



## Conference on 'Improving nutrition in metropolitan areas' Symposium 3: Building a healthier environment

# Neighbourhood food environments: food choice, foodscapes and planning for health

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The burden of obesity contributes to increasing health inequality, and placing healthcare systems under huge strain. The modern society could broadly be described to support unhealthy eating patterns and sedentary behaviour; also described as obesogenic. Obesity prevention and treatment has focused on educational and behavioural interventions, with limited overall success. A sustainable approach is to address the environments that promote less healthy eating and high energy intake as well as sedentary behaviour. Approaches which modify the environment have the potential to assist in the prevention of this complex condition. The present paper focuses on food environments within the context of obesogenic environments. Takeaway and fast food, a fixture of our diet, is usually nutrient poor and energy dense. A 'concentration effect' has been observed, where there is a clustering of fast food and takeaway outlets in more deprived areas. Access to food and intake are associated; however, there are methodological challenges in associating the effect of the food environment on obesity. While there is an imperfect evidence base relating to the role of the food environment in terms of the obesity crisis; policy, practice, civic society and industry must work together and take action now, where current evidence suggests a change. Shaping the environment to better support healthful eating decisions has the potential to be a key aspect of a successful obesity prevention intervention.

**Food environment: Obesity: Obesogenic environment: Urban planning: Complex systems**

### Background

Obesogenic environments have been defined as 'the sum of influences that the surroundings, opportunities or conditions of life have on promoting obesity in individuals or populations'<sup>(1)</sup>. Ten years ago the Foresight *Tackling obesity: future choices*<sup>(2)</sup> report was published. This report described obesity in terms of complex systems<sup>(3)</sup>. While, 10 years ago, this concept was relatively new, it brought together evidence that linked the built and food environments in novel ways<sup>(4,5)</sup>. Over 10 years the publications and evidence relating to obesogenic environments have grown exponentially. Most focus on how aspects of the built environment may contribute to current obesity levels, by influencing physical activity and

dietary behaviours at the individual and community level<sup>(6)</sup>. The 2014 McKinsey report<sup>(7)</sup> described that overcoming obesity will require multiple solutions, involving many sectors from policy and practice through to industry and consumers. The report describes how we need to 'reset the default' in order to normalise and make healthy behaviours easier, relying less on the individual<sup>(7)</sup>. Swinburn *et al.* have described how 'dramatic actions' are needed, globally, to address food environments and thereby impact the on the rise in obesity and diabetes<sup>(8)</sup>. The worldwide rise in obesity has been 'driven' by significant changes in the global food system<sup>(9)</sup>. This food system produces readily available, processed food which is marketed at populations<sup>(9)</sup>. Looking at trends in high-, middle- and low-income countries, research

**Abbreviations:** SPD, supplementary planning documents.

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has concluded that increases in the food energy supply, alongside increasing sedentary behaviour, explains the increases in population body weight, particularly in high-income countries<sup>(10)</sup>. The food environment has a role to play in helping to develop obesity, and therefore a role to play in preventing obesity. The present paper focuses on how the environment influences dietary behaviours mediated through the food environment.

### Food environments

Food choice and eating behaviours are influenced by a multitude of factors from culture to personal preferences. The relationship between our food choices and the environment in which we make these choices is now widely acknowledged; from nudging and choice architecture<sup>(11)</sup> to conceptualising how the local food environment influences eating behaviour<sup>(12)</sup>. We can define the food environment as any opportunity to obtain food; it includes physical, socio-cultural, economic and policy influences at both micro- and macro-levels<sup>(13)</sup>. The broader food environment includes the home food environment, food policies and school food policies in addition to the neighbourhood food environment<sup>(14)</sup>. Story *et al.*<sup>(15)</sup> have developed an ecological framework to illustrate the influences on dietary behaviours. The present paper focuses on the neighbourhood food environment.

The neighbourhood food environment is defined as a mixture of retail outlets (e.g. small convenience stores to supermarkets) as well as restaurants and take-away (fast food) outlets and is not limited to the residential neighbourhood<sup>(14)</sup>. The neighbourhood food environment influences individual food choice and food intake through the concept of food access. The relatively simple concept of access, in terms of the food environment actually includes five dimensions which are: availability, accessibility, affordability, acceptability and accommodation<sup>(16)</sup> (See for more details: Lake *et al.*<sup>(14)</sup>). Research has focused on the availability and accessibility of neighbourhood food outlets. Two recent systematic reviews, one exploring the local food environment in relation to obesity<sup>(17)</sup> and one exploring the food environment in relation to diet<sup>(12)</sup> have been inconclusive in their findings. This is, in part, due to the complexity of the measures and the quality of the studies. However some important patterns emerged; for example, in adults, Cobb *et al.*<sup>(17)</sup> found evidence that supermarket availability was negatively associated with obesity and fast food availability was positively associated. The Janssen *et al.*<sup>(18)</sup> review suggested that the strongest determinants of out-of-home food availability are the density of food outlets and deprivation within the built environment.

Our surrounding environment is going to impact on our food choice and ultimately on our eating behaviour and consequently our energy balance, weight gain and obesity<sup>(19)</sup>. Neighbourhood food environments are important and much attention has been paid to fast food and takeaway outlets. We know the food served within these outlets tends to be nutrient poor and energy dense<sup>(20,21)</sup>. Public Health England estimates that in 2014

there were over 50 000 fast food and takeaway outlets, fast food delivery services, and fish and chip shops in England<sup>(22)</sup> and a greater proportion of these are in deprived areas. Data from the UK National Diet and Nutrition Survey indicates that between a fifth and a quarter of people in the UK eat meals out once per week or more, with one-fifth eating takeaway meals at home once per week or more<sup>(23)</sup>.

Using data from Norfolk (England), researchers report that takeaway food outlet density increased from 1990 to 2008<sup>(24)</sup>. Takeaway food outlet density was significantly higher in more deprived areas at all time points. Worryingly, over the time period, there were increases in socioeconomic disparities in takeaway food outlet density<sup>(24)</sup>. This concentration effect has been observed in other studies where takeaway and fast food outlets tend to cluster in more deprived areas<sup>(25)</sup>.

A recent Danish cross-sectional study reported that fast food access is associated with fast food intake in the capital region of Denmark<sup>(26)</sup>. Cross-sectional research in Norfolk, England reported that greater exposure to fast food and a lower educational level is associated with greater fast food consumption, BMI and odds of obesity<sup>(27)</sup>. However, this finding is not consistent with other studies. An Australian study of disadvantaged women explored the longitudinal associations between the fast food environment around their home and BMI<sup>(28)</sup>. Over the 5-year study, they found no association between increases in a major chain fast food outlet availability and increases in BMI over time. There are a number of reasons why fast food outlets around the home are not associated with a change in BMI. People lead complicated lives and do not simply source food from their residential neighbourhood. Focusing on residential address alone excludes other food environment exposure opportunities<sup>(29)</sup>. In their study, Burgoine and Monsivais<sup>(29)</sup> explored the difference in food environments between homes, workplaces and along commuting routes between home and work for residents in the East of England. Perhaps unsurprisingly there was a significantly greater density of, and proximity to all food outlet types at work compared with home, particularly restaurants and takeaways. Most recently, Mason *et al.*<sup>(30)</sup> used cross-sectional baseline data from the UK Biobank (project 17380) to explore associations between fast food and physical activity environments and adiposity for adults in mid-life. This large and unique UK study, spanning a geographically diverse area, found a weak association between access to fast food and adiposity. However, they reported high densities of physical activity facilities were associated with lower adiposity for these adults in mid-life. The authors attribute this to limitations in the metric and measurements used in the food environment analysis, an opinion strongly supported by an editorial in the same publication<sup>(31)</sup>.

These examples illustrate how reliable measures of the food environment are the foundation of research that will help to inform obesity-related policy<sup>(32)</sup>. A broad evidence base is required, ranging from spatial analyses to within store audits, alongside individual and neighbourhood level data<sup>(12)</sup>. In a recent editorial, Cummins



*et al.*<sup>(33)</sup> explored the methodological challenges in estimating the effect of the food environment on obesity. While the use of census tracts or postcodes to define exposure to food environments has been used in research, they do not represent the environments an individual is actually exposed to. Rather, an activity-space approach is advised which considers the individual's behaviour in space and time<sup>(34)</sup>.

As well as focusing on exposure to different types of outlets, interventions have also focused on the food served in outlets, promoting healthier ready-to-eat meals (to eat in, to take away or to be delivered). Hillier-Brown *et al.*<sup>(35)</sup> conducted a systematic review to assess the impact of such interventions. The majority of the included studies were conducted in the USA (twenty-seven out of thirty), two in Australia and one in the UK. Most studies focused on adults and eighteen were within chain food outlets. The quality of evidence was generally considered to be poor; however, the present study provides useful insight into these types of interventions. Intrusive interventions that restricted or guided choice appeared to have an impact on food-outlet and customer level outcomes, while interventions that enabled choice or provided intervention had little impact.

However, these types of interventions are being delivered by local authorities and rarely get published within the academic literature<sup>(36)</sup>. In addition to the systematic review, this larger piece of work also explored what interventions were being delivered by local authorities (in England) around providing healthier ready-to-eat meals (to eat in, to take away, or to be delivered)<sup>(37)</sup>. This systematic mapping and evidence synthesis of interventions to promote healthier ready-to-eat-food<sup>(37)</sup> found seventy-five interventions, of which most were 'award' type interventions (defined as those that involved an assessment of food outlet practice(s) targeted by the intervention using pre-defined criteria, together with some sort of accreditation if the food outlet met the criteria). The interventions were delivered by local authority staff, in most cases Environmental Health Officers. Interventions tended to be time-limited and evaluation was limited<sup>(37)</sup>. This research suggested that there was much activity across local authorities in England (as well as elsewhere) and that sharing good practice as well as robust evaluation would be beneficial. The analyses suggested that business owners were generally positive about such interventions. Those that were cost neutral and that were not obvious to their customers were perceived more positively. This programme of research has also explored the perspectives of intervention deliverers<sup>(38)</sup>. Interviews found barriers and facilitators to interventions including lack of funding for interventions and the difficulties of dealing with this sector of the food industry<sup>(38)</sup>.

In the developed world, a sophisticated food supply chain and food system, as well as the domination of a small number of companies, have been noted in the literature<sup>(39)</sup>. While there has been much focus on fast food, there is a lack of clarity about the role of supermarkets in terms of obesity<sup>(40)</sup>. Using a large UK sample, Burgoine *et al.*<sup>(40)</sup> explored the independent and combined associations of supermarket distance and

education with BMI, overweight and obesity. Their results indicated that greater supermarket distance was independently associated with higher BMI and odds of both overweight and obesity<sup>(40)</sup>.

Food outlets selling low-cost energy-dense food is one aspect of the modern UK high street. Townshend has coined the term 'toxic high street' to describe the co-location of money lenders, betting shops and fast food restaurants in more deprived neighbourhoods<sup>(41)</sup>. Since the economic recession of 2007/2008, Townshend has described how this scenario has become embedded as a feature of the British high street, in contrast to more affluent areas where bistros, delis and boutiques flourish. While some areas have empty boarded up shops, other areas have an unhealthy or 'toxic' mix of uses including; takeaways and 'all you can eat' buffet style restaurants; sub-prime money lenders (offering instant cash and pay-day loans at high-interest rates); and betting shops; also tanning salons, body piercing parlours, shops selling cut-price (sometimes counterfeit) alcohol and tobacco<sup>(41)</sup>.

### Food environments and eating behaviours

Few studies have explored individual's diets in relation to their food environment, mainly due to the fact it is time-consuming and methodologically challenging. Focusing on young adults ( $n$  86, mean age 17 years), a study by Tyrrell *et al.*<sup>(42)</sup> provided detailed information regarding where young people obtain food and the nutritional consequences of choosing those food environments. Their respondents completed 4-day self-complete food diaries, recorded what food they consumed and where food was sourced. Sources of food items were coded as home (including friends or relatives homes), and out-of-home. Food items sourced out-of-home were further classified using an updated and a modified version of the Lake *et al.* food environment classification tool<sup>(43)</sup>. The tool contained fifteen out-of-home food outlet categories with eighty-eight detailed sub-categories. With the addition of 'home', use of sixteen possible food environments was recorded. Food was obtained by these young adults from a wide range of environments. Over 4 days of observation, all respondents sourced food from home and from an average of 4.3 different out-of-home food environments. Excluding home and school, takeaway and fast food environments were the most commonly used with 53% of respondents sourcing food from these environments; 41% obtained food from convenience stores, at least once over the 4-day period. Food sourced from specialist outlets, convenience outlets, and retail bakers (i.e. national commercial bakers) were the most energy dense. The highest percent energy from fat was from foods sourced from retail bakers, takeaway and fast food and specialist outlets (47%, 43% and 42%, respectively)<sup>(42)</sup>. This work highlights the eating behaviours of this transitional age-group and points to the importance of interventions around schools, colleges (the school fringe) and the wider food environment. The

importance of the school fringe has been highlighted in a number of studies<sup>(44-46)</sup>.

In a larger cross-sectional study of 839 mothers with young children, Vogel *et al.*<sup>(47)</sup> used a survey including an FFQ, demographic characteristics and frequently visited locations. The authors developed scores for the mother's diet and their food environment. Using Geographical Information Systems alongside demographic information their findings suggested that there is a relationship between health and place as well as educational attainment for these mothers. For example, less healthy food environment scores were associated with better dietary quality in mothers with degrees, but poorer dietary quality in mothers with lower educational attainment. Their findings also suggested that the majority of respondents were exposed to less healthy food environments. These studies<sup>(42,47)</sup>, both cross-sectional and both with their limitations, link the environment to food behaviours of two population groups and highlights the importance of the environment in relation to eating behaviour.

### Urban planning and the food environment

The environment has been acknowledged as a determinant of health<sup>(48)</sup>. Historically, the urban planning and public health professions originated from the same need to deal with the health inequalities due to both the rapid industrialisation and urbanisation of the 19th century<sup>(49)</sup>. In the 21st century, it is internationally acknowledged that professions need to work together to address our 'dynamic, complex and interconnected health concerns'<sup>(49)</sup>. Examples of this collaboration include The Healthy Cities movement which, amongst other things links planning and health has raised awareness around healthy urban planning<sup>(48)</sup>.

An acknowledgment of the potential role of the built environment and planning in creating healthier communities was reflected in the 2012 National Planning Policy Framework for England<sup>(50)</sup>. In England, in 2013, many public health responsibilities were moved from the National Health Service to local authorities<sup>(51)</sup>. This included responsibility for obesity, community nutrition and increasing physical activity<sup>(52)</sup>. A recent umbrella literature review<sup>(53)</sup> assessed the impact of the built and natural environment on health. The review concentrated on five key built environment topics: neighbourhood design, housing, healthier food, natural and sustainable environment, and transport. These are environmental issues that can be shaped by planners and have the potential to influence health.

Policy documents have highlighted the role that local authorities have in tackling obesity<sup>(54-56)</sup>. There has been a recent interest in the role of local authorities in shaping the food environment<sup>(22)</sup>, particularly in engaging with small businesses<sup>(57)</sup> and with planning departments<sup>(58)</sup>.

Planning policy in relation to the food environment has tended to focus on the restriction of hot-food takeaways. Using The Town and Country Planning (Use

Class) Order 1987, outlets are classified according to the use class order of the premises they occupy, dependent upon their primary operating model and premise size (The Town and Country Planning (Use Classes) Order 1987 The Secretary of State for the Environment (1987) <http://www.legislation.gov.uk/ukxi/1987/764/made> (as amended) puts uses of land and buildings into various categories known as Use Classes.). However, differences between categories may be unclear. For example, restaurants and cafes (classified as A3), may also sell food to takeaway and hot food takeaways may have small seating areas. Classifications of interest are in Table 1. An increasing number of local authorities are using supplementary planning documents (SPD) to control fast food outlet proliferation (SPD provide detail to support policy in higher level development plan documents. SPD are a material consideration in the assessment and determination of any planning application. (reference from <http://www.newcastle.gov.uk/planning-and-buildings/planning-policy/supplementary-planning-documents>))<sup>(14)</sup>. It is one of the mechanisms suggested by Public Health England for local government to influence the out-of-home food environment<sup>(22)</sup>, alongside the use of the local plans, joint strategic needs assessments, joint health and wellbeing strategies sustainability and transformation plans and the use of Health in all Policies.

However, not all takeaway outlets are necessarily unhealthy. Moreover, where seating is provided food outlets are classified as restaurants and therefore are exempt from takeaway restrictions. This system of classification, in relation to food outlets, requires an overhaul, but the planning system is probably never going to be nuanced enough to differentiate between healthy and unhealthy outlets.

Barking and Dagenham was one of the first planning authorities to produce an SPD aimed at restricting permission for hot-food takeaways (A5 use)<sup>(59)</sup>. It has been reported that in 7 years, this London borough has reduced fast food outlets by 15% from 187 to 160<sup>(60)</sup>. The mayor of London has recently announced a double-pronged approach to limit new takeaways opening within 400 m of schools and health standard to boost baked or grilled food rather than fried<sup>(61)</sup>.

A review by Dr Foster Intelligence in 2011<sup>(62)</sup> found four main approaches taken by local planning authorities to curb fast food proliferation:

1. *Only allowing takeaway outlets in specified areas.* By defining only certain locations, for example existing shopping areas, where further takeaway outlets are deemed acceptable; however, this may introduce issues of concentration and clustering.

**Table 1.** The Town and Country Planning order description of land and buildings in categories known as Use Classes

Use Class	Description
A1	Retail, includes sandwich bars and internet cafes
A3	Restaurants and cafes
A5	Hot food takeaways

2. *Restricting concentration and clustering.* If a location is suitable, local authorities can seek to restrict the number of takeaway outlets in a row (e.g. to two, or three) or the percentage of frontage (ground floor use facing the street) given over to takeaways (e.g. 5% has been used).
3. *Restricting proximity to other uses.* This means setting out buffer zones (e.g. 400 m) around land uses such as schools, parks and children's centres, where the development of takeaway outlets is forbidden.
4. *Clamping down on 'back door' applications.* Fast food outlets have their own classification in UK planning terms, referred to as A5, hot food takeaways. Developers can sometimes try to circumvent takeaway restrictions by opening outlets under different classifications, primarily A3, restaurants and cafes, where the intention is that food will be primarily consumed on the premises. For example, this might be done by adding in a nominal seating area on plans submitted to the local planning authority.

Some planning authorities have sought to charge a levy, or fee, where planning permission is granted for a new takeaway, with funds raised going to initiatives to tackle childhood obesity, for example, improving green spaces to encourage physical activity<sup>(14)</sup>.

Since this review (2011), the number of local authorities producing SPD to tackle fast food outlet proliferation has increased and guidelines have been developed to meet local situations. Estimates are that there are at least twenty SPD in place to tackle hot food takeaways<sup>(60)</sup>. Gateshead Council's SPD<sup>(63)</sup>, prevents new permissions for A5 use in wards where more than 10% of year six pupils are obese. This has effectively barred any new hot food takeaways in the borough.

While authorities may object to food outlets being added to their foodscape, civic society also has a perspective. Also in England, Spence *et al.*<sup>(64)</sup> analysed local residents' opposition to a multinational fast food company submitted to the planning enquiry. While there were many health reasons to oppose this particular development, including its close proximity to a school (within 400 m) the main concerns by local residents included traffic, the effect on the environment (littering, etc.) there were also concerns about noise and safety. This research highlights the importance of cross-sectorial working in local governments, and to consider engaging with residents about health impacts of proposed new food outlets<sup>(64)</sup>.

Our recent qualitative work<sup>(52)</sup> sought to understand the views of individuals working in public health and those working in spatial planning within local government on their respective responsibilities for addressing obesity through spatial planning. One-to-one interviews aimed to explore respondents' perceptions concerning the wider issue of their role in public health before asking them about tackling issues of obesity, community nutrition and increasing levels of physical activity. Eight interviews were conducted with three Directors of Public Health, one Deputy Director and four planners with a range of seniority from across five local authorities

within the North East of England. The findings, from this relatively small study, illustrate what tackling a global problem is like on the front line of local government. It identified a range of barriers to engaging with planners, including an insufficient understanding of the causes of obesity and the primacy of addressing obesity via multiagency approaches, fragmentation in the health system and conflicting priorities. Our research indicates that planners could be better engaged in the obesity agenda via formal incentives (e.g. written within planners' job descriptions or regulations), and aligning priorities via 'soft approaches' (e.g. public health leadership roles)<sup>(52)</sup>. Since this research, the Local Government Association and Public Health England have published a briefing document about a Whole Systems approach to obesity; this practical guide will be published in 2019<sup>(65)</sup>.

## Discussion

Despite our increased knowledge of how the environment, particularly the food environment drives eating behaviours and obesity, there is still a tendency to continue to focus on individual level solutions described as lifestyle drift<sup>(66)</sup>. While policy examples in the UK and abroad, for example, The Soft Drinks Industry Levy due to being enforced from April 2018 exist, the focus remains on the individual. There are few upstream approaches that are tackling marketing and the sale of cheap unhealthy food. There is an urgent need to shift our focus to more upstream (or macro-level) strategies. This can be achieved through whole systems approaches to obesity<sup>(65)</sup> using cross-sector and multi-agency working to consider the multiple factors involved in the aetiology of obesity that influence individual determinants. Examples of upstream approaches could be through use of planning laws<sup>(52)</sup> or through the taxation of unhealthy foods<sup>(67)</sup>. In the 4 years that have followed the first significant nationwide tax on the sugar-sweetened beverage in Mexico (2014), we have seen a global increase in taxes on sugar-sweetened beverage and a trend for this type of intervention to become the norm<sup>(68)</sup>. Perhaps the London mayor's new announcement will set a global precedent for use of planning restrictions<sup>(61)</sup>. There is need for a systems-wide change in the global food market, for there to be accountability across the private sectors, public sectors and government and commitment to creating healthy food environments<sup>(8)</sup>.

As discussed in the present paper, the present planning laws in this country are not nuanced enough, we know the local government are using SPD and local plans to shape a healthier food environment but this is fragmented and there is a lack of a joined-up approach across local governments. Despite this, there is significant will and movement towards establishing ways of working across disciplines at local and national levels.

While the methodological issues around measuring individual's exposure to food environments remain, there exists convincing international evidence to suggest

that exposure to less healthy food results in an increased intake of such foods, which consequently leads to weight gain and ultimately obesity. Our food environment is a sophisticated and complex system, which requires a complex system approach<sup>(69)</sup>.

The present paper has limitations in that it has only focused on certain aspects within the neighbourhood food environment and has not considered other factors such as the choice architecture of stores or food outlets<sup>(70)</sup>, the cost of food<sup>(71)</sup> and the issues around food insecurity and austerity<sup>(72)</sup>. While studies described have been from more than one country, the urban planning section has focused on English planning policy. Additionally, future research might also consider the influence of a wider multi-agency approach to address the food environment, including education, industry and civic society as the significant actors in addressing obesity.

### Conclusions

No country has managed to reverse their obesity trends<sup>(73)</sup>. Obesity is complex, multifactorial and challenging to address<sup>(6)</sup>. What we do know is that takeaway and fast food is, on the whole, nutrient poor and energy dense and that it is a fixture of our diet. There is a concentration effect, with a clustering of these outlets in more deprived areas. Access and intake are associated; however, there are methodological challenges in associating the effect of the food environment on obesity. Tackling obesity requires joined-up approaches from across the professional spectrum, leadership and political will.

The future of interventions in the food environment field is to adopt a systems approach, to encourage professionals in local governments and national governments to work together to develop policies and practices which are championed by the population, supported by all sectors including industry to enable healthier behaviours.

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### Conflicts of Interest

None.

### Authorship

A. A. L. was the sole author of this paper.

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