

# insight

## Overconsumption and Influences on Diet

### Overview

- + Overconsumption refers to a state in which food intake exceeds individual requirements, supplying an excess of nutrients and/or energy. Overconsumption commonly leads to overweight and obesity, with over one third of the global adult population – 1.9 billion people – now found to be either overweight or obese.
- + Malnutrition relates to both deficiencies and excesses in the dietary intake of energy and/or nutrients; therefore, overconsumption can result in a form of malnutrition.
- + Overconsumption has significant impacts on the global food system; increasing individual risk of certain non-communicable diseases and deteriorating public health; costing the world economy an estimated \$2 trillion per year; and fostering an unsustainable pressure on planetary resources and the global environment.
- + While food consumption is primarily required to meet biological needs, individual consumption patterns are also influenced by a complex range of cultural, social, economic and physical factors. These factors combine to form an individual's food environment. Certain environments predispose to overconsumption and poor diet, especially where access to convenience food is high.
- + In developed countries, food poverty is often the root cause of overconsumption, many of those with limited household food budgets basing their diets on relatively cheaper energy-dense convenience foods. Overconsumption is also a growing problem for the developing world, with economic growth stimulating a "nutrition transition" towards high-calorie and processed foods
- + There is a growing need for effective interventions to prevent overconsumption, given that its continued persistence is projected to have severe consequences over the coming decades. Research suggests that large-scale national and global consumption strategies may be the most effective approach, addressing a broad range of dietary influences to simultaneously tackle multiple aspects of the food environment.
- + Many isolated interventions targeting biological, economic, physical and social drivers of overconsumption are already active, providing exemplar initiatives that could be integrated into a wider consumption strategy.

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# What is Overconsumption?

Overconsumption refers to a state in which food intake exceeds individual requirements, commonly resulting in malnutrition, overweight and obesity. Over one third of the global adult population – 1.9 billion people – are now overweight or obese<sup>1</sup>, estimated to rise to 60% of all males and 50% of all females by 2050<sup>2</sup>. In the UK, the prevalence of overweight and obesity is amongst the world's highest, making up 58%<sup>3</sup>, 60%<sup>4</sup> and 65%<sup>5</sup> of the adult population in Wales, England and Scotland respectively.

## Overconsumption and Nutrition

Foods are made up of 3 primary macronutrients - protein, carbohydrate and fat – as well as a range of micronutrients, grouped into vitamins and minerals. Each nutrient is responsible for performing a specific set of functions in the body, while macronutrients also provide energy which is measured in calories. Our exact nutrient and energy requirements are dependent on a number of factors, including individual physiology, age, genetics and physical activity levels.

Malnutrition relates to both deficiencies and excesses in the dietary intake of energy and/or nutrients<sup>6</sup>. In this way, malnutrition encompasses both undernutrition – consuming insufficient food to meet energy and nutritional needs - and overconsumption of food to supply an excess of energy and nutrients.

## Impacts of Overconsumption

The shift over the last four decades from a world with twice as many underweight people as obese people, to one in which there are now more obese people than underweight, is creating a range of new challenges for the global food system as well as public health<sup>7</sup>. The impacts of overconsumption include:

- + **Health risks**, increased incidence of overweight and obesity, associated with an increased risk of cardiovascular disease, stroke, certain cancers and type II diabetes<sup>8</sup>. Reports have suggested that an estimated 30,000 deaths per year in England<sup>9</sup>, and 5% of deaths globally<sup>10</sup>, are due to obesity and associated diet-related disease. Excessive consumption of nutrients can also have potential health impacts. For example, over-consumption of certain vitamins can increase the risk of nerve problems, kidney stones, birth defects and compromised blood clotting<sup>11</sup>; while an excess of protein can lead to increased kidney damage for those with existing kidney disease<sup>12</sup>.
- + **Economic loss** to the world economy of an estimated \$2 trillion per year (2.8% global GDP) due to disease and death related to overconsumption and obesity. In the UK, diet related chronic disease accounts for £6.1 billion of annual NHS spend and generates an economic loss of more than \$70 billion per year (3% GDP)<sup>10</sup>.

- + **Environmental impacts** associated with food production, with inflated demand caused by overconsumption creating additional burden on planetary resources and adding to greenhouse gas emissions - the agri-food system now responsible for about 30% of total global anthropogenic emissions<sup>13</sup>. The global overconsumption of protein is of particular concern, average per capita consumption 36% higher than recommended, with animal-based sources producing a disproportionate amount of greenhouse gas<sup>14</sup>. It has been estimated that if the average UK diet was moderated to align with WHO nutritional recommendations, national greenhouse gas emissions would decrease by 17%<sup>15</sup>. Food-related emission reductions of this kind are necessary if we are to meet Paris climate change targets by 2050<sup>13</sup>.

## How should we Eatwell?

The UK Government currently provides recommendations on eating a healthy and balanced diet through the Eatwell Guide<sup>16</sup>, suggesting a varied diet based on starchy carbohydrates, including plenty of fruits and vegetables, but low in fat, salt and sugar. However, analysis of UK diets against the Eatwell Plate, the model before refresh in 2016, show that these guidelines are not well followed – on average, consumers are eating around 30% fewer fruits and vegetables and 25% less starchy carbohydrate than recommended, but nearly double the recommended amounts of protein and food high in fat and sugar<sup>17</sup>.

While eating a large amount of fruit and vegetables is unlikely to be damaging to health<sup>18</sup> - assuming calorific requirements are not exceeded - overconsumption of other types of food and drink can be harmful. For example, overconsumption of processed meat, sugar, salt and fat - especially saturated and trans fats - have been associated to increased risk of a number of serious health conditions, including overweight and obesity, type 2 diabetes, cardiovascular disease, stroke, kidney disease, liver cirrhosis, certain cancers and dementia<sup>19, 20, 21</sup>.

New thinking is promoting a 'less-but-better' approach to nutrition, encouraging consumers to embrace a diverse but moderate diet, including a variety of foods that promote health while also considering their environmental footprint<sup>22</sup>.

## Overconsumption in the Developing world

Far from being an exclusive issue for developed countries, overconsumption is proving to be a growing problem in every global region<sup>7, 23</sup>. In the developing world, the number affected by overweight and obesity more than tripled, from 250 million to 904 million, between 1980 and 2008<sup>24</sup>.

Economic growth in many developing countries has been associated with significant changes to lifestyles and average diets. As incomes rise and urbanisation spreads, access to both indigenous and imported foods improves, seeing consumption of more traditional cereals and tubers decrease, while consumption of fruits and vegetables as well as processed foods high in meat, calories, fat and sugar increases<sup>25</sup>. This "nutrition transition", alongside increasingly sedentary lifestyles, has led to rising incidence of overconsumption, overweight and obesity; this pattern predominantly seen among urban populations and more affluent groups<sup>26</sup>.

As a result, many developing countries are facing the "double burden" of disease – attempting to tackle continued prevalence of infectious disease and under-nutrition alongside mounting cases of overweight, obesity and other diet-related non-communicable diseases<sup>27</sup>. To compound this issue, it is expected that as developing economies grow and trade liberalises to ease the import of cheaper processed foods, overconsumption will increasingly shift into poorer communities, paralleling the pattern seen in developed countries. This will put further strain on health care systems, requiring significant adjustments to public health priorities.

## Influences on Consumption

Though food consumption is primarily required to meet our physiological needs for nutrients and energy, the wider influences guiding our diets are actually highly complex; a range of social, cultural, psychological, economic and environmental factors working alongside biological cues to control our consumption patterns. Influences on diets can be grouped according to the following factors<sup>24</sup>:

- + **Biological factors**, such as the need for energy and nutrients to allow our bodies to grow and function. Exact requirements vary by individual, dependent on factors such as age, sex, and physical activity levels. Appetite guides the amount we consume via a physiological system linking the brain and gut<sup>28</sup>; hormones released from both the gut and the body's fat deposits indicating available energy levels to the brain, which in response triggers the feeling of either hunger or satiety. Microorganisms living inside the gut – known as the gut microbiome – are also thought to communicate via this gut-brain axis, stimulating consumption of foods that promote their own growth<sup>29</sup>. However, these pathways can be overridden by psychological responses; the consumption of foods and drinks we enjoy – commonly those high in sugar, fat, salt and calories – shown to activate the pleasure centres of the brain by stimulating increased dopamine production. The resulting rewarding effect can encourage emotional or comfort eating, this kind of consumption acting to improve low mood but increasing the risk of overconsuming calories<sup>30</sup>. Genetics also plays a part, with certain genes found to be associated to increased risk of overconsumption; for example, by acting to inhibit the feeling of fullness<sup>31</sup>. Furthermore, individual gene expression can be influenced by the mother's diet, poorer diets increasing any offspring's susceptibility to overconsumption and obesity<sup>32</sup>.
- + **Economic access to food** is affected by food price and individual disposable income, dictating the amount, type and quality of food available to different people. Relative affordability of foods can be measured by the share of household budget spent, the average household in the UK allocating 11.1% of their disposable income to food<sup>33</sup>. Socio-economic status has significant influence over dietary composition, with lower income groups linked to lower fruit and vegetable consumption as well as higher consumption of red meat, processed meat and sugar. However, overconsumption and unbalanced diets can be seen across all income groups, with no differences observed between socio-economic groups in terms of saturated fat consumption<sup>34</sup>.





- + **Physical access to food** in terms of locality to and ability to reach different types of food shops and restaurants offering different selections of foods. For example, high exposure to fast food outlets has been linked to higher consumption of takeaway food and greater risk of obesity<sup>35</sup>. Food deserts can be described as areas with poor access to affordable healthy food, and are often considered responsible for obstructing healthy diets and propagating health inequalities<sup>36</sup>.
- + **Food preferences and habits**, affected by tastes, upbringing, culture, religion and personal beliefs about certain types of foods. While such preferences operate at the individual level, they are learned through exposure to external determinants; for example, the food habits we learn from our families in early life have been shown to last into adulthood<sup>37</sup>.
- + **Modern social and cultural norms** have resulted in more irregular working hours and fewer dedicated homemakers, encouraging wider consumption of convenience foods and higher incidence of eating meals and snacks outside the home.
- + **Food information and education**, whether from governments, schools, or food businesses, is now readily available through a variety of sources, providing a spectrum of information from broad dietary advice down to specific nutritional content of foods. However, over 50% of UK consumers report finding such nutritional information hard to understand<sup>38</sup>, while some studies show that nutritional knowledge does not necessarily translate into behaviour<sup>39</sup>, suggesting that food and nutrition education alone is inadequate to help consumers make healthy dietary choices.
- + **Food advertising** reaches us through a variety of media, providing significant promotion for branded products, shops and restaurants. Statistics from the Department of Health show that the commercial sector spent £838 million on promotion of confectionery, snacks, fast food and sugary

drinks in 2007<sup>40</sup>; this kind of advertising has been linked to increased consumption of foods high in fat, salt and sugar, especially in children<sup>41</sup>.

- + **Globalisation** changes the domestic availability and price of certain foods, influencing consumption patterns. For example: greater foreign investment in food business and infrastructure can increase local food production and availability; the global spread of food media can familiarise foreign cuisines and influence preferences; and liberalised trade offers wider import options, allowing countries to import foods more cheaply as well as import novel foods.
- + **Government policy** through, for example, dietary advice, information provision, food regulation, taxes or subsidies can impact national diets.

## Food Environments

Food environments can be defined as the collective physical, socio-economic and sociocultural context in which consumers make dietary choices<sup>42</sup>. Deep-rooted in wider societal structure, these factors are commonly out of the direct control of the consumer, but combine to create the most powerful influence on consumption<sup>2</sup>. Therefore, any successful intervention to moderate consumption will need to transform local food environments.

An individual consumer's food environment relates to the collective influences of:

- + Local food infrastructure, including food shops, restaurants, fast food outlets, and facilities at schools or workplaces. This also encompasses the way food is displayed and marketed within shops, including placement of certain foods nearer to checkouts, price offers and bulk buying deals, portion sizes, or the available range in size of individual food packs.
- + Access to public or private transport methods, affecting ease of access to a wider variety of food outlets as well as flexibility in shopping and eating patterns.
- + Purchasing power of individual consumers, based on the portion of their disposable income available to spend on food and the relative price of different foods.
- + Socially accepted consumption norms, dictated by upbringing, local food culture and diets of peers.

**Obesogenic food environments** are those that increase the likelihood of overconsumption, leading to greater incidence of overweight and obesity. In developed countries, a range of studies have suggested that areas with poorer access to supermarkets, greater access to takeaway outlets and convenience stores, and lower socio-economic status are more likely to be obesogenic environments<sup>43</sup>.



# Overconsumption and Food Poverty

With food bank usage in the UK at record levels<sup>44</sup>, food poverty - described as the inability of individuals or households to obtain an adequate and nutritious diet, often because they cannot afford or easily access healthy food<sup>45</sup> - is clearly a serious issue faced by many within the poorest groups of society.

Food price inflation since 2010 means that while people are spending more on food, they are actually eating less well, with the poorest households cutting back by 20% on fruit and 12% on vegetables<sup>46</sup>. In addition, studies have shown an inverse relationship between energy density of foods and cost, meaning high calorie foods - commonly also high in sugar, fat and salt - often present the lowest-cost and therefore most attractive option to the consumer<sup>47</sup>. Such price disparities lead many facing food poverty to base their diets on these relatively cheaper energy-dense foods, commonly processed and supplying little nutritional value<sup>48</sup>, but offering a filling and affordable meal. Food poverty can therefore be associated with overconsumption of calories, as diets based on such energy-dense foods quickly supply consumers with greater than the recommended calorie intake from a relatively small amounts consumed.

This kind of consumption has led to a disproportionately greater incidence of overweight and obesity in the most deprived groups within society<sup>2</sup>; the effect is most pronounced in children, with data from 11 year olds showing 25% of children in the most deprived areas to be obese, compared with just 11.5% of children in the least deprived areas<sup>49</sup>.

While overconsumption of calories and low-quality diets are by no means exclusive to lower income groups or those experiencing food poverty, the economic and access restrictions faced by many of the poorest in society give them little opportunity to improve their dietary quality. This further propagates both health and social inequalities between socio-economic groups.



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# Taking a preventative approach

There is clearly a growing need for effective interventions to prevent overconsumption, its continued persistence projected to have severe consequences on public health, global economies and the environment over the coming decades. However, the root causes behind overconsumption are highly complex while also being pervasive through society and the food system, suggesting that equally complex systemic interventions will be required to address them effectively. There is growing support for the idea that isolated initiatives are not the answer, instead pointing to the need for a larger-scale consumption strategy that addresses a more comprehensive range of dietary influences at multiple levels and including multiple stakeholders<sup>50</sup>.

## Policy Interventions

Policy interventions will be key in addressing the root causes of overconsumption, having significant scope to shape many of the major influences on diets presented by local food environments. However, there is no one-size-fits-all approach to dietary policy, with international governments already applying a range of different physical environment, economic and social methods, including: information provision and education; price incentives to change the cost of foods; income measures to make foods more affordable; guidance for food manufacturers to reform the nutrient profiles of products; and regulations on food production, processing, advertising and retailing<sup>26</sup>. However, while a number of dietary policy frameworks already exist, implementation of policy to stimulate healthy consumption and diet faces a great many challenges, including:

- + **The need for a whole-system approach**, creating policy to simultaneously address the full range of biological, physical, economic, social and cultural causes of overconsumption<sup>50</sup>. For example, overconsumption and unhealthy diets are unlikely to be transformed by isolated public education campaigns without any simultaneous change to the obesogenic environment in which dietary choices are made. This type of integrated approach is by no means straightforward, requiring a high level of coordination to bring about change at all levels of society.
- + **Introducing policy to reach all stakeholders in the food system**, encouraging cohesive and consistent multi-sector, multi-agency action. Effective strategy to promote healthy consumption will involve the coordinated effort of the private sector, civil society, health professionals, as well as individual consumers, guided and supported by robust policy governance from across national governments and international agencies<sup>51</sup>.
- + **Potential negative economic outcomes of policy that promotes moderate consumption and healthier diets**, either through influence on consumer purchasing or via direct regulation on the food industry. There may be concern from the food sector that policies to decrease consumption, especially of processed foods, could impact not just their revenues, but also the UK economy more widely. There is a

need to develop the industry landscape such that the food sector can both support public health policy and continue to flourish economically.

- + **Successfully creating dialogue with consumers to raise awareness, encourage feedback and gain support for any comprehensive consumption strategy**. There exists a major tension between those that see diet as a matter of personal freedom, and those who believe stricter controls and regulations are appropriate to guide consumption. This results in conflicting opinion as to whether voluntary or mandatory measures are the best approaches for dietary policy, and concern for the potential unpopularity of stricter policies amongst consumers. Recent public engagement exercises have suggested that the public expect Government to alert them to and act upon issues of critical importance such as overconsumption, and that while dietary interventions of any kind will likely meet with initial resistance, consistent public engagement and dialogue will support their uptake and acceptance in the medium term<sup>52</sup>.
- + **Overconsumption is a long-term challenge that will take significant time to address**, meaning the desired outcomes may not be apparent for some time after implementation. This kind of long-term issue is often difficult to address in a policy setting, where regular metrics and feedback are required to assess impacts, shape action and justify continued intervention.
- + **There are currently limited studies evaluating the effects of different policy approaches on consumption**<sup>53</sup>. Without systematic and comparable evaluations of different policy interventions, it is difficult for policymakers to weigh up the strengths and risks of each approach to form a cost-effective and evidence-based strategy to tackle overconsumption. This is compounded by under-reporting of national calorie consumption<sup>54</sup> and insufficient measures of household food insecurity<sup>55</sup>, making the true scale of overconsumption difficult to identify, and the root causes difficult to address directly.

# What are the intervention points to reduce overconsumption?

Overconsumption is an issue which has seemingly become ingrained within the global food system. The most effective consumption interventions will therefore be those that tackle this issue at a systemic level, simultaneously targeting multiple causes of overconsumption. Many isolated interventions spanning biological, economic, physical environment and social drivers have already been employed, providing examples that could be integrated into a wider consumption strategy. Exemplar interventions include:

## Technological Interventions

New technologies in both the health and food sectors have been seen to play an important role in moderating consumption patterns. While new medical therapies can be used to reduce the amount we can physically consume, or interact with our bodies to regulate appetite or digestion, reformulation of processed foods can directly alter the balance of different nutrients in products, assisting consumers in aligning their nutrient consumption more closely to recommendations<sup>56</sup>. Though often challenging to develop therapies that also support good nutritional health, or alter food products while also maintaining their quality, taste and safety, such technologies are particularly beneficial in reducing health inequalities; disadvantaged groups benefit proportionately more from these accessible interventions for nutritional health<sup>57, 58</sup>.

### Reformulation to reduce salt

In the UK a great deal of reformulation has been pledged under the Responsibility Deal - a voluntary scheme introduced by the previous coalition Government, engaging more than three quarters of UK supermarkets, food manufacturers, caterers and food outlets to adapt their products to cut calories or meet nutrient targets<sup>59</sup>. Over the last 10 years, product reformulation to reduce salt intake has been especially successful. Between 2005 and 2011 there was a 5.1% reduction in salt content of the average UK grocery shop, with this decrease considered to be entirely due to product reformulation by the food industry<sup>60</sup>. With average daily salt intake at 8 grams<sup>61</sup>, there is still some work to do to reach the recommended 6 gram daily limit; however, progress so far is thought to have saved around 6000 lives each year and made the UK world leading in salt reduction<sup>62</sup>. It is anticipated that this work will continue and will inspire similar efforts for reductions of other nutrients.



### Appetite Suppressing Hormone Injections

Hormone signalling between the brain, gut and fat reserves is responsible for generating appetite – the relative levels of a number of different gastrointestinal hormones either triggering the feeling of hunger or satiety depending on whether more energy is needed by the body. Studies conducted by Imperial College London have used three of these hormones as a therapeutic target, altering their relative levels via hormone injections to induce the feeling of fullness<sup>63</sup>. These injections have shown promising results in preliminary human trials, successfully reducing food intake by up to a third in some individuals. While these injections are currently administered on a meal-by-meal basis, researchers hope to develop them to last for longer periods so as to offer a more viable therapy to limit consumption and support weight loss.

### Alginate Bread<sup>64</sup>

More recently, development of novel 'smart foods' that can interact with our digestive system to have greater impact on nutrition, consumption patterns or general health have shown promise. Research from the University of Nottingham has demonstrated that alginates, molecules occurring naturally in seaweed, can prevent the body from digesting fat. This mechanism works by decreasing the amount of active pancreatic lipase, a key enzyme in the fat digestion process, available in the gut. This lower amount of enzyme means less of the fat consumed can be broken down during digestion, resulting in fewer fat molecules being made available for absorption by the gut. As part of this research, bread containing alginate was developed, with consumption tests of this bread in humans shown to be effective in reducing fat digestion while having no side effects.



## Economic Interventions

Food taxes and food subsidies, as well as any similar shift in market dynamics, have significant scope to modify purchasing, and therefore consumption, via changes to the economic context in which dietary choices are made. When applied in an appropriate configuration, such interventions have the potential to influence consumers away from over-buying and overconsuming energy-dense or unhealthy products, while also stimulating consumption of nutrient-rich foods. One of the most well-known and longstanding economic interventions is the US Supplemental Nutrition Assistance Program (SNAP), previously known as the Food Stamp Program. SNAP benefits can be used to buy any type of food at authorised food retailers, supplementing household food budgets in an effort to protect against food insecurity<sup>65</sup>.



Image Nicholas Liby, Flickr

### Mexican Soda Tax

With the largest per capita intake of soft drinks in the world, in 2014 Mexico introduced a tax on soda in an effort to curb sugar consumption and associated obesity<sup>66</sup>. Prices of soda are now levied by £0.04 per litre and sales of taxed beverages have been seen to drop by up to 12%, with the highest reductions seen in households with lower socioeconomic status. However, it is currently too early in the programme to assess how much of an impact this decrease has had on calorie intake and obesity rates. Concerns have been raised about the efficacy of such taxes, some suggesting that the 'hedonic' properties of sugar prompt consumers to simply switch to alternative high-sugar and high-calorie items that are untaxed, or simply continue to buy taxed products at the expense of healthier foods<sup>67</sup>.

### Food Subsidies in South Africa

Many have suggested that a subsidy on healthy foods may be an effective method of lowering calorie consumption by encouraging increased purchasing of fruits and vegetables or low calorie products at the expense of energy-dense and unhealthy foods. This kind of subsidy was tested as part of the South African Healthy Food program, in which cash-back of up to 25% was given on healthy food purchases in over 400 supermarkets across South Africa<sup>68</sup>. Monthly food purchases of 170,000 households were assessed between 2009 and 2012, demonstrating that rebates of 10% to 25% were successful in increasing the proportion spent on fruits, vegetables and other healthy foods, while simultaneously decreasing the proportion spent on healthier foods high in fat, sugar, salt, or refined starch.

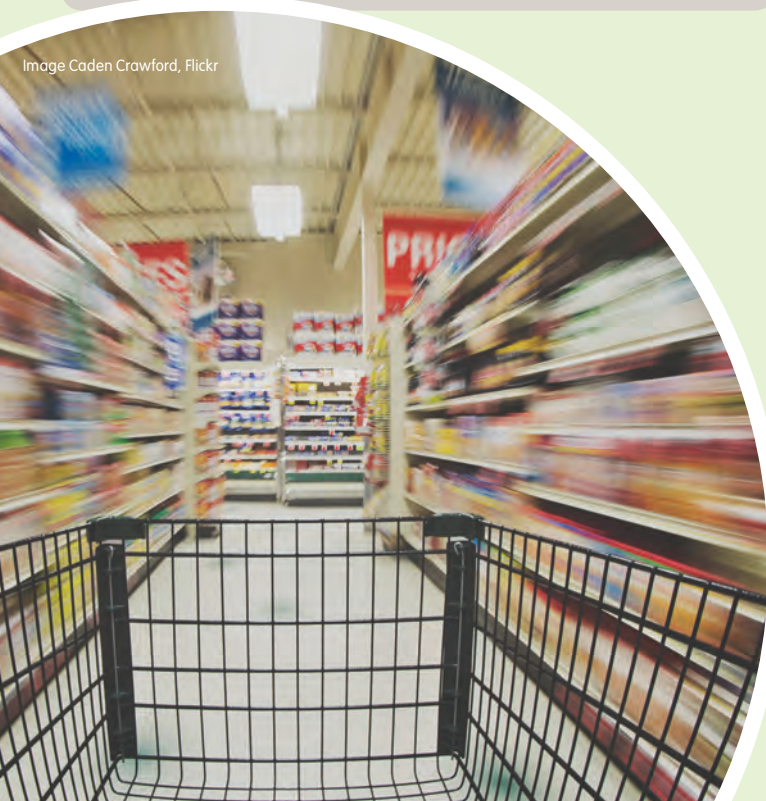


Image Caden Crawford, Flickr

### Healthy Start<sup>69</sup>

Healthy Start is a UK Government initiative supplying food vouchers to pregnant women and families with children under 4 years old. The programme aims to support the ability of low income families to afford a nutritious diet, both for their children and for mothers during pregnancy. Vouchers can only be used on a subset of foods, including milk, fresh or frozen fruit and vegetables or infant formula, while vitamin coupons for both mothers and children are also available. Evaluation has shown that the economic incentive presented as part of this scheme has been successful, spending on fruits and vegetables of those in the target group increasing by 15 per cent, or roughly two-thirds of a portion per household per day.



## Physical Environment Interventions

Physical exposure of consumers to different types of foods has great bearing on dietary choices and consumption. While this is in part down to locality and accessibility of shops and restaurants offering different selections of foods, physical exposure is also determined by placement of foods on the shop floor, as well as awareness of certain types of foods or brands via advertising and endorsement. Changes to the local physical environment by either opening up or limiting available choice can alter this exposure, providing significant scope to influence consumption patterns.

### Food Box Schemes

An increasing number of food box schemes are now available on the market – offering consumers an easy way to get fresh produce delivered straight to their door. While some of these schemes simply provide a subset of foods, such as fruit and vegetables, many now provide all the ingredients in the correct portions necessary to make a family meal, also detailing preparation instructions. This not only facilitates consumption of appropriate amounts, but can also support healthy eating via recipes rich in protective foods.

In Derbyshire, the Eudaimonia programme is looking to use the food box model to tackle local food poverty, aiming to offer a more sustainable alternative to food banks by introducing an affordable food box scheme that is available to people on low incomes. Primarily made up of surplus food donated by the food industry, the boxes supply components for a nutritious and diverse diet at an affordable price. This project will run alongside their already successful 'Superkitchen' programme, providing food and resources for local groups to set up their own community kitchen to facilitate access to affordable and nutritious meals<sup>70</sup>.

### Yeovil Healthy Food Project<sup>71</sup>

Led by the South Somerset District Council, this project brought together local producers and shopkeepers with practical delivery methods designed to meet the needs of the local community and facilitate access to healthy foods. The project set up a food distribution centre to supply food co-ops, local shops and school tuck shops with fruit and vegetables, while also supporting the development of community-led growing projects to reconnect local people with their food. The project has led to a number of health benefits, including increased fruit and vegetable consumption and reduced social isolation.

### Fast Food Outlets Planning Regulations

While the National Planning Policy Framework stipulates that local planning authorities are responsible for "promoting healthy communities", there are no overarching formal restrictions put upon placement of fast food outlets<sup>72</sup>. As a result it is not uncommon to see high densities of take away and fast food outlets, especially in deprived areas<sup>73</sup>, with many shops in close proximity to schools and neighbourhood centres. A number of local authorities have implemented policy to restrict fast food outlet placement, for example: St Helen's Council in Liverpool has introduced a 400m fast food exclusion zone around any primary or secondary school and sixth form college; and Birmingham City Council have restricted hot food take-away outlets to no more than 10% of the total units in any individual shopping centre or parade. It is hoped that this physical change to the local food environment will decrease fast food consumption and improve health, especially in school children.



Image Jessica Spengler, Flickr



## Social and Cultural Interventions

While global food cultures have changed significantly over time, they continue to have great sway over dietary composition and consumption patterns – the eating behaviours learnt during upbringing being especially engrained and commonly carried forward into adulthood. However, interventions targeting socio-cultural elements of diet are commonly grounded in advice, guidance, and encouragement, their efficacy relying on individuals being both able and motivated to engage with and act on the advice provided. Studies suggest that such ‘lighter-touch’ interventions are typically less effective than tougher measures that directly change the context in which consumers behave and make dietary choices<sup>74</sup>; but nevertheless, socio-cultural approaches still have scope to significantly influence consumption if designed shrewdly, delivered well and communicated strongly.

### **‘It’s healthier to eat like Mexicans’ Campaign**

With 1 in 3 adults now obese, Mexico has one of the highest rates of obesity in the world<sup>75</sup>. In an effort to tackle the issue, the Alliance for Food Health – a group of civil associations, social organizations and healthcare professionals – launched the ‘It’s healthier to eat like Mexicans’ campaign. This movement is founded on the idea that the traditional Mesoamerican diet, based on fruit, vegetables and grains, offers a healthier alternative to the typical modern Mexican diet<sup>76</sup>. It is hoped that this attitude will be embraced by locals, encouraging healthier diets and moderate consumption via appeal to cultural tradition, supporting a reduction to obesity levels in the Mexican population.

### **Community Shop**

Community Shop is a social enterprise run by Company Shop – the UK’s largest redistributor of surplus food – that sells surplus food at prices 70% cheaper than usual within deprived communities<sup>77</sup>. One of the primary aims of this programme is to empower individuals and families facing food poverty, improving their access to nutritionally-rich food to support health and relieve burden on household budgets, as well as offering training to support professional development. In order to provide access to a good range of high-quality and nutritious food, especially fruits and vegetables with a short shelf life, each store works to establish relationships with local suppliers, creating a community of farmers, urban growers and delivery companies to support their work.

Image Nestlé, Flickr



### **Change4Life<sup>78</sup>**

Change4Life is a social marketing scheme, working as part of the ‘Healthy Weight, Healthy Lives’ cross-governmental strategy for England. The ambition of the scheme is to create a social movement, recognising obesity as a societal problem, and as such looking to coordinate efforts across society to create an environment that encourages healthy diets and lifestyles, especially in children. Change4Life operates through a variety of tools and techniques inspired by commercial sector marketing, these include: a communications and advertising campaign; a variety of consumer resources – including handbooks, wall charts, web content and smart phone apps – to help individuals change behaviours; and signposting of relevant public services related to healthy eating and physical exercise. Since its launch in 2009, Change4Life has attracted 4 million members as well as becoming a widely recognised brand. Evaluation of the scheme thus far shows that while sustained behaviour change is often a struggle in the face of an adverse environment, there is some evidence that change inspired by the Change4Life scheme has become normalised for a cross-section of members. Using this evaluation the scheme has more recently focused resources on the most effective initiatives, strengthening online engagement and introducing financial incentives while also expanding its target audience.





## References

- WHO. Fact Sheet 311: Obesity and overweight. (2015).
- Government Office for Science. Tackling obesities: future choices—project report. (2007).
- Welsh Government. Welsh Health Survey 2014: Initial headline results. (2015).
- OECD. Obesity and the Economics of Prevention: Fit not Fat. (2014).
- The Scottish Government. The Scottish Health Survey, 2014 edition. (2015).
- WHO. Child Growth Standards, [http://www.who.int/childgrowth/4\\_double\\_burden.pdf](http://www.who.int/childgrowth/4_double_burden.pdf) (2016).
- Ezzati, M. et al. *Lancet* 387, 1377-1396, doi:10.1016/S0140-6736(16)30054-X (2016).
- Tanumihardjo, S. A. et al. *J Am Diet Assoc.* 107, 1966-1972, doi:10.1016/j.jada.2007.08.007 (2007).
- National Audit office. Tackling Obesity in England. (2001).
- McKinsey Global Institute. Overcoming Obesity: An initial economic analysis. (2014).
- Medscape. Vitamin Toxicity. Online: <http://emedicine.medscape.com/article/819426-overview> (2016).
- Martin, W. F. et al. *Nutrition & Metabolism* 2, doi: 10.1186/1743-7075-2-25. (2005).
- Bajzelj, B. et al. *Environ. Sci. Technol* 47, 8062–8069, doi: 10.1021/es400399. (2013).
- World Resources Institute. Shifting Diets for a Sustainable Food Future. (2016).
- Milner, J. et al. *BMJ Open* 5, doi:10.1136/bmjopen-2014-007364. (2015).
- Public Health England, Welsh Government, Food Standards Scotland & Food Standards Agency in Northern Ireland. Eatwell Guide. (2016).
- Macdiarmid, J. et al. *Livewell: a balance of healthy and sustainable food choices.* (2011).
- Oyebode, O. et al. *J Epidemiol Community Health.* doi:10.1136/jech-2013-203500 (2014).
- NHS. Fat: the facts, <http://www.nhs.uk/Livewell/Goodfood/Pages/Fat.aspx>. (2016).
- Schmidt, L.A. *JAMA Intern Med* 174, 525-526, doi:10.1001/jamainternmed.2013.12991. (2014).
- World Action on Salt & Health. Salt and your health factsheets, <http://www.worldactiononsalt.com/salthealth/factsheets/index.html> (2016).
- FAO & FCRN. Plates, pyramids, planet. (2016).
- Finucane, M. M. et al. *Lancet* 377, 557–67, doi:10.1016/S0140-6736(10)62037-5. (2011).
- ODI. Future diets: Implications for agriculture and food prices. (2014).
- Popkin B. M. *Nutrition Reviews* 62, 140-143, doi:10.1111/j.1753-4887.2004.tb00084.x. (2004).
- Swinburn, B. A. et al. *Lancet* 378, 804–14, doi:10.1016/S0140-6736(11)60813-1. (2011).
- EASO. Obesity Facts & Figures, <http://easo.org/education-portal/obesity-facts-figures/> (2016).
- Wagner, G.C. et al. *Food Technology* 67(3). (2013).
- Alcock, J. et al. *Bioessays* 36, 940–949, doi: 10.1002/bies.201400071. (2014).
- Singh, M. *Front Psychol.* 5, 925, doi: 10.3389/fpsyg.2014.00925. (2014).
- Hetherington, M.M. & Cecil, J.E. *Forum Nutr.* 63, 195-203, doi: 10.1159/000264407. (2010).
- Drummond, E. & Gibney, E.R. *Curr Opin Clin Nutr Metab Care* 16, 392-7, doi: 10.1097/MCO.0b013e3283620f45. (2013).
- Defra. Food Statistics Pocketbook 2015. (2016).
- Maguire, E. R. & Monsivais, P. *British Journal of Nutrition* 113, 181–189, doi: 10.1017/S0007114514002621 (2015).
- Burgoin, T. et al. *BMJ* 348, g1464, doi:10.1136/bmj.g1464 (2014).
- Cummins, S. *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society*, 562–564, doi:10.1002/9781118410868.wbehibs450. (2014).
- Campbell, K. & Crawford, D. *Aust J Nutr Diet* 58, 19-25. (2001).
- Chartered Institute of Marketing. Responsible Food Labelling – consumer perceptions and what markers need to know as a result. (2014).
- Worsley, A. *Asia Pacific J Clin Nutr* 11, S579–S585, doi:10.1046/j.1440-6047.11.supp3.7.x (2002).
- British heart Foundation. Unhealthy food and drink marketing and children. (2014).
- WHO. Marketing of foods high in fat, salt and sugar to children. (2013).
- Lake, A. & Townshend, T. *J RSH* 126, 262-267, doi:10.1177/1466424006070487. (2006).
- Giskes, K. et al. *Obesity Reviews* 12, 95–106, doi:10.1111/j.1467-789X.2010.00769.x. (2011).
- Trussell Trust, Latest Stats, <https://www.trusselltrust.org/news-and-blog/latest-stats/> (2016).
- The Food Standards Agency in Northern Ireland. Food poverty. Online: <https://www.food.gov.uk/northern-ireland/nutrition/nutritionhomeless> (2016).
- The Centre for Economics and Business Research. Hard to Swallow: The Facts about Food Poverty. (2013)
- Drewnowski, A. & Specter, S.E. *Am J Clin Nutr* 79, 6-16 (2004).
- The Fabian Commission on Food and Poverty. Hungry for Change. (2015).
- House of Commons Library. Briefing Paper 3336: Obesity Statistics. (2016).
- Lang, T. & Rayner, G. *Obesity Reviews* 8, 165–181, doi:10.1111/j.1467-789X.2007.00338.x. (2007).
- Gortmaker, S.L. et al. *Lancet* 378, 838–47, doi:10.1016/S0140-6736(11)60815-5. (2011).
- Chatham House Report. Changing Climate, Changing Diets: Pathways to Lower Meat Consumption. (2015).
- Capacci, S. et al. *Nutrition reviews* 70, 188–200, doi:10.1111/j.1753-4887.2011.00442.x. (2012).
- The Behavioural Insights Team. Counting Calories: How under-reporting can explain the apparent fall in calorie intake. (2016).
- UK Food Poverty Alliance. Time to count the hungry: The case for a standard measure of household food insecurity in the UK. (2016).
- Van Raaij, J. et al. *Public Health Nutrition* 12, 325–330, doi:10.1017/S1368980008003376. (2008).
- Choudhury, S.M. et al. *Curr Opin Endocrinol Diabetes Obes* 23, 18–22, doi:10.1097/MED.0000000000000216. (2016).
- National Heart Foundation of Australia. Effectiveness of food reformulation as a strategy to improve population health. (2012).
- Department of Health. Calories to be capped and cut, <https://www.gov.uk/government/news/calories-to-be-capped-and-cut>. (2012).
- Institute for Fiscal Studies. The importance of product reformulation versus consumer choice in improving diet quality. (2014).
- Public Health England. National Diet and Nutrition Survey: assessment of dietary sodium. (2016).
- Department of Health. Salt reduction – onwards and downwards! <https://responsibilitydeal.dh.gov.uk/salt-reduction-onwards-and-downwards/> (2015).
- BBC. Horizon. Online: <http://www.bbc.co.uk/programmes/b07fys2y>. (2016).
- Hanley, B. *Nutrition Bulletin* 40, 130-133, doi:10.1111/mbu.12142. (2015).
- USDA. Building a Healthy America: A Profile of the Supplemental Nutrition Assistance Program. (2012).
- Colchero, M.A. et al. *BMJ* 352, doi:10.1136/bmj.h6704. (2016).
- Food research Collaboration. Health-related taxes on foods and beverages. (2015).
- Sturm, R. *Am J Prev Med.* 44, 567–572, doi:10.1016/j.amepre.2013.02.011 (2013).
- Griffith, J. et al. Getting a healthy start? Nudge versus economic incentives. CMPO Working Paper Series No. 14/328. (2014)
- Derbyshire County Council. Two new super kitchens set to open. Online: [https://www.derbyshire.gov.uk/council/news\\_events/news-updates/2016/april/news\\_items/two\\_new\\_super\\_kitchens\\_set\\_to\\_open.asp](https://www.derbyshire.gov.uk/council/news_events/news-updates/2016/april/news_items/two_new_super_kitchens_set_to_open.asp). (2016)
- National Heart Forum. Nutrition & Food Poverty. Section E: Choosing interventions to reduce food poverty. (2004).
- Public Health England. Obesity and the environment: regulating the growth of fast food outlets. (2014).
- Maguire, E.R. et al. *Health & Place* 33, 142-147, doi:10.1016/j.healthplace.2015.02.012 (2015).
- Adams, J et al. *PLoS Med* 13, e1001990, doi:10.1371/journal.pmed.1001990 (2016).
- OECD. Obesity Update. Online: <http://www.oecd.org/health/Obesity-Update-2014.pdf>. (2014).
- The Alliance for Food Health. Traditional Diet. Online: <http://alianzasalud.org.mx/dieta-tradicional/>. (2016).
- Community Shop. Online: <http://community-shop.co.uk/community-shop/>. (2016).
- Public health England. Public Health England Marketing Strategy: 2014 to 2017. (2014).
- Department of Health. Change4Life: Three Year Social Marketing Strategy. (2011).

## Partners



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This review has been prepared by the science writer for the GFS programme, Sian Williams, and provides a representation of the current state of knowledge in a particular area. The review will help to inform policy and practice, which is based on a wide variety of factors, including evidence from research. The review does not necessarily reflect the policy positions of individual partners.

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