Data sources: environmental influences on physical activity and diet

March 2011

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Executive summary

Evidence shows that the environment has an effect on people's dietary habits and participation in physical activity, which in turn affects their health. In order to identify where this may be a problem and to develop appropriate interventions, local areas may need to investigate elements of the physical environment that relate to physical activity and diet. Each project will be different in terms of the specific measures required and data collection methods that need to be employed.

This briefing is intended to:

- describe sources of national and local data relating to aspects of a local area that may influence physical activity and diet

- help users understand the challenges and limitations of using the data sources

- identify gaps in the data and help users understand the options available at a local level to improve data availability.

In order to define the relevant aspects of the environment to be examined, it is useful to consider the following types of data that impact on dietary behaviour such as food purchasing and consumption, and physical activity behaviour such as mode of travel to work. These data and measures overlap each other and are defined differently depending on the location or geographical area, and the population being studied.

- Accessibility: for example, travel time to a healthy food outlet; opening hours of a healthy food outlet; distance to shops and work; cost of healthy food; cost of physical activity facility; and distance to a green space or park.

- Availability: for example, types of food outlet available in a local area; availability and quality of green space; and availability of good quality food in a local area.

- Perceptions: for example, perceptions of safety in parks, food provided in food outlets and cost of healthy foods.

There are three main data collection methods for investigating food and physical activity environments. Primary data can be collected from an area by physically visiting it, collecting the relevant data needed and recording it on a map or another type of audit tool. The usefulness of this method will largely depend on the geography being investigated, but it can be useful for assessing the 'walkability' of a small geographical area or the availability of food outlets selling healthy foods in a community.

Secondary data relating to the nature of a physical landscape and built environment are available from a number of sources. These sorts of data have a wide variety of types and uses, and can be useful when assessing larger geographical areas. Resources such as Google Earth and Google Street View can be particularly useful for defining a physical environment, whether that is by the number of food outlets or amount of green space.

Survey data from the population being studied are useful for assessing people's perceptions of their food and physical activity environments. People's perceptions of their environment may be at odds with objective measures of what is actually physically available and accessible. However, perceptions are important as they have an impact on behaviour. For example, perceptions of an area of green space being unsafe may

hinder people from using it for physical activity. Similarly, a perception that a shop does not sell healthy, good quality or appropriately priced food may hinder people from shopping there. The interventions required to change such perceptions may be very different from the interventions required to change the relevant characteristics of an environment.

It is hoped that this briefing paper will help to create a consistent approach to measuring the environment and improve understanding of the influence of the environment on obesity and its determinants.

Introduction

There are an estimated 300 million people worldwide classified as obese.[1] The environment is a key determinant of dietary behaviours and physical activity levels.[2] The term 'obesogenic environment'[3] has been used to describe an environment in which influences, surrounding opportunities or conditions of life combine to promote weight gain in individuals or populations.[4]

Until recently, most research in this area focused on individual-level determinants, such as a person's diet and physical activity, knowledge, attitudes, practical skills and motivation to lose weight. However, these individual-level factors do not take into account the many complex environmental influences on a person's behaviour. There is a need for a greater understanding of ways to assess different aspects of the environment to understand the influence of the environment on behaviour.

Purpose and scope of this briefing paper

This briefing paper is primarily aimed at public health and other professionals working in local authorities and other public health organisations who are interested in the role of the environment in influencing food and physical activity behaviour. It may also be of interest to researchers and academics working in this field. It aims to:

- describe sources of national and local data relating to aspects of the environment,[a] which may influence food and physical activity behaviour
- help users understand the challenges and limitations of using the data sources available
- identify gaps in the data and help users understand the options available at a local level to improve data availability.

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[a] For the purposes of this paper, 'environment' is used to encompass aspects of the local environment that may influence dietary and physical activity behaviours (Chow et al., 2009). The paper does not cover broader issues such as the social, economic or policy environment, which can influence obesity through limiting or enabling access to physical activity and food.

The influence of the environment on dietary and physical activity behaviours

Physical activity

NICE guidance on the environment and physical activity defined the environment as:

> 'any aspect of the physical (natural) environment or the urban or constructed (built) environment that subconsciously or consciously relates to an individual and their physical activity behaviour'.[5]

In recent years, there has been increased interest in how the environment influences physical activity. Early physical activity research tended to focus on determinants of physical activity at the individual or group level and, as a result, early interventions operated predominantly at the individual level.[6] More recently, research has begun to investigate the role of environmental factors in shaping an individual's decisions about their behaviour.

A number of systematic reviews have summarised the evidence linking the environment and physical activity.[6,7,8,9,10] Aspects of the environment found to be associated with physical activity include:

- access to physical activity facilities
- distance to destinations
- levels of residential density
- type of land use
- urban walkability scores
- perceived safety
- availability of exercise equipment
- provision of pavements

Less clear associations have been noted for aesthetic features of the environment and parks, and perceived crime.[10] These findings have been reinforced by a more recent systematic review.[11] However, it is important to note that the bulk of the research into the influence of the environment has come from the US, where the extent of urban sprawl, environmental conditions and urban forms are very different to those in the UK.[8]

Dietary habits

People living in Western societies generally have easy access to cheap, highly palatable and energy-dense foods lacking in good nutrition.[12] Advancements in technology and transport encourage a more sedentary lifestyle. Together these are a catalyst for overweight and obesity. Research into the link between the environment and dietary intake, and, in particular, the link between food availability and obesity, is still undeveloped compared to research into physical activity and the physical environment.[13] There are different ways of theorising about the environment for the purposes of focusing research relating to diet. One theory distinguishes between the micro and the macro environment. The macro environment includes the social, historical and political factors, such as public policies, group-level social factors and the

overarching economic, cultural and legislative influences that shape the local environment over time. The micro level environment includes genetic disposition, social class, cultural traditions, and individual demographics such as income, age, education, gender and ethnicity.[14]

Another way of theorising about the nutrition environment is demonstrated in the model in Figure 1. This identifies four distinct environmental variables that can have a direct or indirect influence on eating patterns.[15] This model shows the specific areas of the environment that can be studied in relation to dietary habits. These variables are different elements of an overall 'nutrition environment'. While these areas clearly do not exist in isolation from each other, this model helps to provide a framework for developing or collating measures relating to the nutrition environment. The type of measures required, and how easy they are to collect and collate, will depend on the aims and scale of the project. This paper focuses on data sources relating to the community, organisational and consumer nutrition environments.
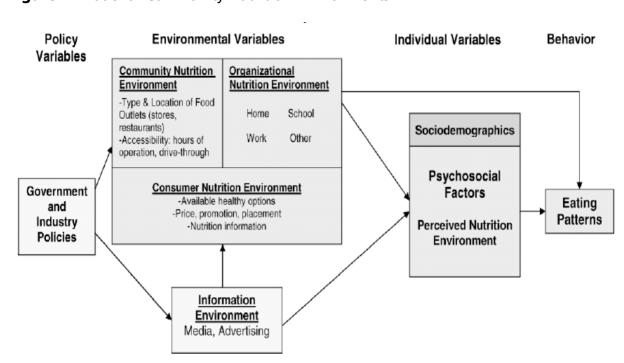
Figure 1: Model of Community Nutrition Environments[15]

The accessibility and availability of particular foods in a geographical area or location are the key factors in any research project looking at the nutrition environment. Accessibility and availability will be defined differently depending on the geographical area on which the project is focused and the nature of the population being investigated.

Accessibility includes physical access, such as the walking distance to a food outlet; availability of public transport to a food outlet; and opening hours or trading times of a food outlet. It also includes factors affecting purchasing and consumption, such as cost. For example, there is evidence that a healthy diet, with adequate fruit and vegetables, is generally more expensive than a diet that is based mainly on foods high in fat and sugar,[16] and that reducing the price of healthier foods tends to increase the frequency with which they are purchased.[17] Availability includes the types and variety of food outlets in a particular location or geographical area and the types of foods they

sell. For example, evidence from the US has identified higher rates of obesity in local communities with high concentrations of fast-food outlets.[18]

Measuring the environment

An essential first step is to define the characteristics of the geographical area, and the population to be investigated.

The area will have an important impact on the data needed to be gathered, the data collection methods used, and the interventions developed. A geographical area may be defined by census output areas; 'natural communities' or neighbourhoods; political geographies; or administrative boundaries such as a local authority area.

It is also important to assess the characteristics of the population being investigated or likely to be affected. Different populations will have different requirements of their environments in relation to diet and physical activity. In particular, demographic and socioeconomic indicators such as ethnicity, income levels, age and employment levels will be important for defining their needs and potential problems. For example, an elderly community may have different problems in terms of physical access to food outlets or physical activity facilities than a younger, more affluent population.

Tools used to measure the environment

It is necessary to be able to define and measure the aspects of the environment that relate to diet and physical activity. There are three main types of instrument available.

Primary tools to assess environments

Physical activity

These include environmental audits and audits using specific tools for measuring particular aspects of a site and rating them according to agreed scales. In the case of physical activity, this might mean measuring an environment for its walkability or 'bikeability'. In such an audit, specific aspects of the environment that facilitate (or prevent) walking or cycling are measured. For example, the charity Living Streets conducts community street audits, working with local people to assess problems in the local environment for walking, and suggests possible solutions.[b] Standard tools such as the Pedestrian Environment Review Software[c] are available for audit. Cycling infrastructure can also be assessed using bike audit tools that measure features such as existence of on-road or off-road cycle lanes, road surfaces, obstructions, traffic flow and other features that may influence the ease with which people can cycle.

Diet and nutrition

As previously stated, different elements of the environment will require different measures. Primary data from audits of a physical area may be particularly useful in measuring the availability of food outlets providing healthy foods located in a particular area and the accessibility of that food in terms of cost. This would involve visiting food outlets and using a tool to provide a standard definition of a 'healthy' food outlet.

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[b]   www.livingstreets.org.uk
[c]   http://www.trlsoftware.co.uk/products/detail.asp?aid=16&pid=66

An example of an audit tool for collecting data is the Nutrition Environments Measures Survey for Stores (NEMS-S).[19] The NEMS-S assesses the food items available in an outlet and compares the availability of 'healthy options' against those that are less healthy. Based on this, it estimates whether a healthy diet could be achieved from purchases from this outlet. Further details of this and other relevant tools are available on the East Midlands Public Health Observatory website.[d]

Physical audits can also be used to assess the accessibility to healthy food outlets in terms of walking distance, or perceptions of availability in terms of the type of area in which the food outlet is located or the presentation of the food outlet itself.

Remote audit methods/secondary data

Remote audit tools allow the assessment of a site without visiting it. In the case of physical activity this might mean assessing the area covered by parks and green space using maps, or auditing the distances travelled to school by studying Geographic Information Systems (GIS) data.[e] Physical activity researchers have also experimented with Google Street View to audit the street environment without visiting a site.[20] In relation to diet and nutrition, this method may be most useful for measuring elements such as the location of food outlets. It may mean collecting data from business listings such as the Yellow Pages or other website searches, buying data from Ordnance Survey, or sourcing data held by local authorities such as the lists of trading food outlets held for environmental health purposes. GIS data can also be used here to assess distances between residential areas and food outlets. There will be a risk that the sources of data may not be up-to-date and it is recommended that 'ground truthing'[f] or checks are used to verify data.

Surveys to assess perceptions of environments

Some surveys ask people what they think about aspects of the environment. This approach will often produce different data from audit methods, but can be a very useful alternative.[21] For example, people's perception of the quality of the food accessible to them in their local area may depend on their own understanding and knowledge about what makes up a healthy diet or their own dietary preferences. Similarly, objective measurement or remote audit methods may deem a residential area to have sufficient open green space to encourage physical activity. However, if the perception is that this physical environment is unsafe, it is less likely to be used by local communities to participate in physical activity.[22,23]

An excellent summary of resources on measuring the physical activity environment is available from the Active Living Research website.[24] There are a number of resources on measuring the nutrition environment available from the East Midlands Public Health Observatory 'Food Poverty' web pages.[g]

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d   http://www.empho.org.uk/

e   GIS are systems that capture, store, analyse and present data that are linked to location(s).

f   'Ground truthing' is used here to mean on-site verification of remotely collected data

g   http://www.empho.org.uk/THEMES/food/food9.aspx

Sources of objective data on the physical activity environment

Open space

Land Use Statistics (Generalised Land Use Database), 2005

This dataset allows detailed analysis of land use in the UK, including the percentage of land that is green space. It is derived from Ordnance Survey data.[h]

The Generalised Land Use Database (GLUD) 2005 shows the area of different land types for census output areas, Lower Super Output Areas (LSOAs), Middle Super Output Areas (MSOAs), Local Authorities, and Government Office Regions (GORs) in England as at January 2005.

All land in the UK is allocated one of the following uses:

- domestic buildings
- non-domestic buildings
- roads
- paths
- rail
- domestic gardens
- green space
- water
- other land uses (largely hardstanding)
- unclassified

The data are presented in thousands of square metres (000m^2), to 2 decimal places, allowing a precision to the nearest 10m^2.

This simple classification provides the framework for an analysis of land for each of the published geographic areas. The statistics provide a basis for comparing, for example, the availability of green space and administrative areas.

The GLUD data are used in the National Obesity Observatory's e-Atlas[i] as the variables '% of land is green space' and '% of land is domestic gardens'. This describes the proportion of the total land area in England that is given over to domestic gardens or green space. Users can generate maps down to local authority level that show these indicators, and the relationships with other indicators including various measures of child and adult obesity.

GLUD data are free to use and available for download from the Department of Communities and Local Government website.[j]

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[h] Some users may prefer to use the original Ordnance Survey data, available from MasterMap, as it may allow more flexibility than the GLUD

[i] http://www.noo.org.uk/maps/eatlas

[j] http://www.communities.gov.uk/publications/planningandbuilding/generalisedlanduse

Environmental data from Natural England

Natural England holds a number of useful datasets on the natural environment. These include:

- access land under the Countryside and Rights of Way (CROW) Act (including registered common land and dedicated land)
- country parks
- doorstep greens
- local nature reserves
- national trails
- national nature reserves

These can all be downloaded free from the Natural England website.[k] The data are in a format suitable for use in a Geographic Information System (GIS).

The Green Atlas

Natural England has undertaken a detailed analysis of environmental data to produce the Green Atlas. This has a focus on open natural spaces that are publicly accessible.

A map layer has been produced using several datasets from both Natural England data and data from other partners and stakeholders such as Sustrans. The map layer includes data from the following indicators:

- agri-environment access
- CROW access land (including registered common land and dedicated land)
- country parks
- cycleways
- doorstep greens
- local nature reserves
- millennium greens
- national trails
- public rights of way
- national nature reserves
- village greens
- Woods for People (Forestry Commission data including Woodland Trust accessible land)

These datasets have been combined and analysed against LSOAs. The output is a file showing every LSOA graded by its percentage of accessible green space. The file is used primarily to support Natural England's health and recreation work. However, it can be supplied to non-commercial partners subject to licensing terms and conditions. Contact: Sally.Pinnegar@naturalengland.org.uk

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[k] http://www.gis.naturalengland.org.uk/pubs/gis/GIS_register.asp

Land Cover Map

The Land Cover Map of Great Britain is produced by the Centre for Ecology and Hydrology. It is used by government departments and agencies in England, Scotland and Wales, county councils, charities, commissions and environmental management bodies. The map is derived from a computer classification of satellite scenes, obtained mainly from Landsat satellites. It is a vector database, for use with GIS, and shows areas of land as 'parcels' or polygons. Each parcel has attached to it a list of values or attributes, covering such topics as land cover class, parcel area or length of boundary. This makes it useful for identifying green space and woodlands.[l]

OpenStreetMap[m]

OpenStreetMap is a free editable map of the world that allows the user to view, edit and use geographical data. It is very good at locating parks, green spaces and woodlands.

Ordnance Survey Points of Interest

'Points of Interest' is the Ordnance Survey database of about 3.9 million geographic and commercial features across Great Britain. Relevant features include schools, parks, gyms and other recreational and sports facilities. All features are supplied with location, functional information and addresses, where possible, which allows mapping and calculation of distances. These features are presented as a three-level classification with nine broad groups, 49 subject categories and around 615 highly specific classes. The dataset is constantly updated and re-supplied quarterly. Further information on this dataset is available at the Ordnance Survey website.[n] It is important to note that ground-truthing has not been undertaken to validate classification of features, therefore the level of accuracy of this dataset is not clear. In addition, there is a charge for this data and some training to use the relevant software may be required.

Walkability

Many of the above data sources may be used to inform assessments of an area's walkability' – the extent to which a local environment supports and encourages walking. There is strong emerging literature on the measurement of walkability.[25,26,27,28] The assessment of walkability can be complex as it includes concepts such as street connectivity, land use patterns, traffic exposure, objective and perceived safety, and access to amenities. Specific data sources for walkability include:

- Ordnance Survey MasterMap products (notably the Integrated Transport Network (ITN) layer data) for deducing street connectivity
- the UK census for population and dwelling density counts
- Ordnance Survey Landform Panorama (DTM) data (available from OS Opendata) for assessing elevation change.

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[l] http://www.ceh.ac.uk/sci_programmes/BioGeoChem/LandCoverMap2000.html
[m] http://www.openstreetmap.org/
[n] http://www.ordnancesurvey.co.uk/oswebsite/products/pointsofinterest/

Sport and leisure facilities

Sport England's Active Places database

The Active Places database includes information on a wide range of sports facilities, including local authority leisure facilities as well as commercial and club sites.[o]

The data fall into three basic categories by type of access to the facility.

- Pay and play – where members of the public can simply turn up and pay a fee to use the facility.
- Registered membership – where members of the public need to pay a registration fee to use the facility (i.e. gym membership).
- Sports club or community association – where use of the facility is dependent on the users being members of a particular sports club or association.

The database is searchable in a number of ways: by browsing an interactive map of the country; searching for facilities in a local area; and using the name and address of a specific facility to find out more information.

Interest Map

Data on private indoor sports facilities or gyms are available from the Landmark Information Group in a dataset called Interest Map. This is a dataset of points locating various features of interest such as gyms, health centres and riding stables. There is likely to be a charge for these data.

Leisure database

The Leisure Database Company is responsible for a sports and leisure facility database with sports facility data across the UK for: fitness gyms, golf, swimming pools, sports halls, indoor tennis courts, synthetic turf pitches, running tracks, indoor bowls, ski slopes, ice rinks, squash courts and dance/aerobic studios.

In addition, since 2010, data on grass pitches are available for: cricket, rugby union, rugby league, Aussie rules, American football, rounders, baseball, hockey, lacrosse, football (senior, junior and mini soccer), softball, Gaelic football, shinty, hurling, polo and cycling polo.

Full location and contact details for every site are available. The full details are on the company website.[p] There is likely to be a charge for these data.

National data on cycling and walking routes

Sustrans[q] holds the database on the National Cycling Network (NCN). The locations of all routes on the NCN are fully mapped using GIS data. Sustrans also holds some data on some walking and cycling routes beyond the NCN but these data are not comprehensive. In addition, Sustrans has a large number of cycle/walk automatic traffic counters, including in the Cycle Demonstration Towns, and these are geographically tagged.

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[o]   http://www.activeplaces.com/
[p]   http://www.theleisuredatabase.com
[q]   For more details and contacts see http://www.sustrans.org.uk

Data on perceptions of the physical activity environment: summary of relevant surveys

The specific questions asked in the surveys mentioned below are included in the Appendix.

Place Survey

This survey, conducted by local authorities, collected data between 2008 and 2010 to inform a number of national indicators based on people's perspectives. Although the survey is no longer running, data can still be used to inform analyses about physical activity and people's perceptions of the environment.

Indicators of interest include:

- overall and general satisfaction with local area
- perceptions of anti-social behaviour
- perceptions that people in the area treat one another with respect and consideration (deleted in April 2010)
- perceptions of drunk or rowdy behaviour as a problem
- perceptions of drug use or drug dealing as a problem
- self-reported measure of people's overall health and well-being
- satisfaction of people aged over 65 years with both home and the neighbourhood

The data are available from the Department of Communities and Local Government website.[r]

Health Survey for England (2007)

This survey regularly collects data on participation in physical activity. This is usually by self-report (questionnaire) and in 2008 included objective measures using accelerometers. However, the 2007 survey also included some questions on knowledge and attitudes to physical activity, and these included some aspects of perceptions of the environment for physical activity. The relevant question asks respondents to list the barriers to doing more physical activity. This included a prompt list that included the items 'no suitable places to do it in my area' which could be taken to be a measure of the perceptions of the environment for physical activity.

Data are available from the Information Centre website.[s] Data can be downloaded from the data archive at MSOA level. However, it should be noted that the data are not robust at small area level due to small numbers.

Tell Us

Tell Us is a series of annual confidential online surveys which gathers quantitative information on the views and experiences of children and young people. The surveys provide evidence for the former National Indicators for local authorities and aim to help local authorities judge the impact of their services on perceived quality of life for children and young people. Since 2006, the Tell Us survey has been completed by a

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[r]   http://www.communities.gov.uk/publications/corporate/statistics/placesurvey2008
[s]   http://www.ic.nhs.uk/pubs/hse07healthylifestyles

sample of children from all local authority areas across England. The most recent survey took place in Autumn 2010. The questions with relevance to the physical activity environment include:

- perceptions of local parks and play spaces
- feelings of safety
- barriers to activity (including environmental barriers)
- opportunities for activity at school

ONS Omnibus survey

The ONS Omnibus/Opinions Survey was a multi-purpose survey, which ran in eight months of the year from 1990 until 2005, and then every month until 2008. Each month, core modules of demographic questions were run alongside non-core questions, which varied from month to month. The sample size was 1,800 adults, from different households. From 2008, the ONS Opinions Survey questions were included within the Integrated Household Survey (IHS) but this module was dropped in January 2010 due to conflicting sampling methodologies.

The April 2004 module contained some questions on perceptions of the environment for physical activity (see Appendix).

Local data sources: physical activity environment

Local authorities hold data on the green space and leisure facilities in their areas. The data are likely to be of varying quality as there is no standard data collection method. These data are generally available via five main sources.

Open space needs assessments (OSNA)

This is one of the studies that all local authorities are currently required to complete. The OSNA looks at the quantity, quality and accessibility of all of the open space, sport and recreation facilities in the county, including:

- parks and gardens
- semi-natural open spaces, such as woods and commons
- amenity open spaces: grassed areas which are open to the public, but which do not have a specific function
- children and young people's space: playgrounds and youth shelters
- allotments
- outdoor sports space – such as designated pitches, courts and greens
- churchyards and cemeteries
- education space: grounds owned by schools, colleges and universities
- golf courses

The OSNA follows the five stages below:

- identifying local needs, usually involving questionnaire surveys and desk research

- an audit of local provision including site visits

- setting provision standards: establishing how much open space in each category residents should expect to have, and what quality it should be

- application of provision standards, including establishing deficiencies in provision of green space

- drafting policies and implementation plan: working out how to make sure all areas have the right amount of safe, accessible and attractive open space

Leisure services departments

These departments hold data on the parks and leisure facilities operated by the local authority, and possibly private leisure service provision (such as gyms and swimming pools).

Transport planning departments

These departments may have conducted audits of the local environment for planning purposes. Some have conducted specific walkability audits, often in conjunction with the charity Living Streets who conduct community street audits.[t]

Public works departments

These departments hold data on the publicly owned space in the local authority area that has to be maintained. For example, local authorities keep records of areas of grassland that have to be mown on a regular basis – this is likely to be only a partial record of green space in the area, but is likely to include all main parks and green open space.

Local authority websites

These frequently contain links to all parks, allotments, bike paths, and leisure and sports centres in each local authority area. However, these data are usually available as simple listings or maps and are rarely available in a downloadable format.

Sources of objective data on the nutrition environment

Ordnance Survey Points of Interest

As mentioned in the previous section, Points of Interest is the Ordnance Survey database of about 3.9 million geographic and commercial features across Great Britain. Relevant features for the nutrition environment include supermarkets, schools and fast-food outlets. The dataset can be used to assess concentration of specific food outlets such as fast-food outlets and takeaways. Further information on this dataset is available on the Ordnance Survey website.[u]

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[t] http://www.livingstreets.org.uk/index.php/expert-help/community-street-audits/
[u] http://www.ordnancesurvey.co.uk/oswebsite/products/pointsofinterest/

Consumer Focus (formerly The National Consumer Council)

Consumer Focus carry out a mystery shopper survey of the UK's nine biggest supermarkets assessing their 'green credentials'. This survey scores each supermarket against a number of criteria relating to climate change, sustainable farming, sustainable fishing, waste and recycling. Annual reports on these data called 'Green to the core' are available from 2007. The latest 2009 report is published on the Consumer Focus website.[v]

Department for the Environment, Food and Rural Affairs (DEFRA)

There are two main sources of data relevant to the nutrition environment available on the DEFRA website.

UK Food Security Assessment

DEFRA collects and analyses data on a number of indicators for the UK Food Security Assessment.[w] It is structured around six themes:

- global availability
- global resource sustainability
- UK availability and access
- UK food chain resilience
- food security at household level
- safety and confidence in our food supply

It assesses the current position for each indicator, compares this with the picture over the last 10–15 years, and looks ahead to the next 5–10 years. A number of text boxes provide additional context and analysis on specific issues. The most recent detailed analysis at time of publication was carried out in August 2009 and updated in 2010. Table 1 summarises the indicators detailed in the report.

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[v]   http://www.consumerfocus.org.uk/assets/1/files/2009/11/consumerfocusgreentothecore.pdf
[w]   http://www.defra.gov.uk/foodfarm/food/pdf/food-assess-approach-0908.pdf

Table 1: Summary of content of UK Food Security Assessment, August 2009

Food security theme	Headline indicators	Supporting indicators
1. Global availability	Trends in global output per capita	Demand growth trends (contextual) 1. Yield growth by region 2. Real commodity prices 3. Stock to consumption ratios 4. Share of production traded 5. Concentration in world markets 6. R&D expenditure 7. Impact of animal disease
2. Global resource sustainability	Global land-use change	CO_2 emissions (context indicator) 1. Fertiliser intensity 2. Phosphate rock reserves 3. Water productivity of crops 4. Water withdrawn for agriculture 5. Global fish stocks Pesticide intensity (to be developed)
3. UK availability and access	Diversity of UK supply	1. EU's share of UK imports 2. Diversity of fruit & veg supply 3. EU production capability 4. UK production capability 5. UK potential in extremis 6. Diversity and flexibility of ports 7. Port diversity of non-indigenous foods
4. UK food chain resilience	Energy dependency of the food chain	1. Energy capacity reliability 2. Diversity of oil and gas imports 3. Business continuity planning 4. Retailer warehouse stocks 5. UK cereals stocks 6. Food industry diversity 7. Viability of large manufacturers 8. Strategic road network
5. Household food security	Low income households share of spending on food	1. Relative prices of fruit & veg 2. Food prices in real terms 3. Household access to food stores Self-reported food insecurity (to be developed)
6. Safety and confidence	Trends in cases of food-borne pathogens	1. Food safety inspections and incidents 2. Food covered by assurance schemes 3. Public confidence in food safety measures Consumer confidence in food availability (to be developed)

The Food Statistics Pocketbook[28]

The annual Food Statistics Pocketbook provides a round-up of statistics on food covering the economic, social and environmental aspects of the food we eat (excluding agriculture). There are chapters including data relating to:

- food chain (excluding agriculture)
- prices and expenditure
- global and UK supply
- environment
- waste
- dietary health
- safety and confidence

Data come from previously published Government surveys run by the Office for National Statistics (ONS) and DEFRA such as the Living Costs and Food Survey,[x] as well as a wide range of other sources including Government agencies and commercial organisations.

Food Standards Agency (FSA)

The FSA holds a number of datasets relevant to the nutrition environment.

Hygiene ratings for food businesses in local areas

The hygiene rating or inspection result given to a food business reflects the standards of food hygiene found on the date of inspection or visit by the local authority. The rating is not a guide to food quality. The information provided on businesses is held on behalf of local authorities participating in the Food Hygiene Rating Scheme in England, Northern Ireland and Wales or the Food Hygiene Information Scheme in Scotland. Only areas running either of these schemes can be searched. These data are available on the FSA website.[y]

The Healthier Catering Commitments initiative

The FSA holds information on commercial food suppliers who have signed up to the Healthier Catering Commitments initiative, which has been running since 2008. This initiative commits caterers and food suppliers to offering healthier choices to their customers. The commitments of each company are captured in a document that is updated each year. Different food businesses commit to different activities depending on the type of service they provide. The commitments focus on the FSA's priorities of reducing salt, saturated fat and energy intake, promoting options and providing consumers with more information. The list of companies and their commitments can be accessed on the FSA website.[z]

Processed Food Databank

The Processed Food Databank is a reference tool designed to provide indicative information on the levels of sodium (salt), fat, sugar and other nutrients in

x   http://www.defra.gov.uk/evidence/statistics/foodfarm/food/familyfood/index.htm
y   http://ratings.food.gov.uk/QuickSearch.aspx?terms=v5fCODQk%2bkQKvDgGAlO6XQ%3d%3d&lang=
z   http://www.food.gov.uk/scotland/scotnut/healthycatering/cateringbusiness/commitments

processed foods. The tool was designed to provide a reference point on the amount of sodium in processed foods in order to inform discussions on this subject between the FSA and the industry. However, since the tool collects data relating to saturated fat, overall energy and sugar, it has also been used as a reference point to inform discussions relating to food labelling.

The first round of data was collected between December 2004 and February 2005, and recorded details of almost 1,000 products in 29 processed food categories available from high street food retail outlets. The second round of sampling took place between February and September 2007 and collected 1,100 samples and details of 1,094 products. The data are available in a Microsoft Excel database on the FSA website.[aa]

School meals research project

The FSA commissioned this research project in order to assess compliance by secondary schools and their catering providers with statutory nutritional standards and associated guidance issued in April 2001.[30] Fieldwork was carried out between October and November 2003. The research also provided data relating to school meals uptake (free and paid-for) at school level; the nature of the contract with the school or caterer (if applicable); additional standards for school lunches set by the local education authority (LEA); and the nature of monitoring by the LEA and other relevant contextual information such as price, individual school food policies, the eating environment, time allowed for eating, marketing of school meals and the availability of food from other sources.

Food For Life Partnership

The Food for Life Partnership is a network of schools and communities across England who aim to work through schools to give communities access to seasonal, local and organic food, and develop the skills communities need to cook and grow fresh food. Data on which schools have registered in the network and those that have achieved or are working towards a series of awards are listed on the Food for Life Partnership website.[bb]

Data on perceptions of the nutrition environment: summary of relevant surveys

There are several national surveys that ask questions that relate to the associations between the environment and diet. Summary descriptions of these surveys are below. Specific survey questions relating to the nutrition environment are listed in the Appendix.

Low Income Diet and Nutrition Survey (LIDNS)

The LIDNS was commissioned by the FSA as a one-off addition to the National Diet and Nutrition Survey (NDNS). It provides nationally representative evidence on food and nutrient intakes, sources of nutrients and the nutritional status of people on low income. A total of 3,728 people from 2,477 households in the most deprived UK populations were included in the survey. It took place between November 2003 and January 2005. The survey asks questions relating to environmental determinants

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[aa] http://www.food.gov.uk/science/surveillance/fsisbranch2008/fsis0108
[bb] http://www.foodforlife.org.uk/Awardsforschools/Findaschool.aspx

affecting dietary behaviours such as accessibility to shops, type of shops available, the availability of fresh food, affordability of healthy food, eating out, and availability and uptake of school meals.

Place Survey

The Place Survey is described in full on page 13. Historical data are available relating to the factors perceived as most important when making somewhere a good place to live, and which of these factors need improving in the respondent's local area. This question includes an option for 'shopping facilities'.

Health Survey for England

The HSE regularly collects data on dietary intake including intake of fruit and vegetables, fat and fibre. This is collected using a self-reporting methodology, using either a self-completion questionnaire or by 24-hour recall interview. The 2007 survey included some questions on knowledge and attitudes to diet and healthy eating. There is one question that is particularly relevant to the impact of the nutrition environment on dietary behaviours. This asks the respondent which factors from a list would stop them from making improvements to their diet. The list includes psychological factors such as preference and motivation, but also includes the availability of healthy options in their home or school environment. Data are available from the Information Centre website.[cc] It should be noted that the data are not robust at small geographical area level due to small numbers.

Consumer Attitudes Survey

The FSA Consumer Attitudes Survey includes one question relating to the nutrition environment. It asks respondents to say whether they agree or disagree with four statements relating to the affordability of eating healthily and the provision of information about food availability. Survey reports are available from the FSA website.[dd]

Living Costs and Food Survey (previously Expenditure and Food Survey)

The Living Costs and Food Survey (LCF) is a module of the Integrated Household Survey (IHS) and collects information on spending patterns and the cost of living that reflects household budgets across the country. The primary uses of the survey are to provide information about food consumption, nutrition and spending patterns for the Consumer Price Indices. The survey is conducted throughout the year across the UK and is the most significant consumer survey undertaken in the UK. This survey took over from the Expenditure and Food Survey (EFS) in 2008. The LCF asks a number of questions relevant to the impact of the nutrition environment on dietary behaviours including the availability and uptake of free school milk and fruit, and meals-on-wheels services. Data from the LCF can be found on the Economic and Social Data Service website.[ee] The most recent data at time of writing was from 2008. Older data from the EFS can also be found here.

ONS Omnibus/Opinions Survey

The ONS Omnibus/Opinions Survey was a multi-purpose survey, which ran in eight months of the year from 1990 until 2005, and then every month until 2008 (see page 14 for details). The April 2004 survey asked respondents about their views on the best way

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[cc] http://www.ic.nhs.uk/pubs/hse07healthylifestyles
[dd] http://www.foodstandards.gov.uk
[ee] http://www.esds.ac.uk/findingData/efsTitles.asp

to tackle risks to children's health resulting from high levels of salt, fat and sugar consumption.

Tell Us

This survey is described on page 13. The Tell Us survey collects data relating to children's consumption of free school meals and their perception of information and advice received in school about healthy food and lifestyles. There are optional questions included by some schools relating to frequency of eating takeaway food and where lunch is taken on school days (at home, school or elsewhere). Whilst some of these data are outside the remit of this paper, they have been included here due to the relative lack of survey data relating to children. The final wave of this survey took place in 2010.

Local data sources: nutrition environment

Local authorities and chambers of commerce

Local authority environmental health departments can be good sources of data on food retail outlets. All local authorities hold details of all the restaurants and takeaways in their area as these all have to be inspected for health and safety and food hygiene. Some of these data can be found on the 'scores-on-the-doors' website.[ff] It holds data from across the country on the local authority hygiene ratings for food businesses – however not all outlets are listed.

Other local authority departments such as trading standards, building control, planning, land charges, licensing, economic development and tourism may also hold useful data relating to food outlets, fixed, seasonal and occasional markets and the availability and location of allotments. Chambers of commerce hold data relating to their local members but this may not include all local businesses.

There are a number of practical considerations to be borne in mind when attempting to collect data from local authorities, which may make systematic collection particularly problematic and time-consuming.[31] Nevertheless, these data are still likely to be more reliable and useable than data from sources such as Yellow Pages or Yell.com. In the UK, only two studies have been conducted to validate secondary sources of nutrition environment data, and both have found local authority data to be a reliable source of information.[32,33]

Primary care trusts

Primary care trusts (PCTs) may hold data relating to food and health initiatives in their local area such as food access projects and healthy eating interventions in specific locations and communities. This may include needs assessment data including details of the types of food outlets available in a local area or the availability and accessibility of healthy food in a community. However, these data are not consistently held in all PCTs. In addition, PCTs may have healthy eating strategies or policies for a locality. In some areas, these are jointly developed and owned by the PCT and the local authority through a local strategic partnership and local area agreement, which may include monitoring and performance information on relevant local indicators. These may include data relating to provision of healthy foods within a local area or even within the organisations themselves.

[ff] http://www.scoresonthedoors.org.uk/

Other useful data sources: nutrition environment

Marine Stewardship Council

The Marine Stewardship Council (MSC) runs a certification and ecological labeling programme for sustainable seafood. It holds data on where to buy MSC-labelled seafood in shops and restaurants around the world.

The National Farmers' Retail and Markets Association

The National Farmers' Retail and Markets Association (FARMA) is an independent organisation that inspects farmers' markets to ensure that they operate within particular guidelines. Shops and markets certified by FARMA are working within a framework that ensures produce is local and sourced directly from the producer. The FARMA website provides a list of producers that are certified.[gg]

Sustain

Sustain, 'the alliance for better food and farming', is a registered charity. The Sustain website provides information about the location (to the nearest postcode) of food cooperatives.[hh] The Sustain website is also a valuable source of information for projects relating to the nutrition environment, food access and food poverty.

Conclusions

This paper sets out the available sources of national and local data on aspects of the environment that influence physical activity and dietary behaviours.

The relationship between aspects of the local environment and dietary behaviour is currently unclear, as is the relationship between the environment and obesity prevalence. There is also a general lack of consistency in approaches to measuring the environment for its impact on both food and physical activity.

There are some interesting findings from US research that have not been found in the UK. For example, the link between the presence of supermarkets and a lower prevalence of obesity, and the presence of convenience stores and a higher prevalence of obesity. This underlines the case for more UK-specific research that looks at nutrition environments and obesity prevalence, and considers the impact of wider environmental factors that may influence dietary behaviours, including social policy and culture.

Similarly with physical activity, the bulk of the research into the influence of the environment has come from the US, where the extent of urban sprawl, other environmental conditions and urban forms are very different to those in the UK. It is therefore essential that UK researchers and practitioners develop consistent and reliable approaches to measuring aspects of the environment in order to investigate these associations. This means using, and in many cases developing, standard tools for measurement that are well validated in both research settings and practical situations.

Studying the links between the environment and behaviour can be challenging. Potential issues include the possibility of making spurious ecological correlations; the

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[gg] http://www.farmersmarkets.net/
[hh] http://www.sustainweb.org/foodcoops/finder/

challenge of timing (as environmental exposure data and outcome data are usually made at different times); a lack of sufficient variation between different environments to make meaningful comparisons between areas; the need to validate remote measures of the environment; and the existence of individual level confounders such as age or social class. These issues need to be borne in mind when attempting to draw any conclusions about the links between the environment and behaviour, and may be even more important when considering health outcomes.

There are potential problems with accessing the data for environmental studies: many of the datasets included in this briefing paper may be difficult to access, some are expensive, and they may require specific software and/or training. Some secondary data sources may not have been validated and so may introduce bias. It is also important to consider some of the surveys that have recently been stopped or are being considered for modifications. It is vital to make the case for retaining some of the key environmental measures in these surveys so that their influence on behaviour can be studied. Only through taking a consistent and long-term approach to measurement can we reliably hope to understand the influence of the environment on obesity and its determinants.

Appendix

Specific survey questions with relevance to the environment for physical activity and eating behaviours

Survey	Questions on the environment relevant to physical activity
Place Survey	Which of these things do you think are most important in making somewhere a good place to live? • Access to nature • Activities for teenagers • Community activities • Facilities for young children • Health services • The level of traffic congestion • Parks and open spaces • Public transport • Road and pavement repairs • Shopping facilities • Sports and leisure facilities Which of these things do you think most needs improving in your local area? • Access to nature • Activities for teenagers • Community activities • Facilities for young children • Health services • The level of traffic congestion • Parks and open spaces • Public transport • Road and pavement repairs • Shopping facilities • Sports and leisure facilities Overall how satisfied are you with your local area as a place to live? How satisfied or dissatisfied are you with your home as a place to live? How satisfied or dissatisfied are you with the following services? • Local transport information • Local bus services • Sport/leisure facilities • Parks and open spaces How frequently have you used the following services? • Local transport information • Local bus services • Sport/leisure facilities • Parks and open spaces

Health Survey for England 2007	Which of these would you like to go to that you don't at the moment? • Local park or playground • Swimming pool • Sports club or class • Gym • Residential course e.g. outward bound Overall what do you think of the activities and things to do in your area? In the last four weeks, have you participated in any group activity outside school lessons? Which of these things have you been to in the last four weeks? • Local park or playground • Swimming pool • Sports club or class • Gym • Residential course e.g. outward bound What do you think of your local area as a place to live? Which of these things would do the most to make your area a better place to live? • Better shops • Better sports clubs or centres • Better public transport • Better activities for children and young people • Better parks and play areas What do you think of the parks and play areas in your area?
ONS Omnibus Survey	**Sept 2004** How important is it for wider activities to be possible in public spaces in your area? How important is it that children can play safely in your street? What physical qualities are important to you when choosing a place to live? • Good general environment • Low levels of traffic on the street • Low speeds of traffic on the street • Good public transport • Well maintained • Wide pavements • Pleasant areas to walk • Feeling safe when walking around • Good parking facilities • Good facilities for cyclists
Tell Us (children aged 11–14)	Which of these, if any, would you like to go to that you don't at the moment? • Local park or playground

- Swimming pool (not in school lessons)
- Sports club or class (where I've done sport not just watched it)
- Gym

Overall, what do you think of the activities and things to do in your area?

- Very good
- Fairly good
- Neither good nor poor
- Fairly poor
- Very poor
- Don't know

Which of these things have you been to in the last four weeks?

- Local park or playground
- Swimming pool
- Sports club or class (where I've done sport not just watched it)
- Gym

What do you think of the parks and play areas in your area?

- Very good
- Fairly good
- Neither good nor poor
- Fairly poor
- Very poor
- Don't know

In the last 7 days, on how many days have you spent at least 30 minutes (Tick one option only) doing sports or other active things?

- None
- 1–2 days
- 3–5 days
- 6–7 days
- Don't know

Survey	Questions on the environment relevant to dietary behaviours
Low income diet and nutrition survey	Does your household have a kitchen or dedicated food preparation and cooking area? Are you able to cook a hot meal in this accommodation? Which, if any, of these items do you have regular access to? • Fridge • Freezer • Microwave oven • A gas or electric hob • An oven If yes, do these items work properly? Do you feel that your food storage facilities are adequate? In what way are they not adequate? Does the face that your storage facilities are inadequate influence your food shopping? If so, how? Why don't you currently eat as much organic food as you would like? • Can't afford it/too expensive • Don't know where to buy it/the shops I go to don't sell it • Other Do you grow your own fruit and vegetables at all, either in your garden or on an allotment? If yes, what do you grow? Do you ever eat any 'free foods' such as fish, berries, mushrooms not grown at home? What free foods do you eat? Does anyone give or make you food free of charge? If so who? Do you keep hens or other animals to provide you with food? What kinds of food do these animals provide? Does your child's school provide meals? Does your child ever have these meals? Is there an outlet in your child's school where pupils can buy snacks or drinks? Does your child ever buy snacks or drinks from this outlet? Does your child receive any of the following? • Free school meal (at lunchtime) • Reduced price or subsidised school meal (at lunchtime) • Free school milk

- Subsidised school milk
- Free vitamin tablets (under 5s)
- Free fruit
- Milk tokens (under 5s)
- Free food before school
- Free food after school

Is your child entitled to free school meals at lunchtime?

Why does your child not take up their free school meals?

- Prefer to come home
- Doesn't like school meals
- Prefers packed lunch
- Dietary reasons
- Cultural/religious reasons
- Peer pressure/stigma
- Other

On average, how many times per week does your child have a free school meal at lunchtime?

Why does your child not take up all their free school meals at lunchtime?

- Prefer to come home
- Doesn't like school meals
- Prefers packed lunch
- Dietary reasons
- Cultural/religious reasons
- Peer pressure/stigma
- Other

On average, how many timnes per week does your child have free school meals before school?

On average, how many times per week does your child have free school meals after school?

What does your child do about lunch when they are not at school?

- Eats at home
- Eats at a relative's home
- Eats at a friend/neighbour's home
- Takes a packed lunch from home
- Buys lunch from a shop/café
- Goes without lunch
- Other

How many pints of milk per week does your child get in exchange for milk tokens?

Do you eat with friends or relatives on a regular basis, either at home or in their home?

Do you go out to eat with friends or relatives, or on your own?

How often do you eat out with friends or relatives?

How often do you eat out on your own?

Is there anywhere else outside your home where you regularly meet and eat with other people?

If yes, where?

- Work/school/college
- Community/day centre
- Other

Do you receive meals on wheels?

How often do you receive meals on wheels?

Does an illness or disability limit you or prevent you from shopping?

How are you limited or prevented from shopping?

- Difficulties with walking
- Problems with sight
- Cannot carry heavy shopping
- Get tired easily
- Other

When you have unexpected expenses, does this affect how much money you have to spend on food?

What do you do when this happens?

- Only buy essential items
- Buy fewer or selected items
- Buy cheaper brands/reduced items
- Go without
- Borrow from family
- Borrow from friends
- Seek (additional) credit
- Other

What would be the major difficulties for you in eating more healthily

What would be the greatest difficulty?

Can you afford to eat as much fresh food as you want?

Can you afford to give your children as much fresh food as you want to?

Which of these statements best describes the food eaten by you or your household in the last 12 months?

- There is enough of the kinds of foods I want to eat
- There is enough food, but not always the kind of food I want to eat
- Sometimes I don't have enough food to eat
- Often I don't have enough food to eat

	Which, if any, of these are reasons why you don't always have enough to eat?
	- Not enough money for food - Not enough time for shopping or cooking - It's too hard to get to the shops because of health problems - It's too hard to get to the shops because of lack of transport - The shops are too far away - Lack of working cooker or microwave - Lack of equipment e.g. sharp knives, pots and pans - Difficulties cooking or eating because of a health problem - Lack of storage facilities - On a diet for health or medical reasons or other special eating habits - Any other reason Which, if any, of these are reasons why you don't always have the quality or variety of foods you would like? - Not enough money - Not enough time for shopping - Not enough time for cooking - Not available in local shops - Not available at work - It's too hard to get to the shops (health problems) - It's too hard to get to the shops (transport) - It's too hard to get to the shops with the children - The shops I can afford to go to don't sell a wide variety of foods - The shops I can afford to go to don't sell good quality foods - These kinds of foods get eaten too quickly - Lack of cooking facilities - Lack of storage facilities - Difficulty preparing or cooking meals - Not knowing how to cook different foods/meals Which is the most important reason? Are there ever times when you do not have enough food to eat because you can't get to the shops? If yes, how often does this happen? Do you ever worry that your food will run out because you do not have enough money to buy more? If yes, how often does this happen?
Health Survey for England 2007	What would stop you making improvements to the way you eat? - Don't like healthy foods - Doesn't satisfy hunger - Don't want to change eating habits - Lack of motivation - I eat what I'm given - No healthy options at home - No healthy options at school

Consumer Attitudes Survey	How much do you agree or disagree with the following statements? • It's too expensive to cook healthy meals • I find it difficult to know if a product is healthy from the labelling • I would like to have more information about the food that I buy • Even if you are on a limited budget you can still eat healthily
Living Costs and Food Survey (previously EFS)	Have you or any of your children had any free welfare milk during the last 7 days? If yes: Who received the milk? How many pints did they receive during the last 7 days? Have any of your children had any free school milk in the last 7 days? Who received the milk? How many cartons/bottles did they receive in the last 7 days? Have any of your children had any free fruit at school or nursery in the last 7 days? Have any of your children had any meals at a state school in the last 7 days? How many meals did they have? Were the meals free? Have you or anyone in your household received meals on wheels in the last 7 days? Who received the meals? How many meals did they receive? Were the meals free?
ONS Omnibus Survey	**April 2004** Concern has been expressed about the amount of fat, sugar and salt that children consume and the risks to their health that can result from such a diet – for example, from obesity. For you, which of the following best expresses your view on what should happen? Please state whether you agree strongly, agree, neither agree nor disagree, disagree, strongly disagree, or don't know to the following statements: • There should be no advertising for fast foods, sweets and soft drinks during children's TV viewing time • Schools should be used to control access to what children eat • Children and their parents should be provided with information about food and its consequences
Tell Us (children aged 11–14)	Do you have free school meals? How helpful is the information and advice you get in school on healthy food and lifestyles? • Helpful • Not helpful

- Don't know
- Haven't received any

OPTIONAL QUESTIONS

How often do you eat takeaway food?

- Everyday
- Sometimes
- Never
- Not sure

What do you eat for lunch on most days at school?

- Packed lunch
- School meals
- Food bought from elsewhere
- Nothing to eat

References

1. International Obesity Task Force. *The Global Epidemic*. 2008; Available from: www.iotf.org/globalepidemic.asp.

2. Butland B, Jebb S, Kopelman P, McPherson K, Thomas S, Mardell J, et al. Tackling obesities: future choices – project report. HMSO. London 2007.

3. Giskes K, van Lenthe F, Avendano-Pabon M, Brug J. A systematic review of environmental factors and obesogenic dietary intakes among adults: are we getting closer to understanding obesogenic environments? *Obes Rev.* 2010. no. doi: 10.1111/j.1467–789X.2010.00769.x

4. Swinburn B, Egger G. Preventive strategies against weight gain and obesity. *Obes Rev.* 2002 Nov;3(4):289–301.

5. National Institute for Health and Clinical Excellence. Promoting and creating built or natural environments that encourage and support physical activity. London: NICE. 2008.

6. Sallis J, Bauman A, Pratt M. Environmental and policy interventions to promote physical activity. *Am J Prev Med.* 1998 Nov;15(4):379–97.

7. Foster C, Hillsdon M. Changing the environment to promote health-enhancing physical activity. *J Sports Sci.* 2004 Aug;22(8):755–69.

8. Frank LD, Saelens BE, Powell KE, Chapman JE. Stepping towards causation: do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity? *Soc Sci Med.* 2007 Nov;65(9):1898–914.

9. Franzini L, Elliott MN, Cuccaro P, Schuster M, Gilliland MJ, Grunbaum JA, et al. Influences of physical and social neighborhood environments on children's physical activity and obesity. *Am J Public Health* 2009 Feb;99(2):271–8.

10. Bauman A, Bull F. Environmental Correlates of Physical Activity and Walking: a review of reviews. London: National Institute of Health and Clinical Excellence; 2007.

11. Dunton GF, Kaplan J, Wolch J, Jerrett M, Reynolds KD. Physical environmental correlates of childhood obesity: a systematic review. *Obes Rev.* 2009 Jul;10(4):393–402.

12. Hill JO, Peters JC. Environmental contributions to the obesity epidemic. *Science* 1998 May;280(5368):1371–4.

13. Townshend T, Lake A. Obesogenic urban form: theory, policy and practice. *Health & Place* 2009 Dec;15(4):909–16.

14. Black JL, Macinko J (2008). Neighborhoods and obesity. *Nutrition Reviews* 66 (1), 2–20.

15. Glanz K, Sallis JF, Saelens BE, Frank LD. Healthy nutrition environments: concepts and measures. *Am J Health Promot.* 2005 May-Jun;19(5):330–3, ii.

16. Drewnowski A, Darmon N. Food choices and diet costs: an economic analysis. *J Nutr.* 2005;135(4):900–4.

17. Faith MS, Fontaine KR, Baskin ML, Allison DB. Toward the reduction of population obesity: macrolevel environmental approaches to the problems of food, eating, and obesity. *Psychol Bull.* 2007 Mar;133(2):205–26.

18. Zenk, S. N., Schulz, A. J., & Odoms-Young, A. M. (2009). How neighborhood environments contribute to obesity. *Am J Nurs, 109*(7), 61–64.

19. Glanz K, Sallis JF, Saelens BE, Frank LD. Nutrition Environment Measures Survey in stores (NEMS-S): development and evaluation. *Am J Prev Med. Netherlands* 2007Apr;32(4):282–9.

20. Rundle AG, Bader MD, Richards CA, Neckerman KM, Teitler JO. Using Google Street View to audit neighborhood environments. *Am J Prev Med. Netherlands* 2011 Jan;40(1):94–100.

21. Timperio A, Salmon J, Telford A, Crawford D. Perceptions of local neighbourhood environments and their relationship to childhood overweight and obesity. *Int J Obes (Lond).* 2005 Feb;29(2):170–5.

22. Chow CK, Lock K, Teo K, Subramanian SV, McKee M, Yusuf S. Environmental and societal influences acting on cardiovascular risk factors and disease at a population level: a review. *Int J Epidemiol.* England 2009. p. 1580–94.

23. Foster C, Hillsdon M, Thorogood M. Environmental perceptions and walking in English adults. *J Epidemiol Community Health* England 2004. p. 924–8.

24. Active Living Research. Building the Evidence to prevent childhood obesity and support active communities. 2010 [1 Aug 2010]; Available from: http://www.activelivingresearch.org/.

25. Leslie E, Coffee N, Frank L, Owen N, Bauman A, Hugo G. Walkability of local communities: using geographic information systems to objectively assess relevant environmental attributes. *Health & Place* 2007 Mar;13(1):111–22.

26. Frank LD, Andresen MA, Schmid TL. Obesity relationships with community design, physical activity, and time spent in cars. *Am J Prev Med.* Netherlands 2004. p. 87–96.

27. Feng J, Glass TA, Curriero FC, Stewart WF, Schwartz BS. The built environment and obesity: a systematic review of the epidemiologic evidence. *Health & Place* 2010 Mar;16(2):175–90.

28. Lake A, Townshend T, Alvanides S. Obesogenic environments:complexities, perceptions and objective measures. Oxford: Blackwell; 2010.

29. Holding, J., Carr, J and Rawlings, L. Food Statistics Pocketbook 2010. York: Department for the Environment, Food and Rural Affairs; 2010.

30. Education (Nutritional Standards for School Lunches) (England) Regulations 2000. Online. [accessed February 2010] http://www.defra.gov.uk/evidence/statistics/foodfarm/food/pocketstats/documents/foodpocketbook2010.pdf

31. Burgoine T. Collecting accurate secondary foodscape data: A reflection on the trials and tribulations. *Appetite* 2010 Sep.

32. Cummins S, Macintyre S. Are secondary data sources on the neighbourhood food environment accurate? Case-study in Glasgow, UK. *Prev Med. United States* 2009. p. 527–8.

33. Lake A, Burgoine T, Greenhalgh F, Stamp E, Tyrrell R. The foodscape: classification and field validation of secondary data sources. *Health & Place* 2010 Jul;16(4):666–73.

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