 60 yrs mortality and 50 yrs morbidity (with a 50% policy reduction)
100% mapping into adulthood and 10% substitution	£1,640m	£125m
50% mapping into adulthood and 10% substitution	£820m	£63m (Central Case)
25% mapping into adulthood and 10% substitution	£410m	£33m

IA Annex C

FSA Research

ESTIMATION OF THE MONETISED HEALTH BENEFITS THAT WILL ACCRUE TO THE UK GIVEN POLICY DESIGNED TO RESTRICT BROADCAST PROMOTION OF CORE CATEGORY FOODS TO CHILDREN

Executive Summary

The following analysis seeks to estimate the monetised health benefits that will accrue to the UK given policy designed to restrict the broadcast promotion of core category foods aimed at the nation's children. There are many dietary related conditions that can effect children both directly (including irreversibly e.g. Type 2 diabetes) and/or their health status as adults (e.g. risk of stroke). We commence this analysis by considering the benefits of such policy in terms of reduced obesity in the UK and then widen our analysis, from calorie intake alone, to capture the much larger dietary related health benefits at stake through the consumption of all nutrient groups.

Within our obesity cost analysis we develop a chain linking: the television advertising children are exposed to; the current eating habits of British children; a model of substitution away from core category foods towards realistic healthier options as advertising is restricted; the effects of these substitutions on energy intake; the effects of energy intake on weight (and Body Mass Index); and given the current distribution of BMI (via which obesity is measured), the effects these changes in BMI would have on childhood obesity.

We then map childhood to adulthood obesity and seek to monetise the health and other associated benefits of reduced obesity via the existing costs of obesity work conducted by The National Audit Office and the House of Common's Health Committee.

In the next section of the analysis we seek to monetise the wider dietary related health benefits that this policy will provide. We again interrogate our modelled substitute child nutrient intake results, especially those relating to salt, saturated fat, sugar and fruit. We discuss the potential for these substitutions in children's diets to be extrapolated into adulthood.

Given this we use the Department of Health's White Paper and current analysis to estimate reductions in mortality and morbidity via reduced daily intakes of some nutrients and increases in others. Thus we estimate the annual amounts of UK lives and suffering predicted to be saved by such nutrient intake substitutions.

To estimate the economic value of these health benefits we employ statistical value of life (using willingness-to-pay methodologies) and quality adjusted life year figures. Having monetised these benefits we discount them appropriately to obtain annual present value

estimates. Our base case result estimates this policy to yield between £125 million and £600 million's worth of annual health benefits via avoided mortality and morbidity in the UK, given a complete ban of such broadcast promotion to children.

We finally consider whether there is sufficient uncertainty relating to children's dietary related health outcomes to also employ the precautionary principle in the current policy formation considerations.

Contents

The Direct and Indirect Effects of Broadcast Food Promotion on Children's Preferences and Consumption

Direct Effects

Two publicly funded studies have been commissioned into understanding and reviewing the body of research into the effects of food promotion to children. The first being on behalf of the FSA conducted by Professor Hastings et al.[86] The second being that of Professor Livingstone[87] on behalf of OFCOM. Hastings et al. consider that there is sufficient evidence to conclude that food promotion is having an effect, particularly on children's preferences, purchase behaviour and consumption.

Similarly, Livingstone's report concludes that there does indeed exist a consensus amongst the many studies she considers in favour of modest direct effects of TV advertising on children's food preferences, knowledge and behaviour. However, Livingstone seldom finds robust quantification of the direct effects of TV advertising. This said, two of the studies considered by Livingstone are illustrative.

Firstly, Susan Hearold's[88,89] (1986) large-scale meta-analysis study considered the effects of television viewing on antisocial and prosocial behaviour by children. As noted in Livingstone's report, Hearold found fairly consistent, but fairly modest direct effects with television violence accounting for around 5% of the variance in the dependent variable. The extent to which this quantification of the direct effects of exposure to violent images can be applied to food promotion is a moot point.

Secondly, Ruth Bolton's[90] (1983) US study actually sought to model the consumption patterns of children as they were exposed to broadcast food promotion. Whilst only finding that the impact of television food advertising explained 2% of the variance in children's snacking frequency, Bolton's study did directly link TV advertising of food to consumption (as opposed to preference).

It is interesting to note that Bolton's effect relating to increases in snacking frequency (child's number of snacks per week) via commercial exposure (average food commercials viewed by the child in minutes per week) involves marginal viewing analysis. It is likely that the more restrictive any potential policy is in reducing/eliminating broadcast promotion to children so its effectiveness will disproportionately increase. The effectiveness of reducing exposure at the margin to children experienced in viewing a certain level of broadcast promotion of core

[86] Hastings, G., Stead, M., McDermott, L., Forsyth, A., MacKintosh, A., Rayner, M., Godfrey, C., Caraher, M., and Angus, K. (September 2003). Review of research on the effects of food promotion to children.

[87] Sonia Livingstone. (2004). A commentary on the research evidence regarding the effects of food promotion on children - Appendix 1.

[88] Hearold, S. (1986). A Synthesis of 1043 Effects of Television on Social Behaviour. In G. Comstock (Ed.). Public Communications and Behaviour: Volume 1 (Vol. 1, pp. 65-133). New York: Academic Press.

[89] Hearold's study considered the behaviour of children following exposure to a variety of "antisocial" eg violent, and "prosocial", eg *Lassie*, viewing. It considered the effects on children of an average age of 13 years (11.5 years median) across 230 studies (mainly from the US) over a fifty-year period.

[90] Bolton, R. N., (1983). Modeling the Impact of Television Food Advertising on Children's Diets. Current Issues and Research in Advertising 1983.

category foods will be less effective than removing this broadcast promotion entirely, thus removing its total effect directly on children.

A more recent US study by Grossman et al.[91] of the potential effects of a complete fast food restaurant advertising ban on television is presented in Annex 1. The authors find potentially very significant effects on childhood obesity of such a ban, although their methodology differs from the one presented below where we seek to explain changes in children's Body Mass Indexes as their calorie intakes vary as a result of broadcast promotion restrictions.

In contrast another recent paper by Zywicki et al.[92] considers that the available US evidence does not support the idea that food advertising to children has grown significantly during the period that their obesity levels have dramatically risen. Indeed they believe that restricting truthful food advertising may have negative welfare consequences as increasing consumer awareness of the importance of weight control may lead to competition in healthy advertising.

Complementary Indirect Effects Which Act to Bolster Broadcast Promotion's Influence on Children's Nutrient Intakes

Livingstone notes that, "It has also been suggested that food promotion may have greater indirect than direct effects. However, this cannot be demonstrated easily, if at all, using the experimental designs required for causal claims" [93].

As OFCOM's surveys found, peer pressure is a notable influence on the food choice of children. To the extent that broadcast promotion influences children to consider core category foods to be desirable within this cohort environment, there are likely to be significant feed-back effects of this advertising through peer pressure, cultural expectations, habits etc. into children's food choices.

Given this, it is proposed that when considering the total effect of broadcast food promotion to children, FSA/OFCOM will consider both direct and indirect nutrient consumption effects. As well as reporting a 5% effect, we consider a 10% policy success effect to be achievable given these indirect effects and we also report complete success (100%) regarding child take-up of our modelled changes (substitutions) in nutrient consumption.

Given the importance manufacturers and retailers of core category food products place on broadcast promotion e.g. see Section 3 of the main consultation document, a further possible indirect effect of broadcast restrictions comes with the potential that some manufacturers may seek to reformulate some of their products such that they can continue to be advertised on television to children. This possible indirect outcome of the policy could feed positively into the diets of many adults as well as children.

As a further potential complementary effect, the Government is considering taking action to restrict advertising of core category foods to children via other forms of advertising such as

[91] Shin-Yi Chou, Inas Rashad, Michael Grossman (April 2005). Fast Food Restaurant Advertising on Television and Its Influence on Childhood Obesity.
[92] Zywicki, T.J., Holt, D.' Ohlhausen, M. Obesity and Advertising Policy. Working Paper Series, Paper 3 George Mason University School of Law (2004).
[93] Sonia Livingstone. (2004). A commentary on the research evidence regarding the effects of food promotion on children - Appendix 1 (P28).

billboards[94]. To the extent that these media complement, or may act as substitutes to each other in advertising campaigns to children, this wider consideration of advertising restrictions is likely to bolster the effectiveness of each restrictive policy strand[95].

[94] Department of Health. 2004. Choosing health: making healthy choices easier.
[95] As noted by Hastings, G., et al. (September 2003), P3.

The Nutrient Intake of UK Children: Modelling the Potential Effects of Broadcasting Restrictions

Using the National Diet and Nutrition Survey (NDNS) of Young People aged 4-15 years (1997[96]); we have obtained data demonstrating the eating habits of British children. This includes the types of foods and the quantities consumed. By examining the consumption patterns of, separately, boys and girls, we have been able to obtain their mean intakes of: energy; saturated fat (as a percentage of food energy); non-milk extrinsic sugars (NMES, as a percentage of food energy); protein; NSP fibre; sodium (and thus salt); iron; fruit; calcium; vitamin C and folate.

Our analysis of these children's diets has been grouped within the age ranges 4-6, 7-10 and 11-15 years. This grouping has been necessary to allow the sample sizes of boys and girls from the NDNS to be large enough to be statistically robust within this analysis.

Using the FSA's Nutrient Profiling Model[9798], FSA Nutritionists have modelled healthier choices that can realistically be substituted for existing high fat salt and sugar (HFSS) foods within these NDNS children's diets. These substitutions are presented in Annex 2 and cover five of the "Big Six" core category foods with which this benefit estimation analysis is concerned. Due to difficulties of modelling them within the parameters of the NDNS, pre-prepared convenience foods are not provided with potential healthier substitutes.[99]

Given that certain categories of food, such as chocolate confectionery, can be consumed as both snacks and as part of a wider meal, our NDNS substitution modelling away from core category foods towards healthier options does not consider the removal of any food intake incident. I.E. we do not curtail the snaking frequency of children; we simply model replacing a core category snack (or any other incidence of core category consumption within a meal) with a healthier option.

Indeed, it is to be expected that children will snack and although restricting broadcast promotion is likely to reduce this frequency (see Bolton, 1983) we here model substituting core category snacks for fruit.

As can be seen from Annex 2's tables of core category products modelled to be substituted, the FSA has tried to make the substitute foods both realistic and nutritious (and consistent with the foods that are allowable for continued broadcast promotion without restriction within the Nutrient Profiling Model). Thus illustrating the potential benefits of a more healthy diet for British children.

We examine, by nutrient group, the effects of moving from the outturn children's diet of 1997 to a more healthy diet. These dietary benefits will then be mapped onto potential health and economic benefits over the children's lifetime.

[96] The 1997 NDNS is the most up-to-date survey of British children's nutrient consumption patterns of sufficient detail to undertake the analysis required here.
[97] Which is based upon the energy, saturated fat, total sugar, sodium, protein, NSP fibre, fruit and vegetable content of each food item.
[98] FSA's Nutrient Profiling Model – now passed to OFCOM; www.food.gov.uk/healthiereating/nutlab/nutprofmod).
[99] As such the nutritionally-based health and economic benefits that are presented in this analysis are likely to be conservative for a given broadcast food promotion restriction policy.

Mapping Children's Nutrient Intakes to Health Outcomes - Obesity (Measurement)

Obesity can be measured in several different ways. Due to its ease of application and its relationship to health risk factors the Body Mass Index (BMI) has become the internationally recognisable measure of obesity and overweight. Obesity has been defined as BMI greater than 30 Kg/m^2 and overweight as over 25 Kg/m^2. A full discussion of the measurement of obesity and overweight is included in Annex (Obesity Measurement). The classification system used for adults is not appropriate for children because the development of children's body mass development is not linear throughout a child's development. The classification system that we use in England (and in this work) is based on the 85^{th} and 95^{th} percentiles of the 1990 Health Survey for England. Fuller discussion and a listing of the cut-off points are included in Annex 3 along with an overview of the current size of the childhood obesity problem facing the country.

We have now laid out how it is possible to conduct scenario analysis as to the effectiveness of various forms of broadcast promotion restrictions to children regarding core category foods and how these may translate in terms of food choice substitutions and thus nutrient intakes (by age and sex). As we now also have a means of measuring childhood obesity and its distribution by age and sex, the next step in our analysis is to understand the relationship between nutrient intake and health outcomes; (at this stage) especially obesity.

Calorie Intake – Child Weight/Body Mass Index Dose Response Function

Following recent analysis by the Standards and Quality Analytical Team (economics) of the Department of Health, a method for linking changes in child body weight to changes in energy balance (here we are concerned with calorie intake) has been developed. The derivation of this methodology is attached at Annex 4. The effect of a one-calorie per day change in energy intake is inversely proportional to the increase in basal metabolic rate (BMR) per unit weight and the level of physical activity (PAL). Reference values for BMR and PAL have been taken from an international study. [100]

As an illustration of the effect of a change in the energy balance suggested by this dose response function; a 100-calorie reduction in intake would lead to an approximate 10% reduction in body weight in boys and girls in primary school. It is interesting to note that Cutler et al find that a "strikingly small" average daily increase in net energy intake of 150 calories is enough to explain the rise in obesity prevalence in the United States in the closing two decades of the twentieth century.

[100] ftp://ftp.fao.org/docrep/fao/007/y5686e/y5686e00.pdf

NDNS Child Nutrient Intake Modelling Results - Obesity

As explained above, the outturns of the 1997 NDNS nutrient intakes for British children were modelled to substitute core category foods by realistic healthier choices and in accordance with the FSA's Nutrient Profiling Model. This was conducted for five groups of children (11-15 boys and girls separately, 7-10 boys and girls separately and 4-6 boys and girls combined) the levels of aggregation chosen to allow the sample sizes to be statistically robust within this analysis.

Breakdowns were obtained by nutrient group for uplifted[101] 1997 intakes and were compared to the nutrient intakes that would have occurred should there have been some substitution to healthier options from core category foods. This enabled us to estimate the potential nutrient intake effects of restricting the promotion of core category foods to children via broadcasting.

Focusing on calories and the subsequent impact on BMI levels and obesity prevalence, we can see the potential impact of the policy. Detailed results are shown in Annex 5. Focusing on 11-15 years olds, BMI levels reduced by 4.41 Kg/m^2 and 3.52 Kg/m^2 for girls and boys respectively, under a 100% successful policy. When these impacts are translated into obesity prevalence, the change is substantial, as shown below.

Age/Sex	Implied Reduction in 2003 HSE Child Obesity Via The Obtained BMI Reductions By Policy Success[102]		
	5%	**10%**	**100%**
Average Boys age 11 -15	3%	6%	60%
Average Girls age 11-15	4%	8%	76%

Not all of the obese adolescents considered in our analysis would have become obese adults (in the absence of this potential policy). Thus when monetising the costs to the economy of adult obesity in this policy context we propose to apply a 70% obese adolescent to obese adult conversion ratio[103]. As such, the average policy-led reductions in 2003 HSE childhood obesity obtained above would, for 100% policy effectiveness, yield **42%** of obese boys and **53%** of obese girls from not becoming obese adults[104].

As a result of changes in BMI some people will be reclassified within the adiposity framework we are using. We found that for each child age/sex and policy success scenario

[101] Following, the analysis of Rennie et al. (Rennie, K.L., Jebb, S.A, Wright, A., Coward, W.A. 2005 Secular Trends in Under-Reporting in Young People. British Journal of Nutrition, 93) the reported NDNS energy intakes were uplifted within our analysis to compensate for under-reporting within the survey. For 11-15 year olds an uplift of 25% was employed; for 7-10 year olds, 20% was used and for 4-6 year olds, 15% was used. In a similar way an uplift of 15% for salt intake was applied across each age group.

[102] Figures generated by scaling reductions linearly by percentage from 100% successful policy modelling. See Annex 5 (Changes in Obesity).

[103] The Parliamentary Office of Science and Technology consider that overweight adolescents have a 70% chance of becoming overweight or obese adults in Britain. September 2003, Postnote Number 205.

[104] For simplicity, assuming that the obese adolescents who would anyway not become obese adults are uniformly distributed amongst obese adolescents.

the number of children reclassified from obese to overweight was less (and in many cases considerably less) than the number that had been reclassified from overweight to healthy. As such we consider it conservative within this analysis to simply concentrate on the potential health and economic benefits of reduced childhood obesity that may accrue from this potential policy.

What Ratio of Obese Adults Were Overweight as Children?

It is to be noted that the available UK evidence relating to the proportion of obese adults who were obese as children is not high. Indeed, Power et al.[105] comment that, "In general the majority of obese adults were not fat in adolescence". Their own UK analysis shows approximately 11-13% of obese adults having been obese children. However, at the other end of the literature's estimates, they also cite US survey results one of which (Srinivasan et al. 1996) finds 57% of obese adults having been obese children.

Despite these existing historic studies, the general trend of obesity expanding in British children of all ages appears to be increasing the scope for obesity in childhood to map into adulthood. We should note that as the "obesogenic environment" is relevant to the whole UK population. It is increasingly possible that the seeds of longer term obese-creating diets are developing in childhood but do not manifest as obesity until adulthood. This said, it is considered that taking a 25% figure of obese adults having been obese children as a realistic base case[106]. Thus, the implied direct reduction in adult obesity given a 100% successful policy would eventually approximate 12%[107]. A 10% effective policy would reduce obesity by 1.2%.

The Health and Economic Costs of Adult Obesity

It is considered that the most comprehensive estimates of the cost of obesity produced in Britain to date have been those of The National Audit Office in 2000 and the House of Common's Health Committee[108] in 2002.

The NAO calculated the costs of obesity at 1.5% of NHS expenditure. For the population of England in 1998, they also estimated the economic costs of obesity to be around £480 million in direct costs and £2.1 billion in indirect costs, with a projected total of £3.6 billion (per annum) by 2010.

In 2002, the House of Common's Health Committee updated this estimate to £3.3-£3.7 billion for 2002 (comprising of direct NHS costs of £990-£1,225 million, lost output due to premature mortality of £1.05-£1.15 billion and lost output due to sickness absence of £1.3-£1.45 billion). This higher cost reflects: the prescription of new, more expensive drugs to obese individuals; more accurate data, increasing levels of obesity and the inclusion of more

[105] Power, C., Lake, J.K., Cole, T.J. Measurement and long-term health risks of child and adolescent fatness. International Journal of Obesity (1997).
[106] See later in this section for further contemporary evidence tracking more general childhood diets longitudinally.
[107] This estimate concentrates solely on obesity manifesting in under-16s. It is thus a very conservative estimate as the policy will also effect the diets of some of those who would otherwise manifest as obese in adulthood.
[108] House of Commons Health Committee. Obesity. Third Report of Session 2003-04. Tackling Obesity in England: HC 220 Session 2000-2001: 15 February 2001.

co-morbidities. For example, whilst the NAO's study considered the costs of obesity-attributed hypertension, Type 2 diabetes, some cancers etc., the HoCHC also included psychological problems and lower back pain. However, as noted in the Report (p129) this estimate should still be seen as an underestimate, given that it does not, for example, capture all of the relevant NHS costs. In addition, individuals' own willingness-to-pay to avoid the mortality and health risks that come with the condition of obesity are not captured[109].

Uplifting this conservative annual estimate of the cost of obesity in England to the UK population level, and adjusting for relative prevalence, yields an annual cost of £4.0–4.5 billion[110]. If we take the mid-point as our assumed UK cost of obesity (£4.25 billion per annum in 2002 prices), and taking a historical 25% figure of obese adults having been obese children, we identify a conservative economic cost of just over £1050 million that this policy potential influences. This is a conservative approach in that many children are likely to have developed dietary habits that are conducive with obesity in later life that does not actually manifest in childhood.

Given 100% "policy effectiveness" yields 42% of obese boys and 53% of obese girls from not becoming obese adults – 47.5% average. Then, 100% policy effectiveness would reduce adult obesity by 11.9%, saving £505 million per annum (2002 prices). At 10% policy effectiveness this equates to £50 million per annum (2002 prices).

There are many health effects of childhood obesity. These include increased blood lipids, glucose intolerance, hypertension and increases in liver enzymes associated with fatty liver[111]. Indeed, adult blood pressure[112], arthritis[113], cardiovascular disease[114] and menstrual problems[115] can all be driven by childhood obesity independent of adult weight. But realistically the bulk of these obesity costs would occur in (later) adulthood. Given this significant discounting of these annual benefit figures would be required to provide a present value of the policy benefits. As the benefits from avoided obesity are only part of the wider dietary related benefits of this policy we conduct this discounting exercise in the next section when more of the policy's benefits have been estimated.

[109] The own willingness-to-pay to lessen/avoid health risks is considered in more detail regarding dietary health more generally later.
[110] Estimate for Wales's base only on population as no accurate obesity prevalence data available. Estimates for Scotland and Northern Ireland calculated using population figures from ONS Population trends 120 (2005), and prevalence data from the Scottish Health Survey (1998) and Northern Ireland Health and Social Wellbeing Survey (1997).
[111] Parsons, T.J., Power, C., Logan, S., Summerbell, C.D. Childhood Predictors of Adult Obesity: a Systematic Review. International Journal of Obesity (1999) 23, Suppl 8, S1-S107.
[112] Lauer RM, Clarke WR. Childhood risk factors for high adult blood pressure: the Muscatine study. Pediatrics (1989) 84, 633–641
[113] Must A, Jacques PF, Dallal GE, et al. Long-term morbidity and mortality of overweight adolescents; a follow-up of the Harvard Growth Study of 1922 to 1935. New England Journal of Medicine (1992) 327, 1350–1355
[114] *ibid.*
[115] Lake JK, Power C, Cole TJ. Women's reproductive health: the role of body mass index in early and adult life. International Journal of Obesity (1997) 21(6), 432-439.

NDNS Child Nutrient Intake Modelling Results – All Nutrients

When we considered the NAO's and the HoCHC's estimations of the costs of obesity to England we explained that these included the impacts of other health conditions, a proportion of which were attributed to the obesity condition. This is, however, only part of the diet related health story. For example, whilst the event of a stroke can have its probability increased if a person is obese, a potentially greater dietary contributory factor to stroke is over-consumption of salt (not calories). Given this, it is necessary to consider the potential dietary health benefits of restricting the broadcast promotion of core category foods to children across the range of nutrient intakes (calories and thus reduced obesity benefits will be nested within these) and then capture the full economic value of these benefits.

Do Good/Bad Diets Persist From Formation?

In terms of the wider nutrient categories, longitudinal analysis linking childhood with associated levels of adult consumption are not currently systematically available in the UK. However, the literature does support an understanding that it is more difficult to change the preferences and consumption habits of adults than children who are still forming these. Thus providing a further rationale for acting to alter the consumption patterns of children[116]. Indeed, as noted by Parsons et al. when reviewing childhood predictors of adult obesity: "In addition to the observed tracking of adiposity from childhood to adulthood, it has been suggested that lifestyle habits such as diet and activity levels may also track during childhood and into adulthood. There is some evidence that such tracking occurs,"[117].

More specifically, when analysing the mineral and vitamin intakes of pre-school children from Edinburgh, Payne and Belton's[118] findings lead them to consider that, "This suggests that early establishment of a good quality diet is extremely important as low levels of nutrient intake tend to persist".

This message has been recently reinforced by the contemporary work of Pauline Emmett and team at the University of Bristol. The Avon Longitudinal Study of Parents and Children[119] (ALSPAC, the "Children of the 90s" study) is ongoing and in research presented to the World Cancer Research Fund Forum (Bristol 2004), Dr Emmett discussed findings that the mean weight of fruit and vegetable intake consumed per MJ of energy actually fell between the child cohort's ages of 3 and 7 years from 28.9g/MJ to 27.2g/MJ. Not only did this tracking figure fall, but the ALSPAC researchers consider that a figure of 45g/MJ would be consistent with WHO intake recommendations after the age of 5 years[120]. As such the implication is that having possessed a relatively low level of fruit and vegetable intake at pre-school age, this current cohort of children in the Bristol area saw this intake track to a worse level by age 7 years at amounts considerably below those recommended by the WHO.

[116] In addition, potential indirect effects of core category food broadcast promotion restrictions to children such as voluntary product reformulation to allow continued television advertising to children are once more relevant and valid.

[117] Parsons, T.J., Power, C., Logan, S., Summerbell, C.D. Childhood Predictors of Adult Obesity: a Systematic Review. International Journal of Obesity (1999) 23, Suppl 8, S1-S107.

[118] Payne, J.A., Belton, N.R. Nutrient intake and growth in pre-school children. II. Intake of minerals and vitamins. Journal of Human Nutrition and Dietetics (1992), 5, 299-304. P304.

[119] www.alspac.bris.ac.uk

[120] Glynn, L., Emmett, P., Rogers, I., ALSPAC Study Team. Food and nutrient intakes of a population sample of 7-year-old children in the south-west of England in 1999/2000 – what difference does gender make? Journal of Human Nutrition and Dietetics (2005), 18, 7-19. P10.

Nutrient Intakes and Preventable Mortality and Morbidity

Salt is a significant risk factor in developing high blood pressure and cardiovascular disease (the main components of which are coronary heart disease and stroke). In addition, a high intake of saturated fat is associated with raised levels of blood cholesterol, a major risk factor for coronary heart disease[121].

The recommended daily amounts of salt consumption vary by age group for children. However, the NDNS 1997 found that for each of the three age groups studied children on average significantly overshot these amounts. 11-15 year olds have a target of 6g, their outturn was 7.3g; 7-10 year olds have a target of 5g, their outturn was 6.6g and for 4-6 year olds the target is 3g, their outturn was 5.8g.

Our NDNS analysis for children shows that intakes[122] of saturated fat (average of 14% of food energy obtained from saturated fat) in 1997 were higher than the COMA (Committee on the Medical Aspects of Food Policy) recommended level (of 11%). In addition, the NDNS 2000 shows that around half of the men and women aged between 19-64 in the survey had blood cholesterol level above the normal range.

Non-milk extrinsic sugars (NMES) are those sugars not naturally incorporated in the cellular structure of the food. There is extensive evidence that NMES[123] is the most important dietary factor in the cause of dental caries (COMA 1991)[124]. Although NMES are not directly related to the development of cardiovascular disease or diabetes, increased consumption can increase the intake of food energy and be associated with obesity. In predisposed people, foods high in NMES could have potentially undesirable metabolic effects such as elevation of blood glucose and insulin concentrations. COMA specifically recommends that NMES should not provide more than 11% of food energy intake. NDNS in 1997 reported that intakes of NMES are much higher than recommended in children – over 16%.

The Department for Health's White Paper considered these three areas of significant nutrient intake concern in England. As the table below shows for the UK, even small reductions in these daily average intakes on a nation-wide basis can lead to significant numbers of lives saved per annum. This table has been updated by Department of Health and FSA economists as our understanding of the dietary effects of these nutrients develops – see Annex 7 for more detail.

Annual UK deaths prevented for unit reduction in salt, saturated fat and sugar[125]			
	Level of reduction	*Causes of Deaths*	*Deaths prevented*
Salt	One gram reduction	CHD, stroke	6,730
Saturated fat	One percentage point reduction in saturated	CHD[126]	1,550

[121] Keys et al 1986
[122] Across all 4-15 year olds.
[123] Extrinsic sugar – lactose in milk and milk products is deemed to be a special case as it is less harmful than other sugars and milk does contain other protective factors.
[124] Annex 6 provides a brief description of the costs of dental caries and anaemia to the NHS. However, as these are relatively small compared to CVD and cancer their costs are not incorporated in the main benefits estimation exercise.
[125] Data in table uplifted to UK by population figures (ONS Population Trends 210, 2005).

	fatty acids, as % of food energy intake		
Sugar	one percentage point reduction in sugars, as % of food energy intake	All causes, via reduction in obesity	2,000 – 5,800[127]

When we considered the potential effect on childhood intake of salt, saturated fat and NMES of a successful substitution from the core category products consumed in 1997 to the NDNS modeled alternatives, significant reductions were achieved for each nutrient group.

Within the NDNS modeling, a 100% successful substitution yielded an average 0.9g daily reduction in child salt intake. If this effect were mapped onto the UK's adult population, this would equate to an annual prevention of 6,050 deaths. For saturated fat a childhood daily average reduction of 1.0% of food energy intake was achieved. This would equate to an annual prevention of 1,550 UK deaths. Children disproportionately consume NMES compared to adults. The Government's White Paper target for adult NMES reduction is 1.7% of food energy intake, this was comfortably achieved within the modeling of child substitutions which in themselves would equate to an annual prevention of 12,500[128] UK adult deaths (see Annex 7).

In addition to these nutrient effects discussed in the White Paper, Department of Health economists have now also been able to estimate the annual UK cancer deaths that could be prevented as fruit intake is increased. This is again explained in Annex 7. As modeled via the NDNS at 100% successful substitution, childhood daily intake of fruit would increase by 100g – this, along with the full substitution modeling results, is explained/presented in Annex 6. This increase in fruit intake is estimated to yield an annual prevention of 31,050 UK adult cancer deaths[129].

If it were the case that the proposed policy to restrict broadcast promotions to children drove the substitutions in children's diets modeled and that this prevented them from extrapolating their current dietary intakes into adulthood then this outcome would be estimated to prevent approximately 50,000 deaths annually in the UK.

Methods of Monetising These Health Benefits: WTP/VOL and QALYs

The monetisation of the value of these 50,000 potential annual lives saved from dietary change into adulthood as children are exposed to less broadcast core food category promotion has the potential to involve many complex issues such as human costs (not factored into the discussion of obesity costs above), economic productivity and health care costs in this dietary

[126] In addition to CHD, the WHO Technical Report 91, 6 (2003) notes that the risk of developing type 2 diabetes is probably increased with consumption of saturated fat. We do not propose here to attempt to quantify this effect but note that this is a further potential category of health cost that these policy considerations may act to reduce.

[127] Explanation of this range of potential outcomes is provided in Annex 7 (DoH: Forecast Health Benefits).

[128] In order to maintain this analysis's conservative approach to estimating potential health benefits, the lower end of the range of deaths prevented re NMES is focused upon as the results of the analysis are presented.

[129] In addition to the effects of fruit consumption on cancer, Annex 6 also notes recent work concerning its effect on cardiovascular disease.

context. To derive one approximation of this value, the FSA proposes to use the Department for Transport's Valuation of Benefits of Prevention of Road Accidents and Casualties in 2003[130], which incorporates medical costs, output and human costs (using a willingness-to-pay methodology) to provide value of statistical life (VOL) estimates in situations where death results. However, this transport-based statistical value of life is derived from victims whose mode age of road death is 20-29 years (2003)[131]. In the context of dietary relate deaths (despite new trends such as the childhood obesity and its uncertain life-long effects) the majority will occur in later life.[132] This fact raises two issues in the current discussion. Firstly, do the productivity and NHS costs included in the transport VOL transfer to the case of dietary related diseases? Secondly, is it appropriate to use a willingness-to-pay methodology regarding risk reduction where people's life expectancy may be being reduced by a few years but not approximately a half of their lifetime?

As can be seen in the Treasury's guidance to managing risks to the public[133], the NHS and productivity elements of the VOL figure account for less than 7% of its total as the public's willingness-to-pay to reduce risk is significant and productivity is measured as output less of lost consumption given the fatality. The NHS costs are small as they relate to short term care following a (to be) fatal accident.

In the case of dietary related deaths it is probable that the patient will have received medical treatment pre-fatality well in excess of the costs associated with a transport accident. This said, the 6% of the VOL figure accounted for by loss of net output is likely to be lower for people whose working lives suffered productivity problems as a result of their dietary related medical conditions and whom at the time of death may have been retired. Given these likely offsetting effects it is proposed here to employ the transport VOL figure as is.

The Treasury's guidance to managing risks to the public explains some of the advantages and disadvantages associated with both the VOL approach to measuring public benefits and the approach using Quality Adjusted Life Years (QALYs).

QALYs are an output measure via which cost effectiveness analysis can compare the costs of alternative ways of producing the same or similar outputs. QALYs are estimated by assigning every life-year a weight on a scale where one represents full health and zero represents death[134].

In the current context this second approach provides a measurement of the yield of QALYs from the increased life expectancy and reduced morbidity that are modeled to come as a result of restricting the broadcast promotion of core category foods to children. These QALYs are then monetised as explained later.

Turning to productivity costs and QALYs. QALYs represent the potential patient's subjective valuation of different health states. The values reflect loss of income whilst patients are unable to work. But this is only the difference between earnings and sick pay or invalidity benefit. As such, most of the value of production loss will not be taken into account. This

[130] Department for Transport, Highways Economics Note 1, December 2004
[131] www.dft.gov.uk/stellent/groups/dft_transstats/documents/page/dft_transstats_041053.pdf
[132] For example, it is in later middle to older age that numbers of deaths via colorectal cancer increase significantly. See: http://info.cancerresearchuk.org/cancerstats/types/bowel/mortality/.
[133] Managing risks to the public: appraisal guidance. HM Treasury, June 2005.
[134] For the most common methods of determining the health related utility values to weight QALYs see, Managing risks to the public: appraisal guidance. HM Treasury, June 2005. P22.

said, the National Institute for Clinical Excellence (NICE) practice is not to adjust QALY evaluations for production losses. In this analysis we plan to keep to this precedent. In addition, there are also arguments that including production losses would distort the allocation of health care against those not in work.

In terms of NHS costs and QALY analysis, unlike in VOL where we have offset probably lower productivity with potentially higher NHS costs. In QALYs we are not including productivity and a case can also be made for excluding NHS costs here. To date, the discussion of NHS costs regarding dietary related diseases has tended to abstract from potentially shorter life expectancies. Given this the net cost effect is yet to be fully determined for dietary diseases. Indeed, there is at least the potential for it to be negative as opposed to positive. As such NHS costs are not considered with QALYs here.

Some analysts may think it more appropriate to apply the QALY methodology in the current situation, given the likely relative older age of average dietary related deaths. However, others would point to the general findings of willingness-to-pay experiments[135] that longer life expectancy does not necessarily yield higher willingness-to-pay valuations and that "dread" of certain health risks, such as cancer[136], can be better captured via the VOL methodology.

Whether it is more salient to employ either the VOL or QALY methodology, as well as mortality the morbidity effects of dietary related disease also need to be accounted for. To do this, for both VOL and QALYs, we propose using the ratio of the number of non-fatal events prevented per fatal event associated with the key nutrient intakes of salt, fat, sugar and fruit.

The Potential Monetised Benefits Using VOL

The value of statistical life was calculated as £1.42m in Q4 2004.[137] Applying this figure to the estimated potential 50,000 annual lives saved, an estimated benefit of £70 billion per year arises from prevented deaths alone – before we consider morbidity benefits.

As is explained fully with the QALY method of monetising these health benefits below, we consider it appropriate to apply a 10% uplift on the mortality outturns to also capture the effect of reduced morbidity.

To reach these figures we have assumed that the policy to restrict broadcast promotion of core category foods to children has been fully successful in delivering the modeled dietary substitutions and that the achieved reductions in salt, fat and sugar and increases in fruit are fully mapped into adulthood.

Whilst total success of the policy in achieving our modeled substitutions is unlikely, we again consider a 10% policy success effect to be achievable. Results at the 10% figure are thus reported below.

[135] *ibid*. P49.
[136] *ibid.* P50.
[137] This was derived from the value of statistical life in June 2003 provide by the Department for Transport (£1,312,260) and inflated to 2004 Q4 prices via the GDP per capita inflator between Q2 2003 and Q4 2004 (taken from ONS, Economic trends)

We have also explained what evidence exists tracking childhood consumption of the wider nutrient categories into their associated levels of adult consumption. Given both the mapping of adolescent obesity into adulthood (70%) and the strong and developing tracking evidence of early childhood nutrient intakes through time. We consider it appropriate to report mapping levels of 25%, 50% and 100% relating to the level of the modeled reduction (increase for fruit) in nutrient intake as children's intakes track into adulthood. Indeed, we propose using a 50% mapping ratio as the base case.

As the majority of diet related health outcomes will tend to occur in later life, the benefits from children's substitution today towards a healthier diet will mostly accrue in decades to come. Given this it is necessary to discount today's monetary values of these benefits appropriately.

For this purpose we use the Government's Social Time Preference Rate[138]. By discounting the benefits by each of 50 and 60 years we obtain the equivalent present value of these future benefits that would accrue to today's 15 year old when they are 65 or 75 years old when the diet related disease caused mortality[139].

However, (for both the VOL and QALY outturns) whilst the gain in life years will come typically in people's seventies, the benefits in terms of morbidity rate are likely to come earlier, perhaps with a lag of fifty years. Given this for our base case we discount mortality for 60 years and morbidity for 50 years.

The table below reports results for the 10% policy success effect in terms of the annual VOL monetised benefits of this policy via reduced UK mortality and morbidity from dietary related diseases.

UK Annual Monetised Health Benefits; VOL	100% mapping of nutrient intake substitution into adulthood	50% mapping of nutrient intake substitution into adulthood	25% mapping of nutrient intake substitution into adulthood
Undiscounted	£7,990m	£3,995m	£2,000m
NPV discounted 50-years: mortality and morbidity	£1,575m	£790m	£395m
NPV discounted 60-years mortality; 50-years morbidity	£1,210m	**£605m**	£300m

As can be seen, even when discounted for as long as 60 and 50 years (mortality and morbidity respectively), **our base case result using the VOL methodology estimates this policy to yield in excess of £600 millions of annual health benefits to the UK.** Indeed this annualised benefit can be seen as applying in perpetuity as successive generations of children develop healthier lifetime dietary patterns and habits.

[138] The Green Book, Appraisal and Evaluation in Central Government (2003). HM Treasury. P99

[139] As advised by the Green Book, we have discounted the first 30 years at the rate of 3.5% and applied the rate of 3.0% for the longer-term discounting beyond that.

It is also worth once more noting the potentially conservative nature of this figure given that: our modelling was not able to provide pre-prepared convenience foods with potential healthier substitutes; we only consider the effects of fruit consumption (and not vegetables) on cancer; and some dietary illnesses and deaths occur in younger children and adults, however we have discounted all of our effects decades into the future. In addition, if any healthy reformulations of core category foods were to be an indirect outcome of this policy then many adults would also benefit from shorter term healthier eating as well.

The Potential Monetised Benefits Using QALYs

We now illustrate the consequent yield of quality adjusted life years from increased life expectancy and reduced morbidity and monetise these. For example, fruit consumption protects against cancer. A high proportion of cancers are fatal within five years. But quality of life is progressively impaired in this period between diagnosis and death; and many people whose cancer is eventually cured anyway suffer a lower quality of life while they have it. Accordingly, as we have recognised in the VOL estimates, there is a benefit of reduced morbidity to be calculated in addition to the gain in life expectancy.

The table below converts deaths averted into life years saved and morbidity prevented. These estimates relate to 100% policy success substitutions maintained through adult life. They relate to the lifetime experience of a single age cohort. The assumption is that one year's expenditure on broadcast food promotion affects a single age cohort. See Annex 7 for the full evidence and analysis underlying these estimates.

UK change in risk factors: deaths averted, life years saved and morbidity prevented

	change	deaths averted	life years saved th	morbidity: QALYs gained th
salt	0.9 gm reduction	6,050	54	11
fat	One percentage point reduction in fatty acids as % of energy intake	1,550	18	1
sugar	The reduction in calories reported in Annex (Changes in Obesity)	12,500	215	16
fruit	100 gms/day			

	increase	31,050	346	43
total		51,150	633	71[140]

It remains to express the life years saved in QALY terms, to value the QALYs, and to bring them to a present value to deliver comparability with cost, which will be incurred immediately.

As noted already, the gain in life years will tend to come towards the end of a normal life span. To judge from the Health Survey for England, older people do not have full quality of life[141], with a deficit of 0.25 each year. This proportion has been deducted from life years to arrive at the total of QALYs linked to gains in life expectancy.

The value people place on a QALY is uncertain. We use the figure of £30,000 in this context. This figure comes from different sources: the value NICE is widely believed to apply as a passmark in appraisal of health technologies; a recent study of air pollution for DEFRA[142]; and a study for DoH of willingness to pay for a QALY, which takes as a starting point the DfT value of a statistical life[143].

As with the VOL calculations, we now again assume a 10% success rate of the policy in achieving our modelled substitutions for children's diets and report this at mapping levels of 25%, 50% and 100% into adulthood diets. Once more we also discount mortality for 60 years and morbidity for 50 years.

At the 10% policy success level, the achieved magnitude of UK health benefits expressed in QALYs is 54,500 QALYs per annum. The table below monetises this and provides the relevant NPV outturns.

UK Annual Monetised Health Benefits; QALYs	100% mapping of nutrient intake substitution into adulthood	50% mapping of nutrient intake substitution into adulthood	25% mapping of nutrient intake substitution into adulthood
Undiscounted	£1,640m	£820m	£410m
NPV discounted 60-years mortality; 50-years morbidity	£250m	**£125m**	£65m

As can be seen, even when discounted for as long as 60 and 50 years (mortality and morbidity respectively), **our base case result using the QALY methodology estimates this policy to yield £125m of annual health benefits to the UK.** Again, this annualised benefit can be seen as applying in perpetuity as successive generations of children develop healthier lifetime dietary patterns and habits.

[140] On average across the nutrients under consideration, an uplift of 10% on mortality for morbidity is applied (71/633).
[141] http://www.archive.official-documents.co.uk/document/doh/survey96/tab5-29.htm
[142] http://www.defra.gov.uk/environment/airquality/airpoll_health/index.htm
[143] Mason H, Marshall A, Jones-Lee M, Donaldson C for the Social Value of a QALY Project Team. Estimating a willingness to pay based value of a QALY from existing contingent valuation studies of prevented fatalities. 2004.

The Precautionary Principle

When conducting cost benefit analysis to help formulate policy it is important to identify any truly uncertain outcomes that simply cannot be accurately forecast or measured today. As has been explained, the growth in childhood obesity in the UK has burgeoned in recent years. As a consequence of this so too have childhood diseases that historically tended to be the preserve of adults (some of which are irreversible), key of these being Type 2 Diabetes[144]. In addition, it is widely accepted that obesity is associated with cancers such as colon and ovarian[145].

Whereas the health and life expectancy effects of obesity and its associated medical conditions in adults are increasingly understood by the medical profession with forecast monetised benefits being produced as a result. The effects of very long-term (i.e. from childhood) obesity and its related conditions over an almost entire lifetime are not well known. This is simply because significant numbers of obese children is a new phenomenon.

Given this it appears necessary to apply the precautionary principle to policy formation when considering the appropriate action regarding the broadcast promotion of core category foods to children. The quantified benefits presented in this analysis from various levels of "success" in restricting the broadcast promotion of core category foods to children are based on the effects of diet on the population of England as is today (uplifted for the UK). As such these quantified effects do not yet capture the life-long health effects created by the new phenomenon of increasing numbers of obese children which can lead to irreversible health conditions, for example, life-long Type 2 Diabetes. In addition, it is likely that the sooner the UK's children become obese and in larger numbers the onset of other obesity related conditions may occur at earlier ages, e.g. the associated cancers.

As there is thus real scientific uncertainty regarding the longer-term (life-long) health effects being created by burgeoning UK childhood obesity which are clearly on the down side and may be significantly adverse, a precautionary policy approach should be applied. Annex 8 provides the Government's definition of the precautionary principle and further explanation regarding when it is appropriate to invoke it.

As such, the monetised benefits presented above relating to restricting the broadcast promotion of core category foods to children (concerning all nutrient intakes) may not fully take account of the potentially significant life-long health effects of rising childhood obesity and its associated (some irreversible) medical conditions.

[144] BBC News, Child Diabetes Time-Bomb Warning, 19 April 2005. "Ten years ago type 2 diabetes was unheard of among children, but it has begun to emerge as the obesity epidemic has exploded." "Experts said there may be up to 1,500 cases nationally now and warned the UK was sitting on a 'time-bomb'".
[145] Tackling Obesity in England: HC 220 Session 2000-2001: 15 February 2001. P59.

Conclusion

The analysis laid out in this benefits of restricting the broadcast promotion of core category foods to UK children concludes that when appropriately discounted the base case yields present value annual health benefits of between £125m and £600m.

Again, it should be noted that these figures may be conservative given that: our modelling was not able to provide pre-prepared convenience foods with potential healthier substitutes; fruit's increased consumption effects on cancer alone are estimated, not vegetables; and some dietary illnesses and deaths occur in younger children and adults. There is also the potential effect of any healthy reformulations of core category foods (as an indirect outcome of this policy) feeding into the diets of many current adults.

Finally, we have also noted the potential role for considering the precautionary principle when framing policy in this area.

Annex 1 (2005 US Research into the Effects of Fast Food Restaurant Television Advertising on Childhood Obesity)

In April 2005 Grossman et al.[146] studied the impact of fast food restaurant advertising on childhood obesity in the US. As is noted below, their findings suggest significant impacts of this form of broadcast promotion on childhood obesity outturns in the US. It is also important to note that the methodology employed by these authors, given the available US data, allowed them to estimate the effects of television advertising on childhood obesity without requiring to model nutrient substitutes or dose responses from calorie intake to BMI/obesity outcomes (these steps are necessary in our analysis for the UK).

This US study employed two micro-level data sets: the National Longitudinal Survey of Youth 1997 for adolescents aged 12-18 and the Child-Young Adult National Longitudinal Survey of Youth 1979 for children aged 3-11. Both are nationally representative.

Fast food restaurant television advertising data was obtained from Competitive Media Reporting, which holds exposure information and dollar expenditures for a wide range of fast food restaurant chains in the US from 1996-1999. The unit of observation used was the Designated Market Area, a region composed of counties that defines a television market. Network television, syndicated television and cable network television were not included as they do not exhibit any local variation.

When television watching time and fast food restaurant advertising messages seen are explanatory variables, the results indicate a positive and significant relationship between advertising and children's BMI, with a larger and more significant impact on boys than on girls. Increasing exposure to fast food advertising by a half an hour per week was found to increase a boy's BMI by 2% and a girl's by 1%.

Overall, the results are interpreted to indicate that a complete fast food restaurant advertising ban on television would decrease the number of overweight by 12-29% among boys aged 3-11 and by 4-15% among girls aged 3-11. The overweight population of teenage boys would fall by 20-31% and teenage girls by 1-5%. However, the results are thought to underestimate the impact of fast food restaurant advertising as the statistics were estimated with spot data and therefore, exclude advertising on national television programmes.

Of final note is that the probability of childhood obesity persisting into adulthood is estimated in this paper to increase from about 20% at four years of age to approximately 80% by adolescence. Indeed, this later estimate appears to concur with the view of the Parliamentary Office of Science and Technology that overweight adolescents have a 70% chance of becoming overweight or obese adults in Britain.[147]

[146] Shin-Yi Chou, Inas Rashad, Michael Grossman (April 2005). Fast Food Restaurant Advertising on Television and Its Influence on Childhood Obesity.
[147] September 2003, Postnote Number 205

Annex 2 (NDNS Substitution Model)

Category	NDNS food group / food codes	Scenarios for effect of action on promotions to children	Notes for modelling
Crisps and savoury snacks	NDNS group 42R – crisps and savoury snacks. Includes all potato and cereal-based savoury snacks	Substitute with fruit	Substitute with average of Banana (NDNS code 1977) Apple (NDNS code 1951)
Soft drinks with added sugar	NDNS group 57A, B, C – non-diet soft drinks. Includes carbonated, concentrated and RTD still varieties. Excludes fruit juice. Excludes diet soft drinks	Substitute with a mixture of water, semi-skimmed milk and fruit juice	Average of Water (5000) Semi-skimmed milk (8543) Mixed fruit juice (2357)
Sugary breakfast cereals	No NDNS group for this category. Select food codes for sugary products. Breakfast cereals that exceed 18g total sugar per 100g	Substitute with breakfast cereals that meet nutrient profiling criteria Shredded wheat (Nutrient profiling score of = -6), Ready Brek (-5), Weetabix (-3); muesli with no added sugar (-2).	Average of: Shredded wheat (code 221) Ready Brek (2675) Weetabix (225) NB. Muesli with no added sugar not included as sugar content in NDNS nutrient databank is higher.
Confectionery	NDNS food groups 43 and 44 – sugar and chocolate confectionery	Substitute with fruit	Substitute with average of Banana (NDNS code 1977) Apple (NDNS code 1951)
Fast food - Pizza	Pizza – NDNS food group 1C NB: NDNS coding system doesn't distinguish takeaway pizzas from retail	Pizza – substitute with pizza that meets nutrient profiling criteria Takeaway pizza fish topped – example of healthier choice in Annex C of consultation package.	Substitute with NDNS code 8528 – chicken pizza deep pan base. Nutrient profiling score = +1 No suitable NDNS codes available for takeaway pizza fish topped.

Fast food -Burgers;	Burgers – separate list of NDNS codes	Substitute with 50% sandwich and 50% meat based ready meal	MW6[148] chicken salad sandwich (nutrient profiling score = 0) White bread 49% (code 120) Chicken 25% (code 1090) Tomato 10% (code 1931) Lettuce 6% (code 1762) Cucumber 6% (code 1740) Fat spread 4% (code 866) MW6 cottage pie ready meal (nutrient profiling score +3) NDNS code 1356
Fast food –Chicken (KFC / nuggets);	Chicken (KFC & nuggets)	Substitute with 50% sandwich and 50% chicken based ready meal	MW6 chicken salad sandwich (as above) MW6 chicken curry with rice (nutrient profiling score =0) NDNS code 9386

[148] McCance and Widdowson's The Composition of Foods, 6th edition.

Annex 3 (Obesity Measurement)

There are several different methods of measuring adiposity, the amount of fat in the body, in adults. Obesity and overweight are excesses of body fat but are defined by cut-off points in the measure of adiposity. Different measures of adiposity offer different theoretical and practical advantages. As obesity is a risk for several different diseases, the measure would ideally categorise those individuals are most risk from the disease as obese or overweight. Measures such as deuterium dilution and underwater weighting are accurate measures of fat, but prohibitively expensive for large and regular studies. Anthropometric measures are cheaper to use and still provide the opportunity to measure areas of body fat that observe the distribution of fat across the body. This allows, for example, an assessment of the fat stored around the waist, which is considered to be a significant risk factor for chest movements and breathing functions, as well as diabetes, hypertension and blood lipid concentrations.[149] Body fat distribution can be measured through comparisons of skinfold thickness; body circumference; or diameters at different parts of the body. Commonly used ratios include waist to hip ratio, waist circumference, and subscapular to triceps skinfold[150]. However, the most commonly used measure of obesity is the Body Mass Index (BMI). This is a ratio of the weight of the individual to their height, as shown in the formula below:

$$\text{BMI} = \frac{\text{weight in kilograms}}{(\text{height in metres})^2}$$

$$= \frac{\text{weight in pounds}}{(\text{height in inches})^2} \times 704.5$$

Given this measure of adiposity, cut-off points have been suggested that correspond to mortality and morbidity risks. For adults, these are shown in the table below.

BMI (Kg/m^2)	Classification
< 20	Underweight
20 – 25	Healthy
25 – 30	Overweight
30 – 35	Obese
35 – 40	Severely obese
> 40	Very severely (morbidly) obese

This measure is used mainly due to its ease of application. As the measure requires only weight and height there is opportunity for measurements to be self-reported. Weight is reasonably correlated with body fat whilst height is only very weakly correlated with fat. The high correlation between the two means that it provides a good proxy for adiposity. BMI, however, is a measure of adjusted weight rather than fatness per se and hence some individuals will test false positive. This is the case with muscular individuals such as sports players.

Whilst BMI is still a valid measurement for children, the classification used for adults is not appropriate for use with children. This is because children are growing, and the body mass

[149] Royal College of Physicians. Storing up problems: the medical case for a slimmer nation. Report of a working party 2004.
[150] Power, C., Lake, J.K., Cole, T.J. Measurement and long-term health risks of child and adolescent fatness. International Journal of Obesity (1997).

development is not linear throughout a child's development. In addition, due to the different growth patterns between girls and boys, there are separate thresholds for each sex at each age. It has been challenging for experts to define a given BMI for each age category to represent the cut-off points for obesity and overweight. One such way is to define obesity relative to the complete set of measurements in the study. If obesity is defined in relation to the complete set of individuals in any given survey then it is difficult to track changes in obesity over time. A way to avoid this is to freeze the cut-offs for a particular survey year and compare all subsequent results to that measurement. Such is the case in the UK. In England, there is an annual health survey, the Health Survey for England (HSE) that measures BMI. For the measurement of childhood obesity, reference values are taken from the 1990 Survey. This covers children from age 2 – 15 (children below age 2 have only recently been included in the measurements so no corresponding reference values exist). This measure is deemed the most appropriate for national analysis as the composition of the datasets is consistent. The cut-off for overweight has been set at the 85th centile and the cut-off for obesity has been set at the 95th centile. These values are shown below. The now stylised setting of the cut-off points at the 85th and 95th centiles in England/Britain is essentially arbitrary (see Cole et al. 2000)[151], but it is employed in this benefit analysis as it has become the norm for British childhood obesity study.

	85% Reference value		95% Reference value	
Age	**Males**	**Females**	**Males**	**Females**
4	17.13	17.23	18.08	18.32
5	16.96	17.16	17.95	18.35
6	17.01	17.32	18.10	18.65
7	17.24	17.71	18.48	19.22
8	17.61	18.23	19.04	19.93
9	18.08	18.82	19.70	20.70
10	18.64	19.49	20.42	21.52
11	19.27	20.23	21.16	22.34
12	19.94	21.00	21.94	23.20
13	20.66	21.75	22.75	24.03
14	21.40	24.46	23.56	24.80
15	22.13	23.09	24.34	24.46

The table below illustrates the proportions of children by age groups 4-6, 7-10 and 11-15 who were classified as obese in the Health Survey for England, 2002[152][153]. These figures help to give a feel for the sizeable nature of the obesity issue facing the nation's children.

Age/Sex	4-6 years old	7-10 years old	11-15 years old
Obese Boys	13.2%	16.1%	18.3%
Obese Girls	11.8%	17.9%	18.3%

[151] Cole, TJ., Bellizzi, MC., Flegal, KM., and Dietz, WH. Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ* 2000;320:1240 (6 May)
[152] HSE 2002, Table 9.6. TSO.
[153] Numerical averaging across ages in each grouping has been used.

Annex 4 (Obesity Dose Response Function)

An FAO/WHO/UN publication "Human Energy Requirements"[154] sets out the determinants of energy expenditure in children and adolescents. Energy expenditure depends on a child's basal metabolic rate (BMR), physical activity level (PAL), and growth. BMR is the energy used at rest. It is partly constant and partly proportional to weight. PAL depends on the mix of activities of different intensity undertaken within a given period, the child's "physical activity ratio" (PAR), and the proportion of time spent on each. It is proportional to the BMR and in this way creates another link between body weight and energy output. In children and adolescents growth contributes approximately 1% on top of other energy requirements and can thus be neglected for most purposes.

There are lists of the PARs of different activities, e.g. in the COMA report on dietary reference values[155].

The relationship between energy output, weight and physical activity level can be expressed as follows:

$$K = (\alpha + \beta W)\, p$$

where, K – daily calorie expenditure (kcal); W – weight (kg); $(\alpha + \beta W)$ – BMR; p – PAL.

In steady state, calorie output is equal to calorie intake. Following the work of Cutler, Glaeser and Shapiro[156], to calculate the effect of calories on weight we solve for W:

$$W = \frac{K - \alpha p}{p\beta}$$

Hence the effect on body weight of a one calorie per day change in energy intake is inversely proportional to the increase in BMR per unit of weight and the level of physical activity PAL:

$$\frac{1}{p\beta}$$

Thus by obtaining reference values of the BMR and PAL's of children we are able to estimate the effects on body weight and thus BMI of changes in daily calorie intake. Given the body weight changes estimated by this dose response function we can calculate changes in children's BMI using the height information contained in the HSE.

From FAO/WHO/UN - Human Energy Requirements (2001), it is estimated that β for 10-18 year old males is:17.686; and for 10-18 year old females is:13.384. From COMA DRV Table 2.4, it is estimated that the PAL for 10-18 year old males is:1.56; and for 10-18 year old females is:1.48.

[154] ftp://ftp.fao.org/docrep/fao/007/y5686e/y5686e00.pdf

[155] Dietary reference values for food energy and nutrients in the United Kingdom. Report of the panel on dietary reference values of the Committee on Medical Aspects of Food Policy. Report on Health and Social Subjects 41. Department of Health. 1991.

[156] Cutler DM, Glaeser EL, Shapiro JM. Why have Americans become more obese? J Econ Perspectives 2003;17:93-118.

Annex 5 (Changes in Obesity)

The nature of the modelling meant that the increase or decrease in nutrient intake was proportional to the percentage of substitution envisaged. As such it is easiest to report the nutrient differences that would be achieved via 100% substitution towards healthier choices and to factor these down with assumed policy success. The table below reports the 5%, 10% and 100% substitutions and the outturn daily calorie consumptions reported in the 1997 NDNS.

Age/Sex	1997 NDNS Reported Daily Calorie Intake (Kcals)	Modelled Daily Calorie Intake Reduction By Policy Success (Kcals)		
		5%	**10%**	**100%**
11-15 Boys (n=291)	2055	12	24	239
11-15 Girls (n=292)	1673	10	21	209
7-10 Boys (n=256)	1793	10	20	201
7-10 Girls (n=226)	1601	9	17	172
4-6 Boys+Girls (n=355)	1458	7	14	137

Given these reductions in calories, we can translate these into changes in BMI and subsequently changes in obesity and overweight prevalence (using the dose response function introduced earlier and average heights of children by age group). In the tables below we will concentrate on the results pertaining to the 11-15 year old groups of boys and girls.

Age/Sex	Implied Reduction in Child BMI[157] Via The Modelled Daily Calorie Intake Reduction By Policy Success		
	5%	**10%**	**100%**
11-15 Boys	0.18	0.35	3.52
11-15 Girls	0.22	0.44	4.41

Age/Sex	Implied Reduction in 2003 HSE Child Obesity Via The Obtained BMI Reductions By Policy Success[158]		
	5%	**10%**	**100%**
11 Boys	4%	7%	70%
12 Boys	3%	6%	55%
13 Boys	3%	6%	64%

[157] For the child's BMI to reduce by the amounts cited, they must have consumed the relevant lower quantity of daily calories.

[158] Figures generated by scaling reductions linearly by percentage from 100% successful policy modelling.

14 Boys	3%	6%	57%
15 Boys	3%	6%	55%
Average Boys[159]	**3%**	**6%**	**60%**
11 Girls	5%	9%	90%
12 Girls	4%	9%	86%
13 Girls	3%	7%	67%
14 Girls	4%	8%	79%
15 Girls	3%	6%	60%
Average Girls	**4%**	**8%**	**76%**

These BMI reductions are once more linear given the assumed percentage of policy success. The table above has been created by applying the 100% successful policy BMI reduction to the proportions of 2003 HSE obese and scaling down linearly by percentage. There are two reasons why this methodology has been employed as opposed to directly mapping the smaller percentage BMI reductions onto the 2003 obesity and overweight child distributions. Firstly, the sample size by each age in the HSE is approximately 220 and those classed as obese constitute a small minority of one of the BMI distribution's tails. In such a sample, the smaller the percentage of policy success assumed the more likely that the relevant BMI reduction fails to reclassify an obese child as non-obese. In the population as a whole even very small policy success percentages would act to statistically reclassify many children.

Secondly, for the population distribution by child age as a whole the nature of BMI distributions means that there will be more children clustered on or just above the cut-off for obesity compared to those even further towards the extremities of the distribution's tails who are severely or morbidly obese. As such smaller policy success percentages will actually act to disproportionately reclassify obese children as non-obese. Although the monetisation of the costs of obesity we discuss are presented for obesity as a whole, in reality the more obese a person is the greater the likely health and economic costs of their condition compared to a person who is closer to the obesity cut-off point.

[159] As can be seen for both boys and girls within this analysis. The older the age of the children within the 11-15 year old groupings (as noted earlier, this age grouping is necessary given relatively small NDNS sample numbers), in general the lesser the proportion of obesity removed by application of a common BMI reduction number. Investigation shows this has little to do with height and calorie intake averaging within this age grouping. Instead the driver is in longer BMI upside tails as children get older. This is illustrated by (pooled) boys and girls BMI distribution standard deviations increasing from 3.4 at 11, 3.8 at 12, 3.9 at 13, 4.1 at 14, to 4.3 at 15.

Annex 6 (Nutrition)

As can be seen from the fully reported NDNS modelling results below, in addition to the already reported salt, saturated fat and NMES results, complete substitution to the modelled healthier consumption pattern would increase NSP fibre intake by approximately 1.4g per day for 4-15 year olds. The remaining small percentages of 4-6 year olds and 11-15 year old girls that had 1997 outturn Vitamin C intakes (0.2% and 0.4% respectively) below the Lower Reference Nutrient Intake (LRNI)[160] would see this cured. Also, there would be reductions in the numbers of all 11-15 year olds and 7-10 year old girls who have folate intakes below the LRNI. In addition there would be increases in child consumption of some other advantageous nutrients, e.g. protein and calcium.

General Nutrient Substitution

	1997 NDNS Reported Daily Intake[161]	100% policy success Reduction/ Increase	1997 NDNS Reported Daily Intake	100% policy success Reduction/Increase
	11-15 Boys	11-15 Boys	11-15 Girls	11-15 Girls
Salt (g)	8	-0.9	6.6	-0.9
Sat. Fat (%FE)	13.5	-1	13.6	-1.2
NMES (%FE)	16.7	-6.5	16.3	-6.2
Protein (g)	66.6	+1.8	53.2	+1.1
NSP (g)	19.1	+1.7	16.3	+1.1
Iron <LRNI %	3.2	+1.6	45.6	-1.2
Calcium <LRNI %	11.6	-2.8	20.7	-7.1
Vit. C <LRNI %	0	0	0.4	-0.4
Folate <LRNI %	0.8	-0.6	3.8	-1.3

	1997 NDNS Reported Daily Intake[162]	100% policy success Reduction/ Increase	1997 NDNS Reported Daily Intake	100% policy success Reduction/Increase
	7-10 Boys	7-10 Boys	7-10 Girls	7-10 Girls
Salt (g)	6.9	-0.9	6.3	-0.9
Sat. Fat (%FE)	13.9	-0.9	14.1	-1
NMES (%FE)	17.8	-6.8	17	-5.9

[160] The LRNI is the amount that is sufficient for only a few people in the population (2.5%) so if more than that are below the LRNI there is likely to be a risk of deficiency.
[161] Plus the constant uplift of 15% applied for salt. As it was not possible to decompose the earlier applied energy uplift by the nutrient groups presented in this table, no such uplifts are added.
[162] Plus the constant uplift of 15% applied for salt.

Protein (g)	54.8	+2.1	51.2	+1.4
NSP (g)	16.6	+1.7	15.5	+1.2
Iron <LRNI %	0.6	0	3.1	+0.6
Calcium <LRNI %	1.6	-0.8	4.6	+0.1
Vit. C <LRNI %	0	0	0	0
Folate <LRNI %	0	0	2.4	-0.8

	1997 NDNS Reported Daily Intake[163]	100% policy success Reduction/ Increase
	4-6 Boys and Girls	4-6 Boys and Girls
Salt (g)	5.8	-0.9
Sat. Fat (%FE)	14.7	-0.9
NMES (%FE)	17.2	-5.9
Protein (g)	46.8	+1.4
NSP (g)	13.7	+1.3
Iron <LRNI %	0.3	0
Calcium <LRNI %	2.5	-1.7
Vit. C <LRNI %	0.2	-0.2
Folate <LRNI %	0	0

Fruit Substitution

Having computed total daily fruit and vegetable intake (in grams) for the five age/sex combinations of young people from the 1997 NDNS. We next make the modelled dietary substitutions that increase fruit consumption amongst children. As explained this involves the substitution of confectionery and savoury snack foods with fresh fruit, e.g. an apple or banana. The vegetable intake does not change because our model did not anticipate substitution to vegetables.

Pre-substitution

Age	4-6	7-10	7-10	11-15	11-15
Sex	All	Male	Female	Male	Female
Fruit	65.2	62.2	68.6	41.6	53.3
Veg.	58.9	58.3	68.7	77.7	77.4

[163] Plus the constant uplift of 15% applied for salt.

Post-substitution (of fruit for confectionery and savoury snacks - assumed 100% success; *approximate substitution outturn of **100g***)

Age	4-6	7-10	7-10	11-15	11-15
Sex	All	Male	Female	Male	Female
Fruit	151.1	170.6	167.0	155.0	156.9

Cancer

The intake of each of fruit, fibre, Vitamin C and folate have the potential to reduce the risks of dietary related cancers as diet is thought to play a role in about one-third of all deaths from cancer. There is a potential £1.1 billion of NHS cost savings alone that may accrue from improved UK diets. The NHS estimates that the net costs to it of cancer are £3.27 billion[164].

As an example of one type of cancer, colorectal cancer is the third most common cause of cancer deaths among both males and females and can be related to fibre intake. The death rates in 2002 were 25 per 100,000 males and 15 per 100,000 females[165]. However, as explained in Annex 7, to estimate the mortality effects of fruit intake on cancer in this analysis we turn to the EPIC-Norfolk study.

In addition to the beneficial effect on cancer risk, a recent article in the *Lancet*[166] has shown that increased consumption of fruit and vegetables is associated with a reduced risk of stroke. Compared to individuals who have less than three fruit and vegetable servings per day, those with three to five servings per day have an 11% reduction in the risk of stroke and those with more than five servings per day have a reduction of 26%. An overall increase in the consumption of fruit and vegetables could also reduce other cardiovascular disease. This effect occurs, firstly, through the potassium content of fruit and vegetables. Potassium has been shown to reduce blood pressure. Since raised blood pressure is the major cause of stroke, the blood-pressure lowering effect of potassium could be one of the major mechanisms contributing to a reduced risk of stroke with an increased fruit and vegetable intake. In addition, the dietary fibre contained in fruits and vegetables may contribute to the reduction in stroke risk by lowering blood pressure and cholesterol. Finally, fruit and vegetable consumption increases plasma antioxidants, which have been shown to reduce atherosclerosis.

Dental Caries

NMES sugar is thought to be the most important dietary factor in the development of dental caries[167]. The NHS cost of children's (under 18 years old) dentistry in 2003/04 in England is broken down as follows.

Capitation payments (including the regular exam) totalled £228.7 million. Treatment fees totalled £104 million. This included exams (£20 million), photographs (£16 million), fillings,

[164] DH, NHS Reference Costs 2004
[165] ONS, Social Trends 34, 2004 edition
[166] *Lancet* 2006; 367: 320-26
[167] This said, it is also recognised that factors such as tooth brushing and fluoride are also key.

including root fillings (£45 million), extractions, including sedation costs (£12 million), treatment on referral (£8 million) and crowns and bridges (£3 million).

There are additional payments to dentists, which are the equivalent of a further 10% in fees. As well as this, children's work accounts for about £20 million of Personal Dental Services. Finally, there will be further costs for other NHS dental services for example, hospital services and community dental services (i.e. screening in schools).

Anaemia

Iron is used to produce red blood cells. A lack of iron can cause anaemia, which is common in children. As can be seen above, small decreases may result from our modelled substitutions in iron consumption for 11-15 year old boys and 7-10 year old girls. Anaemia is associated with a number of health problems; the most common of which is feeling tired, in addition there is evidence of a negative effect of anaemia on cognition. Using the national schedule of NHS reference costs, the national total cost of anaemia (for all sufferers) is £104,753,292. As with dental caries we cannot accurately estimate the effect of these reductions on NHS costs. Although we note that the reductions in iron intake are relatively small.

Annex 7 (DoH: Forecast Health Benefits)

Mortality

Salt

High blood pressure is a key risk factor for CHD and stroke. Categorising blood pressure as "high" does not, however, imply that levels below the threshold definition are benign. Observational studies indicate that the risks of blood pressure are continuous and graded[168].

Salt in the diet raises blood pressure. The INTERSALT study noted that a reduction of 3g/day could lead to an average reduction in systolic pressure of about 3.5mm Hg[169].

There is a target to reduce the population average intake of salt to 6g/day from 10g/day currently. Average systolic blood pressure would fall by 4.7mm Hg corresponding to about 3mm Hg diastolic. The effect on CHD/stroke mortality should be on some scale.

The evidence as to the effect of blood pressure on CHD and stroke is cast in the form of differences, e.g. a 5mm difference in diastolic blood pressure is associated with 34% less stroke[170]. For CHD the effect of a change in blood pressure is lower than for a prolonged difference of the same size[171][172]. Since intervention delivers change, we apply the results for changes, not differences.

Restricting food broadcast promotion to children should lead to changes in eating patterns, leading in turn to a modelled 0.9g reduction in daily salt intake. From the INTERSALT study this should lower diastolic blood pressure by 0.675 mm Hg.

We illustrate the impacts on lives saved and life years saved on the assumption that this difference persists into adult life and continues indefinitely. The impact would be to reduce CHD by 1.8% and stroke by 5.8%. Given this, the number of lives saved, assuming the reductions apply to fatal events – the trial findings relate to all events – would build up to annual totals of 1830 CHD and 3240 stroke, 5070 in all[173].

The next step is to infer the number of life years corresponding to the reduced risk of CHD and stroke. The metric illustrated below is the effect on population life expectancy at birth. The age specific death rates from CHD and stroke were reduced by 1.8% and 5.8% respectively throughout the age range. These reductions were subtracted from the

[168]MacMahon S, Peto R, Cutler J, Sorlie P, Neaton J, Abbott R, Godwin J, Dyer A, Stamler J. Blood pressure, stroke and coronary heart disease: Part 1, prolonged differences in blood pressure: prospective observational studies corrected for the regression dilution bias. Lancet 1990;335:765-74.
[169]Law MR, Frost CD, Wald NJ. By how much does dietary salt reduction lower blood pressure? Br Med J 1991;302:811-24.
[170]Formally: $R_0^1 = k^{b_0 - b_1}$

where R_0^1 is the relative risk associated with blood pressure 1 compared with blood pressure 0; *k* is a constant with a value of about 0.93 for stroke and 0.98 for CHD.
[171]Collins R, Peto R, MacMahon S, Hebert P, Fiebach NH, Eberlein KA, Godwin J, Qizilbash N, Taylor JO, Hennekens CH. Blood pressure, stroke and coronary heart disease: Part 2, short-term reductions in blood pressure: overview of randomised drug trials in their epidemiological context. Lancet 1990;335:827-838.
[172]The reason may be that the period of follow up in the trials was not long enough to allow the full effect on CHD to come through.
[173]CHD accounted for 94,000 deaths, stroke 54,000 in England in 2003.

corresponding all cause mortality rates. The gain in life expectancy was inferred from the difference in the area under survival curves. The impact on population life expectancy is about a month, 0.08 of a year, in both genders.

This gain in population life expectancy applies to the whole birth cohort of nearly 600,000 in England. The total number of life years gained annually is then about 45,000.

Saturated Fat

Serum cholesterol is a risk factor for CHD. Raised cholesterol accounts for a high proportion of CHD mortality.

If it were feasible, through whatever means, to ensure that no one had a cholesterol level above 5mmol/l, the potential reduction in CHD mortality could be around 45%[174]. The average at the date of this report was 5.5 in men, 5.6 in women.

Saturated fats in the diet influence cholesterol. A relationship has been established between changes in saturated fat and changes in cholesterol[175]. Since we are concentrating on saturated fat we implicitly hold the other variables constant. In that case a unit difference in the percentage of dietary calorie intake from saturated fatty acids leads to a 0.036 mmol/l difference in total serum cholesterol. Strictly speaking this represents the effect if carbohydrate replaces saturated fat for one percentage point of calories.

There does not appear to be any information as to the lag between a change in the intake of saturated fat and the change in cholesterol. The full effect of changes in cholesterol on CHD comes in within five years[176]. It attenuates with age. The estimates for a 0.6 mmol/l reduction in cholesterol are as follows:

Reduction in CHD for selected reductions in total cholesterol by age		
	reduction in CHD mmol/l	
	0.6	0.036
age	%	%
40-49	50	3.0
50-59	40	2.4
60-69	30	1.8
70+	20	1.2

[174]Britton A, McPherson K. Monitoring the progress of the 2010 target for coronary heart disease mortality: Estimated consequences on CHD incidence and mortality from changing prevalence of risk factors. Report to CMO. May 2000.

[175]Mensink RP, Zock PL, Kester ADM, Katan MB. Effects of dietary fatty acids and carbohydrates on the ratio of serum total to HDL cholesterol and on serum lipids and apolipoproteins: a meta-analysis of 60 controlled trials. Am J Clin Nutr 2003;77:1146-55.

[176]Law MR, Wald NJ, Thompson MG. By how much and how quickly does reduction in serum cholesterol concentration lower the risk of ischaemic heart disease? Br Med J 1994;308:367-73.

A reduction of 1% in fat intake – the modelled change from restricting food broadcast promotion to children – leads to a reduction in cholesterol of 0.036 mmol/l. In the absence of evidence as to the precise nature of the relationship between cholesterol and CHD mortality, the reduction in mortality from 0.036 mmol/l was assumed proportional to the reduction from 0.6 mmol/l (final column of table above).

The number of lives saved, assuming the reductions apply to fatal events – the trial findings relate to all events – would build up to 1300 CHD annually.

The next step is to infer the number of life years gained. The metric illustrated below is the effect on population life expectancy at birth. The age specific death rates from CHD were reduced by the age specific rates in the final column in the table above. These reductions were subtracted from the corresponding all cause mortality rates. The gain in life expectancy was inferred from the difference in the area under survival curves. The impact on population life expectancy is about twelve days for men, seven days for women, 0.033 and 0.019 of a year respectively.

This gain in population life expectancy applies to the whole birth cohort of nearly 600,000 in England. The total number of life years gained annually is then about 15,000.

Sugar

The FSA estimates that as a result of restricting broadcast food promotion to children food substitution would reduce calorie intake, leading in turn to a 60% reduction in obesity prevalence among boys 11-15, and a 76% reduction in girls in the same age group, assuming full success of the policy.

We illustrate the impact on life expectancy assuming that 70% of obese adolescents become obese adults. The prevalence of obesity in this age group is 18.3% for both boys and girls[177]. With a birth cohort of about 600,000 the numbers obese would be 55,000 boys and the same number of girls, of whom 38,400 of each sex would remain obese into adulthood. The effect of the food substitutions would then be to reduce the adult prevalence of obesity in an age cohort by 23,000 men and 29,200 women.

There are two leading sources of estimates of the life expectancy penalty attaching to obesity. One uses the Framingham longitudinal study and uncovers the life expectancy penalty of those who were obese at 40, about 7 years[178]. As the debate in the literature shows, this relates to average obesity of those obese in 1948 and whatever course their obesity subsequently takes. The other draws on NHANES and gives estimates by BMI by age by gender by ethnicity, on the assumption that the base BMI persists[179]. Loss of life expectancy increases with BMI and declines with age. A young man with BMI 35 loses three years of life, four years for 36. In both cases the comparator is ideal weight so the estimates do not strictly relate to obesity, whose natural comparator is arguably non-obesity, i.e. BMI 29.

[177] HSE 2002, Table 9.6. TSO.
[178]Peeters A, Barendregt JJ, Willekens F, Mackenbach JP, Mamun AA, Bonneux L for NEDCOM, the Netherlands Epidemiology and Demography Compression of Morbidity Research Group. Obesity in adulthood and its consequences for life expectancy: a life-table analysis. Ann Intern Med 2003;138:24-32.
[179]Fontaine KR, Redden DT, Wang C, Westfall AO, Allison DB. Life-years lost due to obesity. JAMA 2003;289:187-193.

The selection of the value for the penalty is inevitably partly a matter for judgement. A figure of 3.5 life years is illustrated here, but it is as well to bear in mind that a higher figure is possible. The gain in life years is then just over 180,000 in a birth cohort. To monetise the benefit using a value of life requires an estimate of the number of lives saved, or more realistically, deaths averted.

We approach indirectly in a series of steps. The mortality ratio which delivers a 3.5 year loss of life expectancy is 1.415 in men, 1.45 in women[180][181], or 1.62 and 1.72 respectively against a non-obese comparator. This ratio reflects the increase in all cause mortality rates in each age group which would reduce population life expectancy by 3.5 years. It requires cautious interpretation as the implicit population attributable fraction implies a number of obesity deaths twice the NAO estimate. The mortality ratio which reproduces the NAO burden is much lower: 1.23 for men, 1.20 in women. We thus illustrate both sets of ratios.

We then estimate the difference in obesity prevalence attributable to the reduced intake of sugar. We assume that the current prevalence of adult obesity arose in adulthood and that the prevalence of current childhood obesity which persists into adulthood would be additional.

Deaths averted through reduced intake of sugar			
		m	f
proportion of obese adolescents becoming obese adults		70%	70%
obesity prevalence 11-15		18.3%	18.3%
proportion of adult population obese because obese in adolescence		12.8%	12.8%
percentage reduction due to policy		60%	76%
reduction in adult prevalence due to policy Δp		7.7%	9.7%
Relative mortality risk from obesity *r*	high	1.62	1.72
	low	1.23	1.20
Proportion of deaths averted[182]	high	4.2%	6.0%
	low	1.7%	1.9%
Number of deaths averted in cohort of 600,000		12,500	18,000
		5,000	**5,500**

Fruit

The FSA statisticians' modelling estimates that daily fruit intake would increase by 100 gm. The effect on life expectancy could be on a considerable scale if (a) these differences persist through adulthood (b) the effects on cancer mortality implied by the longitudinal study EPIC-Norfolk apply[183].

[180] The comparator is the population as a whole. To rework to a non-obese comparator we use $(r - rp)/(1 - rp)$, where *r* is the ratio with a whole-population comparator, *p* is the obesity prevalence, taken as the 2003 average in adults: 22% for men and 23% for women.

[181] Restricting the excess rate to the over 20s, the starting age for the evidence on mortality from obesity.

[182] Applying the population attributable fraction – $\Delta p(r-1)/(pr+1-p)$.

[183] Khan K-T, Bingham S, Welch A, Luben R, Wareham N, Oakes S, Day N. Relation between plasma ascorbic acid and mortality in men and women in EPIC-Norfolk prospective study: a prospective population study. Lancet 2001;357:657-63.

EPIC-Norfolk results are organised by quintile of plasma ascorbic acid. The difference between neighbouring quintiles is roughly constant at 20mmol/l, corresponding in turn to 50 gm of fruit or vegetable consumption. It appears then that 100 gm increase in daily fruit consumption would promote the consumer by two quintiles in terms of cancer risk. We assume that those in the second top quintile would improve by one quintile and those in the top quintile would not change. The relative risks of cancer mortality by quintile and their share of cancer mortality are as follows:

Relative risk of cancer mortality and share of cancer mortality by quintile of plasma ascorbic acid

q	m	f	m %	f %
1	1.00	1.00	30	27
2	0.74	0.76	22	20
3	0.51	0.61	16	16
4	0.57	0.64	17	17
5	0.47	0.73	14	20
			100	100

The reduction in cancer mortality would be highest in the lowest quintile of consumption: this quintile would also account for the majority of the impact on cancer mortality:

Reduction in cancer by quintile: contribution of each quintile to overall cancer reduction

q	m %	f %	m %	f %
1	49	39	15	10
2	23	16	5	3
3	8	-	1	-
4	18	-	3	-
5	-	-	-	-
			24	14

On these assumptions cancer mortality would fall by 24% in men and 14% in women. The reductions are restricted to the age group 45 and over in line with the age range in the EPIC-Norfolk study.

The effect on population life expectancy would be on a similarly major scale, with an increase of two thirds of a year in men and half that in women. This gain in population life expectancy applies to the whole birth cohort of nearly 600,000 in England. The total number of life years gained annually is then about 290,000.

Morbidity

The number of non-fatal events should also fall with the substitute diet. We proceed by establishing a ratio: the number of morbidity QALYs lost per death from stroke, CHD and cancer.

There is evidence as to the prevalence with stroke and heart attack as well as deaths.

Heart attack and stroke: morbidity from non-fatal disease.				
	Deaths[184]	Prevalence of survivors[185]	Survivors per death	QALY penalty[186]
Stroke	50,000	920,000	18.4	0.164
Heart attack[187]	87,000	1,100,000	12.6	0.055

These QALY penalties relate strictly to first events whereas many survivors will have had two or more events. Ideally, the QALY penalty should be derived from the Health Survey for England, which has individual data on health state (measured by QALYs) and CVD experience.

The number of morbidity QALYs per death is then about 3 for stroke and 0.7 for heart attack .

The mortality gains from salt are likely to be in the proportion 45% stroke 55% CHD.

Cancer requires a different approach. The annual incidence of cancer in England is about 200,000. The five year survival, which equates to cure, is about 36%. We assume no loss of quality of life after cure.

There appears to be no estimate of the QALY penalty suffered by those within five years of diagnosis. We deal separately with those destined not to survive five years, the decedents, and the others, the survivors.

The cumulative five year mortality rate is 64%[188]. We assume that decedents' quality of life falls from 0.8 just before diagnosis to zero at death. On the assumption that quality of life declines steadily between diagnosis and death, the average QALY loss depends on the distribution of length of survival. Assuming that one fifth die each year, then the average decedent loses 1.2 QALYs between diagnosis and death. The QALY loss for each year's decedents is then about 155,000[189].

[184] http://www.statistics.gov.uk/STATBASE/ssdataset.asp?vlnk=8986
[185] National Centre for Social Research and University College London. Department of Epidemiology and Public Health, Health Survey for England, 2003 [computer file]. Colchester, Essex: UK Data Archive [distributor], March 2005. SN: 5098.
[186] Clarke PM, Gray AM, Holman R. Estimating utility values for health states of type 2 diabetic patients using the EQ-5D (UKPDS 62). Med Decis Making 2002; 22:340-349.
[187] CHD
[188] Richards MA, Stockton D, Babb P, Coleman M. How many deaths have been avoided through improvements in cancer survival. Br Med J 2000;320:895-8.
[189] 128,000 each losing on average 1.2 QALYs.

There is no guidance as to the QALY penalty suffered up to five years among those destined to survive. On no very strong basis, we use the QALY penalty attaching to a first heart attack, 0.055 QALYs a year. The average survivor then loses 0.275 QALYs. The QALY loss for each year's five year survivors is then 19,800[190].

The total QALY loss would then be 175,000 a year, about 1.38 QALYs per death, in addition to the loss of QALYs entailed by reduced life expectancy.

The benefits from reduced sugar intake are based on all cause mortality. In order to uncover the corresponding reductions in morbidity we must specify the diagnostic mix, as the different diagnoses have different ratios of events to deaths and different QALY penalties.

[190]72,000 each losing 0.275 of a QALY.

We rely on the diagnostic breakdown of obesity deaths from the Nurses' Health Study[191][192].

Diagnostic breakdown of obesity deaths	
	%
cardiovascular disease	16
cancer	57
other	27
	100

As we saw above the weighted average QALYs per CVD death is then 1.75. This compares with 1.38 for cancer. For "other" we adopt, conservatively the rate for CHD, 0.69. The QALY saving from reduced morbidity can then be expressed as 1.25 per death from obesity.

Given this and the estimated number of deaths averted explained above, the number of QALYs gained through reduced morbidity regarding sugar would then be 15,600-45,600 for the UK as a whole. The figures would also be 43,000 for fruit, 11,000 for salt and 1,000 for saturated fat.

[191]Manson JE, Willett WC, Stampfer MJ, Colditz GA, Hunter DJ, Hankinson SE, Hennekens CH, Speizer FE. Body weight and mortality among women. N Engl J Med 1995;333:677-85.
[192]Because obesity is a risk factor for breast cancer, it is likely that the diagnostic breakdown is different in men.

Annex 8 (Precautionary Principle)

The Green Book defines the Precautionary Principle as: "The concept that precautionary action can be taken to mitigate a perceived risk. Action may be justified even if the probability of that risk occurring is small, because the outcome might be very adverse."[193]

The UK Interdepartmental Liaison Group on Risk Assessment (UK-ILGRA)[194] considers that the precautionary principle should be invoked when: there is good reason to believe that harmful effects may occur to human, animal or plant health or to the environment; and, the level of scientific uncertainty about the consequences or likelihood of the risk is such that the best available scientific advice cannot assess the risk with sufficient confidence to inform decision-making.

In the case of childhood obesity, the potential harmful effects of associated life-long medical conditions are characterised by factors such as: potential irreversibility; potential severity for long periods of time (i.e. life); significant and increasing numbers of children effected; and potential knock-on effects such as UK economic productivity.

Application of the precautionary principle needs to distinguish from other drivers that can lead to required caution. For example, society's view on the extent of protection afforded to children. This is the case in applying the precautionary principle in the current analysis as it would not be being invoked to protect children per se. It is simply recognising that obesity and its associated medical conditions are increasingly afflicting the UK population at younger ages with the (potentially longer-term) medical uncertainties that this brings.

[193] The Green Book, Appraisal and Evaluation in Central Government (2003). HM Treasury. P103
[194] www.hse.gov.uk/aboutus/meetings/ilgra